Malta Resources Authority

Annual Report 2006 - 2007

MALTA RESOURCES AUTHORITY

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The Authority

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Mission Statement

The Malta Resources Authority seeks to serve the Maltese community through effective, coherent, holistic and transparent regulation of the energy, minerals and water resource sectors of the economy, ensuring their advancement and sustainable use to support the integrated environmental, social, economic and business development in the Maltese Islands. It further seeks to contribute to and participate in ongoing regional development and assist in the nation's efforts to fulfil its international obligations in these spheres.

Foreword by the Chairman

On behalf of my fellow members of the Board, it is my pleasure to report on the work carried out by the Authority and it's achievements in 2006-2007.

During the twelve months ending on 30th September 2007, the Authority had another eventful year. The Authority continued to play an important role in the economic development and sustainable management of energy, water and mineral resources of the Maltese islands. It has seen the Authority continue to develop and mature with a clearer sense of focus. Our role as regulator for the energy, minerals and water sectors in Malta, requires us to maintain a level playing field, whilst ensuring transparency, fairness and equitability in dealing with the regulated operators and safeguarding the interests of their customers.

During this past year we saw the amendments to the Malta Resources Authority Act being enacted by our Parliament. These amendments widened the powers of the Authority and clarified certain articles of the MRA Act. These amendments also formalised the addition of some new functions to the Authority's responsibilities namely the promotion of efficient use of resources in regulated sectors; the promotion of consumer rights and other users in Malta, particularly vulnerable consumers, especially in respect of the prices, quality and variety of services; and the determination of disputes in relation to matters regulated by our Authority. Our Board welcomed these amendments which brought about the addition of functions, whilst acknowledging the additional responsibilities and duties that these bring with them. In particular I believe that the protection of consumers, and especially the vulnerable consumers, requires us to be more attentive, effective and focused in our intervention especially in those areas where the market can fail. The scenario of increasing oil prices is potentially one such example. In such circumstances, the Board considered that government intervention and regulatory solutions may be warranted especially to prevent situations of energy and water poverty.

Sustainability and competitiveness issues lie at the core of our mission in regulating the energy, water and mineral resources.. At the Board level we have consistently sought to interpret our functions and responsibilities with a deep sense of impartiality and fairness, whilst promoting sustainability and competitiveness across the three regulated sectors. I believe that amongst our strategic priorities, we need to identify in greater detail our stakeholders' priorities and concerns and especially those of the regulated operators and their customers. By recognising and addressing these priorities and concerns we can continue to deliver a better service to them as well as inspire greater trust in the Authority.

During the year, the Authority continued to support Government in its relations with the EU in matters related to water and energy. Particular attention was paid to renewable energy exploitation and energy efficiency. I am pleased to report that the Authority played a leading role in developing a national energy efficiency action plan and in assessing the potential of deepwater offshore wind energy on behalf of the Government.

We continued with our advisory role to Government on the liberalisation of the inland fuel market. We recognise that the liberalisation process and the issue of the Government Policy including the legal framework and licence conditions has been delayed and is long overdue. This delay was the result of longer periods of consultation with all the stakeholders. Government has finalised its policy during the summer months and liberalisation will kick off on the 1st October 2008. Our Board, augurs that potential players will take an active role in the liberalised local fuel market, for the ultimate benefit of the end consumer.

We are the first to realise that there is more that needs to be done. We need more human resources, with specialisation in various professions and more funding to enable us to execute our functions and duties more effectively.

I look forward to continue working with my colleagues and members of the Authority, the Chief Executive Officer and the Authority's employees in our regulatory role for the benefit of the Maltese community. I thank each of them for the commitment and initiative that they have shown throughout the year.

Austin Walker

Chairman

Chief Executive Officer's Introduction

It is my pleasure to introduce this 6th annual report of the Malta Resources Authority that describes the main activities and endeavours undertaken between October 2006 and September 2007.

Climate change continues to be a major challenge to our society. As the regulator for energy resources, the Authority has an important contribution in shaping the country's response to this major challenge of this century. In March this year, the European Council agreed on a new and ambitious energy package for Europe. The European Union has committed itself to at least a 20% reduction in greenhouse gas emissions by 2020 compared to 1990 levels. Malta will need to carry its fair share of this commitment and the obligations that these bring with them. This can only be effectively achieved by a concerted effort and contribution from all sectors of our society. This includes primarily a clear understanding of the make up of our energy demand, and our carbon footprint, followed by working out achievable goals and targets for reducing this energy demand and associated emissions as well as increasing the penetration of renewable energy sources in the country, in agreement with the European Commission.

During this past year we were entrusted by Government with the responsibility to introduce and administer a financial support scheme for the promotion of energy efficient domestic appliances. This scheme turned out to be very successful. We have noted that the introduction of this scheme brought with it a significant market shift in the supply of energy efficient appliances in the Maltese market. This shift will bring with it a positive contribution towards the reduction of national energy demand.

In the introduction to last year's report, I noted that amongst the major challenges that we were facing in the regulated sectors was the liberalisation process of the inland fuel market. This process continued in earnest during this year, taking up significant attention and dedication of our resources. The legislative and regulatory frameworks have been largely completed and we hope that this will be introduced in an efficient manner over the coming weeks.

In the water sector, the highlight of our work is the implementation of the Water Framework Directive, which will lead to the sustainable management and protection of water resources. We are actively developing the Authority's knowledge base on water resources and the associated anthropogenic impacts on these resources. We are noting increasing trends in nitrate and chloride concentrations in groundwater. A major challenge in this area is the need for a greater shift towards more sustainable practices in all sectors: domestic, agriculture, industry and tourism such that the qualitative and quantitative status of groundwater is improved and protected. To address this we need to make judicious use of command and control instruments, economic instruments as well as educational measures. Furthermore we also need to strike the right balance between the short term and longer term measures. Equally

important is the need to ensure that our regulation is properly and appropriately targeted to prevent that compliance costs outweigh the benefits obtained.

An important legislative amendment to the Malta Resources Authority Act was introduced during this year. This amendment strengthened the Authority's powers whilst addressing previous lacunae which had been noted in the Authority's founding Act.

We have continued to adopt a disciplined approach in our management of the Authority, with very strict attention being given to value for money and efficiency in our activities. I invite you to read this annual report to gain a clearer view of the challenges facing the energy, minerals and water resources sectors in Malta, and our achievements and shortcomings in addressing these challenges during the past 12 month period.

As can be judged from this and previous reports, the tasks facing the Authority are extensive. Energy and resources in general have become more and more critical from all aspects. Security of supply, environmental, social and financial issues have come to the forefront of local and international discussion. To meet its obligations successfully and to be of maximum service to the Community requires the Authority to continue to keep its knowledge base up-to-date and improving. This means continual investment in its staff – both in terms of sufficiency in numbers and professional disciplines, but also in their training and specialisation. Already much has been done through EU-funded instruments such as TAIEX and Twinning programmes, but also through its own funding. We hope to be able to continue along this path, accelerating our endeavours and increasing our focus as we go forward.

I am pleased to record the efforts of the staff of the Authority, exceeding expectations in many cases. I also feel it is proper to thank the Chairman and Members of the Authority for their understanding, advice and direction.

Antoine Riolo

Chief Executive Officer

Chapter 1

Corporate Issues

The Malta Resources Authority is the regulator of energy, minerals and water resources in the Maltese Islands. The Authority was established by the Malta Resources Authority Act XXV of 2000.

This annual report covers the period 1st October 2006 to 30th September 2007 and outlines the major activities implemented during this period.

Corporate Matters

Amendments to the MRA Act

During the year the Malta Resources Authority Act was amended. A number of new definitions and concepts have been introduced by this amendment legislation including:

- the introduction of the concept of "authorisation",
- the new definition for "authorised provider",
- a definition for "decision" which includes any determination, measure, order, requirement or specification however so described made by the Authority and the word "decision" shall be construed accordingly"; and
- a definition for "directive" which means a directive issued by the Authority in accordance with the procedures as prescribed by regulations made under this Act.

Article 4 of the MRA Act relating to the functions of the Authority was amended and new functions were added to the remit of the Authority including:

- the promotion of the efficient use of resources;
- the promotion of the interests of consumers and other users in Malta, particularly vulnerable consumers, especially in respect of the prices charged for, and the quality and variety of the services and, or products regulated by the MRA Act;
- determination of disputes in relation to matters regulated by or under this MRA Act.

In addition the Minister is responsible to authorise the Authority to carry out such functions in terms and for the purposes of the Petroleum (Production) Act. The Prime Minister will continue to authorise, the MRA, in terms and for the purposes of the Continental Shelf Act.

The functions of the Authority with respect to information gathering powers for the purpose of ensuring compliance with the provisions of the Act have been further strengthened by the amendment Act.

Article 26 of the MRA Act has been amended and the Minister of Resources may issue authorisations in relation to the exploration and production of hydrocarbons, instead of the Prime Minister.

Article 28 (2) of the MRA Act has been amended with the introduction of various sub articles, the main amendments including:

- Sub article (a) which refers to any aspect relating to the procedure and conditions that may be imposed in relation to any authorisation.
- Sub article (b) which enables the issue of legal notices in relation to Public Service Obligations.
- Sub article (c) which introduces regulation of tariffs by means of the publication of legal notices by the Minister of Resources. The introduction

of price mark-up mechanisms is in line with Government policy regarding the liberalisation of the inland fuel market.

- Sub article (g) which enables the issue of regulations in regard to a Customer Service Charter.
- Sub article (h) which widens the scope to include all resources instead of energy resources only.
- Sub article (o) which strengthens the Authority's functions in its information-gathering powers. This has been considered necessary due to the impending liberalisation of the fuel market, where effective regulation requires gathering all relevant data from existing and any new operators present in the fuel market.
- Sub article (q) which introduces and puts into effect the "polluter pays principle". This is also contemplated by the Water Framework Directive (paragraph (38) of Preamble, Article 9 (1) of the Water Framework Directive).
- Sub article (r) which extends contingency planning for crises situations to all resources instead of to energy only.
- Sub article (s) which enables the publication of regulations with respect to complaint processing procedures to be implemented by an authorised provider and for the resolution of disputes and complaints-handling.
- Sub article (t) which permits the publication of regulations with respect to administrative fines.
- Sub article (u) which enables the issue of regulations that promote and facilitate cooperation between the MRA and other authorities. This will also put on a sounder legal footing the interaction between the MRA and other authorities.
- Sub article (v) which enables the introduction of regulations on the procedures and fees in relation to the Resources Appeals Board.
- Sub article (w) in relation to the Authority's new dispute resolution function. This function is also contemplated in Directive 2003/54/EC (see Art.23 (5)), Electricity Directive).
- Sub article (x) which provides for more specific enforcement powers (and rules as to their limits) may be issued in the future by means of regulations.

Articles 30 and 31 of the MRA Act relating to powers of entry and for the issuing of regulations prescribing penalties for offences against the Act have been deleted and have been replaced and expanded by the new articles 30 and 32. These articles increase the Authority's powers of entry with regards to regulation of energy, water and mineral resources whereas previously these were limited only to water resources. The Authority's enforcement powers have also been extended to include inspections and testing, measuring, lifting of samples or generally, to ascertain that nothing contrary to the provisions of the MRA Act is committed.

Specific penalties have also been provided for, in case of obstructions or impediments created to officers or employees of the MRA in the exercise of their duty under this article. A new article (article 31) allows for the issuing of administrative fines in the case of administrative infringements, instead of the Authority having recourse only and directly to criminal offences for infringements of the Act or regulations prescribed thereunder.

The parameters by which, and within which, administrative fines are imposed will be specified in a legal notice to be published under the MRA Act.

The previous article 31 relating to the power of the Minister to make regulations in relation to criminal offences was overhauled and new penalties were introduced.

In a new article to the renumbered article 34, the Appeals Board may confirm, annul or

vary the decision appealed from, in whole or in part. The Resources Appeals Board has wider latitude when disposing of an appeal.

Article 38 was introduced regarding the exemption from liability of members, officers and employees of the Authority in the performance of their functions and while acting in good faith. This exemption is similar to provisions found in other statutes establishing other authorities, e.g. Malta Financial Services Authority Act, Occupational Health and Safety Act, Consumer Affairs Act and Malta Communications Authority Act.

Other Legislation

During the year a series of legal notices were published under the Malta Resources Authority Act as follows. These include:

Minimum Requirements on the Energy Performance in Buildings Regulations, 2006 (LN 238/2006). These regulations establish that the Minimum Requirements on the Energy Performance of Buildings referred to as "Technical Guidance Document F" notified in the Government Gazette, started to be applied to new buildings and existing buildings that undergo major renovation or alteration, whose building permit applications in terms of regulation 3(1) of the Development Permission (Method of Application) Regulations, 1992, is received by the Malta Environment and Planning Authority on or after the 2nd January, 2007.

Natural Gas (Safeguard of Security) Regulations L.N. 317 of 2006. These regulations establish rules relating to the safeguarding of an adequate level of security of gas supply in the natural gas sector and give effect to Directive 2004/67/EC of 26 April, 2004.

Cogeneration Regulations, 2007 L.N. 2 of 2007. These regulations give effect to Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 94/42/EEC.

Electricity (Amendment) Regulations, 2007 L.N. 17 of 2007 which amend the Electricity Regulations, 2004 (L.N. 511 of 2004).
In addition a series of draft regulations were also prepared for Government's consideration. These included:

- Quality of Fuels Regulations;
- Administrative Infringements Regulations;
- Authorisations Regulations;
- Consultation and cooperation with other Authorities Regulations;
- Dispute Resolution (Procedures) Regulations;
- Enforcement Powers Regulations;
- Delegation to the Verification Body (Metrology at Petroleum Filling Stations) Regulations.

Human Resources

In the year under review, a new collective agreement covering the Authority's clerical grades for the period 2007 to 2010 was concluded with the help of the Collective Bargaining Unit (CBU). This agreement followed on the structure of the previous agreement, which had covered the previous four years to the end of 2006 and had been the first for the Authority. The new agreement incorporated all improved conditions of employment as exercised and implemented across the board within the wider public sector. This resulted in very substantial favourable conditions of work as well as substantial monetary increases to the Authority's clerical complement. Following the practiced policy for the wider public sector, a

substantial number of the improved working conditions referred to above were automatically applied to all of the Authority's existing employee contracts.

During the reporting period, the Authority set in motion the procedures and relative documents necessary to augment its staffing complement in order for it to manage effectively the onerous brief entrusted to it. A consultancy firm was engaged for the purpose of the preparation of a "Manpower needs" report, which was effectively completed towards the middle of the reporting period. Although much effort had been expanded to achieve the desired staff levels outlined in this and other reports, and despite monetary constraints, some progress had been registered by the end of the reporting period.

No stone was left unturned to seize all opportunities presenting themselves to enhance the Authority's manpower's technical knowledge, especially involving overseas training and site visits at comparable authorities within the EU. As is the practice within the public sector, these opportunities was fully availed of in order to train as fully as possible the staff complement by intermingling and networking with their counterparts across the EU. Naturally, although not to the same extent, similar training, and site visits were reciprocated by the Authority to comparable organisations within the EU.

Awareness to health and safety programmes was diffused amongst the Authority's personnel and every endeavour was made to maintain conditions and practices that enable work to be performed safely and to create the best possible working environment. In addition, a practical approach was favoured towards educating employees in water and energy conservation, by effectively marking each light switch and water tap with "green" sticker reminders to "switch off" or "turn off."

Licensing

During the previous reporting year, the Licensing section had passed under the responsibility of the new Head of Accounts and Administration, who maintained the same staff complement as in previous years.

In addition to the section's routine license collection activity, the following three activities were undertaken:

a. Priority was given to the continued development, initiated in June 2004, of the new, outsourced, licensing software program. This programme was intended to resolve the following, existing concerns:
   - Establish a secure, electronic database containing comprehensive details of licensees, and their respective licenses, in particular as to their state of activity and/or condition at a particular moment in time.
   - Simplify, integrate, and digitalise the clerical process concerning activity initiated by the Authority, with particular emphasis on settlement requests, receipt processing, and/or subsequent necessary action if any.
   - Provide an accurate database and value of outstanding unpaid licenses at any one time.
   - Make available accurate figures and information to officials so authorised to review by the Authority.
   - Prepare any relevant licensing forms, and take any other required action in connection with the introduction of the Euro.
   - The afore-mentioned activity resulted in the near completion and comprehensive dry run testing of the new Licensing software program.

b. A renewed effort was undertaken to collect outstanding license fees by conducting the following actions:

- Additional, mid year printed settlement requests were issued to non-performing licensees in conjunction with telephonic follow-ups where possible.
- Legal letters were issued to certain licensees that had defaulted over a long time. In certain cases, these letters were followed up with further concrete action, with positive results in some instances.

Both these actions achieved their desired effect and resulted in an above average collection of older outstanding balances owned by defaulting licensees. It was decided to undertake and extend these actions in future.

c. Intensive efforts were made to answer, resolve, and conclude a percentage of the queries raised by licensees and/or potential licensees with regard to their liability real or perceived for any license fees due.

Mostly these concerned difficulties arose from the following factors:

- The imprecise transfer of swimming pool licenses files from the WSC, and subsequent integration into the Authority's records.
- The state of construction of certain swimming pools, had the subject of the license been a swimming pool.
- The ambiguity of the wording used in the relevant prevailing legal notices and their interpretation in particular "operate and use" in the case of swimming pools.

Energy Efficient Appliances Scheme

Without doubt, the major upheaval to the normal work processes within the Authority's corporate section during the year was the introduction of the "Energy Efficient Appliances Scheme." This scheme, effective from November 2006, and still in operation at period's end, rewarded consumers with a varying monetary rebate calculated for different, qualifying, efficient domestic appliances.

The scheme's operation necessitated the employment and full office support for new support service personnel to be engaged in the processing and settling of the rebates contemplated within the Legal Notice setting up this scheme. During the initial months, work relating to this scheme was performed by the Authority's full time clerical complement. Subsequently, new service providers were sourced from private recruitment agencies, who later were engaged on a rolling contract basis as individual service providers, thus replacing the recruitment agencies.

Without doubt, this influx of inexperienced personnel coupled with an above average number of student workers recruited for the scheme, together with the scheme's initial setting up problems put a strain on the normally smooth operations of the section, which however still managed to issue and deliver around 12,600 cheques by the end of this reporting period.

Customer Care

The Quality Management System embarked on within the previous reporting period was seen as requiring further refining in order to be considered an effective tool to help the Authority perform its functions, in particular those dealing with customer care. In fact, the services of a call centre were engaged to provide answers and

suggest solutions to queries arising from the public concerning energy and water conservation issues and best use of renewable resources. This service, whose effectiveness was still being evaluated by the Authority, was in operation even after this reporting period's end.

In accordance with the Authority's customer care policy, the Authority's website was kept continuously updated with documents meant for public consultation. This included feedback meant to widen discussion on matters relating to the Authority's main brief and simultaneously incorporated subject matter and data relating to projects undertaken in conjunction with the EU. The opportunity afforded by the website was taken to give full exposure to available vacancies within the Authority as well as having all tender documents posted therein that involved all the Authority's directorates.

Chapter 2

Participation in EU Affairs

Technical support with respect to EU legislative process

EU Energy Package

In March 2007, the European Council agreed on a new energy package for Europe. The main objective of this energy package is an EU commitment to achieve, at least a 20% reduction of greenhouse gases by 2020 compared to 1990. The contribution of each Member State to achieving the Union's target will need to take into account different national circumstances and starting points, including the nature of their energy mix.

To achieve this commitment the EU has identified 3 targets to be attained by 2020 namely:

(i) improvement in energy efficiency by 20%;

(ii) raising the share of renewable energy in the energy mix to 20%. From the overall renewables target, differentiated national overall targets should be derived with Member States' full involvement with due regard to a fair and adequate allocation taking account of different national starting points and potentials, including the existing level of renewable energies and energy mix;

(iii) increasing the use of biofuels in transport fuel to 10% to be achieved by all Member States.

The national targets for the share of renewable energy sources in final energy consumption in 2020 have still to be formally established.

The point of departure for a European energy policy is threefold: combating climate change, promoting jobs and growth, and limiting the EU's external vulnerability to gas and oil imports.

The mainstay of the new policy is a core energy objective for Europe: that the EU should reduce greenhouse gas emissions from its energy consumption by 20% by 2020. This objective will enable the EU to measure progress in re-directing today's energy economy towards one that will fully meet the challenges of sustainability, competitiveness and security of supply.

The concern was not only about climate change, it was also about Europe's security of energy supply, economy and the wellbeing of its citizens. Even without climate change, there was every reason to take the steps proposed by the European Commission. The Commission considered that achieving the objective limits the EU's growing exposure to increased volatility and prices for oil and gas, bring about a more competitive EU energy market, and stimulate technology and jobs.

To achieve this objective, the Commission also proposed to focus on a number of energy related measures: improving energy efficiency; raising the share of renewable energy in the energy mix, as well as new measures to ensure that the benefits of the internal energy market reach everyone; reinforcing solidarity among Member States, with a more long term vision for energy technology development, a renewed focus on nuclear safety and security, and determined efforts for the EU to "speak with one voice" with its international partners, including energy producers, energy importers and developing countries.

The Review included a ten-point energy Action Plan with a timetable of measures to put the EU on course to achieve the new strategic objective. A first package of measures was presented with the Action Plan. This included:

- a report on the implementation by the Member States of the internal market of gas and electricity as well as the results of an enquiry of the state of competition in these two sectors;
- a Plan of for Priority Interconnections in the electricity and gas networks of the Member States so that a European grid becomes a reality;
- proposals to promote sustainable power generation from fossil fuels;
- a roadmap and other initiatives to promote renewables, notably biofuels for transport;
- an analysis of the situation of nuclear energy in Europe;
- a work sheet for a future European Energy Strategic Technology Plan.

The Energy Efficiency Action Plan which the Commission adopted on 19 October 2006 also formed part of the Action Plan. The Commission's Communication "Limiting Climate Change to 2° - Policy Options for the EU and the world for 2020 and beyond" and the Strategic Review complement and reinforce each other.

In March 2007, the European Council agreed on the targets of 20% energy by 2020 from renewable sources of energy on an EU basis. The Council also agreed on a binding 10% national target for biofuels by 2020. A further energy package was presented by the Commission in September 2007 with the aim of stimulating energy efficiency and guaranteeing that even smaller companies, for instance those that invest in renewable energy, have access to the energy market.

These proposals do not affect Malta directly since Malta has a small isolated system in electricity and has no natural gas.

Proposal for amendment to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels

Directive 98/70/EC which regulates the specification of petrol, diesel and gas oil is being amended. Officers of the Directorate for Energy Resources Regulation were required to review the amendments being suggested by the European Council and propose new amendments to the text.

Support to Government in its dealings with the European Union

Reporting to the EU Commission

EU Directive 2003/54 concerning common rules for the internal market in electricity

Directive 2003/54/EC requires the Authority to report on:

- Measures adopted to fulfil universal service and public service obligations, including consumer protection and environmental protection, and their possible effect on national and international competition, whether or not such measures require a derogation from this Directive;
- Security of supply issues. This monitoring shall, in particular, cover the supply/ demand balance on the national market, the level of expected future demand and envisaged additional capacity being planned or under construction, and the quality and level of maintenance of the networks, as well as measures to cover peak demand and to deal with shortfalls of one or more suppliers.
- Effective competition and the efficient functioning of the market, monitoring in particular:
  - the time taken by distribution undertakings to make connections and repairs;
  - the publication of appropriate information by distribution system

operators concerning interconnectors, grid usage and capacity allocation to interested parties, taking into account the need to treat non-aggregated information as commercially confidential;

- the effective unbundling of accounts as to ensure that there are no cross subsidies between generation, transmission, distribution and supply activities;
- the terms, conditions and tariffs for connecting new producers of electricity to guarantee that these are objective, transparent and non-discriminatory, in particular taking full account of the costs and benefits of the various renewable energy sources technologies, distributed generation and combined heat and power;
- the extent to which distribution system operators fulfil their tasks;
- the level of transparency and competition.

- Market dominance, predatory and anti competitive behaviour. This report shall, in addition, review the changing ownership patterns and any practical measures taken at national level to ensure a sufficient variety of market actors or practical measures taken to enhance interconnection and competition.

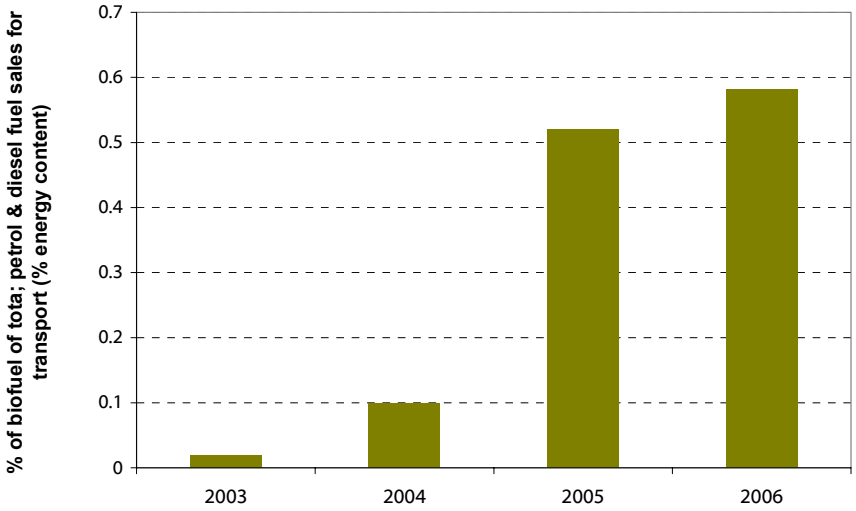
The Authority prepared a report to meet these requirements in the European-standard format.

Directive 2003/30/EC on the promotion of biofuels and other renewable fuels for transport

The Authority annually draws a report on the production and consumption of biofuel. This year's report also included a proposal for the national indicative target of the share of biofuels in the transport market for 2010. This target was set at 1.25% of the total petrol and diesel sales and was based on the following considerations:

- land and water resources scarcity for the production of energy crops used in biofuel production. It is envisaged that local biofuel production will still rely on such locally available raw material as waste cooking oil or imported vegetable oil;
- bio-ethanol production is not seen as a viable option, at least at the current conditions and the share of biofuel is, therefore, to be reached by the consumption of biodiesel alone;
- fossil fuel consumption is assumed to remain steady and the 1.25% target is calculated against the total fuel sales (energy content) of 2006;
- discussions with producers in Malta to see their views on what outputs are expected to be produced in 2010; and
- current petroleum storage and retailing infrastructure remaining unchanged.

Figure 1: Biofuels Use



As can be noted from Figure 1 the use of biofuels is ever more on the increase, both in Malta and in the EU. In 2006 biofuels in Malta accounted for 0.582% of total petrol and diesel sales.

EU Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market

Article 3 (3) of EU Directive 2001/77/EC requires Member States to publish a report every two years which includes an analysis of the success in meeting the national indicative targets taking into account, in particular, of climatic factors likely to affect the achievement of those targets and to indicate to what extent the measures taken are consistent with national climate change commitment.

During the year, a report was compiled and submitted to the Ministry for Resources and Infrastructure for Government's consideration on the implementation of this Directive. This report outlines the policy framework in place and the various measures undertaken that promote electricity generation from renewable energy in Malta.

Table 1: Gross National Electricity Consumption 2002 - 2006

	Gross national electricity consumption – MWh / annum
2002	1,973,451
2003	2,235,541
2004	2,216,103
2005	2,083,347
2006	2,261,189

Table 2: Electricity Generation from Renewable Energy Sources

		Solar photovoltaics	Micro-wind generating systems	Total RES-E
2005	Installation capacity (kW_p)	15	0	15
	Estimated electricity generated (MWh/annum)	23	0	23
2006	Installation capacity (kW_p)	58	0	58
	Estimated electricity generated (MWh/annum)	87	0	68
2007 (end October)	Installation capacity (kW_p)	80	4	84
	Estimated electricity generated (MWh/annum)	120	8	128

EU Directive 2004/8 on Combined Heat and Power (CHP)

As part of the implementation process of Directive 2004/8, on the promotion of cogeneration based on a useful heat demand in the internal energy market, the Commission set-up a Working Group to define the technical details on the calculation of efficiencies of CHP equipment. Authority's officers attended a number of these technical meetings, subsequently applying the knowledge gained while transposing the directive in question. The Authority, in collaboration with the Federation of Industry (FOI), has produced a questionnaire for the members of this association. Its results should serve as the basis for a future study on CHP.

Courtesy: WasteServ Ltd

Primes Energy Modelling

In March, an Authority officer attended the Energy Economists Meetings in Brussels, with the aim of obtaining first hand information on the PRIMES Energy Modelling Program used by Commission Directorate General for Transport and Energy in building Energy Scenarios which consequently lead to imposing energy target upon Member States. The Authority set up a working group on the PRIMES program with the collaboration of the National Statistics Office, the Malta Transport Authority, the Malta Environment and Planning Authority (Environment Protection Department), the Ministry of Finance, WasteServ and Enemalta Corporation.

Chapter 3

Energy Resources Regulation

Liberalisation of the Inland Fuel Market

Liberalisation of the inland wholesale fuel market

A major effort was undertaken by the Directorate for Energy Resources Regulation's staff to prepare and present to Government for approval, the licensing and legislative framework necessary to put into effect the liberalisation of the inland wholesale fuel market.

The following draft legal notices were prepared for Government to implement this process:

- Draft Petroleum for the Inland (Wholesale) Fuel Market Regulations, 2007;
- Draft Petroleum for the Inland (Retail) Fuel Market Regulations, 2007;
- Draft Excise Duty Act (Amendment of Part D of the Sixth Schedule) Regulations, 2007;
- The Biofuels Market Regulations .

Concurrently other related tasks were undertaken during the period under review including:

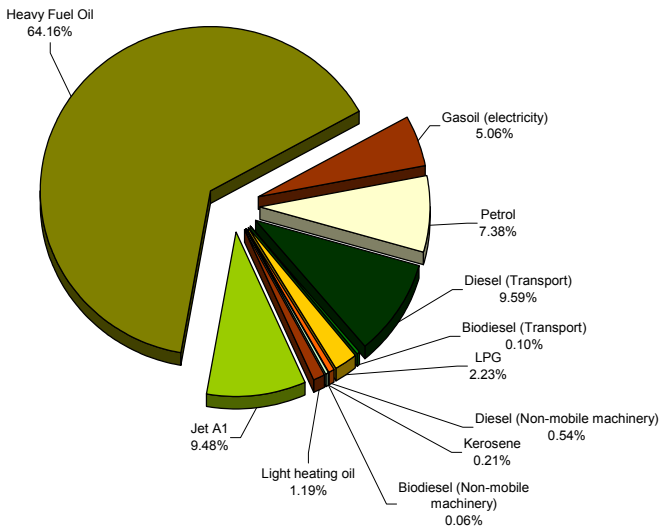
- Preparation of a new sets of licence conditions, made necessary by the introduction of this new legislative and regulatory framework, alongside the draft regulations. These were related to the following set of activities:
  - Importation / Wholesaling of Petroleum (Licence to carry out the activity of an Importer (and/or Wholesaler) of Petroleum)
  - Primary Storage Facilities (Licence Conditions of Primary Storage Facilities)
  - Secondary storage facilities (Licence Conditions of Secondary Storage Facilities)
  - LPG Cylinders Distributor (Licence to carry out the activity of an LPG Cylinders Distributor)
  - Fuel Distribution (Licence to carry out the activity of a Fuel Distributor)
  - Petrol Stations (Licence to operate a Petroleum Filling Station)
  - Importation, Wholesale, Production, Storage, Blending and/or Retail of Biofuels (Licence to carry out the activities of Importation, Wholesale, Production, Storage, Blending and/or Retail of Biofuels).
- Development of an authorisation to enable the commercialised gas division of Enemalta to import, wholesale, store, bottle, dispense, transport, distribute and retail LPG.
- Drafting of a 'Response to Consultation' document in relation to the Consultation Paper on the Liberalisation of the Inland Fuel Market
- Drafting of a Policy Paper on the 'Liberalisation of the Inland Fuel Market: The Way Forward' and its submission to Cabinet.

Other Activities Related to Regulation of the Fuel Market

Fuel mix in the Maltese Islands

Imported liquid fuel makes up for the most of the energy consumption in Malta, with 64% of this being heavy fuel used in the production of electricity at the two power stations. Figure 2 shows the total energy mix of the Maltese Islands in 2006 excluding bunkering.

Figure 2: Fuel Consumption in 2006



As can be seen from Figure 2 most of the imported fuel is used for the production of electricity in the power stations, with heavy fuel oil and gasoil making up the largest percentages. Jet A1 is used in aviation. Transport still relies heavily on conventional fuels with petrol and diesel being the by far the two most common types used, although recently biodiesel has increased its market presence.

The remaining fuels used in Malta such as kerosene and LPG are mainly used by industrial commercial and households for various activities such as cooking and heating.

Monitoring of fuel prices

The Authority monitors the prices of fuels. On a monthly basis Enemalta, which is to date the only importer of fuels sold in the inland fuel market, estimates and reports to the Authority the price per litre of each fuel type. The price is based on the cost of each respective consignment of fuel, fiscal dues (Excise and Vat) and a profit margin.

Monitoring of minimum security stocks

During the year under review the Authority checked that the security stocks of petroleum products in Malta were kept at a level corresponding to at least sixty, (and as from 2007.ninety) days average daily internal consumption of the preceding calendar year. This was done for each of the following categories of petroleum products:

- Category I: Motor spirit and aviation fuel (aviation spirit and jet-fuel of the gasoline type);
- Category II: Gas oil, diesel oil, kerosene and jet-fuel of the kerosene type; and
- Category III: Fuel oils.

Establishment of a fuel marking and traceability policy

Consultative meetings with international producers of petroleum dyes and markers were held to establish a fuel marking and traceability policy. An agreement was reached in principle, with the Department of Customs on the need to introduce new fuel dyes and to introduce a national marker to all fuels entering the inland fuel market. A draft amendment to the Excise Duty Act was presented to Department of Customs for its consideration and this is intended to pave the way for the reform of the dyeing and marking system.

Improvement of security at LPG installations

Draft regulations regarding the installation and use of bulk LPG installations were prepared and presented to Government for its consideration. The aim of these Regulations is to establish rules regarding quality parameters and to ensure public and private safety.

The Authority instructed all owners of LPG storages as well as warranted engineers that the design certification of LPG installations should be done in accordance with approved Codes of Practice. A meeting was held with engineers involved in certifying installations to continue harmonizing their work in anticipation of the upcoming legislation.

The Directorate for Energy Resources Regulation throughout the year consolidated its relationship with CORGI, the Centre of Registered Gas Installers of the UK.

Work on MRA Codes of Practice

In the United Kingdom, gas operators design, construct and operate in the LPG market in conformity with Codes of Practice issued by the Liquefied Petroleum Gas Association (LPGA). The Codes of Practice cover most sectors of the LPG market including location of storage vessels, regulation of autogas, storage and filling of cylinders and technical details on LPG accessories such as safety valves and piping.

Most of the UK's Codes of Practice are being transposed to the Maltese market with the authorization of the LPGA. This exercise in itself enjoys the collaboration of a number of other authorities such as the OHSA, CPD, MSA and MEPA, due to the overlapping competences that such a codification entails.

In September the Authority approved six Codes of Practice namely:

- MRA LPG Code of Practice 7:2007 : Purging LPG Vessels and Systems;
- MRA LPG Code of Practice 5:2007 : Hoses for the transfer of LPG in bulk – Installation, Inspection, Testing and Maintenance;
- MRA LPG Code of Practice 6:2007 : Valves and Fittings for LPG Service. Part 1: 2007 – Safety Valves;
- MRA LPG Code of Practice 10:2007 : Automotive LPG Refuelling Facilities;
- MRA LPG Code of Practice 3:2007 : Autogas Installations;
- MRA LPG Code of Practice 8:2007: Recommendations of the safe use of LPG as a propulsion fuel for boats, yachts and other craft.

Participation in Carbon Labelling Project

In October 2006 the Malta Resources Authority started participating in the Carbon Labelling Project under the "Intelligent Energy for Europe Programme" of the European Commission. The project involves a set of concurrent work package activities to evaluate the different aspects of carbon labelling of the fuel, lubricant, vehicle and freight sectors. The project brings together multiple countries and participants that work together in looking at carbon labelling programs that can work best in their country. Lessons learned from their particular approach in their country are discussed to determine interest in European carbon labelling initiatives.

The results of having carbon labels on products in the transportation sector will be similar to successes with energy labelling of consumer products. The pilot programs will provide the information necessary to generate strong consumer interest in biodiesel and efficiency products. Inclusion of fuel and lubricant additives in the labelling effort now, and other products like tires in the future offers opportunities to substantially reduce energy use and fuel costs and lower emissions.

The project is still half way through but one of the completed sections included the writing of a report on the present state of bio-diesel in Malta and measures for its promotion. The report pointed out the existing barriers for a larger share of biofuel consumptions and suggested ways on how the consumption of biofuel could be increased.

Drafting of Quality of Fuels Regulations, 2007

In line with Government's policy to establish the Malta Resources Authority as the holistic regulator of the fuels market, the Authority prepared a draft set of regulations entitled *'Quality of Fuels Regulations, 2007'*. These regulations are also intended to transpose the EU directives related to the quality of fuels.

The regulations also transpose the relevant EU directive related to marine activities. Hence the co-operation of the Malta Maritime Authority was solicited and a Memorandum of Understanding was drafted to implement the regulation in the most efficient manner.

Memorandum of Understanding with the Department of Customs and collaboration with the National Statistics Office

The Authority entered into a Memorandum of Understanding with the Department of Customs. The objective of the memorandum is to develop a streamlined system in respect of monitoring imports and storage of petroleum products. This system will ensure, that there is, within the confines of the law, a regular and timely flow of information, by which the Authority may monitor the market.

This monitoring is intended to enhance the Authority's capacity to ensure that there is a secure supply of quality fuel at fair prices. Cooperation with the National Statistics Office in the collection of data regarding fuels and their reporting to the Commission is also a positive factor in this sense.

Follow-up of audit Inspection of petroleum-filling stations

As part of the follow up to audit and inspection of all petroleum-filling stations that was carried out earlier in 2006, the Authority decided to concentrate its efforts on two aspects:

- Regulation and data compiling; and
- Site operators training.

Regulation and Data Compiling

Based on the documentation collected by the MRA as a result of the audit inspections of all the petroleum filling stations and kerbside pumps carried out by the Authority in collaboration with APEA, a comprehensive database with the reports, diagrammatic plans and photographs was produced. All petrol stations licensees were later informed of the outcome of the inspections and were advised of the actions needed to upgrade their petrol stations up to the required standards.

Site Operator Training

During the month of December, the Malta Resources Authority organised a training course for the owners and managers of petrol stations and kerbside pumps in order to train site operators of the said stations. The course was designed to cover the responsibilities of the forecourt operator in charge of the filling station.

The course involved speakers from the Association for Petroleum and Explosives Administration (APEA) of the UK and some of the topics presented were the following:

- Overview of the legal requirements in Malta and the EU;
- Standards in Petrol Stations Construction;
- Protection of the Environment;
- Intervention in case of fires;
- Precautions during road tanker deliveries;
- Wetstock Management.

The course also included a written assessment with all successful attendees receiving a certificate in a ceremony held later at the Project House in Floriana.

Participation in local Technical Committee meetings on autogas and biofuels

Officials from the Authority participated in technical committees organized by the Malta Standards Authority in relation to standards related to the work of the Authority, namely *MSA EN 12979 Automotive LPG Systems* – Installation requirements, and MSA EN 14214 Automotive Fuels – Fatty Acid Methyl Esters (FAME) for diesel engines – Requirements and test methods.

Participation in the Privatisation Process of Enemalta Corporation Gas Division and Petroleum Division

Government has decided to commercialise both the Gas Division and the Petroleum Division of the Enemalta Corporation. The Authority participated in the discussions with potential bidders to the tenders issued by the Privatisation Unit, in order to give its views or guidance on issues related to the national market following the process of liberalisation.

Regulation of the Electricity Sector

Electricity Market Monitoring

Monitoring of generation performance

The Authority monitors the performance of generation and the distribution systems in Malta. To this end Enemalta Corporation is required to submit monthly reports on the generation which include the generated units, peak demand and status of each unit in the two power stations. The peak demand for 2006/07 was 426MW and occurred in August. This represented an increase in the summer peak of 5.2% on the previous year. Figure 3 shows the trend of the growth of the summer peak demand on the system between 2001 and 2007.

The month of June 2007 was characterised by a number of repeated power failures. The Authority requested Enemalta Corporation to provide details on each power failure including the cause and the remedial actions taken.

Fuel mix for electricity generation

The fuel mix for the electricity generation in 2006/07 consisted of 92% heavy fuel oil and 8% gasoil. The amount of heavy fuel oil consumed was 609,447 tons and 38,345 tons of gasoil. The consumers receive information on the fuel mix in their electricity bill.

Figure 3: Peak demand growth trend 2001 to 2007

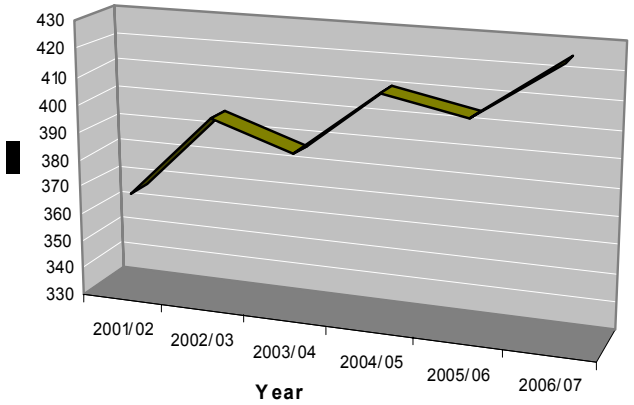


Table 3: Fuel mix and installed capacity

Type of plant	Installed capacity	Fuel type	% of Total installed MW
Steam turbines	330	Heavy fuel Oil	60%
Open Cycle Gas turbine	111	Gas Oil	20%
Combined Cycle Gas Turbine	110	Gas Oil	20%
Total	551		

Distribution Network Performance

Presently, the Authority is able to monitor continuity of supply at substation level only because records on interruption of the individual low voltage feeders, smaller than 1000V, are not submitted by Enemalta Corporation. Since the information available at customer level is very limited the minutes lost per customer per year can only be estimated. The estimation is done on the assumption that the number of customers supplied from each substation is proportional to the kVA installed. The overall minutes lost per customer per year for the calendar year 2006 is 6.65 hrs. This overall indicator for minutes lost per customer is based on the following classification of faults:

- *Faults* which include naturally occurring faults and induced faults such as cables damaged by contractors;
- *Shedding* normally refers to interruptions due to faults on the generation side;
- *Switching* interruptions are generally due to load shifting and safety measures and
- *Works* usually refer to planned interruptions.

During the year, the Authority also required further detailed reports on the occurrence of major incidents affecting the supply of large areas of Malta.

Electricity tariffs

In January 2005 a fuel surcharge on the electricity and water consumption bills was introduced. The fuel surcharge rate was revised on a bi-monthly basis during the year 2006/2007 to reflect fluctuations in the fuel prices.

Households, except those classified as social cases, pay the established surcharge rate. In the commercial sector hotels and guest houses are capped on the maximum surcharge payable based on the consumption bill while other consumers classified as commercial pay the full surcharge rate. The industrial sector consumers have their fuel surcharge capped.

Preparation of 'Twinning Light Application' related to the Implementation of Directive 2003/54/EC

A twinning light application entitled 'Strengthening the Regulator' in the implementation of the EU Directive 2003/54/EC concerning common rules for the internal market in electricity, EU Directive 2006/32/EC on 'Energy end-use efficiency and energy services' and EU Directive concerning 'Measures to ensure security of electricity supply' (2005/89/EC), was prepared and submitted to the relevant authorities for onward transmission to the European Commission. The aim of this Twinning Light programme is to strengthen the Authority by developing the human and institutional capacities and by assisting in developing strategies, procedures and methodologies to improve the implementation of the above mentioned directive.

Energy link with Europe

Government has decided that there should be an interconnection with the European Electrical Energy market by means of an undersea cable.

A study on the best way to implement this project and buy electricity from overseas sources is under way. This study is being carried out by Lahmeyer International. The

options for future expansion of on-island generation capacity together with natural gas via pipeline interconnection or liquefied natural gas as alternatives to the existing fuel oil/ gas oil mix are also under review.

The possible synergy of this project with the production of 'green energy' from wind farms is also within the purview of this study.

The study is divided into three work packages. The report for the first work-package, *Background analysis and research*, was submitted for approval to the MRA in July 2007 whilst the draft report for the second work package, *Study on interconnection options and analysis for planning criteria,* was submitted in September 2007. The work on the third work-package *System planning,* is under way.

Network code

A public consultation process has been undertaken with regards to the Network Code. The Network Code is primarily of interest to potential new entrants in the generation business, contractors and installers, and also consumers. Stakeholders were invited to submit their comments on the draft network code, focusing on issues that included safety criteria, impact on stakeholders, and interoperability and organisation of network operations.

The Malta Resources Authority has instructed Enemalta Corporation, as the network operator in Malta, to draft technical rules establishing the minimum technical design and operational requirements for the connection to the system of generating installations, distribution systems, directly connected consumers' equipment, interconnection equipment and direct lines.

The comments and recommendations made by the European Commission on the Network Code consultation process have been referred to Enemalta, which has presented its response with justifications to the comments and suggestions received during this process, by means of a report submitted to the Authority.

Wireman Licence Revision

It has been decided by Government that there should be a revision of the licensing process of the so-called 'wiremen', i.e. those who have a Licence A or B to carry out electrical installations.

A public consultation process will be launched in relation to this proposal and draft regulations will be prepared to give effect to this updated licensing process. This licence will in the future be referred to as 'electricians' licence' to reflect the fact that this licence has been updated to meet today's needs.

Other Matters

Participation in TAIEX Programs

During the period under review the Directorate for Energy Resources Regulation participated in four TAIEX programs:

(1) In May 2007, officers of the Authority organized a two day visit from UK expert on co-generation practices. The UK officers from the Department of Environment, Forestry and Rural Affairs (DEFRA) explained the implementation of Directive 2004/8, on the promotion of cogeneration in the UK. They explained also the new legislation on Guarantee of Origin certificates for CHP. The UK experts made a number of visits to the Maltese Industry (e.g. SG Thompson, General Soft Drinks, St. George's Corinthia Hotel and Swan Laundry) at the same time meeting FOI officials.

2) In July 2007 Authority officials visited the National Laboratories in Milan. These labs are in charge of assessing the quality of fuel for the Italian Authorities. The scope of this visit was in order that the Maltese officials could have first hand information what other Member States are doing regarding dyeing and marking of fuel. In particular they obtained first hand information on sampling, laboratory tests and procedures.

3) In May 2007, Officials of the Authority paid a study visit to the Spanish Energy Regulator on Fuel Procurement Information from Utilities. During this visit, the experiences gained and the difficulties faced by the Spanish Authority following liberalisation of their fuel market were discussed. Officials from the Spanish Authority also made presentations on the following topics: the Spanish energy markets, the electricity tariffs in Spain, (here reference was made to special surcharges), the renewable energies, the international prices of oil products, the regulation of fuel costs in the Spanish Islands, security of supply and the new responsibilities of the National Energy Commission (CNE) for monitoring the Island electricity systems.

4) In May 2007, Officials of the Authority paid a visit to the French Transmission System Operator (RTE). During this period the representatives of RTE provided presentations on the organisation of the French system and market evolution, information system for control, metering and billing, regulations and tariffs issues including the legal aspects and tariff forming. The legal implications of interconnectors were also discussed. A visit to the converter station of the England-France 2000MW interconnector at Calais was also included.

Liaising with other authorities and stakeholders

Meetings were held with several authorities and stakeholders on a variety of issues related to the Directorate for Energy Resources Regulation's remit and also on other issues pertaining to other Authorities' remits but still of interest to the MRA. The public authorities and bodies which were the parties to these meetings included the Enemalta Corporation, the Malta Environment and Planning Authority (MEPA), the Occupational Health and Safety Authority (OHSA), the Department of Customs, the Office of Fair Competition (OFC), the Malta Maritime Authority (MMA), the Consumers and Competition Division, the Malta Standards Authority (M.S.A), the Malta National Laboratories (M.N.L.), the Office of the Data Protection Commissioner and the Malta Transport Authority, the National Statistics Office, the Malta Insurance Association and the Federation of Industry and other private bodies such as the General Retailing and Traders Union (GRTU), enabling the Authority to better meet the demands of regulating the energy sector.

Chapter 4

Energy Efficiency and Renewable Energy

Promotion of Energy Efficiency

National Campaign on Sustainable Energy Use

During 2007, MRA launched a national campaign on sustainable energy use. The main objectives of this national educational campaign are:

- to educate consumers through dissemination of information and knowledge :
  - on Malta's dependency of oil;
  - associated measures that may be implemented to reduce this dependency on oil including energy efficiency measures, energy conservation measures and integration of renewable energy sources;
  - benefits of sustainable energy use to the environment and society as a whole;
- to increase public participation and change consumers' behaviour towards more sustainable energy use.

Figure 4: National Campaign on Sustainable Energy Use—Survey Results (1)

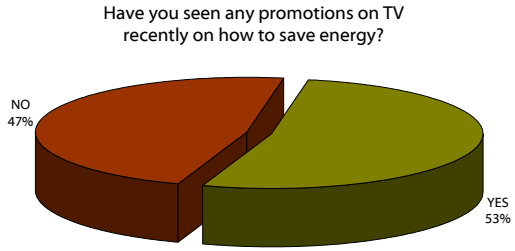


Figure 5: National Campaign on Sustainable Energy Use—Survey Results (2)

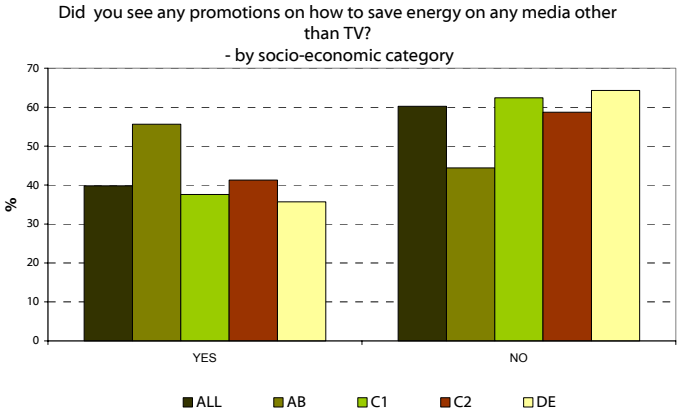


Figure 6: National Campaign on Sustainable Energy Use—Survey Results (3)

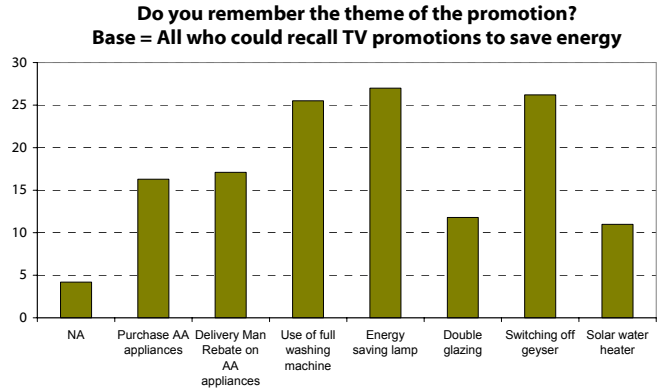
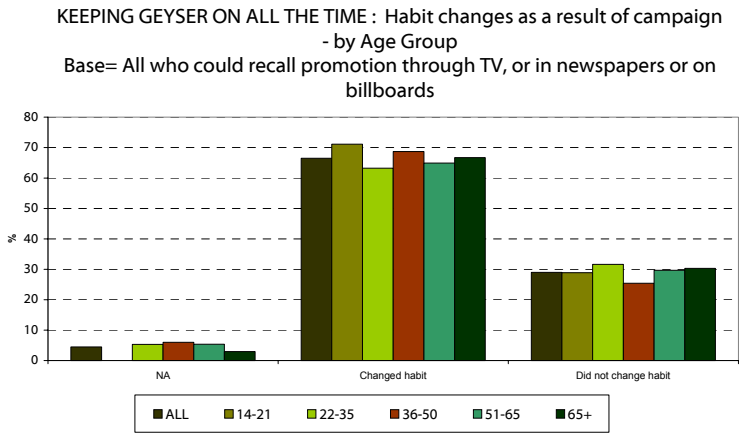


Figure 7: National Campaign on Sustainable Energy Use—Survey Results (4)



Support scheme for promoting energy efficient domestic appliances

In the Budget speech for 2007Government announced a scheme for grants on the purchase of household appliances for domestic use certified as being efficient in the use and consumption of energy. This scheme came into effect from 1st November 2006 and the Malta Resources Authority was given responsibility to manage and administer the scheme.

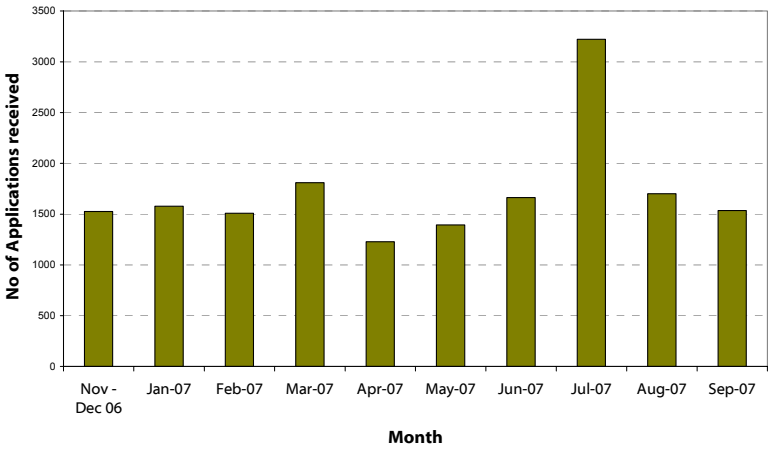
Table 4: Energy Efficient Appliances Scheme

Appliances	Category	20% of selling price with a maximum grant of
Dishwashers	A	Lm25 (€ 58.23)
Refrigerators, Freezers or Combinations	A Tropical	Lm50 (€ 116.47)
	A+ Subtropical	Lm50 (€ 116.47)
	A Subtropical (till 31st March 2007)	Lm25 (€ 58.23)
Washing Machines	A	Lm25 (€ 58.23)
Tumble Dryers	A	Lm25 (€ 58.23)
Air Conditioning Units	A	Lm25 (€ 58.23)

The objective of the energy efficient appliances rebate scheme is to change the market towards more efficient appliances and influence consumer choice in favour of energy efficiency. Furthermore, by using a more energy efficient appliance, the consumer would, in the longer term, be facing a lower electricity bill than otherwise would be the case.

Up to the end of the financial year, MRA received 21,300 applications or an average of 1,521 applications each month. Figure 8 shows the estimated number of applications submitted each month.

Figure 8: Energy Efficient Appliances Scheme



The results of the scheme have been a market transformation process as indicated in Table 5. The weighted average sales of each category of appliances increased in the A class sector. The poorest performing sector was that of air conditioners, inundated with cheap equipment imported from outside the EU with poor energy classifications. This data in this table is the result of a very limited response from importers participating in the scheme.

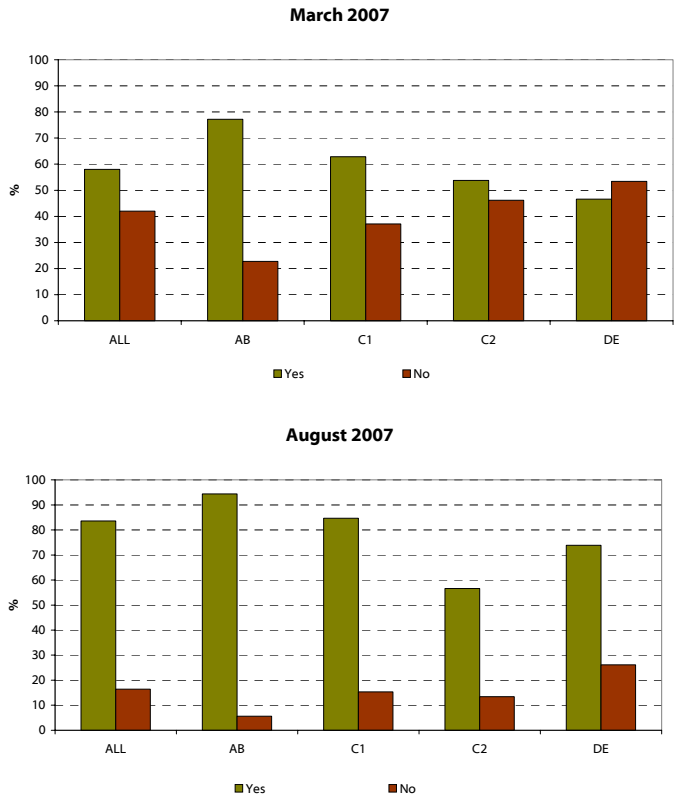
Table 5: Transformation in the Appliances' Market

Category		2006 level of sales	2007 level of sales	2005 level of sales in EU15
Refrigeration	A+, A++	10%	29%	8%
	A, A+, A++	36%	77%	59%
Air conditioners	A	16%	44%	Not available
Washing machines	A	75%	86%	85%
Dishwashers	A	85%	96%	80%

By the 30 September, 11,595 applications were passed for payment for a value of Lm334,147 (€ 778,416).

The Scheme should soon be audited by an external auditing firm in order to improve and streamline the various processing and verification procedures, with the aim of reducing the time from when an application is submitted and process until the rebate cheque is posted to the applicant.

Figure 9: Energy Efficient Appliances Scheme —Survey Results



A survey was also carried out in December 2007 to assess how the process can be improved. Out of 100 applicants called, the following was the feedback received:

Table 6: Results of Consumers' Survey on Energy Efficient Appliances Scheme

Suggestion	Number
No suggestion	57
Faster payment	31
Payment direct from the shop	4
Rebate too low and more appliances to be included	3
Not enough help when calling	2
More help from the retailer	3
Other suggestions	2

Steps have been taken increase the speed of processing. The reason for delays was that only 2 people were working on the scheme in the first quarter of 2007. However, more is being planned to be done in this area. Staff are being trained in customer relations while software was also upgraded to improve customer contact.

The responses to the question of satisfaction with service is reported in Table 7. The applications where dissatisfaction was registered were checked individually. It transpired that 10 applicants had submitted an incomplete application or requested a refund on an appliance that was not eligible for the rebate. Two other applicants who had expressed dissatisfaction had been paid suggested that faster payment be made – they had been paid within 2 months.

Table 7: Satisfaction with service provided by MRA

Very satisfied	3
Somewhat satisfied	73
Satisfied	12
Not so satisfied	1
Not satisfied	11

A question was also asked about the disposal of the old appliance. The disposal rates are what one might reasonably expect given the rate of penetration of the relevant appliances. What is worrying, though less significant than expected, is the retention of old refrigerators in use. Although the sample is limited, the retention level indicates that additional work is required in this area.

Table 8: Disposal / Use of Old Appliances

Appliance	new %	disposed %	still in use %
Washing machine	33%	52%	15%
Refrigerator	38%	52%	10%
Air-conditioner	87%	13%	0%
Dishwasher	75%	25%	0%

In addition, Government also has the following financial support schemes:

- a grant of 15.25% on the purchase price of the electric-powered cars subject to a maximum grant of Lm 500 (€ 1164.69).
- a grant of 25% on the purchase price of roof thermal insulation material applied to domestic premises subject to a maximum of Lm 100 (€ 232.94).

The Authority will also be applying for structural funds to increase the uptake of these schemes and extend their application and introduce new schemes for the non-domestic sector.

Metering consumption in the domestic sector

The design of energy efficiency activities requires some understanding of the energy consumption behaviour of the targeted consumer groups. With the exception of a study carried out in 1996 by EDF assisted by Enemalta Corporation in 1996, no such studies have been carried out previously. The Institute for Energy Technology provided the Authority with an estimate of consumption in water heating. No theses were traced at the University of Malta on the subject.

Data had to be collected first hand by the MRA. A desk exercise on the consumption of appliances taking into account penetration of appliances as measured by the National Statistics Office and the Authority during a number of surveys was carried out leading to the chart below. Significantly, water heating, air conditioning, refrigeration and lighting accounted for most of the consumption in this elementary model.

It was clear that additional monitoring was required, and for this reason the Authority purchased a number of plug-in meters to carry out surveys in actual domestic households. Although not randomly selected, the households are typical Maltese. Results still have to be analysed, but some early indications are available.

The consumption of refrigeration equipment is higher than that reported in other EU member states. This could be due to the higher ambient temperatures in Malta, but also due to a prevalence of older appliances. Weekly consumption in washing machines is similar to that reported elsewhere.

Figure 10: Metering Consumption

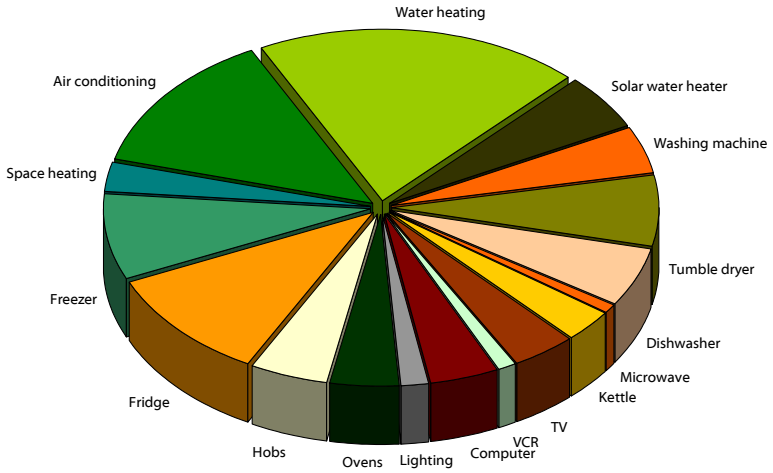
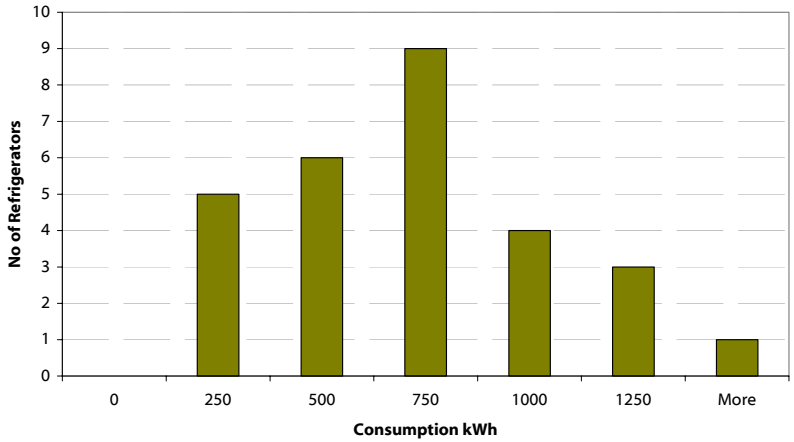


Figure 11: Refrigerators' Energy Consumption



Figures 11-13 show the distribution of (extrapolated) annual consumption of these appliances. The variation of (extrapolated) annual consumption with age of the refrigeration equipment is also shown separately.

Interesting was the consumption of seemingly innocuous appliances. Out of sixteen computer systems monitored, six consumed more than 500kWh per year, with one consuming more than 1500kWh per year. In another case, an aquarium accounted for 20% of the metered consumption. In another case, standby equipment accounted for over 1100kWh per year.

Figure 12: Energy Consumption vs Refrigerator Age

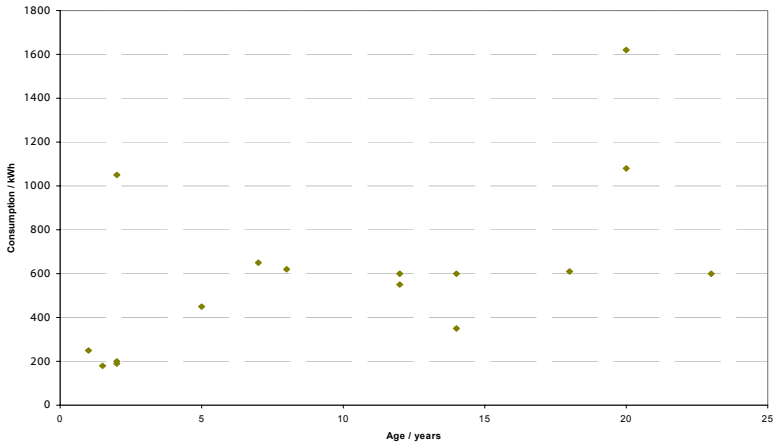
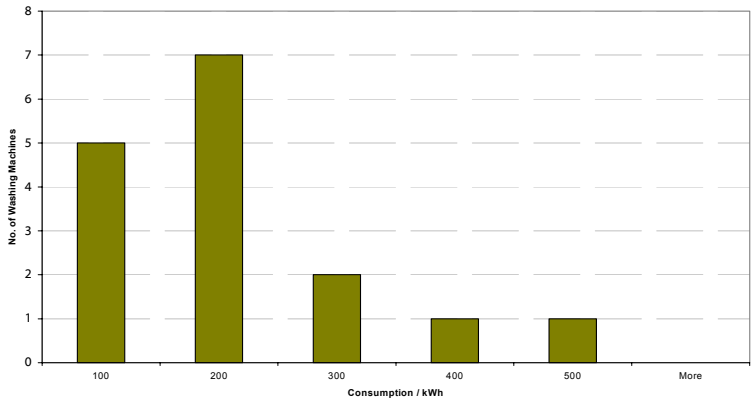


Figure 13: Washing Machines ' Energy Consumption



Dehumidifiers also account for a significant consumption – at least 500kWh per year and in some cases over 1000kWh per year.

Consumption in the non-domestic sector is more varied. The Authority jointly with the FOI issued a 10-question survey amongst FOI members on their consumption. Only 11 replies were received, a level of response that could have several interpretations. The main areas of consumption for these respondents were machinery, air conditioning, heating and lighting.

Promotion of Renewable Energy

Offshore Windfarm Development

During 2006, Government, through the MRA, issued a Call for Expressions of Interest for Offshore Windfarm Development. Following receipt of the offers submitted in response to the Call, a detailed review and comparative assessment of the offers was carried out.

The viability of a location for siting commercial-scale offshore wind farm is determined by various physical and meteorological criteria. The most important include:

- Environmental Impacts including ecological issues, landscape and visual impacts, noise and vibration effects, marine archaeology and potential conflicts with sites of archaeological interest;
- Effects on other activities and uses of the potential sites including: maritime traffic and bunkering operations, air traffic and radar and navigational aids operation, communication facilities, tourism facilities, military and defence operations, fisheries and fishing activities;
- Wind resource potential and wind energy considerations including wind speed and duration and overall quality of the wind resource;

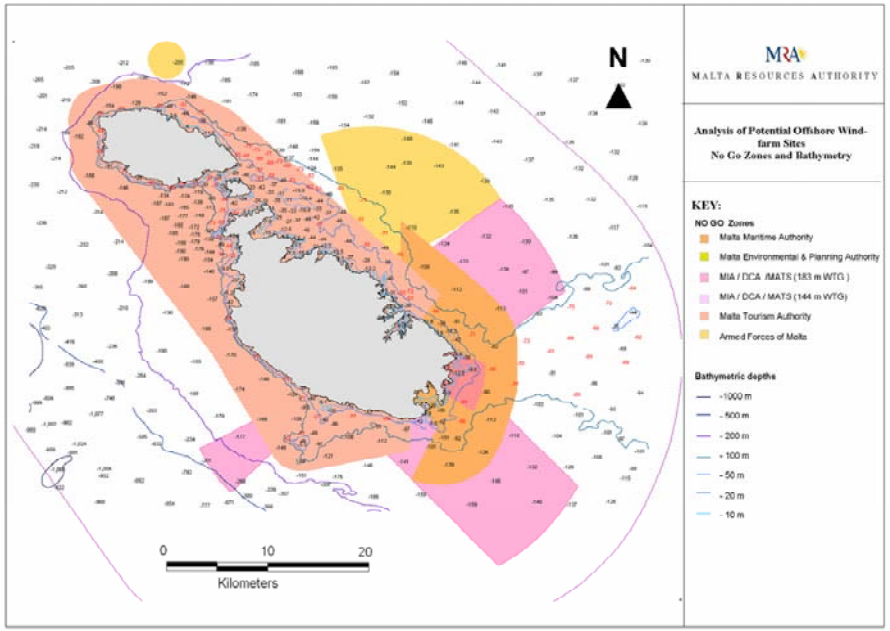
- Constructional, operational and maintenance issues which determine the economic viability of the project including:
  - Foundation technology, depth of seabed and type of substrate; The geological characteristics of the potential sites are also required to be studied and the seabed constituency effects the type of foundation to be used
  - Wave depths and hydrodynamic effects on offshore wind turbine structures;
  - Distance of the site from the shore and interconnection facilities.

A detailed GIS mapping exercise was at the same time undertaken where the no-go zones and sensitive zones previously identified in the course of the Call for EOI were overlayed with bathymetric depths of the Maltese territorial waters. This exercise enabled analysis and clear identification of potential areas with depths up to 80 m which could be selected for deepwater offshore wind development.

In view of the bathymetric conditions of Maltese territorial waters and the limited sites for locating offshore windfarms in shallow waters (< 20m), it has been decided that deepwater wind technologies should be assessed in further detail since this is a major aspect in the location of offshore windfarms. The difficulty with this type of technology lies in the substructure design.

The Authority is closely following developments in two substructure technologies namely floating technologies and tripod / multipod jacket technologies. Both these technologies are currently at the demonstration phase. Floating technology is being demonstrated through a scaled prototype at a distance of 10.6 nautical miles from the coast in Southern Italy. Quattropod jacket technology is being demonstrated through two wind turbine generators of 5 MW each in 45m deepwater near the Beatrice Alpha

Figure 14: Analysis of Potential Offshore Windfarm Sites



oil production platform in the Moray Firth offshore North East Scotland. At the same time the Authority has established contacts with Scottish Enterprise with the aim of getting assistance in our pursuit in deepwater offshore wind technology for electricity generation in Malta.

The Authority also assisted EuroMediTI and Malta Enterprise in the preparation of a project proposal for an offshore energy research and development project.

EEA Study on "Establishing environmentally compatible wind energy potential in Europe"

The Authority was invited to respond to a questionnaire developed by the European Environment Agency on establishing environmentally-compatible wind energy potential in Europe. This project involved quantification of the impact of environmental and other constraints on the potential of wind energy in different land use and sea use categories.
To assess and develop a detailed and scientifically sound response to this questionnaire the GIS-based mapping approach was utilised as part of Malta's response to this review. The various constraints identified by the EEA as applicable to Malta were mapped and country-specific recommendations submitted. Key stakeholders including MIA, MATS and the DCA as well as MEPA were consulted. Submissions received in the course of complementary consultation exercises carried out also fed into this study's feedback.

The Authority's submissions were later presented in the course of an experts' meeting held in Copenhagen by the EEA.

Support Mechanisms for Promotion of RES

During the year under review, the Malta Resources Authority prepared proposals for financial support schemes for electricity generated from renewable energy sources. Various support schemes were designed and proposed. The proposed schemes were submitted to the Ministry of Finance to assist the latter in developing financial support measures in this area.

Various measures were introduced in 2006 to increase the penetration of micro-generation from wind and solar photovoltaic (PV) and these financial support mechanisms include which assist consumers to invest in renewable energy technologies continued to be implemented during the year under review.

Currently the following schemes are being administered by the Ministry of Finance:

- a grant of 20% on the purchase price of solar PV installations on domestic premises with a minimum size of 1 kWp and less than 3.7 kWp. This grant is subject to a maximum of Lm 500 (€1164.69) with an additional grant of Lm250 (€ 582.34) for every additional installed kilowatt peak, plus or minus five per cent (1kWp+/-5%), subject to a total maximum input power of 3.7 kilowatt peak (3.7kWp). Fractions of a kilowatt peak installed additionally above the minimum of one kilowatt peak (1kWp) are treated pro rata.
- A grant of 25% on the purchase price of microwind systems installed on

domestic premises (with a maximum generation capacity of 3.7 kW) and subject to a maximum of € 232.94 (Lm 100).

- A grant of 25% on the purchase price of solar water heaters installed on domestic premises subject to a maximum of Lm 100 (€ 232.94).

In addition to these grants further supporting administrative measures continued to be implemented. During the year the Electricity (Amendment) Regulations, 2007 were published through Legal Notice 17 of 2007. These amended the Electricity Regulations, 2004 (L.N. 511 of 2004) where the exemption from Regulations 3, 12, 13, 14 and 23, of LN 511 of 2004 for producers of electricity produced solely from renewable sources of energy or cogeneration plant was increased from a total peak generation capacity of 3.7 kW to 10 kW and 16 Amps per phase. At the same time these producers are required to notify the Authority prior to the construction of their installation.

A number of micro-generation renewable energy demonstration projects were also constructed by Government during the year. This included a number of PV installations installed on public buildings, including a 10 kW_p PV installation in Gozo and a 6.84 kW_p installation on a public school and a 1.3 kW microwind turbine installed by WasteServe at its civic amenity facility in Mriehel.

Other Activities

Solaterm - Promotion of Solar thermal technologies

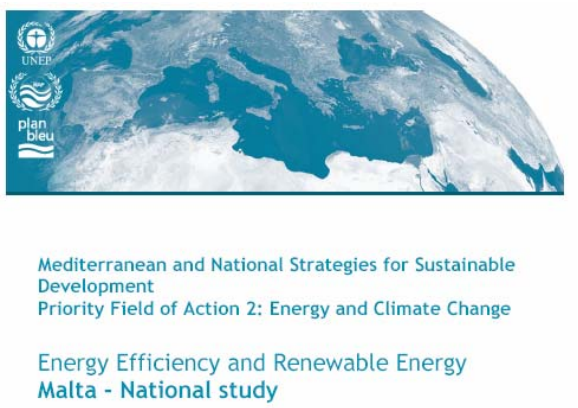
In November 2006 the Authority started participating in Solaterm, an EU funded RTD project (co-ordinated action) under the 6th Framework Programme. The overall objective of the project is the widespread application of solar thermal systems for the hot water preparation, space heating and climatisation in the Mediterranean partner countries in order to meet the increasing demand for hot water and cooling and to exploit the high potential of solar energy in the region.

A country report was drafted on the status development of solar thermal applications in Malta. In addition a meeting was held in Cairo, Egypt where the framework conditions for solar thermal and the state of the art of solar thermal technologies in the southern Mediterranean countries were discussed. Further details are also posted on the project's website http://www.solaterm.eu

Reporting on Energy Efficiency and Renewable Energy in Malta

In December 2006 the Authority was requested by Plan Bleu to carry out a national study on Energy and Climate Change, Energy Efficiency and Renewable Energy under the United Nations Environment Programme – Mediterranean Action Plan. The main objectives of this study were to:

- quantify and analyse basic data and indicators stipulated in the Mediterranean Strategy and in the national strategies;
- present the RUE and RE strategies and policies currently under way in Malta;
- outline the effects and benefits gained from the current development of RUE and RE on an economic, social and environmental levels;
- present case studies dealing with good practices that may be communicated on a Mediterranean scale;
- analyse possible risks linked with the observed and forecasted trends as well as to highlight potential solutions which could be proposed in the scope of RE and RUE strengthening policies.



Intelligent Energy for Europe

The Authority has participated in the development of project proposals submitted to the EU Commission for funding under the Intelligent Energy for Europe Programme. The project proposals submitted were:

(i) PV-NMS-NET . Supporting Development of Photovoltaics in the EU New Member States Network. This project is being proposed in order to contribute to achieving the objectives of EU energy policy and to implement the Lisbon Agenda, especially in the European Union New Member States. It will generally contribute to use of RES (notably PV) in electricity production which will cause a secure, sustainable and competitively priced energy development in Europe, environmental protection and economic cohesion. The main objective of this project is to increase solar energy application in production of electricity in EU (mainly in NMS) to contribute sustainable energy development by tackling non-technical barriers with a view to reducing energy consumption and CO_2 emissions. The specific aims are:

- to develop of methodology, the means and instruments to follow up, monitor and evaluate the impact of the measures adopted by the NMS in the PV fields;
- to contribute transparency, reliability and cohesion of legal framework conditions of PV development and implementation;
- to raise awareness about PV among decision makers, regulators and utilities in NMS to integrate PV into their economies;
- to maintain co-operation between national PV activities in NMS and EU15 shaping a common vision for the development of PV.

(ii) EU-TEEP. (European Techno Environmental Energy Park - Intelligent energy solutions and tools to favour energy independence of small municipalities).
The project seeks to promote of the rational use of energy and renewable energy sources to favour the energy independence of European communities; the design and planning of a global European Techno-park model; the promotion of innovative clean technologies; the attraction of investments in the renewable energy field from the public and private sector and the promotion of sustainable energy management. The project intends to create a European network which, by providing its technical expertise, will aim at reinforcing all the other objectives of the project by working to disseminate knowledge concerning renewable energy sources and technologies and by promoting the building of the European Techno-park across the EU.

(iii) CA-ESD (Concerted action on the energy services directive).
The project aims to enhance and structure the sharing of information and experiences from national implementation and to promote good practice concepts in activities to improve and strengthen Member States implementation of the Directive on the energy end-use efficiency and energy services (ESD). It should also create favourable conditions for an accelerated degree of convergence of national procedures in ESD related matters. Finally, the project should complement the work of the Energy Demand Management Committee (EDMC, Article 16 of the ESD) and its sub- group on top-down and bottom-up methods, CEN standards and Certification exercises.

- CAN BE EFFICIENT (through changing behaviour and market transformation of energy-efficient products).
The project aims at promoting selected energy-efficient products (cold appliances, lighting, washing machines and dishwashers)1) in residential and tertiary sectors and persuades end users to change behaviour in order to reduce energy use at home and in work places and to purchase most energy-efficient products. This will be achieved through pilot promoters' initiatives for market transformation, pilot consumers' projects/actions for changing behaviour, training sales personnel to adopt energy labelling as sales argument as well as monitoring of the previous activities for improving the approach.

- AQUENERGY. (Network of European coastal and riverside cities for the exploitation of the contained in the water thermal energy).
The project seeks to promote aquatic heat pump technology. In this case, MIEMA is the project partner with the MRA assisting as it deems fit

- ODYSSEE. (Monitoring of Energy Demand Trends and Energy Efficiency in the EU).
The project aims at monitoring energy efficiency progress (and CO_2-reduction) for the EU-27 countries, plus Norway and Croatia, and more generally at a better understanding of the energy demand trends. It will also compare the countries in their relative energy efficiency performance, as well as to benchmark values. Finally it intends to evaluate the impact of national energy efficiency policy measures and Community Directives. This project should therefore highly contribute to the monitoring requirement of the Energy Service Directive (ESD), by providing a top-down assessment of energy savings. It will rely on two complementary tools: ODYSSEE, a database on energy efficiency / CO_2 indicators and MURE, an online database on energy efficiency policy measures.

Chapter 5

Minerals Resources Regulation

The main function of the Directorate for Minerals Resources Regulation is to promote and regulate the exploration and exploitation of Malta's mineral resources. The Directorate for Minerals Resources Regulation's objective is to facilitate the development of the mineral extractive industry, while meeting contemporary expectations for social, economic and environmental outcomes. To accomplish this, various actions and measures have been undertaken and during these past years.

Licensing, Monitoring and Enforcement

Licensing

During the year 2006-2007 the Directorate registered a total of 55 quarries operating in Malta and Gozo, 35 softstone quarries and 20 hardstone quarries. The Authority issues applications for renewal of quarry licences as well as extensions to existing licences. The records are updated annually since the status of operating quarries changes from time to time.

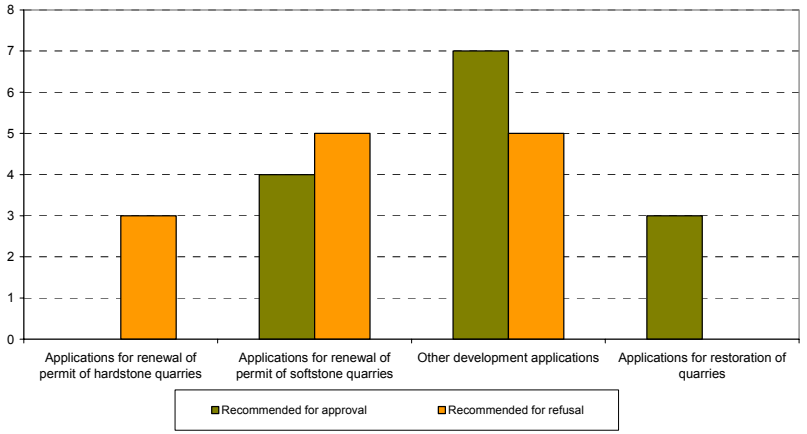
During the period under review, efforts continued to be sustained to restore disused quarries thereby reducing the negative visual impact associated with such sites whilst providing additional land for executing other activities. Several disused softstone quarries are being restored by filling with inert stone waste and these sites are now being used for agricultural purposes.

Administration of mineral resources – development applications

The Directorate for Minerals Resources Regulation is responsible to issue the quarry operating licence. At the same time the planning development applications for quarries remains the responsibility of MEPA, these are also regulated through a development permit. To ensure the harmonization of planning, environment and mineral resource requirements several consultations are held with MEPA on applications for the extension of softstone quarries, hardstone quarries, other development planning applications and applications for restoration of exhausted quarries.

Figure 15 below show the number of applications processed and those which were recommended for approval or otherwise.

Figure 15: Consultations on Planning Development Applications



Regulations

The Directorate for Minerals Resources Regulation has finalised draft regulations on the economic operations of quarries, ensuring acceptable environmental impacts, conservation of resource and fair competition. These regulations consist in translating the Minerals Policies into rules. These draft regulations will focus on operational issues such as resource quality and their extraction, deferring land use matters such as impacts and ancillary infrastructure within quarries to MEPA.

These draft regulations affect those employed in the quarrying sector, and will impose duties on the operator with respect to persons at or in the area immediately surrounding the quarry. The draft regulations ensure the suitability of the operator and the keeping of specified records. These draft regulations are now in the final stages.

Stakeholder consultations

The Directorate for Minerals Resources Regulation was one of the stakeholders consulted in the course of a Twinning Project on Construction and Demolition Waste, organized by Ministry for Rural Affairs and the Environment of Malta in collaboration with Austrian Federal Environment Agency.

This project dealt with the long-term sustainable waste management for the Maltese Islands for specific types of waste streams that have so far been insufficiently catered for in Malta. The focus of the project is concerned mainly with a long-term disposal system for types of waste streams, such as construction and demolition (C&D) waste and non-inert and non-hazardous waste including residual waste generated for Municipal Solid Waste. The Directorate for Minerals Resources Regulation was consulted on the formulation of a strategy for the long term possibility of reuse/ recycling of construction and demolition waste in Malta.

The Directorate for Minerals Resources Regulation also participated at an intensive training program on Geomorphology and Coastal Management. This training program was organized by the EU and it tackled the implementation of integrated management.

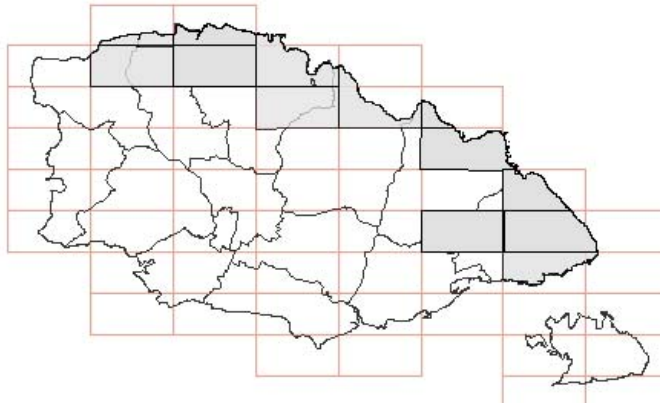
Industry Specific Services

Geological map of the Maltese Islands

Building on the work carried out in previous years the Directorate for Minerals Resources Regulation is progressing in developing high quality geological information on Malta's mineral resources.

This database will be an important tool which can be utilized by many professionals, as it provides a detailed view of the geological formations and members outcropping at the surface of the Maltese Islands. In addition to Malta, this year a section of Gozo was also developed as shown in Figure 16.

Figure 16: Development of Geological Map



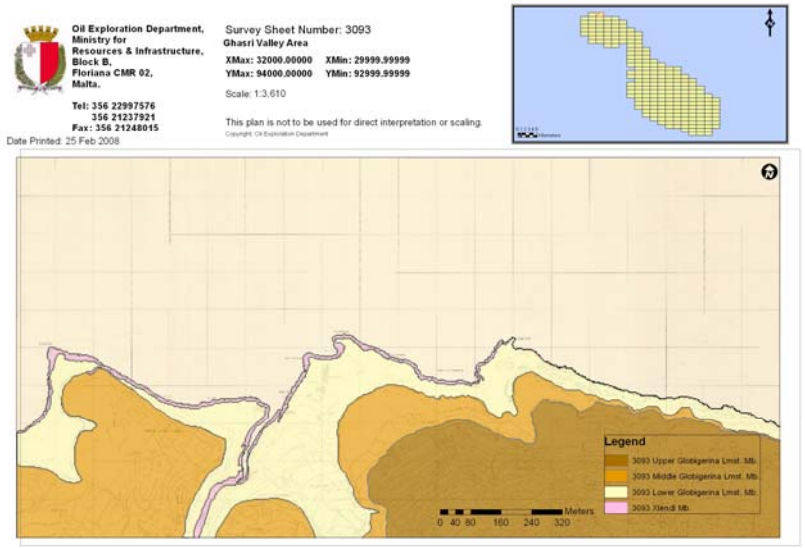
Importation of minerals

A study on the importation of minerals into the Maltese Islands has been undertaken by the Authority. The aim of this study is to assess the feasibility of importing, where appropriate minerals which may be used as a substitute to local minerals, and taking into account economic, environmental and social issues.

The Directorate for Mineral Resources Regulations is examining the local position with respect to mineral production such that it may determine whether the imported product would perform better than the local products.

Identification of economic uses of mineral waste

Research work is being undertaken to identify the economic uses of mineral waste, including demolition waste. In this respect the Authority will undertake a detailed study to identify any economic use of mineral waste, including demolition waste. The research will assess the economic viability, including direct and indirect cost and benefits, of reusing mineral waste and will also examine the environment impact as a consequence of the resources of mineral waste. The study will also evaluate the impacts with the current disposal methods.



Chapter 6

Water Resources Regulation

The Directorate for Water Resources Regulation focused its efforts on three strategic policy areas with the objective of improving the sustainable management of water resources and ensuring a more effective delivery of water services by putting good water-governance into practice. The policy areas can be grouped in three categories:

1. Resource development, protection and control
2. Regulation of service providers
3. Stakeholder consultation, public participation and data-base management.

Resource Development, Protection and Control

The Directorate for Water Resources Regulation actively monitors the practices related to resource development aiming at improving the qualitative and quantitative status of all groundwater bodies as a renewable source of freshwater. Within its corporate function, the Directorate has delegated responsibility of implementing the obligations required by the EU Water Framework Directive 2000/60/EC transposed under Maltese Legislation as LN194/2004.

National Implementation Process of the Water Framework Directive

The Water Framework Directive is a framework legislation aiming to achieve high environmental standards for all water resources, by 2015. It establishes a very demanding set of obligations and regulatory reporting requirements, scheduled by clearly defined deadlines. Notwithstanding the lack of human resources available to the Water Directorate, all WFD obligations falling under the remit of the MRA were hitherto fulfilled and reporting obligations were duly met. In the following paragraphs, the preparatory work related to the forthcoming obligations of the Directive for 2008, 2009 are being reported, pointing out that these tasks constitute one of the main strategic functions of the Directorate.

Development of Groundwater Monitoring Networks

Article 8 of the Water Framework Directive (WFD) defines a requirement for the establishment of programmes for the monitoring of groundwater, intended to provide the necessary information to enable the achievement of the Article 4 Environmental Objectives. In particular the programmes are intended to provide the information for the assessment of groundwater quantitative and qualitative status, and for the identification of significant, long–term trends in natural conditions and trends resulting from anthropogenic impact.

The results of the Article 5 'Characterisation' assessment conducted by the MRA during 2005, indicated that all the bodies of groundwater in the Maltese River Basin District (RBD) can be considered to be 'at risk' of failing to achieve the objectives of

Table 9: Established groupings of groundwater bodies

Group Code	Component GWB Code	Name of Component Groundwater Bodies
MT0_G01	MT001	Malta Mean Sea Level
MT0_G02	MT002	Rabat-Dingli Perched
MT0_G03	MT003, MT006, MT014	Mgarr/Wardija Perched, Mizieb Mean Sea Level, Ghajnsielem Perched
MT0_G04	MT005, MT009, MT010	Pwales Coastal, Mellieha Coastal, Marfa Coastal
MT0_G05	MT008, MT015, MT016	Mellieha Perched, Nadur Perched, Xaghra Perched
MT0_G06	MT017, MT018	Zebbug Perched, Victoria-Kercem Perched
MT0_G07	MT012, MT013	Kemmuna Mean Sea Level, Gozo Mean Sea Level

the Directive. In as much, the provisions of the Directive allow grouping only for those water bodies which are sufficiently similar in terms of aquifer characteristics, pathway susceptibilities, pressures and confidence in their risk assessments. A review of the conclusions of the Characterisation Report was undertaken, and used for the delineation of these 'management' groupings of the groundwater bodies. The resulting groupings are outlined in Table 9.

It should be stressed that the Directive requires the establishment of a monitoring network which is representative of each groundwater body. The amount of monitoring required thus needs to be proportional to the difficulty in judging the status of the groundwater body, the presence of adverse trends and the implication of errors in such judgements, in particular with regard to the setting up programmes of measures.

Consequently, different approaches for establishing monitoring networks have been adopted in the Maltese RBD, in order to take into consideration the relative importance of the groundwater bodies with particular reference to those water bodies which sustain freshwater ecosystems and those which are utilised as sources of 'water intended for human consumption'. The conclusions of this analysis are:

(i) For the **sea-level groundwater bodies** a monitoring density of one site per sixteen square kilometres was established. This allows detailed investigations on spatial variations in the quality of these water bodies and also to permit further future upgrades in the resulting monitoring networks.

(ii) For the **perched water bodies** a minimum threshold of three monitoring points for each groundwater body grouping, with at least one monitoring point in each groundwater body was established. An additional 'qualitative status' monitoring point was established in the case of the Rabat-Dingli perched groundwater body to provide effective coverage to the surface water systems that this body sustains.

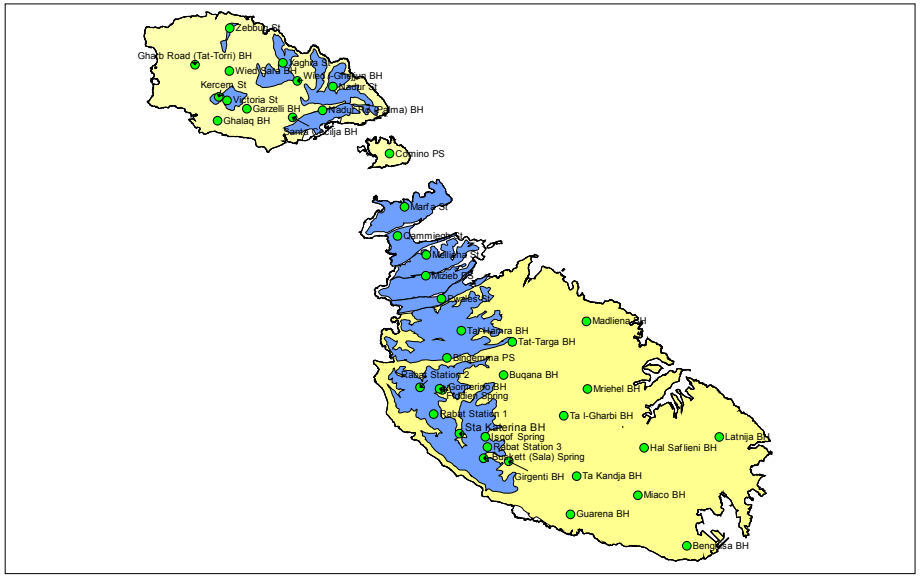
An outline of the number of monitoring sites in each groundwater body is presented in Table 10 below; whilst spatial views of the established Quantitative and Qualitative Monitoring Networks are presented in Figure 9 and Figure 10 respectively.

A report outlining the monitoring networks and the related monitoring strategies was submitted to the European Commission in August 2007. It is moreover planned that

Table 10: Established Groundwater Monitoring Points

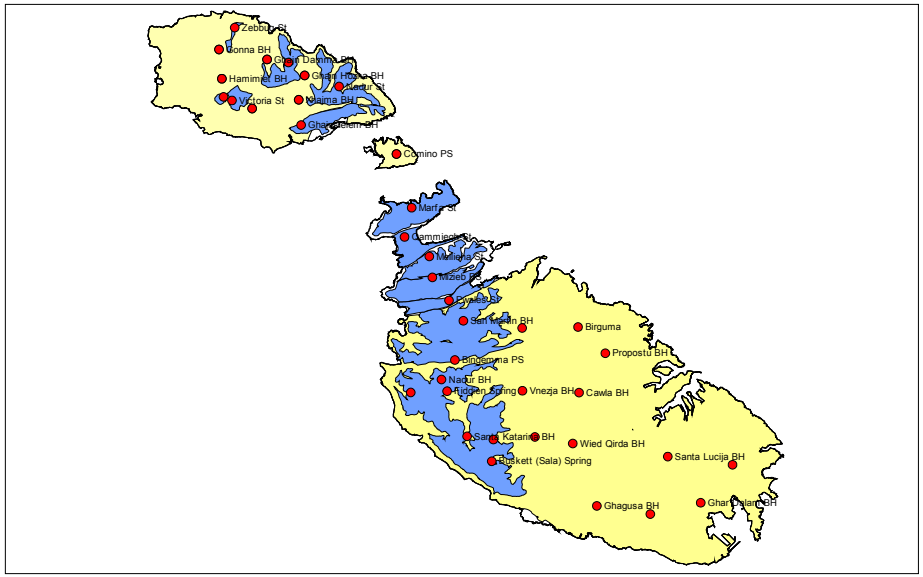
Group Code	Total Number of Monitoring Sites	Quantitative Monitoring Sites	Surveillance Monitoring Sites	Operational Monitoring Sites	Protected Area Monitoring Sites
MT0_G01	108	15	15	15	50
MT0_G02	14	6	4	4	0
MT0_G03	14	3	3	3	5
MT0_G04	9	3	3	3	0
MT0_G05	9	3	3	3	0
MT0_G06	9	3	3	3	0
MT0_G07	55	7	7	7	34

Figure 17: Plan of the Proposed 'Quantitative Status' Monitoring Network



full details of the network setting up process will be made available for public information from the MRA web-site during 2008. The process of effectively commissioning regular monitoring in all groundwater bodies is envisaged to be completed during 2008.

Figure 18: Plan of the Proposed 'Qualitative Status' Monitoring Network



Identification of significant water management issues

In line with the requirements of Article 14 of the WFD, Member States need to identify significant water management issues for each River Basin District and to present them to the public for consultation (at the latest by December 2007).

On the basis of the results of the Article 5 Characterisation assessment, six main water management issues were identified for the groundwater bodies in the Maltese Water Catchment District.

Non-sustainable abstraction practices - the quantitative problem

Overall, over-abstraction is problematic for 10 out of the 16 groundwater bodies, which were classified as being at risk or potentially at risk because of groundwater quantity issues. In particular, this *'at risk'* group includes the two main mean sea level aquifer systems that are of strategic importance for the country. Solving over-abstraction problems will require reducing groundwater abstraction by different sectors - either by increasing water use efficiency or procuring alternative sources of water such as treated sewage effluents and rainwater.

Groundwater chemical quality status in particular with regards to nitrate and chloride concentrations

Recent trends in groundwater quality have shown an important increase in nitrate and chloride concentrations in groundwater. Average nitrate concentrations are often exceeding the 50mg/l Groundwater Quality Standard, with values as high as five times this value being reported in the perched aquifer systems. As a result, 15 out of 16 groundwater bodies have been classified as being at risk of not reaching the WFD's Environmental Objectives due to qualitative issues.

Regulatory framework and enforcement

The implementation of the WFD requires reinforcing the current legislative structures to enable effective enforcement of sustainable practices. It will also depend on more co-operation between stakeholders - for example, in implementing *cross compliance* regulations by the agricultural sector in particular where the Nitrates Directive is concerned. For the achievement of the environmental objectives of the WFD, more emphasis will be also made to interaction of water policy with other policy areas effecting land-use and economic development. Hence the allocation of sufficient financial resources is key to these issues if the objectives of WFD are to be achieved within the expected timeframes.

Information and awareness raising

Water is essential to people's life and to the sustainability of the Maltese economy. But there is a general lack of education on water issues and limited understanding of:

(i) the nature and magnitude of the problems currently faced by Malta with regards to groundwater sustainability, in the light of current practices and the effects of climate change.
(ii) the consequences of individual actions in the origin of these problems,
(iii) the direct and indirect responsibility and liability one might have, and
(iv) the potential solutions to solving groundwater management problems.

A key challenge is therefore facilitating the citizen's access to data and knowledge, while creating the required educational facilities to generate a more "water-aware" society. This will invariably need to be tackled within the information and consultation processes required under the EU Water Framework Directive.

Enhancing the knowledge base

The characterisation assessment has identified several data gaps in key water management areas, calling for further research and investigations to obtain a better understanding of anthropogenic impact on groundwater. There are still several unknown figures which will ultimately throw more light on the measures required to improve groundwater management. Such issues include, the impact of private groundwater abstraction, the impact arising from the use of treated effluent for irrigated agriculture, the nitrate balance, the impact of pesticides on groundwater and

the impact of solid waste disposal in particular the disposal of hazardous priority substances by the industrial sector.

An in-depth evaluation on the impact of measures has been conducted by the Directorate with the assistance of a Twinning partner the International Office for Water (OIEAU). Details of this study are given further on.

Art 11- 2000/60/EC – the Programme of Measures

Article 11 of the 2000/60/EC requires Member States to draw a programme of measures such as to achieve good environmental status of all water bodies by 2015. MRA as the competent authority on groundwater commissioned a study with the assistance of the Ministry of Ecology and Sustainable Development in France and the Office International de l'EAU (OIEau) through *Twinning Light* to draw a set of measures aimed at establishing an effective framework for the management of groundwater and nonetheless for the improvement of the municipal supply in Malta and Gozo.

The study first identified the baseline scenario and assessed the measures required for achieving good quantitative and qualitative status for groundwater. A compendium of measures was drawn each of which were assessed on the basis of unitary cost, the respective impact on groundwater status and cost-effectiveness. Measures were ranked according suitability to restore the groundwater status.

Furthermore the financial implications of cost recovery by different users were examined in the context of Article 9 of the Directive. Special attention was given also to the socio-economic implications of the selected measures, in the light of cost recovery implications for the various sectors and the taxpayer in general.

The total investment cost of the basic and supplementary measures amount to Lm129 million or € 300 million which include, amongst other, the investment required for the improvement of the drinking water quality, the compliance with the Urban Wastewater Treatment Directive and the replacement cost for reducing groundwater abstraction.

The study assessed three alternative scenarios for achieving good status. Each scenario implies a series of measures that carry a related capital investment and annualised costs. It was established that the most cost-effective scenario focused on water demand management and laid more emphasis on the need for improvement of water governance and awareness building. Measures are addressed towards various categories of consumers including industry and agriculture.

The Authority will be submitting the programme of measures to Government for political approval and further discussion prior to implementation.

Results of Commission Screening of Article 3 and 5 Reports

In March 2007, the Commission issued a 'Working Document' entitled '***Towards a Sustainable Water Management In the European Union***' which analysed the quality of the first two WFD implementation reports submitted by Member States.

Overall, the results presented by the Commission are satisfactory with regards to the reports submitted by Malta, where the main problems identified related to the delayed submission of particular sections of these reports.

Figure 19: Performance Indicators of Member States on overall implementation of environmental and economic analysis—Article 5 WFD

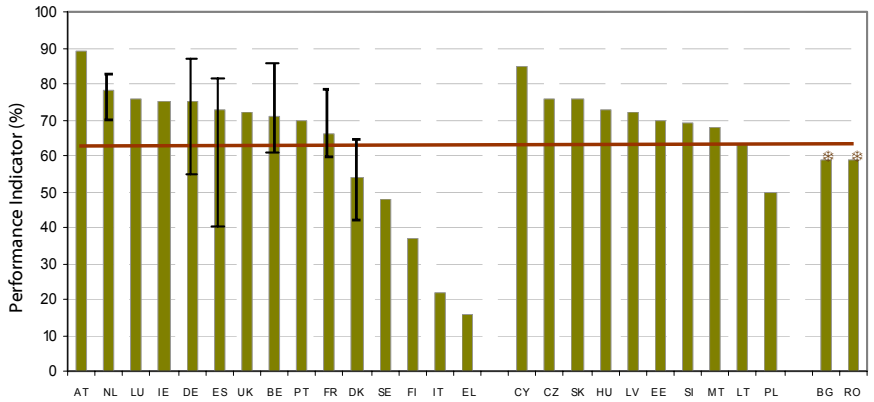
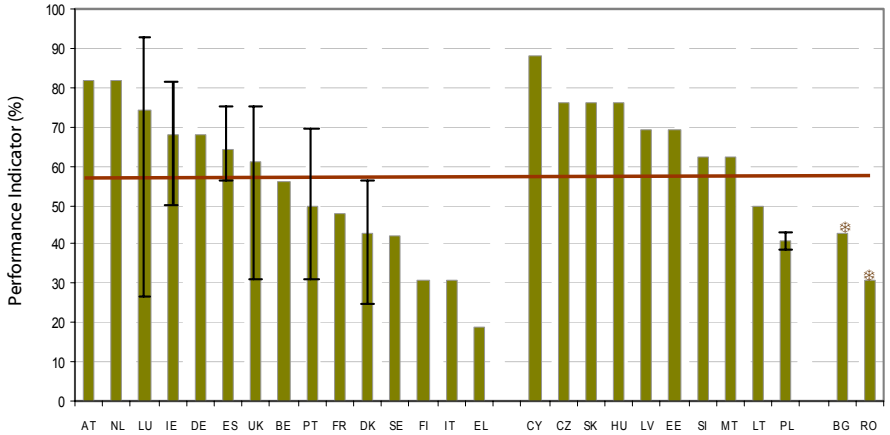


Figure 20: Performance Indicators of Member States on pressures and impact analysis and risk analysis of groundwater — Article 5 WFD



Implementation Programme of the WFD

The implementation strategy for the Water Framework Directive envisages a number of important activities in the next two years. These are:

- the effective commissioning of regular monitoring of the quantitative and qualitative status of groundwater bodies during 2008;
- the development of a draft Water Catchment Management Plan, to be issued for public consultation by December 2008;
- the publication of the final Water Catchment Management Plan by December 2009.

Details are presented in Table 11.

Table 11: Timetable of implementation activities for the coming two year period

	Monitoring Activities		Water Catchment Management Planning Activities
2007	Define Monitoring Networks Submit a report on the design of the Monitoring Networks to the European Commission		Publish an interim overview of the significant water management issues in the Water Catchment District for general consultation.
2008	Surveillance Monitoring Operational Monitoring	Quantitative Status Monitoring	Publish a draft of the first Water Catchment District Management Plan for consultation
2009	Operational Monitoring	Quantitative Status Monitoring	Finalise and publish the first Water Catchment District Management Plan Finalise the Programme of Measures required for achieving the Environmental Objectives of the Directive. Submit a report on the Water Catchment District Management Plan to the European Commission.

The New Groundwater Directive (2006/118/EC)

Publication and Transposition Requirements

The new Groundwater Directive was adopted on the 12th December 2006. This Directive establishes a framework which defines quality standards for groundwater and introduces measures to prevent and limit the input of pollutants into groundwater with due consideration being taken of the different regional and national specificities of groundwater bodies.

Aims of the Directive

This Directive complements the environmental objectives of the Water Framework Directive. Basically it requires that:

- chemical quality standards be established for all groundwater bodies by the end of 2008;
- the pollution trends in groundwater bodies be determined and actions taken for these to be reversed;
- measures for the prevention and limitation of the input of pollutants into groundwater be identified and made operational; and
- groundwater quality complies with the good chemical status objectives of the Water Framework Directive.

Implementation programme of the Groundwater Directive

The implementation strategy for this Directive requires Member States to bring into force laws, regulations and administrative provisions for its implementation by January 2009.

Moreover, Member States are also required to set by December 2008 'Threshold Values' - groundwater quality standards at the Member State Level - for all those parameters which were identified by the WFD Article 5 analysis as contributing to the risk of achievement of the Environmental Objectives of the Directive; and determine the starting point for the reversal of the trends in the concentration of these parameters in groundwater. These requirements will be reported to the European Commission within the River Basin Management Plan required under the WFD.

The detailed implementation time-table for this Directive is presented in Table 12:

Table 12: Timetable of implementation activities for the coming two year period

	Implementation Activities
2008	Establishment of Threshold Values for those parameters identified as contributing to the characterisation of a groundwater body to be at risk.
2009	Transposition of Directive into Maltese Legislation (16th January 2009). Establishment of starting points for the determination of Trend Reversals. Reporting to European Commission on the Threshold Values; as part of the reporting for the Water Catchment District Management Plan.

Common Implementation Strategy for the Water Framework Directive

EIONET Data Submission - 2006

The European environment information and observation network (EIONET) aims to provide the necessary tools and data to enable the European Environmental Agency (EEA) to produce timely and quality-assured reports on the state of the environment in Europe and the pressures acting on it.

The Water Directorate is the National Focal Point for Groundwater Quality reporting on this information network. Quality data covering the calendar year 2005, on the major aquifer systems in the Maltese islands was submitted by the Directorate to the EEA during October 2006.

Further details on this reporting exercise can be downloaded from the website of the European Environment Agency:
http://reports.eea.europa.eu/corporate_document_2007_3/en

Figure 21: Summary Result for the 2006 Groundwater Quality Report submitted by the MRA

EWN3: Groundwater quality		Data delivered on time and in the requested format. General descriptions provided. Quality data provided. No data on pesticides and hazardous substances provided. GIS data provided. Saltwater intrusion data provided.

Participation in EU Fora

WG C Groundwater Working Group

Officials from the Directorate for Water Resources Regulation participated in the two meetings of the Groundwater Working Group held under the Common Implementation Strategy of the Water Framework Directive. During these meetings, which were held in Lisbon and Berlin, the European Commission presented for discussion guidelines for the implementation of provisions of the WFD.

The discussions during these two meetings were mainly centred on the following issues:

- The determination of groundwater protected areas;
- Guidance on the development of measures for the prevention and limitation of the input of pollutants into groundwater;
- The development of methodologies for the determination of Groundwater Threshold Values; and
- Guidance on the methodologies to be adopted by Member States for the identification of pollutant trends in groundwater.

Within this Working Group the MRA is also collaborating with other Mediterranean Member States in order to bring to the forefront issues specific to our region. This, since the pressures on the aquifers (the regional semi-arid climate, higher population densities, the influx of tourism) and the resulting impacts (water scarcity, saline intrusion) in the Mediterranean region are quite different from those experienced in other Member States and need specific measures and considerations. Moreover, the MRA is also stressing that EU legislation in the water sector must be flexible enough to

be able take into consideration issues related to climate change, given that current studies indicate significant impacts on the water availability in our region.

The MRA is also supporting a Commission initiative for increasing the dialogue on water issues with other Mediterranean countries, in order to ensure increased co-operation in the region.

During these discussions, the officials from the Directorate commented on the impact which these Commission guidelines could have on the implementation of the WFD in a coastal or island groundwater scenario. A number of these comments were accepted by the Commission and eventually included in the guidance documents.

Moreover, officials from the Directorate were invited by the Commission to contribute in the drafting and development of a Commission guidance document on the methodologies to be adopted for the determination of Groundwater Threshold Values and for the setting up of Groundwater Status determination tests.

Environmental Objectives Drafting Group

Officials from the Directorate for Water Resources Regulation also participated in the Commission drafting group on the Environmental Objectives and Exemptions under the Water Framework Directive. The aim of this drafting group is to develop guidelines to Member States and the Commission on which requests for exemptions from the achievement of the objectives of the WFD are to be determined.

EU Water Directors' Meetings

Two meetings of the EU Water Directors were held, in Dresden and in Lisbon. At the Water Director's meeting held in Lisbon, the issue of exemptions to the environmental objectives required under Article 4 of 2000/60/EC, was extensively discussed with particular emphasis on the disproportionality of costs.

The conclusions of these discussions are being reported in view of the economic implications on a national scale. Emphasis was made by the EU Commission on the application of exemptions as a last measure to be applied only under exceptional circumstances. Furthermore the burden of financial cost arising MS obligations for compliance with the old directives cannot be taken into account when deciding on disproportionality of costs.

In other words the cost of compliance with directives such as the Nitrate Directive, the Urban Wastewater Treatment Directive, the Drinking Water Directive, the Bathing Water Directive, the IPPC Directive etc, cannot be used by Malta as a justification to extend deadlines. This has serious implications in our local perspective as failure to comply with these directives on grounds of high cost, will not lever any justification for the extension of deadlines.

At the meeting in Lisbon the need was expressed to develop a common understanding by Member States on the application of exemptions, as the approaching deadlines for the submission of the River Basin Management Plan was raising concern, especially in new Member States.

The Water Directors requested further clarification from the Commission as to different interpretation of phased implementation as per Article 4.4 and less

stringent objectives as per Art 4.5. and how the related assessment between will materialise in practice. Furthermore the need was expressed to develop a common understanding where the criteria of affordability may apply or not, calling for concrete examples. Emphasis was also made on the need to explore all possible sources of financing structures, more so in the light of the approaching deadline for the River Basin Management Plan. A better overview on the different approaches in Member States is needed supported by concrete examples of cases where available finances are proven to be insufficient to implement measures by the first RBMP cycle. Financial measures need to be examined further in the light of recovery of cost and its impact on social standards

The Authority alerted Government to proceed with inter-ministerial discussions which will support the preparatory work for Malta to build its case to the Commission. A number of research projects currently undertaken by the Directorate for Water Resources Regulation will support this decision-making process but it needs to be pointed out at this stage that preliminary studies conducted by the MRA, lead to three main conclusions:

- Malta will fail to reach the qualitative objectives required by the WFD in 2015.
- Nitrate levels in groundwater will not drop to the 50mg/l threshold by 2015, even with the enforcement of strict measures limiting the input of fertilisers.
- Quantitative measures meant to alleviate pressures on groundwater imply high investment costs, as alternative (non conventional) sources of supply will be required to replace groundwater.

Working Group D - Reporting Obligations

The overall objective of the group is to identify information and data to be transmitted and to prepare guidelines on the transmission and processing of information and data gathered in the frame of the WFD. These guidelines are meant to cover also the reporting aspects resulting from other water directives and are drafted with the view of collecting targeted data and information, avoiding duplication and ensuring an efficient use of available data and information. During 2007 the Working Group convened twice and discussed issues concerning WISE and the State of the Environment and Trends Report. Preparation of the 2010 Guidance was also initiated for the preparation of the reporting sheets for the 2010 River Basin management Plan and for the New Groundwater Directive. The Working Group also issued guidance on the reporting obligations concerning the Urban Wastewater Treatment Directive, priority substances and the new Floods Directive.

Review of Groundwater Quality

During the current year, the MRA carried out an extensive survey on the chemical quality of groundwater abstracted from boreholes and pumping stations operated by the Water Services Corporation. This study involved the collection and analysis of 25 groundwater samples from randomly selected stations in the Malta main mean sea-level, the Mgarr-Wardija and the Mizieb groundwater bodies. The study was carried out in support of the threshold value setting process currently being undertaken by the MRA in line with the requirements of the new Groundwater Directive.

The results obtained indicated that generally:

1. the levels of sea-water related ions such as chloride, sodium and sulphate are generally high with the 23, 8 and 2 samples found exceeding the indicative values of the Drinking Water Directive respectively for each ion.
2. the levels of nitrate exceed the EU Quality Standard of 50mg/l in all but two stations;
3. the levels of heavy metals, pesticides and other organic compounds were significantly lower than the drinking water quality standards in all stations.

Figure 22: Correlation plot Cl vs Na from groundwater

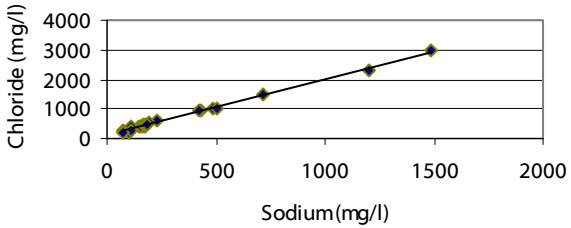


Figure 23: Correlation plot Mg vs Cl from groundwater

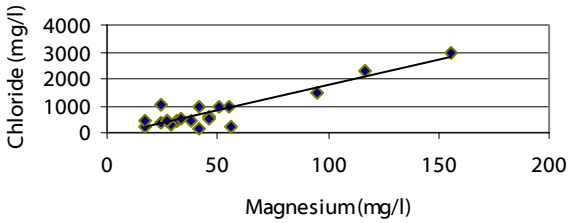
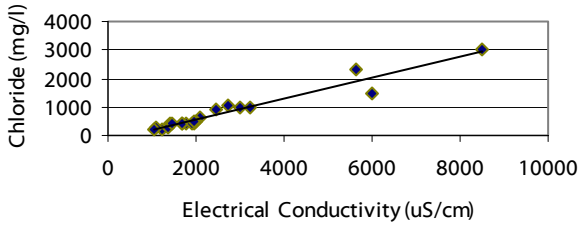


Figure 24: Correlation plot Conductivity vs Cl from groundwater



It should be clarified that these results do not reflect the quality of the potable water supplied by the WSC since this water is blended with desalinated water lowering the content of these parameters in line with the quality objectives of the Drinking Water Directive. Further investigations on these results were carried out, in order to assess the possibility of any anthropogenic origin to the high levels of the sea-water related ions.

The graph of sodium (Na) versus chloride (Cl) shows an excellent correlation between Na and CL. Actually, these two elements are the two major constituents of seawater. The same conclusion can be drawn from the magnesium (Mg) versus chloride (Cl) graph; but scattered Mg values are observed, particularly for low Mg values.

The graph of conductivity versus chloride shows the habitual correlation in this context between these parameters, and demonstrates that the salty water is responsible for the large conductivity observed and will hide some smaller conductivity variations that are related to pollution on this island.

Upgrading of water quality data management system

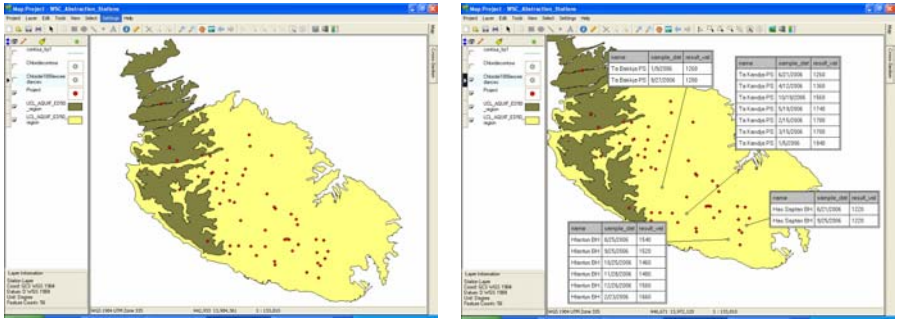
The Directorate for Water Resources Regulation owns a long series of water quality data which needs to be structured in a way to allow easy handling for monitoring purposes. For this purposes a new database system has been developed using proprietary software *Hydrogeoanalyst* which combines point data with GIS (spatial) data. This feature reduces processing time and increases data analysis possibilities.

It is envisaged that this data management tool will facilitate the determination and visualisation of the chemical status of the aquifers. The data base structure

developed will group all the chemical quality data available and the integration with the GIS structure will enable this data to be available on a spatial scale. Moreover, the spatial (GIS) interface, will enable the development of pictorial representations of the chemical quality of the aquifers and thus prove as an important tool for reaching out to the general public.

This data management system will also find an important application within the implementation process of the Water Framework and Groundwater Directives in the Maltese islands, being complimentary to the data analysis required under these Directives.

Figure 25: Samples of Spatial Representation of Groundwater Abstraction and Monitoring Points



Revision of legislation regarding discharges into the aquatic environment

The Directorate for Water Resources Regulation is responsible for the stewardship of natural resources and is therefore in duty bound to protect against quality deterioration. Major potential contributors to this deterioration are wastes generated from anthropogenic activity. During this year the Directorate started a review of the legislation regarding discharges of pollutants into the aquatic environment. Preliminary discussions were held with MEPA, which is responsible for a number of legal notices prohibiting the discharge of dangerous substances.

Discussions are underway with representatives of the industrial sector and the Water Services Corporation, in its capacity as operator of the Public Sewage Network to revise the Sewer Discharge Control Regulations of 2002.

Research Projects - Supporting the Functions of the Directorate for Water Resources Regulation

Compliance with the obligations of the Water Framework Directive calls for continuous research in several fields related to water resources management coupled with regular monitoring to enable the assessment of quantitative and qualitative trends. The Directorate for Water Resources Regulation therefore undertook various research works financed by international programmes supported by the EU. Through these programmes the Directorate was able to conduct research on specific themes related to its core functions and supporting those tasks leading to compliance with EU legislation, in particular the Water Framework Directive. Though several requests for participation in international programmes were received by the Directorate for Water Resources Regulation, only those relevant to its regulatory business were entertained.

Research on Measures to improve quantitative trends in Groundwater

Re-use of treated sewage effluent as an alternative resource (INWATERMAN - INTERREG IIIA Italia-Malta)

The construction of three new wastewater treatment plants in the Maltese islands will see the annual production of around 18hm³ of treated sewage effluent, thus introducing a new source of water which could be utilized in lieu of groundwater by certain sectors and therefore reduce the quantitative pressures on the aquifers.

The main aim of the INWATERMAN Project was to analyse the constraints limiting the eventual application of this resource in order to present in a realistic manner the facts related to this potential-use of treated sewage effluent and thus contribute towards the creation of a sound national debate on the issue.

During the course of the project, a number of constraining factors which potentially could limit the use of treated effluent in the Maltese islands were identified and investigated. The principal conclusions of the project are presented hereunder:

Effluent Quality

Discharged waste water inevitably has a higher salt content than the distributed water. This, since salts are added through the processes in which the water is used in all the sectors (domestic, industrial, tourism etc.)

The main sources of salt additions from the domestic sector can be assumed to arise from anthropogenic sources and the use of water in the various domestic uses particularly those where salts or detergents are mixed with the water.

Therefore, the salt content in the sewerage system originating from domestic sources will depend on the baseline set by the salt content of the tap-water. In fact, the parameters of concern in Malta (from the point of view of effluent re-use – in particular in the agricultural sector) are:

- Boron: Quality Standard of 1.0mg/l
- Chloride: Indicative value of 250mg/l
- Sodium: Indicative value of 200mg/l
- Conductivity: Indicative value of 2500us/cm

This since:

- If the irrigation water is saline, crops will absorb less water resulting in slower growth rate and reduced yields;
- High levels of sodium can, over time, damage the soil structure reducing infiltration and restricting sub-soil drainage;
- High levels of boron are toxic to plants.

One should however note that the quality of potable water has been steadily improving during the last twenty year period, with significant reduction being achieved in salt-water related ions. This is due to the introduction of desalinated water and the reduction of the proportion of groundwater in the public supply.

Taking the island of Gozo as an example of a predominantly domestic sewerage system, the conductivity at the sewerage outfall is of the same order (slightly higher) than that registered in the potable water network.

Several types of industries add significant amounts of salts to their process water. Other industries produce significant volumes of brines from water processing facilities. Typical examples include the food processing industries and batching

Figure 26: Salt additions in a predominantly domestic sewerage system

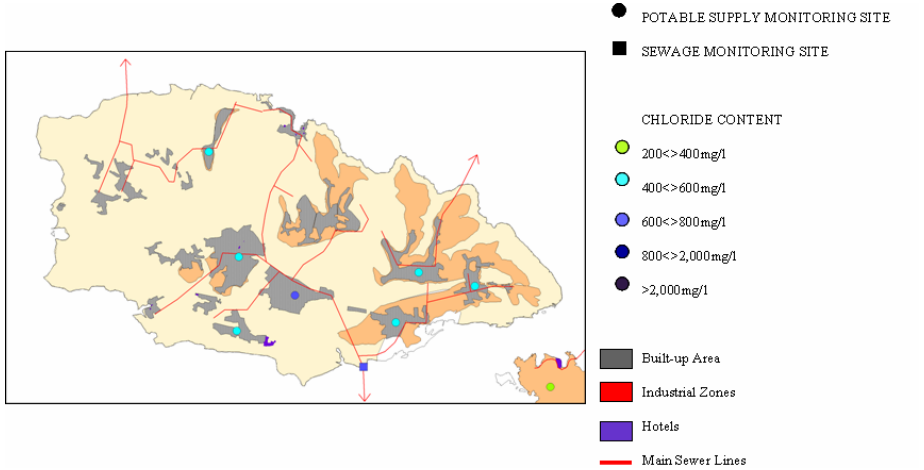
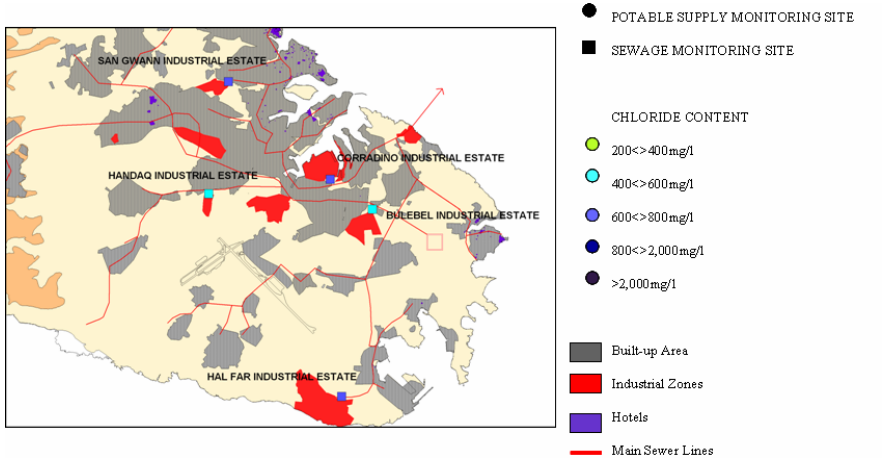


Figure 27: Salt additions to the sewerage system in industrial estates



plants. In Malta, discharges to the public sewers from all trade premises are regulated under Legal Notices 139 of 2002 and 378 of 2005 – Sewer Discharge Control Regulations.

Moreover, the operation of (including discharges from) large industrial plants are regulated under Directive 96/61/EC concerning integrated pollution prevention and control; which has been transposed into Maltese legislation by LN165/202 entitled Integrated Pollution Prevention and Control Regulations.

Water quality investigations carried out as part of the INWATERMAN project, showed that the conductivities of the effluent from certain industrial estates tend to be significantly higher than those encountered in the municipal water supply.

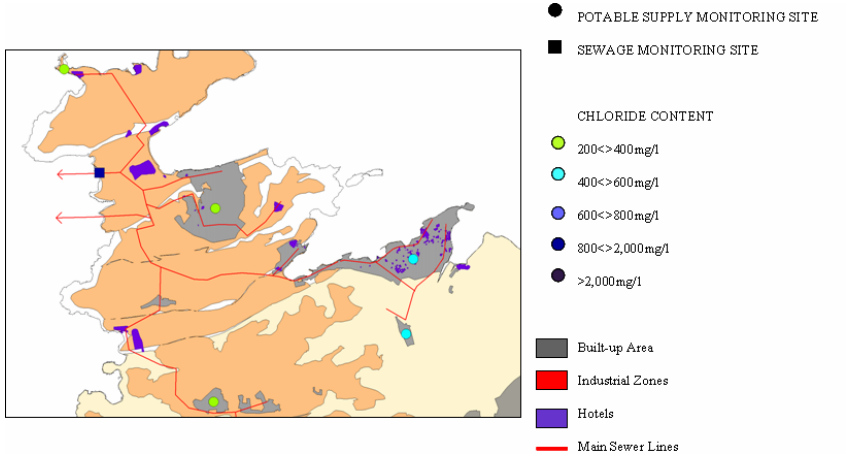
Water used in the normal (domestic) processes related to the tourism sector, would be salt enriched in a similar way to domestic effluents. However, this sector presents other sources of saline additions to the sewers; such as:

- Discharges of brines from water purifying facilities; and
- Discharges of sea-waters used for secondary purposes.

The chloride content of potable water in the northern region of Malta is quite low. However, the chloride content of the effluents at the sewage outfall is extremely high. The Sewerage Master Plan (COWI, 1992) had identified brine discharges from tourism establishments as one of the major sources of chlorides in the sewage in this area.

The Sewerage Master Plan (COWI, 1992) refers to various instances where infiltrations

Figure 28: Salt additions to the sewerage system in a predominantly touristic region



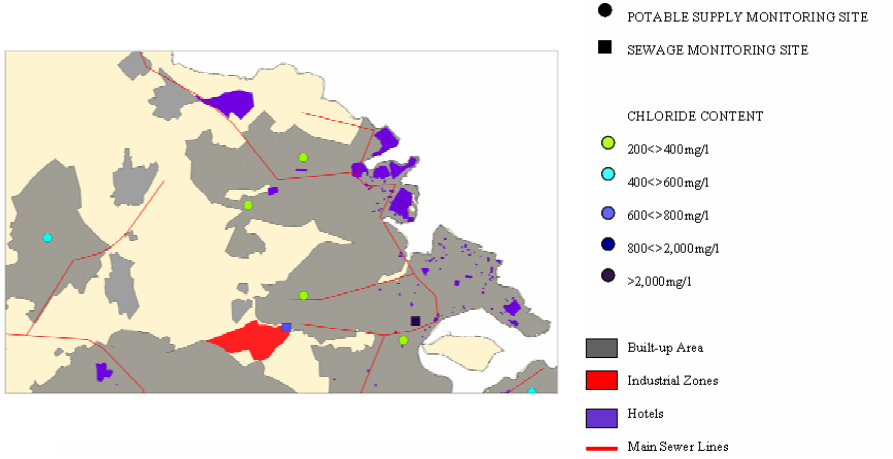
of sea water into the sewers were identified in particular in those areas where the sewers are situated below sea-level. One of the areas identified was the Sliema-Gzira area. In fact, conductivities in the sewers are of around an order of magnitude higher than that of the potable water supply in the area.

Distribution of the Effluent

Definitely, one of the most significant hurdles for ensuring the effective use of treated effluent is its distribution to the point of use. Various options to address this issue exist such as:

- utilising existing second class storage and distribution facilities;
- the construction of a dedicated distribution network for treated effluent; and

Figure 29: Salt additions to the sewerage system in a predominantly touristic region



- shifting the sources of existing 'water tanker' operators to treated effluent.

One possibility for the distribution of treated effluent considers the utilisation of existing 2nd class water infrastructure to deliver the treated effluent to storage reservoirs from where it can be delivered to users. Storage space is however limited since all existing 2nd class water infrastructure can store up to a maximum of around 150,000m^3.

Another possibility for the distribution of the treated effluent entails the construction of a dedicated 2nd class water distribution system. The existing treatment plant at Sant' Antnin already had a dedicated distribution system

essentially made up of open channels and reservoirs. Illegal tappings into the system and losses due to evaporation area major issues. Therefore any new distribution system should preferably utilise a closed pipe system in order to reduce losses and tampering. However, construction, operation and maintenance of such a system will invariably introduce a cost which will have to be borne (at least in part) by the end users.

Another limitation of such a system is its spatial extent, since a boundary will have to be fixed based on both economic (financially not viable to distribute water) and quantitative (water availability) reasons. The demand of users who would not be served by a dedicated second class distribution system could however be satisfied through the utilisation of water tankers. In Malta there are already a number of (illegal) water tankers in operation, which could be diverted to the distribution of treated effluent. More so, since, the volumes in question are quite within reach of their carrying capacity. This would also practically produce a 'legal' market for their service.

Health issues

The major limitations with regards to the potential use of treated effluent remain the issues related to the protection of public health. No clear guidelines exist to date regulating these aspects, especially at European level.

It is a fact that the exposure of consumers to contaminants arising from the use of wastewater depends on several factors including the quality of the applied wastewater, the method of application, the time-delay between the use and contact with the consumer as well as the consumers' habits. A comprehensive regulation of all these aspects must therefore be established in order to minimise as far as possible any risk ensuing from the eventual use of treated effluent.

Groundwater protection

When the effluent is applied to land (e.g.. irrigation), its salt content is also important from the point of view of the protection of the quality of the underlying groundwater resources. This, since all the salts which are introduced in the soils, will inevitably be flushed downwards to groundwater.

Considering a specific example, should all the effluent produced in the Gozo plant (1.75 million m^3 with an estimated TDS of 1,500mg/l) be utilised for irrigation, this would result in the potential annual introduction of around 2,500 tonnes of salts to the groundwater – inevitably presenting a further source of contamination for the aquifers.

Public perceptions and product marketability

Apart from the technical aspects limiting the use of treated effluent, one has to consider the acceptability of such use from the general public; particularly since this a negative perception will have an effect on the marketability of the product and hence on the viability of the concern in which the effluent is being utilised.

This is particularly important in the agricultural sector, where the apprehension of people towards crops irrigated with treated effluent could result in lower economic returns being obtained for such products. Moreover on an international scale, the use of treated effluent could hamper the export market of the whole agricultural sector; particularly to those countries where water availability is still not considered as a problem.

In Malta, there is a negative perception by the public towards the use of treated effluent in agricultural. This stems from the fact that crops irrigated with treated effluent in the Sant' Antnin area are considered to have a lower shelf life and a less 'fresh' aspect when compared to crops grown in other parts of the islands. Most

probably these problems stem from the salinity of the effluent; and would still happen if the crops had been irrigated with water having the same salinity.

It is therefore very important that any proposed use of treated effluent be accompanied by a wide public information campaign, informing the public on the pros and cons of effluent use. An informed consumer base is a very important process in building up consumer confidence in any re-use proposal.

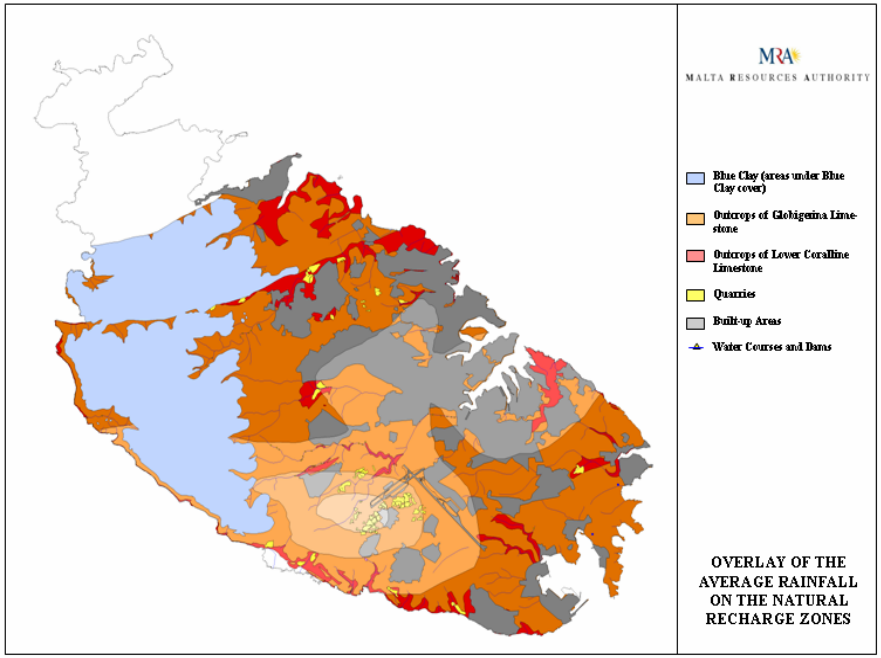
Research related to Resource Protection

WATER-MAP - INTERREG IIIB - Archimed

The "Characterisation" report required by Article 5 of the WFD showed that most of the aquifers were at risk of failing to meet the environmental objectives of the Directive by 2015. On this count alone, the Directive requires Member States to conduct further characterisation of these groundwater bodies to obtain a better understanding of their hydrogeological features in order to devise protective measures against further deterioration.

Thus an understanding of groundwater conditions and their inherent vulnerability to anthropogenic activity is critical for sustaining the ecological and human use-functions of this resource. More so when groundwater provides an important source of freshwater in Malta, both for drinking purpose and for agriculture

Figure 30: Natural Recharge Areas to the Mean Sea Level Aquifer System



Aquifer vulnerability mapping is an important tool that can support the decision-maker with the protection of groundwater resources by identifying areas where the presence of contaminants within the surface catchment area of the groundwater body is more likely to induce the groundwater depletion. These maps are therefore useful management tools in particular for the processing of planning development

Figure 31: Soil Landscapes in the Maltese Islands

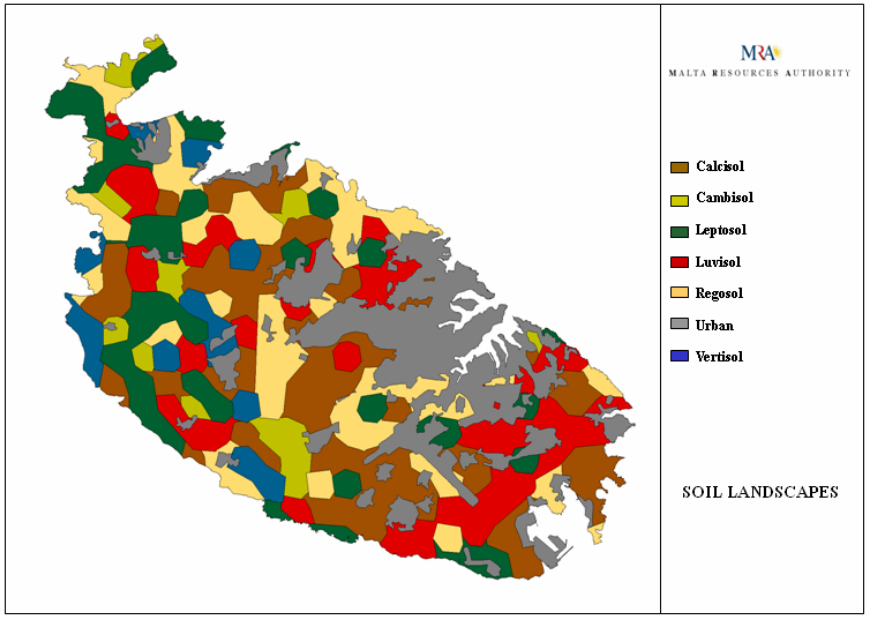
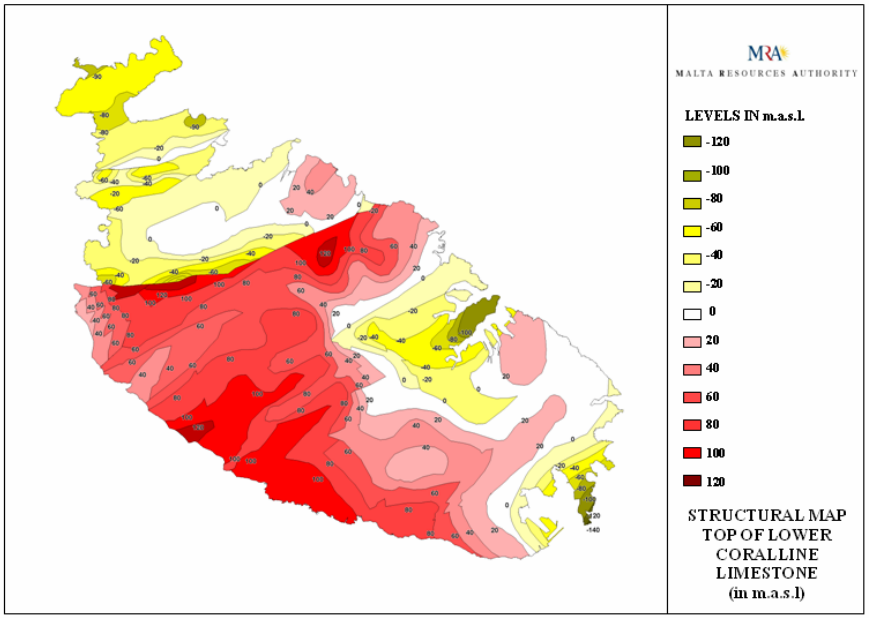


Figure 32: Structural Map of the top of the Lower Coralline Limestone Formation



applications. Vulnerability maps are rapidly becoming extremely common in groundwater protection; hence their application to the local scene.

The rationale behind the methodology defining the vulnerability mapping procedure is directly linked to the time of travel of infiltrating water and the contaminants that are transported with the water (usually in a dissolved state) from the surface to the saturated zone. The concept of vulnerability is tied to the assessment of the processes which will reduce the concentration and retard the arrival of a contaminant at the water table. As a typical example, tight rock formations delay contaminant transport, whereas fractured or coarse, porous media provide faster travel times and hence have a greater degree of vulnerability. Therefore, vulnerability mapping requires field surveys and studies of several geological, hydrological and morphological factors which will influence the path of the pollutant to groundwater.

Figure 33: Slope Map of the Malta

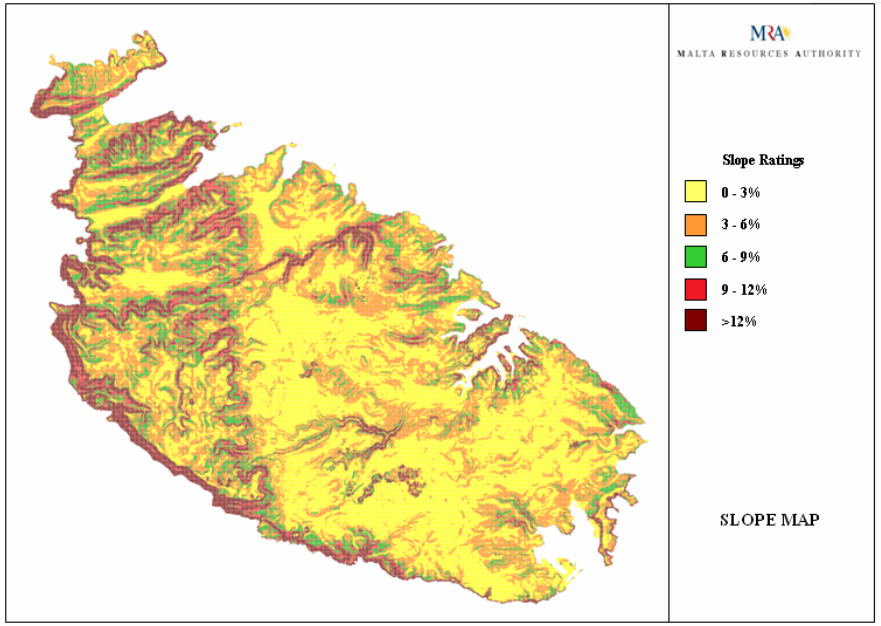
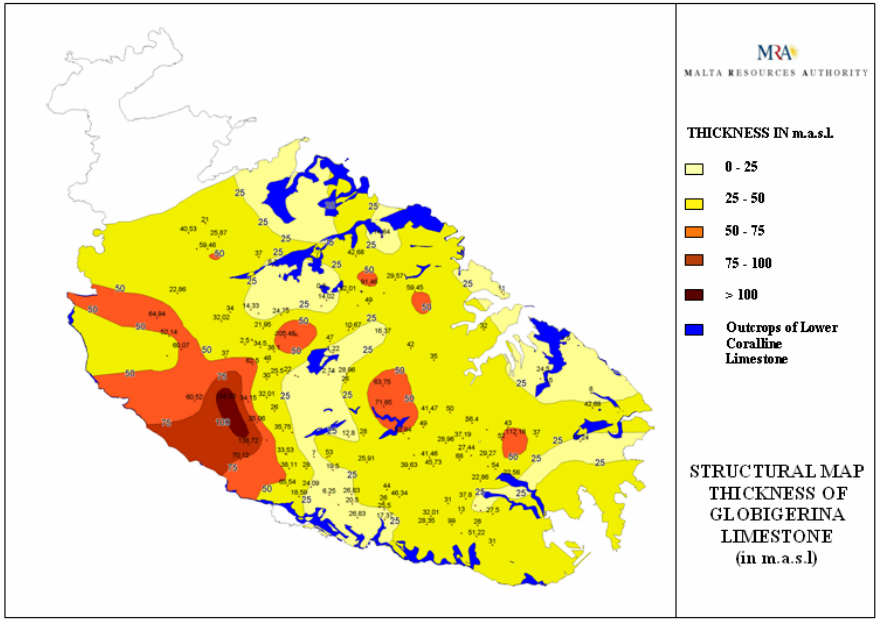
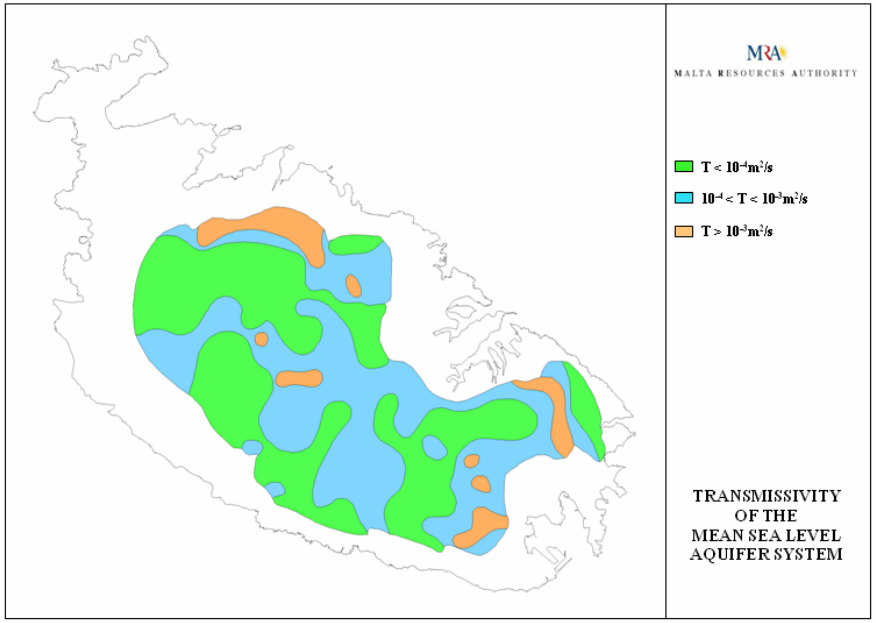


Figure 34: Structural Map of the Thickness of the Globigerina Limestone Formation within the Unsaturated Zone



The project identified the DRASTIC model, developed by Aller et al (2000) in the USA as the basic model for the development of the vulnerability model of the pilot areas. Following this, as a first step, a number of GIS based thematic maps were prepared for each of the parameters identified in the DRASTIC Vulnerability methodology. A number of these maps, developed for the Malta study area, are presented below. In its second phase, the project foresees the integration of these thematic maps for the development of the final aquifer vulnerability map.

Figure 35: Map of the Transmissivity of the Mean Sea Level Aquifer System

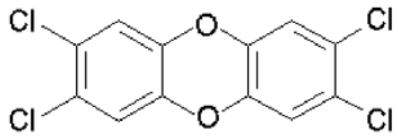


Research related to the Qualitative Status of Groundwater

SAFEWATER - FP7 CRAFT

The Safewater project aims to develop a monitoring technology to keep track of the concentration of adsordable AOX present in wastewater streams. To achieve this objective, the project proposes the development of compact equipment enabling an automated regular monitoring of wastewaters.

Some of the materials included in the Adsordable Organically bound Halogens (AOX) group are very toxic and noxious to living beings. They have toxic, mutagenic and carcinogenic effects on every living creatures. The concentration of AOX (dioxins, furans, PCBs, organochlorates or CFC's among others) in the environment changes vastly, and they can be found in water sediments, suspended in air and finally in living organisms, where they carry out their most devastating effects. Hence, there is a clear and pressing need to reduce the amount of AOX in the environment. However, the complex and costly laboratory based AOX monitoring techniques available to date have hampered the introduction of AOX related legislation, as inherent control and enforcement cannot be accomplished without access to a precise and fast AOX monitoring system.



2,3,7,8-tetrachlorodibenzeno-p-dioxin

Estimates for the potential production of AOX compounds in Malta were formulated based on the indicators for the production of dangerous liquid wastes from the services industry produced by the French Loire-Brittany Water Agency. These estimates show that the potential annual production of AOX compounds in Malta is of the order of 5 tonnes; a significant part of which could end up in the sewers and eventually in the local food cycle.

Table 13: Potential Production of AOX by the Services Industry in Malta

Industrial Activity	Estimated potential AOX production (kg/year)
Printing Industry	15
Mechanics	1,512
Photography	17
Dry Cleaning	3,433
TOTAL	**4,977**

These estimates show that AOX production and disposal present a potential problem in Malta constraining the re-use of treated sewage effluent. In as much, the development of a practical and reliable monitoring device to continuously monitor discharges is seen as an effective tool for determining the magnitude of the problem and protect the resource potential of treated effluent. It is also envisaged that the monitoring tool will be field-tested in Malta during the course of the project.

The Malta Resources Authority is participating in the project with an 'end-user' role, and entrusted with analysing the utilisability of the monitoring tool for the effective implementation of EU Policy.

Research related to the Impact of Drought on the Quantitative Status

PRODIM - INTERREG IIIB Archimed

The occurrence of drought translates into severe depletion of water resources. So far, very little information is available on the frequency of drought events in Malta, whilst little is known on the consequential effects of these events on the water balance and on future projections for groundwater availability. Driven by this objective, the Directorate for Water Resources Regulation commissioned a drought research study financed under INTERREG IIIB Archimed, PRODIM project.

The study entailed the analysis of a 50-year series of several meteorological parameters namely rainfall, temperature, relative humidity and evapotranspiration along with the development of drought indices to identify the occurrence of drought creation of new methodologies to monitor Drought and its influence.

Several Drought Indices have been developed to identify the occurrence of drought. These Indices take into consideration several meteorological parameters like rainfall, temperature, relative humidity and evapotranspiration to characterise particular periods under observation. In the studies carried out under the PRODIM two indices

namely, the Standardised Precipitation Index (SPI) and the Reconnaissance Drought Index (RDI) were used to characterise observation periods as either:

- Extremely Wet,
- Very Wet,
- Moderately Wet,
- Near Normal,
- Moderately Dry,
- Severely Dry, or
- Extremely Dry.

Figure 36: RDI Trends since 1947

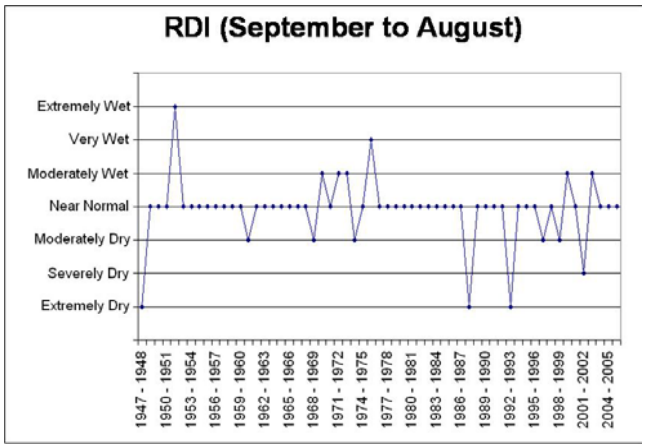


Figure 36 shows the characterisation of a 50-year series of Hydrological Years (September to August) according to RDI. The same categories were obtained in classifying the same Hydrological Years using SPI and hence the respective plot is purposely not included.

As one can see from Figure 26, there have been five years recorded in each of Moderately Wet and Moderately Dry categories; another year in both Very Wet and Severely Dry but when it comes to the extreme conditions only one year was recorded as Extremely Wet as opposed to three years being classified as Extremely Dry. Besides this, the spatial distribution through time of the occurrence of these events is of high relevance since these are more frequent in the later half of the observation period taken into consideration (1947-2006) in this analysis.

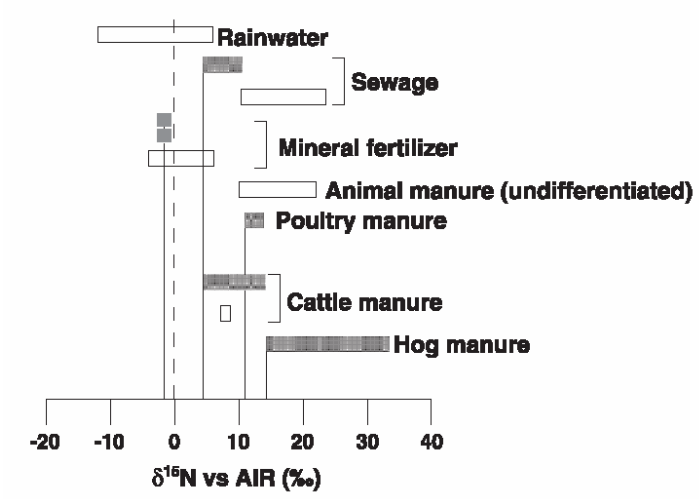
Courtesy PRODIM: http://www.project-prodim.eu/?pg=1&LANG=en

In the coming months the Directorate for Water Resources Regulation will be using further the information acquired from this project to assess the impact of climate change on the quantitative status of the aquifers and redraw the water balance for the purpose of defining a sustainable level of abstraction.

WFD and Agriculture – Tracing of Nitrate Sources
Nitrate Source Tracing Project

The overarching policy objective for groundwater in Malta is the achievement of good quantitative and qualitative status by 2015 as outlined by the Water Framework Directive. The achievement of good qualitative status is clearly spelled out in the new Groundwater Directive. In fact, this Directive defines a 'Groundwater Quality Standard' for nitrate content in groundwater at 50mg/l; which must not be exceeded for the achievement of good status.

Figure 37: N-Isotopic Signatures for various Nitrate Pollution Types



The Nitrates Directive, which tackles nitrate pollution originating from agricultural sources, defines as nitrate vulnerable zones, the recharge areas of aquifers where a content of 50mg/l Nitrate in groundwater is exceeded or could be exceeded if action is not taken. The Directive sets out an obligatory programme of measures for those areas, in order to reduce nitrate pollution.

In the implementation process of these two results-oriented Directives, measures will increasingly need to be targeted on the major polluting activities in order to progressively achieve the qualitative targets within the timeframes set in the legislation. Scientific policy support tools are therefore needed in order to clearly identify and quantify the contribution of the various activities towards groundwater contamination and as such induce stakeholder acceptance of the implemented mitigation measures and related disincentives. Apart from helping to achieve maximum benefit from the measures implemented, the results obtained will also reduce impacts on non-polluting activities since action will be focused on the 'polluters' – thereby effectively putting into operation the 'polluter pays principle'.
The identification and quantification of the contribution of various anthropogenic activities towards the nitrate contamination of the aquifers is therefore crucial for managing and addressing pollution mitigation measures in an equitable and socially acceptable way in order to help reduce and if possible prevent future contamination.

Tracing nitrogen compounds is not an exact science since no single methodology is able to differentiate the many sources of nitrogen in the environment. Source

attribution can be addressed, at least in part, by monitoring the stable isotope composition of the nitrogen and oxygen in nitrate dissolved in groundwater. In addition, detection in groundwater of nitrate co-contaminants and other chemical indicators that are specific to certain land uses can also be valuable for source attribution. Thus, this project proposes the development and utilisation of a multidisciplinary approach involving geochemical and hydrological modelling in conjunction with isotope tracing techniques in order to investigate the nitrate-pollution problem in the Maltese islands.

This project is funded within the Technical Assistance programme under the Rural Development Plan for Malta. Detailed terms of reference for the project were developed in consultation with the Rural Development Department and an international call for tenders was issued in January 2007. Five replies were received and the tender was adjudicated and issued to the British Geological Survey. The project is envisaged to start in December 2007, and finalised by June 2008.

Regulation of Service Providers

Licensing of the Water Services Corporation

Random Quality Check

The Water Services Corporation is a licensed operated by the MRA in terms of LN525/2005. In the discharge of its remit, the Water Directorate monitors the performance of the utility by way of quality of service and nonetheless the quality of the supply distributed to various localities. Hence an audit monitoring programme was performed on random points chosen from the public distribution network.

It needs to be emphasised that a definite improvement of drinking water quality has been registered over the whole territory; only a few points were found to be in exceedance of the indicator parametric value for sodium. Discussions were held between the MRA, the Health Regulator and the Water Services Corporation to improve the situation. The Corporation is in the process of upgrading its Reverse Osmosis facilities and will consequently improve the quality of drinking water while eliminating these exceedances.

Water Demand and Wastewater Discharges from Industrial Concerns

One of the sectors which pose a substantial impact on water resources is industry. A study was commissioned to address two important impacts arising from industry, namely water demand and the potential pollution of the aquatic environment.

A number of stakeholders were consulted during the process. These included:

- Malta Environment and Planning Authority
- Malta Enterprise
- Water Services Corporation;
- Federation of Industry;
- General Retailers and Traders Union;
- Ministry of Competitiveness and Communications;
- National Statistics Office.

The study revealed a substantial data-gap on both issues thus calling for a fresh programme for systematic data collection.

Where the pollution aspect is concerned, the impact industrial discharges to the aquatic environment was examined and found to lack a proper regulatory framework for industry. A future permitting system was proposed to have a 4-tier structure, namely:

- Industries requiring an IPPC Permit. This procedure is regulated by Legal Notice 165 of 2002 as amended by Legal Notice 230 of 2004.
- Industries which do not require an IPPC Permit but which will fall under a similar permitting process because of their impact on the environment. Thus the IPPC process will be extended to a wider range of industry. An impact assessment will be required and industries will be encouraged to apply the Best Available Techniques.
- Industries which will be given general binding rules with their permits, in which system the applying industry will be given standard binding rules that need to be applied according to the industrial type.
- Industries that will be exempt. These are mostly office based industries.

It has also been recommended that a unique desk for industrial application aspects should be created that would address the requirements of all regulating bodies under one application. As the Environmental Permitting Unit at MEPA is currently undertaking a study for devising a holistic permitting system for registered industrial concerns, MRA has started discussions with this unit so that its requirements can be dovetailed into the new proposed system.

Stakeholder consultation, public participation and data-base management

Development applications for consultation

Environmental Impact Assessments and Integrated Pollution Prevention and Control applications (IPPC)

A large number of existing installation applications were processed this year. IPPC applications include those related to the pharmaceutical industries, poultry farms,

Industrial energy intensive plants, oil storage and landfills. Due to the necessity to ensure the application of best available technologies in development applications, particular attention was given to the following main issues:

Water demand and actual consumption: Alternatives for water demand management are assessed and encouraged. These could involve water reuse and treatment, reduction in consumption through leakage detection and losses; water harvesting measures.

Groundwater quality and potential indirect discharges to surface water The MRA also sees that the Groundwater Directive List I and List II substances are prevented or limited from polluting water bodies. The requirements of the Water Framework Directive to establish a monitoring programme will surely aid in the surveillance of these discharges and related water quality.

- Discharges to sewers and chemical parameters in waste water;
- Waste management including methods for disposal;
- Fuel storage.

The MRA has also recognised the importance of integrating different permitting structures together and thus EIA permits and related IPPC permits were being considered simultaneously. Greater attention has been paid to cumulative impacts associated with larger developments which require an EIA. The sudden request for large developments to be located in close proximity to each other meant that greater attention had to be paid to water demand management mechanisms. Innovative ways for managing demand were concurrently investigated whilst carrying out the draft Programme of Measures for the WFD. This enabled these to be proposed at the planning level whenever the MRA was consulted on such major projects.

EMWIS

The year 2007 was the final one for the EMWIS project. The SEMIDE / EMWIS project had started in 1999 to "facilitate access to the existing know-how in the water sector and develop the sharing of information along with the preparation of common outputs and cooperation programs between the participating countries".

EMWIS addressed several issues concerning water information namely:

1. The difference in the level of advancement (and sometimes the absence of National Water Information systems in the participating countries). Some countries have advanced systems while others have barely started. This difference leads to problems in coordination and communication;
2. Lack of coordination between organizations and institutions within the same country which results in data gaps, duplication and discrepancy;
3. Difficulties to access data, whether because of technical reasons or lack of policies for data access;
4. Availability of data in different forms;
5. Lack of water data access policies;
6. Differences in ICT infrastructures, human resources capacity and in adopted processes for data collection , transfer, storage and dissemination in the participating countries.

Some countries address the issue of water information in their varying organisations using a micro approach rather than a macro approach. This approach has led to fragmented systems lacking consistency and integration.

SEMIDE
EMWIS

In order to solve these problems EMWIS is now looking at the enhancement of the National Water Information Systems (NWIS) in the participating countries since it is being anticipated that the improvement of these NWIS systems would improve and harmonise data/information exchange between participating countries.

In July 2005 a feasibility study to assess the current situation of a national water information system was carried out by *Easyinfo* Consulting Company in Malta. The study resulted in the general agreement between the participating stakeholders that the Malta Resources Authority was to be the NWIS National Focal Point. However, it was also outlined that the unavailability of an IT core system at the MRA would not enable the MRA to develop or host an NWIS.

During 2007 a diagnostic study to assess the feasibility of a Regional Observation mechanism was carried out. The main objective of this study was to focus on the current needs and expectations of Maltese stakeholders that either collect water data or any data related to water resources; or rely on its provision by other stakeholders. The aim of the study was to expose the existing potential, within a national context of the possible functionalities, needs and expectations of these different stakeholders in order to develop a Mediterranean Water Observation mechanism.

At face value most of the stakeholders interviewed acknowledged the need for a centralised water observation mechanism in the Mediterranean region but on further questioning it was revealed that priority should be given to developing a strong national central database that does not solely focus on water or water-related data but be all encompassing in its outlook towards other issues of environmental concern.

Participative/informative roles in environnemental management

The MRA also played a consultative role in a Twinning project which was organised principally by the MRAE and considered assistance to explore long term projects to manage specific waste streams in a more sustainable manner. In addition to waste management the MRA also participated in an information exchange and awareness raising event on Landfills of Waste whereby groundwater vulnerability was defined together with technical aspects to consider when designing landfills such as liner systems, storm water drainage and leachate collection systems.

Consultation on guidance documents related to planning, land use and resource management was also required. Two main documents which were revised by the MRA were the Policy and Design Guidelines on Farms, Agricultural diversification and stables and the Guidance document on Environmental Impact Assessments.

Participation in TAIEX

The Directorate submitted two requests for technical assistance under the TAIEX programme, both of which were approved by DG Enlargement.

Development of a framework for the development of the RBMP

The aim of this mission is to analyse the requirements for the development of a River Basin Management Plan in the frame of reference of a small island state and to develop a terms of reference for the preparation of the River Basin Management Plan for the Maltese River Basin District as required under Article 13 of Directive 2000/60/EC. It is planned that this mission will take place in September 2007 with the participation of a visiting expert from the Artois-Picardie Water Agency, France.

Applicability of WFD exemptions to the Maltese Groundwater Scenario

The aim of this mission is to analyse the applicability to the Maltese 'groundwater scenario' of the Article 4 provisions leading to potential exemptions to the Environmental Objectives of Directive 2000/60/EC, when and where necessary and to propose a possible position and a methodology for Malta in the negotiation for the attainment of these environmental objectives and exemption processes. It is planned that this mission will take place in December 2007 and the visiting expert from the French Water Agencies.

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