

Reporting of National Programmes under the National Emission Ceilings Directive (2001/81/EC)

Prepared for the Ministry for Rural Affairs and the Environment
By the Malta Environment and Planning Authority
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1. Background

The Directive (2001/81/EC) of the European Parliament and of the Council on National Emission Ceilings for certain atmospheric pollutants came into force on the 27th November 2001. Malta is obliged to implement the provisions of this Directive since May 2004 and transposed this Directive into national legislation through LN 291/2002 (amended by LN 232/2004) which entered into force by Commencement Notice LN 24/2003 on the 14th January 2003.

The National Emission Ceilings Directive (NECD) gives each Member State maximum emission ceilings for certain pollutants responsible for acidification, eutrophication and ground-level ozone in the community area which must not be exceeded from 2010 onwards.

To implement the directive, each Member State must draft a national programme to reduce emissions. This programme includes emission projections or estimations of sulphur dioxide (SO₂), nitrogen oxides (NO_x), ammonia (NH₃) and volatile organic compounds (VOC) for 2010, and information on policies and measures affecting these emissions.

This report was prepared by the Malta Environment and Planning Authority (MEPA), which is the competent authority of this Directive for the Ministry of Rural Affairs and the Environment (MRAE). The report was drafted according to the “Recommendations on developing and reporting national programmes under the National Emission Ceilings Directive” prepared by the Working Group on Implementation of the Clean Air for Europe (CAFE) Programme and distributed to all Member States by the European Commission in April 2006.

2. Executive Summary

This section gives a summary of the plans and programmes adopted to date and their impact on national emissions and projections, where applicable.

All projections presented in this report were carried out using the Regional Air Pollution Information and Simulation (RAINS) model developed by the International Institute for Applied Systems Analysis (IIASA). This same model was used for the work carried out by the European Commission on the revision of the NEC Directive. Malta participated in bilateral consultations with IIASA, and supplied data for the national scenario, with climate policies.

While some of the plans described below were regulatory (command and control) instruments and had a clear and visible reduction in emissions; others, such as the application of economic instruments, have indirect and long term effects on emission reduction. The results for the latter actions are not easily determined using models, but will be described to the best extent possible hereunder.

2.1 Summary of plans and programmes already implemented

2.1.1 Use of low sulphur fuel in transport and power generation

The responsible sectors for potential emissions of sulphur dioxide (SO₂) in the Maltese Islands are power generation, small industry and transport.

Unleaded petrol and leaded replacement petrol (LRP), the latter introduced in 2003, are virtually sulphur free¹. Hence the SO₂ emissions derived from road transport can be mainly attributed to diesel vehicles. The sulphur content of diesel imported by Enemalta for transportation was gradually reduced from September 2000 to January 2002. Diesel had a sulphur content of 0.5%, which was reduced to 0.2% in September 2000. A further reduction to 0.055% occurred in February 2001. Finally, since January 2002, diesel fuel contains only 0.035% sulphur².

Power generation is in the responsibility of Enemalta Corporation and depends on two power plants located in Marsa and Delimara respectively. In 2004 approximately 88% of the electricity was generated using heavy fuel oil and the remaining 12% was generated by gas turbines (in open and combined cycle modes) operated on gas oil.

The heavy fuel oil used at both power stations had a sulphur content of about 2.5 to 3% before Enemalta made the switch to a more expensive low sulphur fuel in January 2004.

¹ Pace, 2004

² National Statistics Office, Malta

This low sulphur fuel has a sulphur content of 1%³. In 2004, Marsa power station was operated mainly with heavy fuel oil, whilst at Delimara power station, 78% of the output was generated using heavy fuel oil and 22% with gas oil. The latter has a sulphur content of less than 0.2% since November 2003.

The introduction of low sulphur fuel since January 2004 brought a drastic reduction in SO₂ emissions. This reduction was noted in both the NEC emission inventory and the monitoring programme set up according to the requirements of the Air Quality Framework Directive (1996/62/EC).

Total SO₂ emissions from public electricity production in 2003 were estimated to be 27.13kT, while in 2004 they were estimated to be 11.63kT. Both calculations were carried out using the EMEP CORINAIR Guidelines, as required by the NEC Directive.

With reference to the local air monitoring network, in 2004, Malta experienced a nationwide reduction of 36% in SO₂ concentrations.⁴

2.1.2 The IPPC Directive

The Integrated Pollution Prevention and Control (IPPC) Directive (1996/61/EC), transposed by LN 234/2002 and amended by LN 230/2004, requires Member States to reduce emissions to the air, land and water from industrial activities as categorised in the Directive.

In Malta, a total of 16 installations (including existing and new, or new in application phase) qualify as IPPC installations as per Schedule 1 of the IPPC Directive.

Since accession, two of these 16 installations have been IPPC permitted. These are a landfill and a pharmaceutical company and are both new installations. Such permits include conditions which control emissions to the air including requests for self monitoring and compliance with specified emission limit values. The operator is obliged to provide monitoring reports to MEPA. The conditions in the IPPC permit are enforced through routine inspections by the regulatory authorities/ departments. This is because the IPPC permit is an integrated permit; thus, it integrates the responsibilities of several authorities or government departments.

2.1.3 Emissions testing in road transport

The Vehicle Roadworthiness Test was gradually introduced in Malta, starting in October 1999. During the first phase, the car user was obliged to carry out a full test on the

³ De Jonge 2004, Pace 2004

⁴ State of the Environment Report 2005, MEPA

vehicle, only the following four items were obligatory: correct data of vehicle, steering system, lights and brakes.

Since January, 2002, another five items were added to the original items: testing of tyres and wheels, windscreen wipers and washers, horn, and exhaust emissions and noise emissions.

The full test became obligatory on the 1st January 2005.

2.1.4 Emission Alert Campaign

The “Emission Alert SMS Campaign” was launched in August of 2005 and 83,000 reports were received until September 2006. The campaign was launched in a bid to increase awareness amongst all road users: motorists, motorcyclists and pedestrians, on the negative impact of high vehicular emissions on health and the environment, whilst at the same time intensifying enforcement.

To report a vehicle emitting noxious fumes, one must send an SMS bearing the registration plate of the vehicle. All messages received are accessed through an internal message centre that was purposely set up. The system flags vehicles that receive various reports from different mobile numbers, and automatically flags the vehicle to be tested. The vehicles are then tested by the Malta Transport Authority (ADT) using specialized equipment. These tests are carried out by ADT Enforcement Officers and Police.

If the vehicle fails the test, the owner is fined and is obliged to have the emission problem fixed. The owner is then required to return to the Authority within a week, with the issue solved. Should the vehicle fail the emission test again, a restriction will be placed on the vehicle's record so that the vehicle road license will not be renewed unless the Enforcement Section certify the emission problem as solved and that all relevant penalties are settled. The whole process of booking appointments and testing will continue until the problem is solved.

From the 83,000 reports received, 3,585 vehicles received enough SMS reports to be called in for testing. Out of these 2,783 were tested, and the others did not show up - therefore their road license has been suspended until the test is performed with success. Out of those tested, a cumulative 491 failed (18%) and will continue to be retested until they pass the test.

2.1.5 Economic Instruments⁵

Taxes constitute the majority of economic instruments for environmental management in Malta. They span from taxation on specific items or activities, such as licenses for swimming pools, to wider instruments such as the eco-contribution which is levied on a range of environmentally-sensitive products.

2.1.5.1 Taxation on fuels

Fuels are taxed to some degree in all European countries, mainly for fiscal reasons, although some taxes may have a specific environmental component. Locally Government imposes excise duties on most fuel products, with the highest taxes being imposed on motor fuels.

Since accession, Government has streamlined its taxation on fuels to remove subsidies which were encouraging the use of inappropriate fuels leading to unacceptable environmental impacts.

2.1.5.2 Excise duty on registration of motor vehicles

The Motor Vehicles Registration Tax Act (Cap. 368) provides the Malta Transport Authority with the responsibility to register every vehicle imported into or manufactured in Malta, and to impose an excise tax on its registration in accordance with the rates prescribed in the Schedule to the Act.

The tax is charged on the registration value of the vehicle, subject to any minimum amount of tax specified in the legislation. The rate of tax ranges between 6% and 75%, depending on the engine capacity (which is in turn related to emissions), motor vehicle type and purpose of use, with some special purpose vehicles (such as breakdown lorries, crane lorries and fire-fighting vehicles) being zero rated. Vehicles that run only on an electrically driven system are also exempt from paying this tax.

Up till 2003, the registration tax on imported second hand vehicles was more or less the same as that for new cars, thus creating a reverse incentive which resulted in an increase in the number of second hand imported cars. In fact, the share of second hand cars increased from 12.9% of imported cars in 2000 to 26.7% in 2002. Consequently in an attempt to slow down the rate of importation of second hand cars, which may not have the same environmental standards as new cars, in late 2003 Government increased the minimum registration tax for imported second hand cars.

⁵ Source: Building capacity to introduce the polluter pays principle through economic instruments to implement the EU Environmental Acquis (a project funded by the Transitional Facility Project 2004), Ernst & Young Limited as project leaders, Gordon Cordina and the Institute for European Environmental Policy ("IEEP").

2.1.5.3 Electric Vehicles

In order to encourage consumers to switch to more environmentally friendly transport, in 2001 the registration tax on battery operated vehicles was reduced from a rate which ranged between 50% and 75% to 16.5% of the value of the car. Furthermore, the registration tax on battery operated motor cycles was reduced from a rate which ranged between 28% and 42% to 6.5%.

These rates were further revised in 2003 and the registration tax on all battery powered electric vehicles was removed. Furthermore, up to 2007 all electric vehicles are given a free entry permit (which currently costs Lm20 per annum) to Valletta.

The registration tax on hybrid vehicles which consume both fuel and battery energy stands at 16.5%.

In 2003 the Government also repealed the road licence for all battery operated mopeds.

In 2005, Government introduced a further measure of assistance on electric cars whereby an amount equivalent to 15.25% of the car's value up to a maximum of Lm500 will be refunded upon purchase of an electric vehicle⁶.

Despite these initiatives, the number of electric cars in Malta as at March 2006 amounted to only fifteen⁷.

2.2 Achievement of National Emission Ceilings

As explained in the beginning of this section, the emission projections presented in this report are those estimated by the RAINS model; this is in order to be consistent with the present work that is being undertaken for the revision of the NEC Directive and the development of the new ceilings for 2020.

The formulation of projections is not an easy task to undertake, especially when future policies may have to include radical changes in major sectors which contribute to air pollution, which in turn have serious implications on the economy of the country. Additionally, models can only take into account country-specific needs up to a certain limit, and there is a risk that the outcome may not reflect reality. A case in point is the assumption of the introduction of Euro 5 and 6 standards; a good number of the Maltese population do not change their car as frequently as in other countries, and there is still a good number of the population that buys second hand cars. In fact about 42% of the vehicles purchased in 2004 and 2005 were second hand cars⁸. Additionally, the introduction of the catalytic converter in the Euro 1 standard is not effective in practice

⁶ Budget Speech 2005 (Government of Malta, November 2004)

⁷ Source: National Statistics Office (March 2006), Malta

⁸ Source: National Statistics Office, Malta

for a small island like Malta since the distances travelled are too small for such a technology to function in an efficient manner (the three-way catalytic converter does not reach the required temperature due to short trip distances).

As shown in detail in Annex B, the plans and programmes implemented to date (as described in Section 2.1), are not enough to meet the ceilings of sulphur dioxide and nitrogen oxides.

Model runs and/or calculations for emissions projections for 2010 were carried out for the following three scenarios, as required:

- A business as usual ‘**without measures**’ projection should exclude all policies and measures implemented, adopted or planned after the year chosen as the starting year for this projection (2000).
- A ‘**with measures**’ projection taking into account all currently implemented and adopted policies and measures;
- A ‘**with additional measures**’ projection taking into account all planned policies and measures;

Table 1 below compares a model run for 2010 of projected emissions “with measures” to the emission ceilings for Malta.

| Pollutant | RAINS projections/kT | National Emission Ceilings/kT |
|------------------|-----------------------------|--------------------------------------|
| SO ₂ | 14.201 | 9 |
| NO _x | 9.071 | 8 |
| VOC | 3.855 | 12 |
| NH ₃ | 2.285 | 3 |

Table 1: Emission projections for NEC pollutants for 2010 “with measures” as compared to emission ceilings in the NEC Directive

Thus, additional plans are required to be in compliance with the 2010 ceilings.

Table 2 compares a model run for 2010 of projected emissions “with additional measures” compared to the emissions ceilings for Malta:

| Pollutant | RAINS projections/kT | National Emission Ceilings/kT |
|------------------|-----------------------------|--------------------------------------|
| SO ₂ | 8.766 | 9 |
| NO _x | 7.870 | 8 |
| VOC | 3.595 | 12 |
| NH ₃ | 2.295 | 3 |

Table 2: Emission projections for NEC pollutants for 2010 with “additional measures” as compared to emission ceilings in the NEC Directive

From Table 2 above it can be noted that all projected emissions are below the respective emission ceilings. The next section gives a summary of the additional measures planned to meet the above emission ceilings.

2.3 Additional plans and programmes required

A summary of the proposed additional plans and programmes is the following:

Energy Industries: combustion in power plants and energy production

Enemalta will be implementing measures to reduce emissions of nitrogen oxides, sulphur dioxide and dust from the power plant at Delimara. Additionally, to be able to satisfy future energy demand, Enemalta has also issued a call for local generating capacity which will be compliant with specific emission limit values for various pollutants regulated by the respective Directives.

Road Transport

The Malta Transport Authority (ADT) is implementing a project for the installation of an Intelligent Traffic Management System in Malta. This is part of an EU funded project of which Malta is the beneficiary. This will reduce emissions of nitrogen oxides around the major traffic nodes, especially during rush hours by improving the traffic flow and reducing traffic congestion.

Another incentive which ADT has started implementing is the “Valletta Strategy”, aimed at reducing traffic into the historical capital city of Malta, Valletta. This project will have a major impact on the modal shift since Valletta lies on a peninsula and is easily accessible by public transport and by sea, whilst it houses most administration buildings in Malta, therefore attracting a number of commuters every day.

Combustion in Industry

The Malta Environment and Planning Authority is currently in the process of developing an environmental permitting system. Such a permitting system aims to control SO₂, VOC and NO_x emissions (amongst others) by using regulatory mechanisms to ensure that equipment used is of the required standard. It should be noted that about 90% of Maltese companies are micro-enterprises. Although the emissions from individual activities are limited, the cumulative effect may be significant.

Energy Efficiency and Renewable Energy Sources

The Maltese Government has very recently offered additional incentives on solar energy products and photovoltaics. Additionally the Government has also introduced grants on energy efficient household products. Such incentives will reduce the burden on power generation, and thus reduce NO_x, SO₂ and other emissions.

The Malta Resources Authority in collaboration with the Ministry for the Environment, the Malta Transport Authority and other entities is leading a sustained educational campaign to generate awareness and imbue a new culture on ideal behaviour in energy consumption. Such incentives will reduce the burden on power generation, and thus reduce NO_x and SO₂ emissions, amongst others.

3. Political and administrative procedure of adoption of national programme

3.1 Authorities involved and stakeholder consultation

Various authorities have been consulted in the preparation of both inventories and projections, and the plans and programmes for emissions reduction.

In the case of inventories, data acquisition is made through an official request to all the sectors considered in the inventory calculations. Data is acquired from Enemalta, the National Statistics Office, the Department of Agriculture, the Malta Transport Authority, WasteServ and other national authorities.

The same was done for the formulation of baseline data for emission projections up to 2010 and 2020. MEPA had numerous bilateral consultations with specific government authorities and departments to discuss future plans for the respective sectors. These major projects were reflected in projections for activity data, emission factors and control strategies, which were in turn submitted to IIASA in September 2006.

However, the above does not exclude the possibility that in the future there may be other projects which Malta could take on board; or variations in the present plan for major projects. This would in turn have an effect on the above mentioned data for the formulation of emission projections.

Stakeholder consultations were also carried out in the formulation of these plans and programmes. Model runs involving “business as usual”, “with measures” and “with additional measures” scenarios have also been carried out in consultation with the relevant stakeholders.

3.2 Coordination with other reporting requirements

The plans and programmes indicated in this report have been prepared considering the current and future implementation timeframes of various Directives.

The plans and programmes for the NEC Directive aim to reduce emissions by 2010. This timeframe coincides with the mid-year of the second trading period of the Emissions Trading Scheme. Thus, any decisions taken with the aim to achieve the necessary targets for both Directives have to be planned in a harmonised manner. This is the case for the plan envisaged for the increase of locally installed power generation capacity for which a call for proposals has been issued recently. The call is for a plant that is compliant with

the requirements of Directive 2003/87/EC⁹, such that CO₂ emissions are less than a specified amount under given operating conditions (an annual duty cycle).

If the reduction in CO₂ emissions will bring about a counterproductive effect for any of the pollutants regulated by the NEC Directive, then the necessary abatement measures will have to be carried out to limit the emissions of that specific pollutant to the required limits.

At the same time the call for proposals requires that this new plant is compliant with specific limit values for nitrogen oxides, sulphur dioxide and ammonia (to ensure compliance with the NEC Directive from 2010). This new plant will also be in compliance with the Large Combustion Plants Directive where specific limit values are given for stack emissions of sulphur dioxide, nitrogen oxides and total suspended particulates.

Specific policies and measures presented in this report, especially those for transport, are common also in the plans and programmes presented for the Air Quality Framework Directive. In the case of the implementation of the Intelligent Traffic Management System, traffic and urban background stations should be able to monitor the effectiveness of the system.

⁹ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

4. Policies and measures

The policies and measures applied since preparation for accession to date have been described in detail in Section 2.1. As shown in Annex B, some of these measures have already reduced emissions of NEC gases in specific sectors from 2000 to 2005.

As described in Section 2.2, if emissions were projected for 2010 taking into account all currently implemented and adopted policies and measures, sulphur dioxide and nitrogen oxides will not comply with the ceilings. Thus, the policies and measures described below are planned to be implemented to further lower emissions for NO_x and SO₂ to be able to be compliant with all emission ceilings by 2010.

Thus ALL policies and measures described below have been taken into account in the “**with additional measures**” emission projections.

4.1 Energy Industries: combustion in power plants and energy production

Plans for new and existing plants

Enemalta Corporation is a government-owned operation responsible for electricity generation in Malta. Enemalta operates two power plants, namely Marsa and Delimara Power Stations.

Enemalta has prepared and issued on its website¹⁰ an Electricity Generation Plan for 2006-2015 in which the electrical energy consumption up to 2020¹¹ was estimated, taking into consideration planned developments such as the new hospital (Mater Dei), a major new industrial development (Smart City) and new commercial and housing developments (Tigne and Manoel Island).

Due to the increasing energy demand and environmental restrictions, Enemalta is considering several technical options for new generating units and the upgrade of the present power plant at Delimara. The Generation Plan considers advantages and disadvantages of the various technical options, including security of supply and particularities of small island states like Malta.

The environmental restrictions include the limitations of emissions to the air resulting from various directives, namely the Large Combustion Plants Directive, the National Emission Ceilings Directive, the Integrated Pollution Prevention and Control Directive,

¹⁰ www.enemalta.com.mt

¹¹ Electricity Generation Plan 2006-2015, Enemalta Corporation (June 2006)

Ambient Air Quality Assessment and Management Regulations, and the Greenhouse Gas Emissions Trading Scheme.

A financial analysis taking into consideration the economic lifetime of the equipment options was carried out. The generation plan also includes a study on the cost of generation including electricity cost calculations.

The report recommends that the new generating plant with an electrical output not less than 100MW and which complies with all environmental requirements should be commissioned by the end of 2009.

Thus, the plans for reduction of emissions whilst satisfying future energy demands in the energy sector are split in three phases:-

- (a) Commissioning of a new 100MW power plant by the end of 2009
- (b) Operating the 'existing' (pre-July 1987) combustion plant at Marsa Power Station for 20,000hours from 1/1/2008 in compliance with the LCPD
- (c) Modification of Delimara Power Station to comply with the LCPD by the end of 2009

To this effect the 3 phases mentioned above are planned to be achieved as follows:

4.1.1 Commissioning of a new 100MW power plant by the end of 2009

Enemalta issued a Contract Notice for local generating capacity on the 13th November 2006. This contract notice gives specific emission limit values in g/kWh for sulphur dioxide, nitrogen oxides and carbon dioxide. Ammonia is requested to comply with Best Available Techniques. Additionally, the new plant has to be in compliance with all the legislation which limits emissions into the air.

With reference to the National Emission Ceilings Directive, MEPA as the regulator has guided Enemalta in allocating their respective "share" of NEC pollutants attributed to power generation. Such apportionment of emissions was derived from historical emission inventory data and also compared to model runs using the RAINS model.

This measure will have no negative impact on GHG emissions, but will reduce their rate of increase. The abatement technology accompanying the equipment will be functioning in such a way as to reduce NEC and GHG pollutants to acceptable standards.

4.1.2 Operation of plant at Marsa Power Station

The European Commission has been informed of Enemalta's intention to operate its 'existing' plant at Marsa Power Station for 20,000hours starting from 1/1/2008 and no longer than 31/12/2015, in compliance with the LCPD. It is expected that the plant will be replaced by the new 100MW plant mentioned above and by a submarine cable link to mainland Europe.

4.1.3 Modification of boilers 1 & 2 at Delimara Power Station by the end of 2009

The heavy fuel fired boilers at Delimara Power Station are to be modified so that all gaseous emissions shall comply with the requirements of the Large Combustion Plants Directive by the end of 2009. The process to determine the best available techniques is underway. One significant difficulty is the availability of space at the site. Abatement for sulphur dioxide is presently expected to be carried out by procuring heavy fuel oil with sulphur content lower than 1% which will incur additional costs.

From the three phase approach described above, Enemalta will be reducing emissions of nitrogen oxides, sulphur dioxide and dust from the present power plants. It is anticipated that due to NO_x abatement using catalytic reduction, a small amount of ammonia is to be emitted from 2010 onwards. The NH₃ emitted was calculated using BAT guidelines.

The tables below give emission estimates for the NEC gases for 2010 and 2020 from power generation, with the implementation of the above described policies. The term "existing power plants (EPP)" refers to the Marsa and Delimara power stations, while "new power plant (NPP)" refers to any new power generation plants built from 2009 onwards. The following definitions also apply¹²:

| | |
|---------|-------------------------------------------------------------------------------------|
| HFO: | heavy fuel oil |
| MD: | diesel |
| NOC: | no control |
| POGCM: | power plant oil and gas - combustion modification |
| POGCSC: | power plant oil and gas - combustion modification and selective catalytic reduction |
| POGSCR: | power plant oil and gas - selective catalytic reduction (SCR) |
| LSHF1: | low sulphur heavy fuel (1%S) |
| LSHF2: | low sulphur heavy fuel (0.7%S) |
| LSMD2: | Low sulphur diesel oil - stage 2 (0.1% sulphur content) |

¹² Note: There are some differences to the definitions used by the RAINS model in order to cater for specific local conditions.

Nitrogen Oxides

| NO_x 2010 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|----------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| EPP_HFO_NOC | 17.9 | 0.2 | 0 | 0.2 | 70 | 2.506 |
| EPP_HFO_POGCM | | | 30 | 0.14 | 30 | 0.752 |
| EPP_MD_NOC | 4.8 | 0.5 | 0 | 0.5 | 50 | 1.2 |
| EPP_MD_POGCM | | | 65 | 0.175 | 50 | 0.42 |
| NPP_MD_POGCSC | 5.56 | 0.5 | 69 | 0.155 | 100 | 0.862 |
| TOTAL NO_x 2010 | | | | | | 5.74 |

| NO_x 2020 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|----------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| EPP_HFO_POGCM | 8.44 | 0.2 | 30 | 0.14 | 100 | 1.182 |
| EPP_MD_NOC | 3.6 | 0.5 | 0 | 0.5 | 50 | 0.9 |
| EPP_MD_POGCM | | | 65 | 0.175 | 50 | 0.315 |
| NPP_HFO_POGSCR | 12.06 | 2.3 | 92 | 0.184 | 100 | 2.219 |
| NPP_MD_POGCSC | 4.7 | 0.5 | 69 | 0.155 | 100 | 0.729 |
| TOTAL NO_x 2020 | | | | | | 5.345 |

Sulphur Dioxide

| SO₂ 2010 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|----------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| EPP_HFO_LSHF1 | 17.9 | 1.715 | 71.429 | 0.490 | 70 | 6.14 |
| EPP_HFO_LSHF2 | | | 80 | 0.343 | 30 | 1.842 |
| EPP_MD_LSMD2 | 4.8 | 0.234 | 80 | 0.047 | 100 | 0.226 |
| NPP_MD_LSMD2 | 5.56 | 0.234 | 80 | 0.047 | 100 | 0.261 |
| TOTAL SO₂ 2010 | | | | | | 8.469 |

| SO₂ 2020 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|----------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| EPP_HFO_LSHF2 | 8.44 | 1.715 | 80 | 0.343 | 100 | 2.895 |
| EPP_MD_LSMD2 | 3.6 | 0.234 | 80 | 0.047 | 100 | 0.169 |
| NPP_HF_LSHF2 | 12.06 | 1.715 | 80 | 0.343 | 100 | 4.137 |
| NPP_MD_LSMD2 | 4.7 | 0.234 | 80 | 0.047 | 100 | 0.221 |
| TOTAL SO₂ 2020 | | | | | | 7.422 |

Ammonia

| NH₃ 2010 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|-------------------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| NPP_MD_POGCSC | 5.56 | 0.00175 | 0 | 0.00175 | 100 | 0.01 |
| TOTAL NH₃ 2010 (tonnes) | | | | | | 0.01 |

| NH₃ 2020 | Energy (PJ) | Unabated EF (kT/PJ) | Removal Efficiency (%) | Abated EF (kT/PJ) | Controlled capacity (%) | Emissions (kT) |
|----------------------------------|-------------|---------------------|------------------------|-------------------|-------------------------|----------------|
| NPP_HFO_POGSCR | 12.06 | 0.00175 | 0 | 0.00175 | 100 | 0.0211 |
| NPP_MD_POGCSC | 4.7 | 0.00175 | 0 | 0.00175 | 100 | 0.00823 |
| TOTAL NH₃ 2020 | | | | | | 0.03 |

Annex B (reported emission projections for the NEC gases), shows the reduction in NO_x and SO₂ emissions with the implementation of this three-phase policy when compared to the “business as usual” and “with measures” scenario for 2010.

4.2 Road Transport

The Malta Transport Authority is a body corporate run by a Board that is appointed by the Minister for Urban Development and Roads consisting of a Chairman, a Deputy Chairman and three Members.

The mission of the Authority is to plan and provide for a sustainable, high quality, safe, integrated and efficient land transport system that will meet the travelling needs of people and the transport requirements for the movement of goods within the national framework for economic development, social inclusion and protection of the environment.

ADT is currently working on two major projects which will contribute to control traffic generated pollution:

4.2.1 Intelligent Traffic Management System

Malta is the beneficiary of an INTERREG project, part of which is the implementation of an Intelligent Traffic Management System (ITMS), led by ADT as the national authority responsible for public transport.

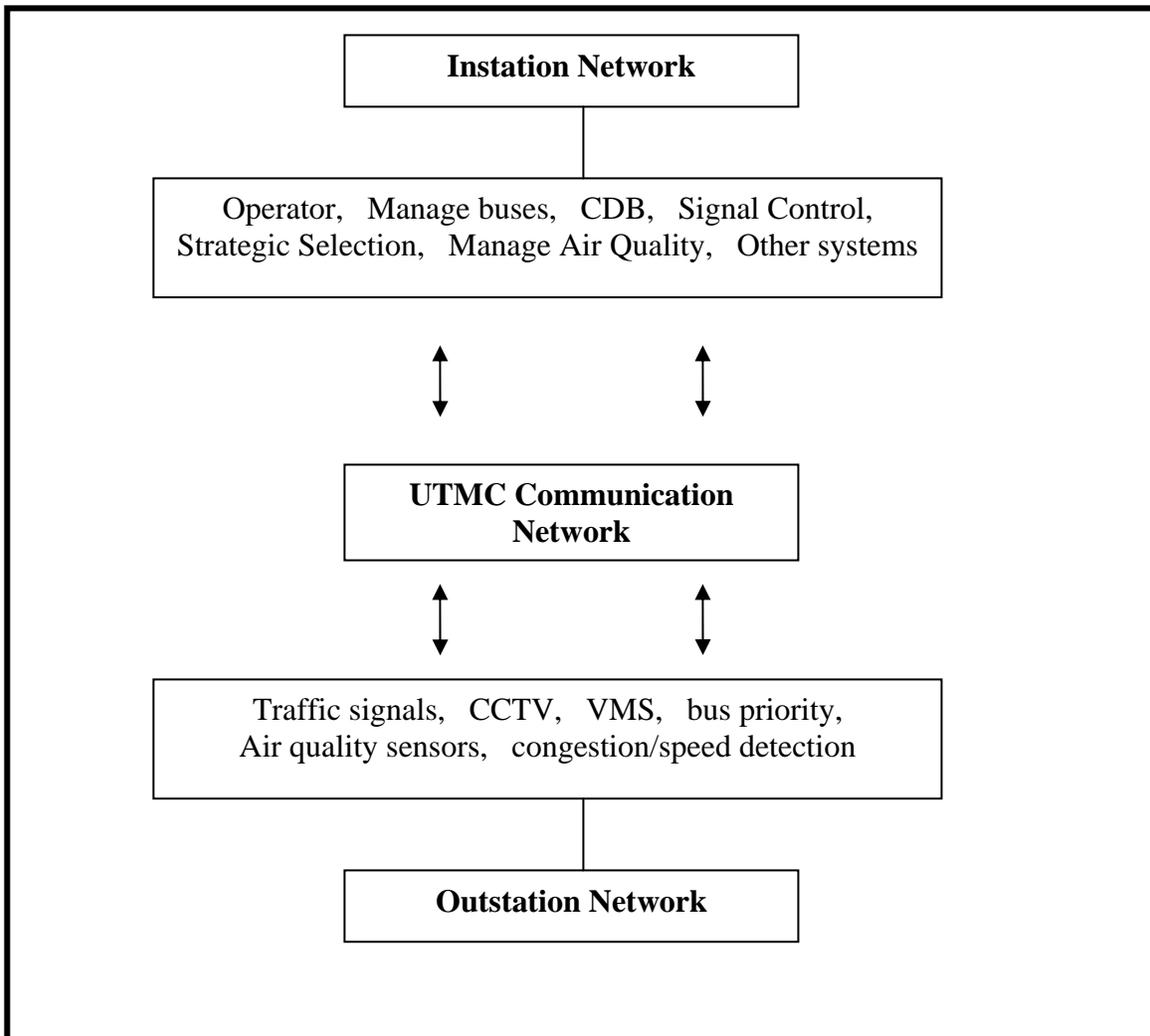
The ITMS is a system which automatically responds, in real time, to changes in traffic patterns, congestion, road works, accidents and air pollution. The project aims to manage and control traffic demands, reduce congestion, improve public transport, encourage modal shift from private cars to sustainable transport modes and reduce traffic related air pollution.

The system is divided into three component parts:

Instation: various systems collect several forms of data to give information on traffic flows and congestion, air pollution, etc.

Communications: there are various options for network communications, such as fibre optic cables, GPRS, GSM etc.

Outstations: traffic signals, CCTV cameras, air quality sensors, congestion and speed detectors etc.



Specific expertise from another Member State is aiding ADT to develop a vision for ITMS in Malta. Currently studies are being carried out to decide on which sites on the island of Malta the ITMS system shall be installed. The system will definitely cover the busiest urban areas especially where drivers encounter heavy traffic congestion in peak time.

In the second phase of this project, which is planned to come into effect in 2008, appropriate air quality monitoring kits will be installed on specific roads. These sensors will measure traffic related pollutants namely carbon monoxide, nitrogen oxides and particulate matter. To be able to effectively analyse trends, these monitors may also measure wind speed and direction.

Traffic is managed accordingly when an air quality threshold is exceeded. For example if one of the pollutants exceeds limit values specified in the directive, then traffic is re-routed until levels reach acceptable limits. A “gating” strategy will also be employed to limit traffic demand in an area at, or above, its environmental capacity by reducing the

amount of traffic signal green time to incoming vehicles and increase “exit” green times automatically until air quality improves in the gated area. There is also the possibility to link a Vehicle Management System (VMS) to the air quality monitoring sensors to inform drivers and pedestrians where air quality is poor and thus further aid rerouting.

The input data from the ITMS system is very useful for emission inventory purposes. This in turn will aid MEPA to develop policies for reductions in traffic emissions.

Statistical network performance indicators will monitor the functioning of the whole system.

Pollution reduction will depend on how the ITMS is set up and operated. The relationship between reduction in congestion and reduction in pollution is being studied by multiple regression models which are being currently developed by other countries.

4.2.2 The Valletta Strategy

This initiative resulted from discussions of a Cabinet Committee made up of the Minister for Investments, Industry and Information Technology, the Minister for Resources and Infrastructure, the Minister for Roads and Urban Development, the Minister of Finance and the Minister for Rural Affairs and the Environment.

There is a wide consensus in Malta that the Valletta and Floriana area faces complex traffic congestion situations, especially during peak time. A specific questionnaire was drawn up for specific authorities, non-governmental organisations, political parties and various entities that live in or frequently access the area. Most of the authorities agreed that there is a serious problem there and including on roads that lead to Valletta. In fact, 11% of all trips in Malta start or finish in Valletta or Floriana. Historic buildings in these areas have to be restored much more frequently than others situated in urban background sites. Air monitoring stations situated in that locality also confirm high levels of traffic generated pollutants.

Thus, there was an agreement that something has to be done to reduce traffic congestion, and improve accessibility and air quality in that area. A specific audience participated in consultations that targeted individuals who were directly concerned. Following this, a public consultation and presentation to Cabinet were carried out. Various options were presented to cabinet and the final decision was that the Valletta Strategy should include the following measures:

Extension of the existing pedestrian zones: Major roads in Valletta have been pedestrianised in the past. This was very successful and such streets became extremely popular with shoppers and converted the area into an attractive commercial centre on the island. The pedestrian zone in Valletta will be expanded to incorporate the city's central zone.

Reduce parking needs in Valletta: This goal is being achieved through the Park and Ride Project which started to function on the 6th November 2006. This is a service that enables the general public to park outside the capital city, at Crown Works/Horn Works Ditch, Blata l-Bajda and enter Valletta by means of a shuttle bus service. The use of the parking at the Park and Ride site as well as the shuttle service is free of charge.

The car park is open 24 hours a day, 7 days a week with the shuttle service operating Monday to Friday between 06.00 and 01.00. Waiting time is from 4 to 10 minutes depending on the time of day.

The feedback the Park and Ride received until now is very positive and the general public is making good use of this facility.

A Controlled Vehicular Access (CVA) System to replace the current V-licence: Presently cars that wish to enter Valletta pay 20 Maltese Liri extra when paying the annual car license. In the near future this Valletta license will be abolished and a "pay-as-you go" system will be introduced, called the Controlled Vehicular Access System. This system is aimed to discourage people from using their car and parking inside the capital city.

Car users will be charged an hourly rate for the time the vehicle spends in the city. Certain vehicles such as those used for emergency purposes or electric cars will be exempt from payment.

The Controlled Vehicular Access System is targeted to be operational in March 2007.

Alternative means of transport and connecting different areas of the capital city:

This measure will be implemented in three ways:

- (i) Intra-city electric minicab services operating within the city boundaries;
- (ii) Vertical Transport connecting the lower ditches outside the walls of Valletta to the centre;
- (iii) Sea ferries will act as shuttle services for easier accessibility to and within Valletta Sea Ferries, linking all major coastal towns to Valletta.

The TRIPS model was used to study the reduction in emissions through the implementation of the CVA, making assumptions from the reduction of traffic that would result from the introduction of the CVA in Valletta. The forecasted percentage reduction in peak hour traffic in major roads varies from 2 to 13%.

TRIPS forecasted a general reduction of trips made to Valletta based on the reduction of parking spaces and the cost involved in parking in the remaining spaces. These were assumptions made simulating normal travel patterns and the proposed cost of the parking per hour. The model was then re-used for all of Malta with Valletta having a lower trip attraction than current.

4.2.3 Reduction of emissions in road transport

The reduction in NO_x and VOC emissions shown in Annex B for RAINS model runs assume emission reductions with the introduction of Euro standards only. As explained in this report earlier on, such model assumptions are very difficult to calculate for Malta. Emission reduction estimates through the use of catalytic converters cannot be quantified since emission control equipment in cars does not reach optimum efficiency. Their reduction efficiency is much lower in Malta, due to the very short trip distances during which the operating temperature is not reached for a large part of the trip.

Thus, emission reductions in road transport assumed in Annex B refer to implementation of Euro standards and the measures described above. It is assumed that the deficiency in obtaining emission reductions through the implementation of Euro standards, resulting from country specific particularities; are however achieved through the specific policies described above.

In addition, the Malta Resources Authority is working on certain initiatives to introduce Autogas in Malta. In fact in their consultation on the liberalisation of the inland fuel market in Malta, the Malta Resources Authority stated that the “*MRA foresees that in the near future, Autogas will be available for use in automotive vehicles. It is envisaged that Autogas will be retailed through petroleum stations that have fitted Autogas storage and dispensing systems. Government welcomes the proposals for immediate introduction of this fuel. Issues related to the storage and dispensing are being established and agreed to with other competent authorities. MRA will seek to actively promote the use of Autogas since this fuel will contribute to reduction of harmful emissions*”.¹³ The use of such fuel will aid in further reducing NO_x emissions from road transport. However Autogas could have a counterproductive effect on CO emissions.

The ITMS and CVA will not have negative impact on GHG emissions, but on the other hand will aid in reducing such pollutants.

¹³ Source: Liberalisation of the Inland Fuel Market, Consultation paper, MRA 19 April 2006

4.3 Combustion in Industry

As explained in Section 2.1.2, the installations falling under the IPPC Directive have been identified. However there are other emission sources which are not regulated at Community level. The Commission is planning to examine whether the IPPC Directive should be extended to cover sources below 50MW thermal input¹⁴.

Installations with thermal input of between 20 and 50MW are very few in Malta, and a substantial part of industrial activity consists of a limited number of Small and Medium Enterprises (SMEs), with a large complement of micro enterprises. Emissions from SMEs are expected to vary according to the nature of the individual enterprises and the age and type of plant; the potential for reduction of emissions is expected to vary, particularly since there has been substantial investment in the modernisation of plant in recent years. As regards micro-enterprise, although the emissions from individual activities are limited (typically small family run bakeries, vehicle re-finishers, etc.), the cumulative effect may be significant.

Environment Permitting System

The Malta Environment and Planning Authority is currently in the process of developing an environmental permitting system. The first step in the development of this system is a review of industry to better understand the national scenario, and to establish regulatory priorities for limiting of environmental impacts. The priority to date with respect to permitting was waste management, where permitting has been established. Further national legislation on a registration system is expected to be implemented by mid 2007.

Within the permitting system, SMEs will be required to obtain a permit for their activities, although this process shall be simplified for those sectors where environmental impacts are low. This shall be facilitated through further development of the registration system in the coming years, with a view to providing general binding rules for the different sectors of micro enterprise, according to the potential environmental impact. The registration system is currently being coordinated with the trade permit system, to facilitate the interaction between enterprises and regulatory agencies, as a better regulation initiative.

MEPA is studying the possibility of a grant scheme to aid enterprises in the improvement of their performance with respect to environmental considerations. This would involve the review of installations by experts in the field, who would formulate recommendations on the reduction of environmental impacts at reasonable costs; such improvements would then be eligible for a grant. The objective of such a scheme is to assist enterprises in

¹⁴ Thematic Strategy on Air Pollution, Section 4.2.1.1

environmental initiatives, and to promote the concept that environmental best practice is compatible with increased economic competitiveness.

Such a scheme, in combination with the permitting system, will aid in controlling emissions to the air from various sources, especially within the industrial sector. Improvement in best practice on the use of better fuels can be achieved, especially if a balance between commercially viable abatement equipment and acceptable air emission limits is reached.

4.4 Energy Efficiency and Renewable Energy Sources

The Government has devised a number of economic instruments to reduce electricity demand and hence the burden on power generation, and thus further reduce emissions of NO_x and SO₂.

4.4.1 Energy efficiency: Grants and targets

Since 1st November 2006, the Government is offering a 20% refund (up to a maximum of Lm 50 for cooling appliances and Lm25 for other appliances) on energy efficient washing machines, fridges, freezers and their combinations, tumble dryers, dishwashers and air conditioners for domestic use. Equipment eligible for the rebate has to be labelled A or better as per directives issued under the framework Council Directive 92/75/EEC¹⁵ (transposed into LN 99/2002)¹⁶.

To promote greater energy saving in domestic premises, in 2006 Government introduced a grant scheme consisting of a 25% grant (up to a maximum of Lm 100) on the purchase price of roof insulation of domestic premises.

As from the year 2008, Malta is obliged to increase its energy efficiency target by 1% per year and has to report to the European Commission by mid 2007 through an Energy Efficiency Action Plan.

¹⁵ Directive 92/75/EEC of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances

¹⁶ Budget Speech 2007 (Government of Malta, October 2006).

4.4.2 Renewable Energy Sources: Support measures and targets

Government has also implemented various support schemes for renewable energy sources (RES). This includes:

- (i) An increase in the refund on purchasing of solar energy products from 15% to 25% (subject to a maximum of Lm100) for domestic premises. In addition the network connection fee of Lm 70 is waived by Enemalta Corporation in the case of new households installing these systems.
- (ii) A grant of 25% on the purchasing of micro wind systems (with a maximum generation capacity of 3.7 kW) and which are installed on domestic premises.
- (iii) A grant of 20% on the purchasing of photovoltaic installations with a minimum size of 1 kWp and less than 3.7 kWp on domestic premises. This grant is subject to a maximum of Lm 500 with an additional grant of Lm 250 for every additional 1 kWp ($\pm 5\%$) above the minimum 1 kWp. In addition other support measures for such installations include:
 - Waiving of the meter costs by Enemalta Corporation and amounting to Lm 20 fee for the installation of the meter necessary for the operation of the photovoltaic technology;
 - A net metering arrangement where any excess electricity fed to the grid is purchased by Enemalta Corporation at the rate of 3 c/kWh.¹⁷

The Treaty of Accession of Malta to the EU sets a target of 5% of the total electricity generated in 2010. Detailed studies on the potential of renewable energy sources in Malta have been carried out since then. This was presented as a report to the Commission in view of the implementation of Directive 2001/77/EC on the Promotion of Electricity from Renewable Energy Sources (Ministry for Resources and Infrastructure, October 2005).

The report gives a national indicative target of 1.37% for electricity from renewable energy sources by 2010 (including the construction of a large scale wind farm) or 0.31% (excluding construction of a large scale wind farm)¹⁸.

A draft RES policy document has also been published by Government in August 2006. This policy document notes that Government will continue to keep under review and update according to progress and changing situations, knowledge-based targets which are based upon national renewable energy resource evaluations and taking into account best available technology, costs, feasible penetration rates and other constraints.¹⁹

¹⁷ Budget Speech 2006 (Government of Malta, November 2005)

¹⁸ Budget Speech 2006 (Government of Malta, November 2005)

¹⁹ A Draft Renewable Energy policy for Malta (Government of Malta, August 2006)

A call for expressions of interest for offshore wind farm development from interested parties that are capable and willing to undertake offshore wind projects with a final capacity of between 75 and 100 Megawatt (peak) in Maltese territorial waters on a public private partnership basis has been issued and the responses submitted to this Call are being assessed by Government. This approach also coincided with a decision taken by the Government that the national electricity distribution grid was to be interconnected with the European grid. Such an interconnection would render the system stable and robust and permit a scale of operations sufficient to make the project economically feasible.

Raising awareness on sustainable energy use: Educational Campaign

The Malta Resources Authority in collaboration with the Ministry of the Environment, the Malta Transport Authority and other entities is leading a sustained educational campaign to generate awareness and imbue a new culture on ideal behaviour in energy consumption. The total budget available for this tender is Lm 75, 000 and the period of execution is 13 months.

The Educational Campaign will commence in the very near future and will address the following key issues:-

- Energy efficiency and conservation
- Micro-generation through renewable energy sources and promotion of solar thermal systems
- Energy efficiency in transport
- Energy performance in buildings

The main target audiences of the campaign in Phase 1 and 2 are

- Domestic consumers
- School children
- Environmental NGO's and opinion leaders

The campaign will involve research both in Phase 1 and Phase 2. In the initial stage a survey will establish domestic consumers' energy consumption patterns, level of customers' awareness and general behaviour. The result will be used to design the educational campaign. A combination of channels will be used to convey the messages of the campaign including:

- Advertising mass media channels
- Non advertising mass media channels
- Non mass media channels

Children will be involved in the campaign through school activities and programs on mass media channels.

In Phase 2 self-audit facilities will be developed for domestic consumers on energy consumption in terms of electricity and fuels. Qualitative research will take place in order to assess the messages of the campaign and modify as necessary. Phase 2 shall use similar communication channels used in Phase 1 with variants as necessary to attain specific objectives. The communication channels for the self audit facilities will include website, printed materials and publications, etc.

In Phase 3 the Professional Bodies and Associations, Government department and entities, importers, industry associations and organisations and other heavy consumers will be targeted.

In this phase the campaign will involve research, seminars amongst others.

5. Emission Inventories and Projections

Emission Inventories for the NEC Directive using EMEP/CORINAIR Guidelines have been calculated only for the years 2003 to 2005. The historic emissions presented in Annex A from 1990 to 2003 are taken from the Greenhouse Gas Emission Inventory, calculated using IPCC Guidelines. This inventory was also used as baseline data for emission projections, as input to the RAINS model. The emissions calculated by RAINS differ to national inventories for particular years, especially for sulphur dioxide. This could be due to the use of different emission factors and methodology.

Emission Projections were carried out using the RAINS model. “RAINS Web” contains several emission scenarios which are grouped into versions, which document progress of the work on the scenarios. Each emission scenario combines assumptions about activity pathways, control strategies and emission vectors:

- (i) **Activity pathways** are specified for the following types of economic activity:
 - Energy
 - Transport
 - Agriculture
 - Industrial processes and
 - VOC-specific sources.
- (ii) **Control strategy** determines penetration of emission control technologies for every emission sector. In particular, the “Current legislation” (CLE) strategy reflects the controls that need to be applied to comply with the already decided national and international emission, fuel quality, and product standards.
- (iii) **Emission vector** stores the information about (country-specific) emission factors and other coefficients for every activity/sector/control technology combination.

The scenarios applied for the model runs for Malta, which are presented in Annex B, are as requested in the Guidelines of this report: “business as usual”, “with measures” and “with additional measures” scenarios.

All national data feeding into the RAINS model has been recently updated as part of the NECD revision process (September 2006). Such data consists of historic activity data for all sectors from 1990 to 2005, and additional activity data from 2005 up to 2020, (projections in steps of five years) depending on the envisaged future plans in the respective sectors. Such data was also provided for removal efficiencies and capacities controlled. The emissions are then calculated by the model as follows:

Emissions = sectoral activity × abated emission factor × capacities controlled

Where the abated emission factor = unabated emission factor (1 – removal efficiency)

6. Geographical distribution of emissions

The geographical distribution of emissions is dealt with separately for the respective policies and measures:

Plans for new and existing plants

The contract notice for the commissioning of a new 100MW plant specifies the area of land available at Delimara power plant, while leaving the options open for prospective tenderers to propose any other site in Malta.

Thus, at this stage it is not possible to state if there will be any changes in geographical distribution of emissions from the new plant.

In the case of the upgrade of the Delimara power plant, emissions from the site will comply with LCPD limits. In this case, there will be a reduction in the geographical position of emissions resulting from this power plant.

Intelligent Traffic Management System

This measure will reduce emissions in certain busy roads at certain times, re-routing the traffic to less busy roads. Emission reduction will be achieved in streets which normally undergo traffic congestion at peak hours. Thus these specific roads will experience geographical emission reduction. The exact streets that will be targeted with the ITMS implementation are being short listed and studied.

The Valletta Strategy

The Valletta Strategy will reduce traffic generated pollution in the capital city.

Environment Permitting System

Such a permitting system will aid in reducing emissions from specific SMEs carrying out various kinds of activities which have an effect on air quality, particularly in industrial estates. Improvements in general ambient conditions may also be possible, given that industrial areas and micro enterprise tend to be dispersed throughout the islands.

7. Costs and benefits of policies and measures

7.1 Cost of policies and measures

Plans for new and existing plants

The new 100MW plant is estimated to cost the Maltese Government from 35 to 40 million Maltese Liri (approximately 82 to 94 Million Euro).

The cost to modify Delimara steam plant is presently estimated at Lm 5 Million (11.7 Million Euro) for both dust and NO_x abatement. The procurement of heavy fuel oil with sulphur content of less than 1% is expected to result in an additional annual running cost of Lm 5.5 Million (12.9 Million Euro) over the present fuel cost.

The cost of stack emission monitoring equipment for Marsa and Delimara power stations will approximately cost Lm 750,000 (1.8 Million Euro).

Intelligent Traffic Management System

This measure is part of the INTERREG project of which Malta is the beneficiary. The funding available for the work planned until the period 2007-2008 is 1.5 to 2 Million Euro.

The Valletta Strategy

In implementing the Valletta Strategy, the Government is mostly asking private enterprise to invest in the various aspects of the project, such as electric taxis and sea ferries. Costs of other aspects of the project are not available as yet.

With respect to the Controlled Vehicle Access project, the cost should be neutral to Government, since the revenue generated from the hourly payment rates should cancel out the amount presently acquired from the fixed fee system of the V-licence.

Environment Permitting System

Given that implementation of the permitting system is still under way, the total costs involved have yet to be determined with any accuracy. Nevertheless, such costs are expected to include substantial recurrent staff costs, together with additional costs in terms of training and system development. The latter are expected to include development of IT systems for the handling of permits, in line with the Government's policy on e-Government.

Raising awareness on sustainable energy use: Educational Campaign

The sustained educational campaign lead by the Malta Resources Authority with the aim to generate awareness and imbue a new culture on ideal behaviour in energy consumption is going to cost Lm 75, 000 (175,500 Euro).

7.2 Health and environmental benefits

The latest information available for health and environmental impacts was provided by IIASA in September 2006 developed for each Member State by model runs using the RAINS model. The report provides a preliminary assessment of health and environmental impacts of the baseline emissions projected for the various scenarios for the year 2020.

Malta cannot present the health and environmental impacts for 2010 since these are only available from the CAFE baseline scenario, and at the time IIASA did not have updated information and projections for Malta for such studies.

The loss in statistical life expectancy attributable to the human exposure to PM_{2.5} originating from anthropogenic sources was estimated to be 5.9 months in the year 2000. This was estimated to decrease to 5.1 months in the year 2020. A full assessment of the environmental impacts of the baseline scenarios will be presented by IIASA in the very near future. Thus, these figures have to be considered as indicative and not as a robust assessment.

Calculations on the effect of eutrophication and acidification on forests do not apply for Malta. Model runs on all ecosystems were not made available for Malta in this report.

8. Evaluation and monitoring of national programme

The evaluation and monitoring of the national programmes will be carried out as follows:

Plans for new and existing plants

Stack emission monitoring equipment will be installed in the new 100 MW plant. Similarly, the present two power plants will be equipped with new stack emission monitors. The regulator will have access to this data, which in turn is to show compliance with the emission limit values specified in the Large Combustion Plant Directive.

Additionally, MEPA manages a real time monitoring station which is in line with maximum plume ground concentration of Marsa Power Station. This will also be used to monitor improvements in air quality in the area.

Intelligent Traffic Management System

The ITMS system is self monitored using the air quality sensors. Additionally, statistical network performance indicators will monitor the functioning of the whole system. Traffic real time monitoring stations managed by MEPA can also be used to study the improvement in air quality through the implementation of this programme.

The Valletta Strategy

The diffusion tubes installed in Valletta could be used to study the improvement in air quality in the pedestrianised areas. With reference to the CVA, traffic monitoring of the system can give detailed information on entry and exit of vehicles, duration of stay, time of visit, vehicle type etc.

Environment Permitting System

With reference to small and medium sized enterprises, excluding those falling under Schedule 1 of the IPPC Directive, the permitting system will request the operator to abide by specific emission limit values, which would in turn require emission monitoring. Thus, the installation will be self monitored. This will be required in the case where emissions to the air are known to be substantial in view of the nature of the activity carried out.

Annex A

Reporting historic emissions data

Emissions of Nitrogen Oxides (Source: GHG Inventory)

| Sector | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| NO _x | kT |
| Energy | 5.99 | 6.41 | 6.49 | 6.63 | 6.4 | 5.08 | 4.64 | 4.55 | 4.66 | 4.96 | 4.97 | 4.88 | 5.27 | 5.5 |
| Manufacturing Industry & Construction | 0.14 | 0.15 | 0.14 | 0.14 | 0.13 | 0.14 | 0.15 | 0.14 | 0.13 | 0.13 | 0.13 | 0.11 | 0.11 | 0.11 |
| Transport | 3.39 | 3.56 | 3.8 | 4.02 | 4.19 | 4.35 | 4.6 | 4.7 | 4.79 | 4.897 | 5.01 | 5.3 | 5.38 | 5.4 |
| Domestic Aviation | 0 | 0 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| Road | 3.24 | 3.44 | 3.65 | 3.85 | 4.02 | 4.13 | 4.36 | 4.49 | 4.58 | 4.657 | 4.73 | 4.99 | 5.04 | 5.04 |
| National Navigation | 0.15 | 0.12 | 0.14 | 0.16 | 0.17 | 0.22 | 0.22 | 0.19 | 0.19 | 0.22 | 0.26 | 0.3 | 0.33 | 0.35 |
| Commercial & Institutional | 0.07 | 0.08 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 | 0.07 | 0.05 | 0.07 | 0.08 | 0.06 | 0.06 | 0.06 |
| Residential | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| International Aviation | 0.88 | 0.85 | 1.05 | 1.14 | 1.4 | 1.41 | 1.43 | 1.49 | 1.43 | 1.49 | 1.42 | 1.22 | 1.33 | 1.12 |
| Agriculture | NA |
| Solvent use | NA |
| TOTAL NO_x emissions | 10.50 | 11.08 | 11.58 | 12.03 | 12.22 | 11.09 | 10.93 | 10.98 | 11.09 | 11.58 | 11.64 | 11.60 | 12.18 | 12.22 |

VOC Emissions (Source: GHG Inventory)

| Sector | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
| VOC | kT | kT | kT | kT | kT | kT | kT | kT |
| Energy | 0.08 | 0.09 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 | 0.12 | 0.12 | 0.12 | 0.13 |
| Manufacturing Industry & Construction | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 | 0.003 |
| Transport | 4 | 5 | 5 | 5 | 5 | 6 | 5.74 | 6 | 6 | 6 | 6 | 5.4422 | 5.3295 | 5.311 |
| Domestic Aviation | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0034 | 0.0013 | 0.0012 | 0.0014 | 0.001 |
| Road | 4 | 5 | 5 | 5 | 5 | 6 | 5.74 | 6 | 6 | 6 | 6 | 5.43 | 5.316 | 5.297 |
| National Navigation | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.0121 | 0.013 |
| Commercial & Institutional | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 | 0.003 |
| Residential | 0.0011 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 |
| International Aviation | 0.15 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Agriculture | NA | NA | NA | NA | NA | NA | NA | NA |
| Solvent use and other product use | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.45 | 0 | 1.62 | 2 | 2.329 |
| Industrial Process | 0 | 0 | 0 | 0 | 0 | 0.2 | 5 | 2 | 3 | 2 | 1 | 5.67 | 3 | 3 |
| TOTAL VOC emissions | 4.24 | 5.12 | 5.14 | 5.14 | 5.14 | 6.34 | 10.88 | 8.14 | 9.14 | 9.60 | 7.15 | 12.88 | 10.48 | 10.80 |

SO₂ Emissions (Source: GHG Inventory)

| Sector | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| SO₂ | kT |
| Energy | 18.518 | 19.171 | 21.089 | 18.785 | 23.729 | 29.661 | 30.65 | 31.64 | 33.62 | 29.66 | 25.71 | 25.90 | 26.79 | 27.13 |
| Manufacturing Industry & Construction | 0.066 | 0.068 | 0.075 | 0.067 | 0.084 | 0.105 | 0.11 | 0.112 | 0.119 | 0.105 | 0.091 | 0.0917 | 0.0951 | 0.0963 |
| Transport | 0.096 | 0.099 | 0.109 | 0.097 | 0.123 | 0.154 | 0.159 | 0.164 | 0.174 | 0.154 | 0.133 | 0.1342 | 0.139 | 0.1405 |
| Domestic Aviation | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.0006 | 0.0005 | 0.0004 | 0.00043 | 0.000444 | 0.00045 |
| Road | 0.082 | 0.085 | 0.093 | 0.083 | 0.105 | 0.131 | 0.136 | 0.140 | 0.149 | 0.131 | 0.113 | 0.115 | 0.118513 | 0.12 |
| National Navigation | 0.014 | 0.014 | 0.016 | 0.014 | 0.017 | 0.022 | 0.023 | 0.023 | 0.025 | 0.022 | 0.019 | 0.019 | 0.019752 | 0.02 |
| Commercial & Institutional | 0.021 | 0.022 | 0.024 | 0.022 | 0.027 | 0.034 | 0.035 | 0.037 | 0.039 | 0.0342 | 0.03 | 0.0299 | 0.0309 | 0.0313 |
| Residential | 0.029 | 0.030 | 0.033 | 0.030 | 0.038 | 0.047 | 0.048 | 0.050 | 0.053 | 0.0468 | 0.04 | 0.0409 | 0.0424 | 0.0429 |
| International Aviation | | | | | | | | | | | | | | |
| Agriculture | NA |
| Solvent use and other product use | NA |
| Industrial Process | NA |
| TOTAL SO₂ emissions | 18.73 | 19.39 | 21.33 | 19.00 | 24.00 | 30.00 | 31.00 | 32.00 | 34.01 | 30.00 | 26.00 | 26.20 | 27.10 | 27.44 |

Annex B

Projected emissions

| Substance: NO _x | Emissions in Kilotonnes | | | | |
|--------------------------------------------------------------------------|-------------------------|-----------------------------|----------------------------|---------------|--------------------------|
| | | | Projected Target Year 2010 | | |
| | | | Business As Usual | With Measures | With Additional Measures |
| Aggregation for projections | Reference Year 2000 | Latest Historic Year (2005) | Business As Usual | With Measures | With Additional Measures |
| 1 A 1 Energy industries (Combustion in power plants & Energy Production) | 5.166 | 5.804 | 7.27 | 6.91 | 5.74 |
| 1 A 2 Manufacturing Industries and Construction (Combustion in industry) | 0.135 | 0.113 | 0.125 | 0.125 | 0.113 |
| 1 A 3 b Road Transport | 3.136 | 2.624 | 2.732 | 1.810 | 1.803 |
| 1 A 3 Other Transport | 0.118 | 0.134 | 0.145 | 0.126 | 0.126 |
| 1 A 4 Other sectors | | | | | |
| 1 B Fugitive emissions (from fuels) | | | | | |
| 2 Industrial processes | | | | | |
| 3 Solvent and other product use | | | | | |
| 4. Agriculture | | | | | |
| 6. Waste | | | | | |
| 7. Combustion in residential commercial sector | 0.107 | 0.088 | 0.1 | 0.1 | 0.088 |
| Other sectors not included above | | | | | |
| Other sectors not included above | | | | | |
| | | | | | |
| Total Emission | 8.662 | 8.763 | 10.372 | 9.071 | 7.87 |

| Substance: SO₂ | Emissions in Kilotonnes | | | | |
|--------------------------------------------------------------------------|------------------------------------|----------------------------|------------------------------------|--------------------------|----------------------|
| | | | Projected Target Year 2010 | | |
| | Aggregation for projections | Reference Year 2000 | Latest Historic Year (2005) | Business As Usual | With Measures |
| 1 A 1 Energy industries (Combustion in power plants & Energy Production) | 32.804 | 11.7 | 46.2 | 13.9 | 8.469 |
| 1 A 2 Manufacturing Industries and Construction (Combustion in industry) | 0.157 | 0.096 | 0.096 | 0.096 | 0.096 |
| 1 A 3 b Road Transport | 0.816 | 0.108 | 0.113 | 0.102 | 0.102 |
| 1 A 3 Other Transport | 0.031 | 0.025 | 0.029 | 0.029 | 0.025 |
| 1 A 4 Other sectors | | | | | |
| 1 B Fugitive emissions (from fuels) | | | | | |
| 2 Industrial processes | | | | | |
| 3 Solvent and other product use | | | | | |
| 4. Agriculture | | | | | |
| 6. Waste | | | | | |
| 7. Combustion in residential commercial sector | 0.140 | 0.074 | 0.074 | 0.074 | 0.074 |
| Other sectors not included above | | | | | |
| Other sectors not included above | | | | | |
| | | | | | |
| Total Emission | 33.948 | 12.003 | 46.512 | 14.201 | 8.766 |

| Substance: VOC | Emissions in Kilotonnes | | | | |
|--------------------------------------------------------------------------|------------------------------------|----------------------------|------------------------------------|--------------------------|---------------------------------|
| | | | Projected Target Year 2010 | | |
| | <i>Aggregation for projections</i> | <i>Reference Year 2000</i> | <i>Latest Historic Year (2005)</i> | <i>Business As Usual</i> | <i>With Additional Measures</i> |
| 1 A 1 Energy industries (Combustion in power plants & Energy Production) | 0.106 | 0.126 | 0.149 | 0.150 | 0.125 |
| 1 A 2 Manufacturing Industries and Construction (Combustion in industry) | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 |
| 1 A 3 b Road Transport | 4.139 | 2.152 | 1.934 | 0.958 | 0.958 |
| 1 A 3 Other Transport | 0.015 | 0.017 | 0.017 | 0.014 | 0.014 |
| 1 A 4 Other sectors | | | | | |
| 1 B Fugitive emissions (from fuels) | 0.350 | 0.269 | 0.303 | 0.226 | 0.226 |
| 2 Industrial processes | 0.531 | 0.371 | 0.3796 | 0.345 | 0.345 |
| 3 Solvent and other product use | 2.302 | 2.049 | 2.155 | 2.155 | 1.920 |
| 4. Agriculture | | | | | |
| 6. Waste | | | | | |
| 7. Combustion in residential commercial sector | 0.007 | 0.004 | 0.004 | 0.004 | 0.004 |
| Other sectors not included above | | | | | |
| Other sectors not included above | | | | | |
| | | | | | |
| Total Emission | 7.454 | 4.991 | 4.945 | 3.855 | 3.595 |

| Substance: NH₃ | Emissions in Kilotonnes | | | | |
|--------------------------------------------------------------------------|------------------------------------|----------------------------|------------------------------------|--------------------------|---------------------------------|
| | | | Projected Target Year 2010 | | |
| | Aggregation for projections | Reference Year 2000 | Latest Historic Year (2005) | Business As Usual | With Additional Measures |
| 1 A 1 Energy industries (Combustion in power plants & Energy Production) | 0 | 0 | 0 | 0 | 0.010 |
| 1 A 2 Manufacturing Industries and Construction (Combustion in industry) | | | | | |
| 1 A 3 b Road Transport | 0.029 | 0.038 | 0.038 | 0.033 | 0.033 |
| 1 A 3 Other Transport | 0.023 | 0.026 | 0.026 | 0.026 | 0.026 |
| 1 A 4 Other sectors | | | | | |
| 1 B Fugitive emissions (from fuels) | | | | | |
| 2 Industrial processes | | | | | |
| 3 Solvent and other product use | | | | | |
| 4. Agriculture | 1.352 | 2.016 | 2.183 | 2.174 | 2.174 |
| 6. Waste | 0.004 | 0.006 | 0.018 | 0.018 | 0.018 |
| 7. Combustion in residential commercial sector | 0 | 0 | 0.001 | 0.001 | 0.001 |
| 8. Other Nitrogen Fertilizers | 0.014 | 0.033 | 0.033 | 0.033 | 0.033 |
| Other sectors not included above | | | | | |
| | | | | | |
| Total Emission | 1.422 | 2.119 | 2.299 | 2.285 | 2.295 |

Annex C

National Programme

Table C1 Executive Summary

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary of implemented P&Ms <i>Text: Low sulphur fuel ,IPPC permits, emissions testing in road transport, emissions reporting from polluting cars, various economic instruments</i> | | |
| Will the national ceilings be achieved for: (“with measures scenario”) | SO₂ NO_x VOC NH₃ | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| If no, summary of additional P&Ms to achieve NEC <i>Text: plans for new and existing power plants,, environmental permitting system, energy efficiency and renewable energy sources, Intelligent Traffic Management System, Valletta Strategy</i> | | |
| Significant changes in the geographical distribution of emissions anticipated for 2010 for: (possibly, see Section 6) | SO₂ NO_x VOC NH₃ | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If yes, please specify _____ <i>Text: It is still unknown in which area the new power plant will be built, thus there may be changes in the geographical distribution of NO_x and SO₂ emissions starting in the end of 2009/beginning of 2010.</i> | | |
| Other information | Text _____ | |

Table C2 Procedure of adoption

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Procedure for preparation and adoption <i>Text: These plans and programmes have been prepared by consulting with the relevant authorities involved in their implementation.</i> | |
| Regulatory status of the programme | <input checked="" type="checkbox"/> In planning <input type="checkbox"/> before adoption <input type="checkbox"/> adopted <input type="checkbox"/> Other _____ |
| Authorities involved | <input checked="" type="checkbox"/> National Government <i>Specify ministries/departments: Enemalta, Malta Transport Authority, Malta Resources Authority, Malta Environment and Planning Authority</i> <input type="checkbox"/> Regional or local Governments <i>Specify names</i> _____ <input type="checkbox"/> Others not listed <i>Specify names</i> _____ |
| Consultations undertaken | <input checked="" type="checkbox"/> Industry <i>Specify names: Enemalta Corporation</i> <input type="checkbox"/> Industry associations <i>Specify names</i> _____ <input type="checkbox"/> NGO's Environment |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Specify names _____ <input type="checkbox"/> Public Specify how _____ <input checked="" type="checkbox"/> Other _____ <i>Malta Transport Authority, Malta Resources Authority, Malta Environment & Planning Authority</i> |
| Consultations: Approach (time frame, method to consider response), Problems and Barriers encountered <i>Text: Consultations were carried out through meetings with the authorities involved, separately. Stakeholders were generally cooperative, and while no major difficulties were encountered, resource availability created minor difficulties in achieving the deadline.</i> | |
| Other national Plans and Programmes & Directives considered in the preparation of the National Programme | <input type="checkbox"/> Monitoring Mechanism and to the UNFCCC <input checked="" type="checkbox"/> Emissions Trading <input type="checkbox"/> National Kyoto Strategy (National Climate Change Programmes) <input checked="" type="checkbox"/> Plans under the AQFWD (96/62/EC) <input type="checkbox"/> Ozone depletion data reporting under the Montreal protocol <input checked="" type="checkbox"/> IPPC (96/61/EC) <input type="checkbox"/> Fuel sulphur content (1999/32/EC) <input checked="" type="checkbox"/> Large Combustion Plant Directive (2001/80/EC) <input type="checkbox"/> Quality of petrol & diesel fuels Directive (98/70/EC) <input type="checkbox"/> Directives on waste incineration (94/67/EEC and 2000/76/EEC) <input type="checkbox"/> Petrol Storage & Distribution (94/63/EC) <input type="checkbox"/> Limitation of emissions of VOCs from organic solvents (99/13/EEC) <input checked="" type="checkbox"/> EURO vehicle standards I-V (98/69/EC) <input type="checkbox"/> Labeling & limitation of solvents in products COM(2002)750 <input type="checkbox"/> Other _____ |
| Other information (optional) <i>Text</i> _____ | |

Table C3 (a) Policies and measures (One table per measure or group of measures)

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P&M (group) No. | 1 | |
| Name of policy or measure (or group) | <i>Energy Industries: combustion in power plants and energy production</i> | |
| Brief description of policy or measure (or group) <i>Commissioning of a new 100MW power plant, modification of boilers at Delimara Power Station and operation of plant at Marsa Power Station</i> | | |
| Sector(s) targeted for reduction | <u>Main</u> <input checked="" type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste | <u>Supplementary</u> <input type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste |
| Objective of measure(s), activities affected | <input type="checkbox"/> Energy Efficiency: Buildings <input type="checkbox"/> Energy Efficiency: Industry <input type="checkbox"/> Energy Efficiency: Transport <input type="checkbox"/> Waste and resource efficiency <input type="checkbox"/> Increase Renewable <input type="checkbox"/> Reduce Congestion <input type="checkbox"/> Reduce specific emissions <input type="checkbox"/> Reduce fuel consumption <input type="checkbox"/> Resource Sustainability <input type="checkbox"/> Agricultural Sustainability <input type="checkbox"/> Technological change <input type="checkbox"/> Behaviour change <input checked="" type="checkbox"/> Fuel quality (including S content) <input checked="" type="checkbox"/> ELVs <input type="checkbox"/> Energy efficiency <input checked="" type="checkbox"/> Abatement technology <input type="checkbox"/> Fuel switching <input type="checkbox"/> Product switching <input type="checkbox"/> Technique switching <input type="checkbox"/> Sustainable transport <input type="checkbox"/> Agricultural measures ^a <input type="checkbox"/> Waste recycling <input type="checkbox"/> Renewables <input type="checkbox"/> Eco-labelling <input type="checkbox"/> Green taxes <input type="checkbox"/> Sector emission ceilings <input type="checkbox"/> Best practice / guidance | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input checked="" type="checkbox"/> Emissions trading <input type="checkbox"/> Controls on solvent use & content <input type="checkbox"/> Congestion charging <input type="checkbox"/> Publicity & promotion <input type="checkbox"/> Rural development <input type="checkbox"/> Other _____ |
| NECD pollutants affected | <input checked="" type="checkbox"/> NOx <input checked="" type="checkbox"/> SO2 <input type="checkbox"/> VOC <input checked="" type="checkbox"/> NH3 (possibly) |
| Type of instruments | <input type="checkbox"/> Economic <input type="checkbox"/> Fiscal <input type="checkbox"/> Negotiated agreements <input type="checkbox"/> Voluntary agreements <input checked="" type="checkbox"/> Regulatory <input type="checkbox"/> Information <input type="checkbox"/> Education <input type="checkbox"/> Research <input type="checkbox"/> Other _____ |
| Status of policy, measure or group | <input type="checkbox"/> implemented, current mitigation impact <input type="checkbox"/> implemented, future mitigation impact <input type="checkbox"/> adopted <input checked="" type="checkbox"/> planned <input type="checkbox"/> expired <input type="checkbox"/> Other _____ |
| Implementing entity or entities | <input type="checkbox"/> National Government <i>Specify name _____</i> <input type="checkbox"/> Local or Regional Government <i>Specify name _____</i> <input type="checkbox"/> Industry <i>Specify name _____</i> <input type="checkbox"/> Industry associations <i>Specify name _____</i> <input checked="" type="checkbox"/> Others not listed <i>Enemalta Corporation</i> |
| Estimate of mitigation impact, by pollutant, in 2010 (kt) if available quantify by pollutant or indicate where included in the model parameters of projections | NOx _____ kt reduction from 2010 SO2 _____ kt reduction from 2010 VOC _____ kt reduction from 2010 NH3 _____ kt reduction from 2010 Please refer to Annex B |
| Is the policy or measure included only in the 'With measures' projections reported under annex B? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Is the policy or measure included only in the 'With additional measures' projections reported under Annex B? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Mitigation impact of measure on Greenhouse Gas (GHG) emissions in target year (2010) | <input type="checkbox"/> Specific GHG emission reduction measure/group <input type="checkbox"/> Significantly reduces GHG's <input type="checkbox"/> Significantly increases GHGs Please specify impact..... <input checked="" type="checkbox"/> Other comments: Reduce the rate of increase of GHGs. |
| How is progress monitored | <input checked="" type="checkbox"/> Specific reporting |

| | |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <i>LCPD, stack emission reporting to regulator</i> <input checked="" type="checkbox"/> Using national annual emissions inventories & Projections <input type="checkbox"/> State of the Environment Reporting <input type="checkbox"/> Other activity based indicators <i>Identify indicators</i> _____ <input type="checkbox"/> Nationally coordinated annual review <i>Specify name and status</i> _____ <input type="checkbox"/> Other _____ |
| Other information (optional) | |

Table C3 (b) Policies and measures (One table per measure or group of measures)

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P&M (group) No. | 2 | |
| Name of policy or measure (or group) | <i>Road Transport</i> | |
| Brief description of policy or measure (or group) <i>Implementation of an Intelligent Traffic Management System and the Valletta Strategy</i> | | |
| Sector(s) targeted for reduction | <u>Main</u> <input type="checkbox"/> Energy Supply <input checked="" type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste | <u>Supplementary</u> <input type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste |
| Objective of measure(s), activities affected | <input type="checkbox"/> Energy Efficiency: Buildings <input type="checkbox"/> Energy Efficiency: Industry <input type="checkbox"/> Energy Efficiency: Transport <input type="checkbox"/> Waste and resource efficiency <input type="checkbox"/> Increase Renewable <input checked="" type="checkbox"/> Reduce Congestion <input type="checkbox"/> Reduce specific emissions <input type="checkbox"/> Reduce fuel consumption <input type="checkbox"/> Resource Sustainability <input type="checkbox"/> Agricultural Sustainability <input type="checkbox"/> Technological change <input checked="" type="checkbox"/> Behaviour change <input type="checkbox"/> Fuel quality (including S content) <input type="checkbox"/> ELVs <input type="checkbox"/> Energy efficiency <input type="checkbox"/> Abatement technology <input type="checkbox"/> Fuel switching <input type="checkbox"/> Product switching <input type="checkbox"/> Technique switching <input checked="" type="checkbox"/> Sustainable transport | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input type="checkbox"/> Agricultural measures <input type="checkbox"/> Waste recycling <input type="checkbox"/> Renewables <input type="checkbox"/> Eco-labelling <input type="checkbox"/> Green taxes <input type="checkbox"/> Sector emission ceilings <input type="checkbox"/> Best practice / guidance <input type="checkbox"/> Emissions trading <input type="checkbox"/> Controls on solvent use & content <input type="checkbox"/> Congestion charging <input type="checkbox"/> Publicity & promotion <input type="checkbox"/> Rural development <input type="checkbox"/> Other_____ |
| NECD pollutants affected | x NOx x SO2 x VOC <input type="checkbox"/> NH3 |
| Type of instruments | x Economic <input type="checkbox"/> Fiscal <input type="checkbox"/> Negotiated agreements <input type="checkbox"/> Voluntary agreements x Regulatory <input type="checkbox"/> Information <input type="checkbox"/> Education <input type="checkbox"/> Research <input type="checkbox"/> Other_____ |
| Status of policy, measure or group | <input type="checkbox"/> implemented, current mitigation impact <input type="checkbox"/> implemented, future mitigation impact x adopted (part of the CVA) x planned <input type="checkbox"/> expired <input type="checkbox"/> Other_____ |
| Implementing entity or entities | x National Government <i>Malta Transport Authority</i> <input type="checkbox"/> Local or Regional Government <i>Specify name_____</i> <input type="checkbox"/> Industry <i>Specify name_____</i> <input type="checkbox"/> Industry associations <i>Specify name_____</i> <input type="checkbox"/> Others not listed |
| Estimate of mitigation impact, by pollutant, in 2010 (kt) if available quantify by pollutant or indicate where included in the model parameters of projections | NOx _____ kt reduction from 2010 SO2 _____ kt reduction from 2010 VOC _____ kt reduction from 2010 NH3 _____ kt reduction from 2010 Please refer to Annex B |
| Is the policy or measure included only in the 'With measures' projections reported under annex B? | <input type="checkbox"/> Yes x No |
| Is the policy or measure included only in the 'With additional measures' projections reported under Annex B? | x Yes <input type="checkbox"/> No |

| | |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Mitigation impact of measure on Greenhouse Gas (GHG) emissions in target year (2010)</p> | <p><input type="checkbox"/> Specific GHG emission reduction measure/group</p> <p><input type="checkbox"/> Significantly reduces GHG's</p> <p><input type="checkbox"/> Significantly increases GHGs</p> <p>Please specify impact.....</p> <p>✗ Other comments: Reduce the rate of increase of GHGs.</p> |
| <p>How is progress monitored</p> | <p><input type="checkbox"/> Specific reporting <i>Identify reporting commitments</i>_____</p> <p><input type="checkbox"/> Using national annual emissions inventories & Projections</p> <p><input type="checkbox"/> State of the Environment Reporting</p> <p>✗ Other activity based indicators <i>Statistical network performance indicators (in the case of the ITMS)</i></p> <p><input type="checkbox"/> Nationally coordinated annual review <i>Specify name and status</i> _____</p> <p><input type="checkbox"/> Other _____</p> |
| <p>Other information (optional)</p> | |

Table C3 (c) Policies and measures (One table per measure or group of measures)

| | | |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P&M (group) No. | 3 | |
| Name of policy or measure (or group) | <i>Combustion in Industry</i> | |
| Brief description of policy or measure (or group) <i>Environment Permitting System</i> | | |
| Sector(s) targeted for reduction | <u>Main</u> <input type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input checked="" type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste | <u>Supplementary</u> <input type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste |
| Objective of measure(s), activities affected | <input type="checkbox"/> Energy Efficiency: Buildings <input type="checkbox"/> Energy Efficiency: Industry <input type="checkbox"/> Energy Efficiency: Transport <input type="checkbox"/> Waste and resource efficiency <input type="checkbox"/> Increase Renewable <input type="checkbox"/> Reduce Congestion <input checked="" type="checkbox"/> Reduce specific emissions <input type="checkbox"/> Reduce fuel consumption <input type="checkbox"/> Resource Sustainability <input type="checkbox"/> Agricultural Sustainability <input checked="" type="checkbox"/> Technological change <input checked="" type="checkbox"/> Behaviour change <input checked="" type="checkbox"/> Fuel quality (including S content) <input checked="" type="checkbox"/> ELVs <input type="checkbox"/> Energy efficiency <input checked="" type="checkbox"/> Abatement technology <input type="checkbox"/> Fuel switching <input type="checkbox"/> Product switching <input type="checkbox"/> Technique switching <input type="checkbox"/> Sustainable transport <input type="checkbox"/> Agricultural measures ^s <input type="checkbox"/> Waste recycling <input type="checkbox"/> Renewables <input type="checkbox"/> Eco-labelling <input type="checkbox"/> Green taxes <input type="checkbox"/> Sector emission ceilings <input checked="" type="checkbox"/> Best practice / guidance <input type="checkbox"/> Emissions trading <input checked="" type="checkbox"/> Controls on solvent use & content <input type="checkbox"/> Congestion charging | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input type="checkbox"/> Publicity & promotion <input type="checkbox"/> Rural development <input type="checkbox"/> Other _____ |
| NECD pollutants affected | x NOx x SO2 x VOC <input type="checkbox"/> NH3 |
| Type of instruments | x Economic <input type="checkbox"/> Fiscal <input type="checkbox"/> Negotiated agreements <input type="checkbox"/> Voluntary agreements x Regulatory <input type="checkbox"/> Information <input type="checkbox"/> Education <input type="checkbox"/> Research <input type="checkbox"/> Other _____ |
| Status of policy, measure or group | <input type="checkbox"/> implemented, current mitigation impact <input type="checkbox"/> implemented, future mitigation impact <input type="checkbox"/> adopted x planned <input type="checkbox"/> expired <input type="checkbox"/> Other _____ |
| Implementing entity or entities | <input type="checkbox"/> National Government <input type="checkbox"/> Local or Regional Government <i>Specify name</i> _____ <input type="checkbox"/> Industry <i>Specify name</i> _____ <input type="checkbox"/> Industry associations <i>Specify name</i> _____ x Others not listed <i>Malta Environment & Planning Authority</i> |
| Estimate of mitigation impact, by pollutant, in 2010 (kt) if available quantify by pollutant or indicate where included in the model parameters of projections | NOx _____ kt reduction from 2010 SO2 _____ kt reduction from 2010 VOC _____ kt reduction from 2010 NH3 _____ kt reduction from 2010 Please refer to Annex B |
| Is the policy or measure included only in the 'With measures' projections reported under annex B? | <input type="checkbox"/> Yes x No |
| Is the policy or measure included only in the 'With additional measures' projections reported under Annex B? | x Yes <input type="checkbox"/> No |
| Mitigation impact of measure on Greenhouse Gas (GHG) emissions in target year (2010) | <input type="checkbox"/> Specific GHG emission reduction measure/group <input type="checkbox"/> Significantly reduces GHG's <input type="checkbox"/> Significantly increases GHGs Please specify impact..... x Other comments: Reduce the rate of increase of GHGs. |
| How is progress monitored | <input type="checkbox"/> Specific reporting <i>Identify reporting commitments</i> _____ <input type="checkbox"/> Using national annual emissions inventories & Projections <input type="checkbox"/> State of the Environment Reporting <input type="checkbox"/> Other activity based indicators |

| | |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input type="checkbox"/> Nationally coordinated annual review <i>Specify name and status</i> _____ <input checked="" type="checkbox"/> Other: Review of the progress of emissions from SME's through data acquisition |
| Other information (optional) | |

Table C3 (d) Policies and measures (One table per measure or group of measures)

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P&M (group) No. | 4 | |
| Name of policy or measure (or group) | <i>Energy efficiency and renewable energy sources</i> | |
| Brief description of policy or measure (or group) <i>Energy efficiency grants and targets, renewable energy sources, educational campaign on sustainable energy use.</i> | | |
| Sector(s) targeted for reduction | <u>Main</u> <input checked="" type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste | <u>Supplementary</u> <input type="checkbox"/> Energy Supply <input type="checkbox"/> Transport <input type="checkbox"/> Industrial Process <input type="checkbox"/> Domestic <input type="checkbox"/> Agriculture <input type="checkbox"/> Waste |
| Objective of measure(s), activities affected | <input checked="" type="checkbox"/> Energy Efficiency: Buildings <input type="checkbox"/> Energy Efficiency: Industry <input checked="" type="checkbox"/> Energy Efficiency: Transport <input type="checkbox"/> Waste and resource efficiency <input checked="" type="checkbox"/> Increase Renewable <input type="checkbox"/> Reduce Congestion <input type="checkbox"/> Reduce specific emissions <input type="checkbox"/> Reduce fuel consumption <input type="checkbox"/> Resource Sustainability <input type="checkbox"/> Agricultural Sustainability <input type="checkbox"/> Technological change <input checked="" type="checkbox"/> Behaviour change <input type="checkbox"/> Fuel quality (including S content) <input type="checkbox"/> ELVs <input checked="" type="checkbox"/> Energy efficiency <input type="checkbox"/> Abatement technology <input type="checkbox"/> Fuel switching <input type="checkbox"/> Product switching <input type="checkbox"/> Technique switching <input type="checkbox"/> Sustainable transport <input type="checkbox"/> Agricultural measures ^a <input type="checkbox"/> Waste recycling <input checked="" type="checkbox"/> Renewables <input type="checkbox"/> Eco-labelling <input type="checkbox"/> Green taxes <input type="checkbox"/> Sector emission ceilings <input type="checkbox"/> Best practice / guidance <input type="checkbox"/> Emissions trading <input type="checkbox"/> Controls on solvent use & content <input type="checkbox"/> Congestion charging | |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input checked="" type="checkbox"/> Publicity & promotion <input type="checkbox"/> Rural development <input type="checkbox"/> Other _____ |
| NECD pollutants affected | <input checked="" type="checkbox"/> NOx <input checked="" type="checkbox"/> SO2 <input type="checkbox"/> VOC <input type="checkbox"/> NH3 |
| Type of instruments | <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Fiscal <input type="checkbox"/> Negotiated agreements <input type="checkbox"/> Voluntary agreements <input type="checkbox"/> Regulatory <input checked="" type="checkbox"/> Information <input checked="" type="checkbox"/> Education <input type="checkbox"/> Research <input type="checkbox"/> Other _____ |
| Status of policy, measure or group | <input type="checkbox"/> implemented, current mitigation impact <input type="checkbox"/> implemented, future mitigation impact <input checked="" type="checkbox"/> adopted (energy grants) <input checked="" type="checkbox"/> planned <input type="checkbox"/> expired <input type="checkbox"/> Other _____ |
| Implementing entity or entities | <input checked="" type="checkbox"/> National Government <i>Malta Resources Authority</i> <input type="checkbox"/> Local or Regional Government <i>Specify name</i> _____ <input type="checkbox"/> Industry <i>Specify name</i> _____ <input type="checkbox"/> Industry associations <i>Specify name</i> _____ <input checked="" type="checkbox"/> Others not listed Ministry for Rural Affairs and the Environment, Malta Transport Authority |
| Estimate of mitigation impact, by pollutant, in 2010 (kt) if available quantify by pollutant or indicate where included in the model parameters of projections | NOx _____ kt reduction from 2010 SO2 _____ kt reduction from 2010 VOC _____ kt reduction from 2010 NH3 _____ kt reduction from 2010 Not available |
| Is the policy or measure included only in the 'With measures' projections reported under annex B? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Is the policy or measure included only in the 'With additional measures' projections reported under Annex B? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Mitigation impact of measure on Greenhouse Gas (GHG) emissions in target year (2010) | <input type="checkbox"/> Specific GHG emission reduction measure/group <input type="checkbox"/> Significantly reduces GHG's <input type="checkbox"/> Significantly increases GHGs Please specify impact..... <input checked="" type="checkbox"/> Other comments: Reduce the rate of increase of GHGs. |
| How is progress monitored | <input type="checkbox"/> Specific reporting <i>Identify reporting commitments</i> _____ <input type="checkbox"/> Using national annual emissions inventories & Projections <input type="checkbox"/> State of the Environment Reporting |

| | |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <input type="checkbox"/> Other activity based indicators <input type="checkbox"/> Nationally coordinated annual review <i>Specify name and status</i> _____ <input checked="" type="checkbox"/> Other: Review of the progress of the different programmes |
| Other information (optional) | |

Annex D

Socio-economic assumptions and model parameters

The socio-economic assumptions and model parameters stated below are the same as those provided to IIASA in the bilateral consultations carried out as part of the revision of the NEC Directive.

Assumptions for general economic parameters

- GDP growth rates split by industrial sectors in relation to 2000

These figures originate from the PRIMES Scenario (Climate Policy).

| <i>Parameter</i> | <i>Unit</i> | <i>Year</i> | | | | |
|----------------------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|
| | | 1990 | 1995 | 2000 | 2005 | 2010 |
| Population | Million | 0.360 | 0.378 | 0.390 | 0.398 | 0.405 |
| Gross domestic product | 10 ⁹ € ₂₀₀₀ | 2.524 | 3.296 | 4.055 | 4.233 | 4.971 |
| Value added, of which: | 10 ⁹ € ₂₀₀₀ | 2.244 | 2.930 | 3.604 | 3.788 | 4.465 |
| - Industry | 10 ⁹ € ₂₀₀₀ | 0.642 | 0.732 | 0.902 | 0.957 | 1.140 |
| - Tertiary | 10 ⁹ € ₂₀₀₀ | 1.502 | 2.085 | 2.560 | 2.691 | 3.174 |
| - Energy sector and others | 10 ⁹ € ₂₀₀₀ | 0.100 | 0.112 | 0.143 | 0.140 | 0.151 |

Assumptions for the energy sector

- National coal, oil and gas energy prices per sector (including taxes) – suggested sectors are electricity and heat generation, industry, commercial, residential and transport. Constant prices should be quoted.
- National electricity prices per sector as above (may be model output)

| Parameter | Fuel | Cost | Unit | Comments |
|---------------------------------------------------|------------------------|-------------|-------------|--------------------------------------------|
| Fuel price for power generation (fuel combustion) | Low sulphur heavy fuel | 0.83 | MEuro/PJ/%S | Present prices January 2006 |
| Electricity cost | N/A | 0.117 | Euro/kWh | N/A |
| Fuel prices for mobile sources | heavy fuel | 6.83 | Euro/GJ | 1%S HFO price in January 2006 |
| Fuel prices for mobile sources | Gasoline | 22.07 | Euro/GJ | Price in January 2006 including excise tax |
| Fuel prices for mobile sources | LPG | 9.36 | Euro/GJ | N/A |
| Fuel prices for mobile sources | Diesel | 11 | Euro/GJ | 0.2%S gas oil price in January 2006 |

Assumptions for the transport sector

- The growth of passenger road kilometres

| Type of Motor Vehicle | Passenger road km (Million) | | |
|------------------------------|------------------------------------|-------------|-------------|
| | 2000 | 2005 | 2010 |
| Motor Cycle | 95.50 | 85.75 | 86.18 |
| Passenger Cars | 3404.21 | 3723.61 | 4071.01 |
| Buses and coaches | 337.80 | 337.20 | 338.89 |
| Lorries | 646.54 | 636.88 | 646.49 |
| Road Tractors | 17.72 | 18.21 | 18.76 |

Assumptions for the agriculture sector

- Housing days/year

| Dairy cows-solid systems | Other cattle-solid systems | Pigs-liquid (slurry) systems | Laying hens | Other poultry | Horses | Sheep and goats |
|--------------------------|----------------------------|------------------------------|-------------|---------------|--------|-----------------|
| 325 | 165 | 365 | 365 | 365 | 240 | 250 |