

THE ENVIRONMENT REPORT
INDICATORS 2008

THE ENVIRONMENT REPORT
tracking the environment

Malta Environment & Planning Authority

March 2010
ISBN: 978-99957-26-09-6

These indicators have been compiled by MEPA
in partnership with the National Statistics Office.



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INTRODUCTION

Welcome to the booklet of Environment Indicators for 2008, which accompanies the 2008 Environment Report. The aim of this booklet is to allow easy access to the key datasets underpinning the analysis in the Environment Report, thereby providing timely information on key environmental trends to policymakers, organisations and the public in an active, user-friendly and systematic way.

Each indicator is accompanied by a smiley , neutral  or sad  face, in order to help users track progress more easily. As in previous years, two criteria were used in determining whether to award a smiley or not, relating to the overall dimensions of the problem and the recent trend. Based on these two criteria, while a smiley is awarded where there is a positive trend, if there is a small positive change in the trend but the overall issue remains a matter of concern, a smiley is not awarded. In the same way, awarding a neutral or sad face depends on both the trend and the overall seriousness of the issue.

The 2008 Environment Indicators booklet is published by the Malta Environment & Planning Authority in partnership with the National Statistics Office, and draw on datasets from across the Maltese government, as well as from other organisations, providing a broad picture of developments in the environmental field. If you have any comments or queries on them please contact ter@mepa.org.mt or telephone MEPA's Policy Coordination Unit on 2290 1537. This publication and the relevant datasheets are downloadable from the MEPA website (www.mepa.org.mt/ter).



DRIVING FORCES FOR ENVIRONMENTAL CHANGE

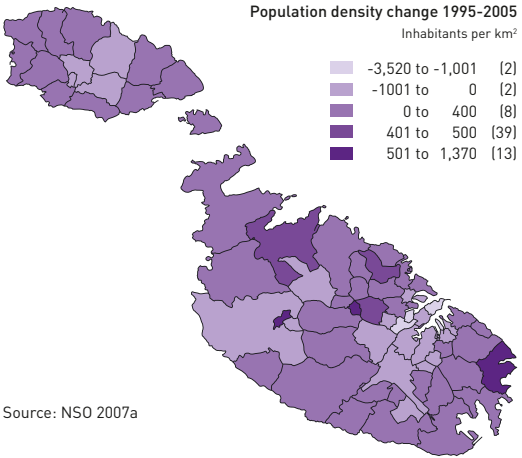
KEY FACTS:

- Planning permissions granted for housing decreased by 40% between 2007 and 2008, but the 6,836 dwellings permitted were still in excess of annual household need, estimated at 2,000 units.
- Fuel imports increased by 3.14% between 2004 and 2008.
- Registered motor vehicles increased by 8.7% between 2004 and 2008.
- Irrigated land area more than doubled between 2001 and 2005, while agricultural production fluctuated but exhibited an overall growth trend of 735 tonnes annually between 2004 and 2008.

DF1 POPULATION DENSITY

Key policy question: What impact is population density change having on the environment?

Malta's population density was 1,309 persons per square kilometre (km^2) in 2008, increasing by 9% or 109 persons per km^2 since 1995.[1] High population density is generally accompanied by pressure on infrastructure and on amenities. However at locality level some extent of population concentration into well-organised settlements benefits the efficient provision of services and amenities, and reduces the need to travel by car. In 2005, the Northern Harbour district was the most densely populated, with a density of 4,967 per km^2, while Senglea was the most densely populated town, with 19,234 per km^2 (almost 15 times as much the national average), followed by Sliema with 10,218 per km^2. Marsascala and St. Paul's Bay registered the highest population density increases between 1995 and 2005, of over 95%, although the latter experienced a slight decrease in land area due to shifting of the local council boundaries during this period. The highest decrease (26.4%) in population density was registered at Mdina, followed by Senglea (15.4%). Population density changes between 1995 and 2005 reflect internal migration trends through which population is shifting towards newer coastal settlements.



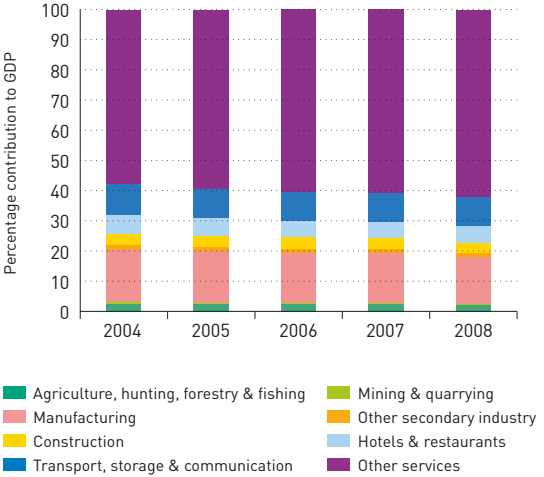
Source: NSO 2007a

Note: Due to changes in locality boundaries in the intercensal period (particularly at Rabat and St. Paul's Bay) densities for 1995 and 2005 are not directly comparable in these regions.

DF2 SECTORAL CONTRIBUTIONS TO GDP

Key policy question: Are sectoral contributions to GDP moving in environmentally-friendly directions?

The Maltese economy is characterised by growing activity in the service sector, which in 2008 had a share of 76.9% of total GDP, growing by 1.5% between 2007 and 2008. The shift towards a more service-oriented economy in the last years could indicate a cleaner form of economic growth, although this depends on the actual performance of the individual operators. During this period, while the share of real estate, renting and business activities, at 17% of total in 2008, continued to expand in line with recent trends, and that of transport, storage and communication increased by 0.5%, the share of hotels and restaurants decreased slightly by 0.3%. On the other hand, the productive sector is retreating but remains dynamic, and contributed 23.1% of GDP in 2008. The share of the manufacturing industry continued to show a slow decreasing trend during the period under review, contributing to 15.6% of GDP in 2008 (declining from 16.6% in 2007). The share of agriculture, hunting, forestry and fishing also registered a decrease (0.3%) in this period. During the same period the share of construction remained the same, while that of electricity, gas and water supply decreased by 0.4%. Mining and quarrying's share remained stable between 2007 and 2008.

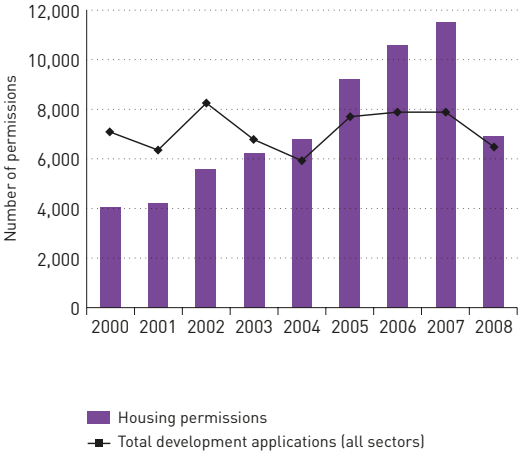


Source: NSO 2009a

DF3 HOUSING PERMISSIONS

Key policy question: What is the trend in permissions for housing development?

Trends in permissions granted for housing provide a snapshot of the pressures on land resources from construction in the housing sector. Between 2007 and 2008 the number of permissions granted for new dwellings fell by 40%, from the 11,343 dwellings permitted in 2007 to 6,836 in 2008, most likely reflecting the economic climate. A decrease in total number of applications was also registered. Nevertheless, the number of dwelling units permitted continues to heavily exceed the annual increase in need for new dwellings, which may be estimated at 1,800 – 2,000 dwelling units on the basis of new households formed per year.[2] It is worth noting in this context that the last Census[3] identified that 22.4% of the total housing stock was permanently vacant in 2005. As in 2007, in 2008 90% of all dwelling permissions granted were for apartments, while the number of permissions for maisonettes, terraced houses, bungalows, farmhouses, semi-detached houses and villas continued to decrease. The share of housing permissions located outside the development zone increased to 2.3% in 2008, despite an overall decreasing trend since 2000, when it stood at 3.4%. In 2008, 50.8% of housing permissions was on land that was so far undeveloped, up from 46.5% in 2007, but far less than the 70% registered in 2000.

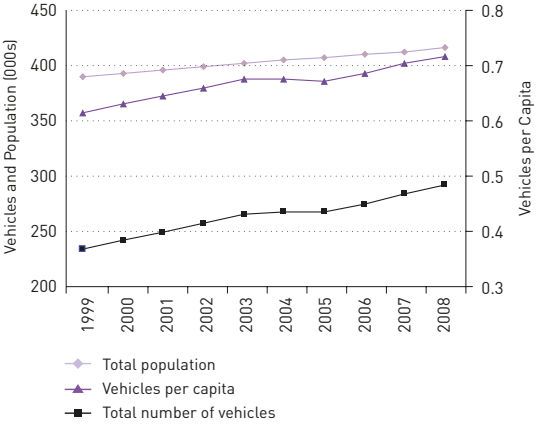


Source: MEPA Dwellings Database

DF4 VEHICLE FLEET PER CAPITA

Key policy question: Is vehicle ownership on the rise?

Malta's land transport system depends chiefly on private motor vehicles. The large vehicle fleet relative to population has a negative impact on human health, the environment and the economy. Registered motor vehicles totalled 294,658 in 2008, increasing by 2.63% from 2007, compared to the 3.12% growth rate between 2006 and 2007. The number of vehicles per capita stood at 0.71 in 2008, increasing slightly (by 0.01) from 2007. The increasing number of imported second-hand vehicles is a matter of concern since second-hand vehicles in the European Union (EU) are not required to have the same emission standards as new vehicles. In 2008, 44% (5,726 vehicles)[4] of imported vehicles were second-hand, increasing by 11% over the 2007 value. The number of registered electric vehicles continued to increase, albeit at a slow pace, and in 2008 there were 30 of these, 3 more than in 2007.[5] Electric vehicles do not produce emissions at point source and therefore have a positive impact on air pollution.



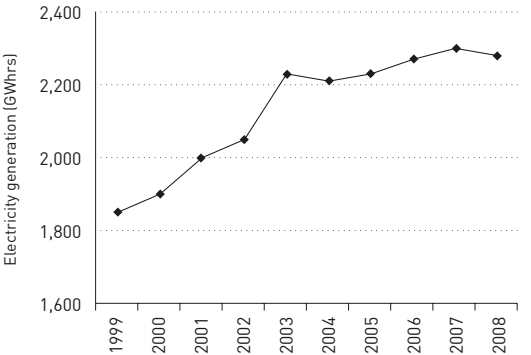
Source: NSO 2004, 2007c; 2009b; 2009c

Note: In the fourth quarter of 2005, the stock of motor vehicles was re-assessed in view of an improvement in the computation of cars that had been scrapped in past years

DF5 ELECTRICITY GENERATION

Key policy question: What is the trend in electricity generation?

Power generation and road transport are considered two of the principal sources of air pollution, although aviation and shipping are also important sources. In 2008, 65% of primary energy in the form of fuels imported[6] went to electricity generation.[7] Between 2007 and 2008 electricity generation decreased by almost 1%, despite the overall increase in generation over the last decade. This may indicate a lower demand, influenced by factors such as fuel prices. However, it is expected that demand will increase due to the coming on line of major new commercial and housing developments.[8] At the same time, Malta's 2006 National Allocation Plan, drafted in relation to the EU Emissions Trading Scheme, indicates that energy efficiency programmes are expected to reduce electricity demand by some 43.8GWh between 2008 and 2012.

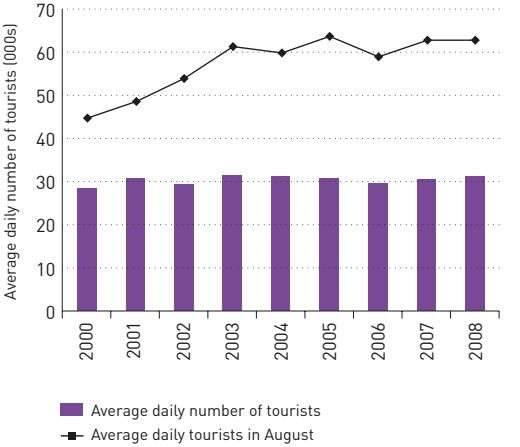


Source: NSO

DF6 DAILY NUMBER OF TOURISTS

Key policy question: Is tourism pressure on the environment increasing?

Tourism has a major role in Malta's economy, since it provides a market for the sale of Maltese goods and services, and injects foreign exchange into the economy, whilst creating employment. It nonetheless creates significant environmental impacts, due to additional consumption of resources, pressure on ecologically sensitive areas, increase in waste generation and land take-up for tourism infrastructure. Tourist numbers increased by 3.8% between 2007 and 2008, while total nights spent increased by 2.2%.[9] However, the first half of 2009 saw a decline of 13.8% over the corresponding period in 2008.[10] The uneven distribution of tourists throughout the year remains a challenge for Malta's tourism sector, and generally results in more pressure during the summer months.[11] Departures data for August 2008 indicated that 178,570 tourists had visited the Islands, 1.3% more than in 2007. Between 2007 and 2008, foreign students attending English language schools declined slightly (0.8%), although over the years an increasing trend has been registered. In 2008, such students represented 6.5% of total tourists, down slightly from 6.8% in 2007, and 54.9% of them visited Malta in summer.[12] In 2008 there were 397 cruise-liner calls and 555,840 cruise passengers,[13] increasing by 8% and 14% respectively since 2007.

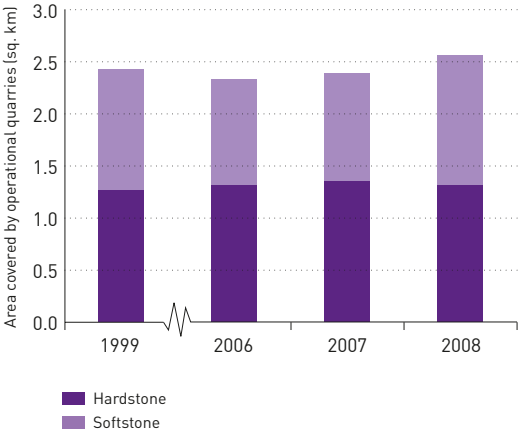


Source: NSO

DF7 AREA COVERED BY OPERATIONAL QUARRIES

Key policy question: What is the trend with respect to area covered by operational quarries?

Limestone is Malta's principal non-renewable mineral resource. Mineral extraction has a significant impact on the environment since quarries are a source of noise, vibration and dust pollution, and are of significant concern in scenic areas due to their negative effect on the landscape. While in 2007 0.76% of Malta's land area was covered by quarries, in 2008 this rose to 0.81%, an increase of 0.016km^2, such that total quarried area amounted to 2.54km^2 in 2008. The number of hardstone[14] (including lime kilns) and softstone[15] quarries did not change from 2007, remaining 28 and 60 respectively. Since 2003, construction and demolition waste has been disposed of in various licensed or otherwise disused quarries, facilitating rehabilitation of these quarries and deviating considerable amounts of waste from landfill.



Source: MEPA



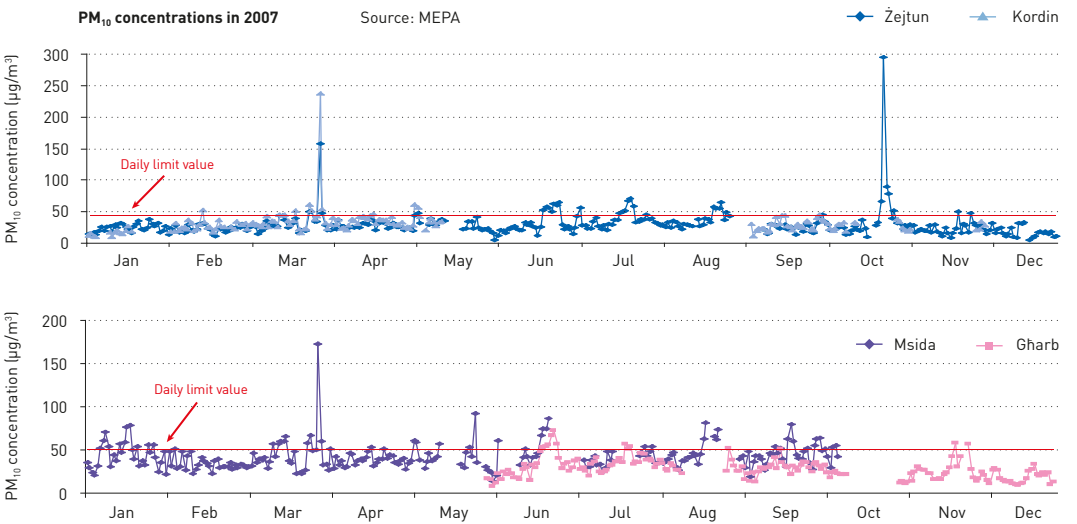
AIR

KEY FACTS:

- National annual sulphur dioxide concentrations fell by 38% between 2004 and 2007.
- Particulate matter concentrations exceeded EU daily limit values in certain locations in 2007, with peak concentrations in March and October 2007 corresponding with weather events when Sahara dust was being transported to Malta.
- National annual average nitrogen dioxide concentrations were well below the EU annual limit value in 2007 but exceeded the limit value in 27 localities.
- Ozone concentrations exceeded EU standards in certain rural areas in 2007. The majority of Malta's ozone is of transboundary origin.

A1 PARTICULATE MATTER CONCENTRATIONS

Key policy question: Do particulate matter concentrations meet EU air quality standards?



Particulate matter (PM) consists of very small suspended solid or liquid particles. High levels of PM are associated with general ill-health, decrease in lung function, asthma or even mortality.[16] While the primary anthropogenic source of particulates is fuel combustion from traffic and power generation,[17] other PM contributors include atmospheric sea salt, wind blown dust (both local and transported dust, in particular from the Sahara), quarrying and construction dust, mechanically-generated dust, tyre and brake abrasion, and aerosols of transboundary origin. Malta's four real-time monitoring stations indicate high levels of PM_{10}.[18] The EU daily limit value of 50µg/m³, which should not be exceeded more than 35 times a year (approximately 10% of days measured), was exceeded on 56 out of 237 days measured at Msida (24% of days measured). At both Żejtun and Għarb, thresholds were exceeded on 7% of days measured (24 out of the 340 days measured in Żejtun and 13 out of the 182 days measured in Għarb), and at Kordin on 5% of days measured (8 out of 161 days). The highest concentration, of 294.5µg/m³ was recorded in Żejtun, followed by 237.0µg/m³ in Kordin. The 2 concentration peaks depicted in the charts (28th March and 26th October) correspond with typical events when Sahara dust was being transported to Malta.

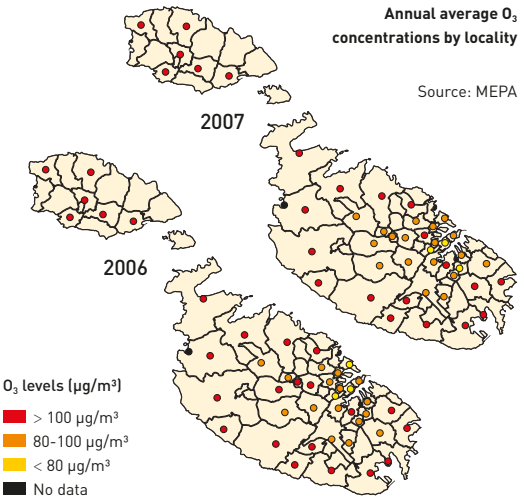
A2 OZONE CONCENTRATIONS

Key policy question: Do ozone concentrations in Malta meet EU air quality standards?

Ozone (O_3) at ground level is a harmful pollutant that impairs the respiratory system,[19] and reduces crop yields.[20] O_3 is formed when nitrogen oxides and volatile organic compounds react in sunlight. Principal O_3 precursors[21] emerge from primary traffic and power generation emissions.[22] However the majority of O_3 affecting Malta is of transboundary origin.[23] EU standards set the following limit values for O_3, which require real-time monitoring: 120µg/m³ 8-hourly running average value for human health protection,[24] not to be exceeded more than 25 times per year (6.8% of days measured); and also 180µg/m³ hourly information threshold for human health protection. In 2007, while in Għarb the 8-hour limit value was exceeded in 17.5% of days measured, exceedences were recorded in 5.7% of days measured in Żejtun, 2.3% of days measured in Kordin, and 0.3% of days measured in Msida. The 180µg/m³ hourly limit was exceeded once in Żejtun and four times in Għarb, with the highest value of 203.4µg/m³ recorded in July in Għarb. Although EU limit values have not been set for annual average O_3 concentrations, it is useful to note that while national annual average O_3 concentrations decreased by 1% from 102.3µg/m³ to 101.3µg/m³ between 2006 and

Annual average O_3 concentrations by locality

Source: MEPA



2007, the number of sites with an annual average concentration exceeding 100µg/m^3 remained constant at 74 between 2006 and 2007, after increasing significantly in 2006 from 25 in 2005. As in 2006, O_3 levels were highest in rural localities less affected by traffic, with Għarb, Gozo, registering the highest average level (125.4µg/m^3).[25] With respect to individual sites, readings from Triq ix-Xwejni in Marsalforn and Burma Road in Swieqi registered the highest average levels of O_3 in 2007 (143.4µg/m^3 and 141.5µg/m^3 respectively).

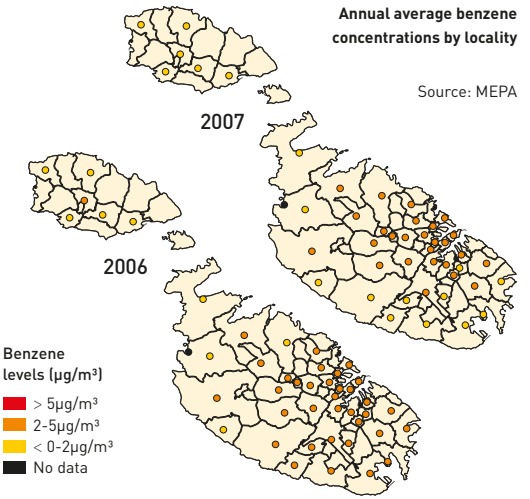
A3 CONCENTRATIONS OF BENZENE AND OTHER VOLATILE ORGANIC COMPOUNDS

Key policy question: Do concentrations of benzene and other volatile organic compounds meet EU air quality standards?

Volatile Organic Compounds (VOCs) cause respiratory irritations and genetic and nervous disorders, depending on various factors, including exposure. VOCs are also ozone precursors.[26] These compounds are generated through combustion,[27] but also by many products containing solvents such as paints, varnishes, cleansers, disinfectants and automotive products.[28] MEPA is monitoring benzene, toluene, ethylbenzene and xylenes with diffusion tubes as well as in near real-time at Msida, Żejtun and Għarb. Benzene becomes a pollutant in air when it is released through the distribution of petrol or its incomplete combustion. Benzene is mutagenic[29] and carcinogenic and is considered to be harmful in any dose.[30] The overall trend towards reduction in atmospheric benzene levels continued in 2007, with average annual benzene concentrations falling by 10.4% between 2006 and 2007, from 2.7µg/m³ to 2.4µg/m³ respectively. No locality exceeded the EU limit value of 5µg/m³ (which is not to be exceeded by 2010). Benzene levels decreased in the majority of localities, with the greatest decrease recorded in Qrendi (33% between 2006 and 2007). The lowest average benzene concentration, of 1.1µg/m³, was

Annual average benzene concentrations by locality

Source: MEPA



recorded in Marsalforn. In terms of particular sites, as for 2005 and 2006, the highest benzene concentration was recorded at St Anne's Street, Floriana (6.5μg/m³), decreasing by 9% from 7.1μg/m³ in 2006. No other site exceeded the EU limit value in 2007, in contrast with 2006, when 5 sites exceeded the limit. The significant improvement in air quality with respect to benzene since 2000 has been due to the phasing out of leaded petrol in 2003 and the introduction of lead replacement petrol, which has a lower benzene content. Annual average ambient concentrations of the solvent toluene decreased slightly from 16.6μg/m³ in 2006, to 15.7μg/m³ in 2007. There are no recommended limits for ambient toluene concentrations, although a 19,100μg/m³ limit exists for workplace exposure.[31] No recommended limits are available for ethylbenzene and xylene. The annual ambient concentration of ethylbenzene in 2007 was 3.2μg/m³, compared to 2.9μg/m³ in 2006, while annual ambient concentrations of mp-xylene and o-xylene were 9.4μg/m³ and 3.6μg/m³ respectively in 2007.

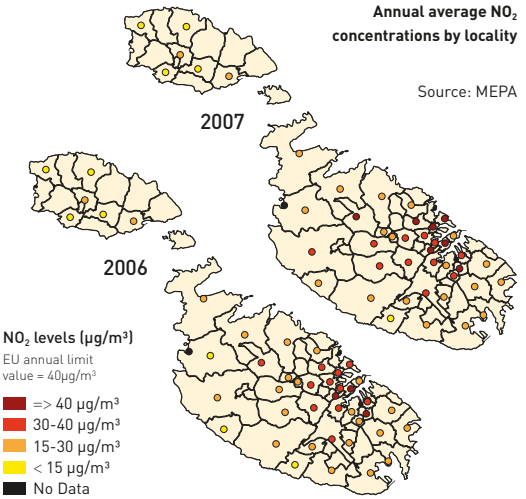
A4 NITROGEN DIOXIDE CONCENTRATIONS

Key policy question: Do nitrogen dioxide concentrations in Malta meet EU air quality standards?

Nitrogen dioxide (NO_2) is a toxic gas at short-term concentrations exceeding 200µg/m³, and long-term exposure at lower concentrations. It also interacts with water vapour to form acids, and with other particles to form nitrates and other harmful compounds.[32] NO_2 is emitted directly from fossil fuel burning, as well as by natural sources such as lightning. Although the annual average national NO_2 concentration remained well below the 40µg/m³ EU and the World Health Organisation (WHO) limit value, it continued to increase between 2006 and 2007, from 25.4µg/m³ to 28.9µg/m³ respectively. In 2007, annual average values exceeded annual EU standards in 6 localities, Floriana (50.60µg/m³), Fgura (49.9µg/m³), Sliema (45.4µg/m³), Mosta (42.0µg/m³), Żbiġa (41.7µg/m³) and San Ġwann (40.8µg/m³). Furthermore, 27 individual sites registered NO_2 levels higher than the EU and WHO limit, with St. Anne's Street, Floriana, increasing by 6% to 98.4µg/m³ in 2007. This suggests that nitrogen oxides are on the rise due to increasing traffic, such that this pollutant may be a problem in localities where heavy traffic and poor ventilation prevail. Real-time measurements for 2007 indicate one exceedance for the EU hourly limit value, in Msida.

Annual average NO_2 concentrations by locality

Source: MEPA



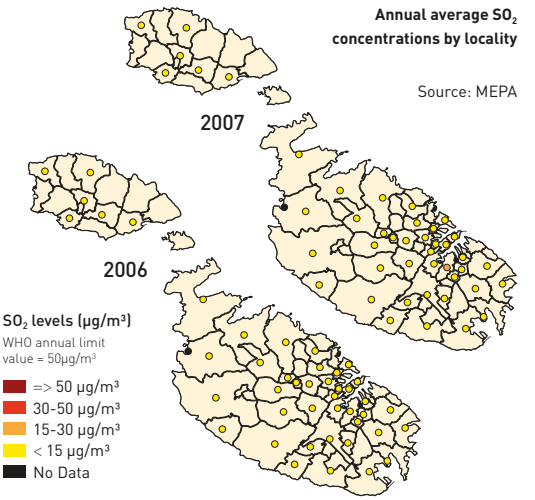
A5 SULPHUR DIOXIDE CONCENTRATIONS

Key policy question: Do sulphur dioxide concentrations in Malta meet EU air quality standards?

Sulphur dioxide (SO_2) is an acidifying substance that adversely affects the respiratory systems of humans and damages water bodies, soils, vegetation, and limestone buildings. It originates from both natural sources such as volcanoes, and human activities such as fuel and biomass combustion.[33] SO_2 pollution from international shipping has also become a matter of concern.[34] Sulphate particles also combine with other atmospheric compounds to become important contributors to particulate formation,[35] and affect climate.[36] Although remaining well below EU standards, national annual average SO_2 concentrations increased by approximately 39% (from 5.5µg/m³ to 7.6µg/m³) between 2006 and 2007, perhaps in line with the 2% increase in electricity generation in that period,[37] together with the 6.3% increase in fuel imports.[38] Concentrations in 2007 may also have been higher than those in 2006 due to factors such as apparatus inaccuracy and weather conditions. While locality averages were all found below the 50µg/m³ WHO annual limit value for human protection, increases were registered in almost all localities. The highest levels were recorded in Paola (at 20.2µg/m³) followed by Marsa (14.7µg/m³) and Floriana (12.9µg/m³). At 3.4µg/m³, Xlendi registered the lowest SO_2 concentration, however this had increased from 2.2µg/m³ in 2006. Real-time measurements indicate that the daily average limit value and hourly limit value were not exceeded in any of the 4 stations in 2007.

Annual average SO_2 concentrations by locality

Source: MEPA





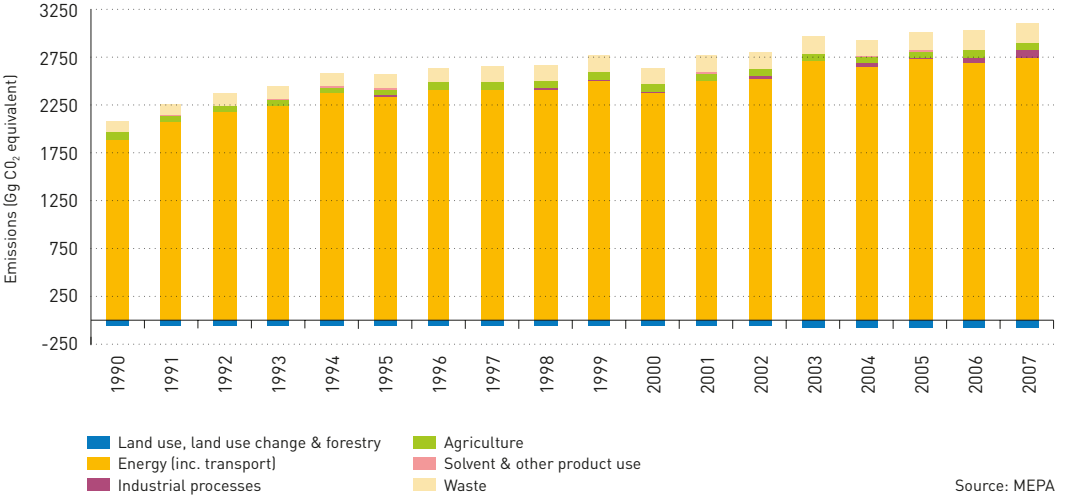
CLIMATE CHANGE

KEY FACTS:

- Malta's greenhouse gas emissions rose by 49% between 1990 and 2007, while emissions per unit GDP fell by 18% over the same period.
- The amount of fuel used per Euro of GDP has decreased slightly since 2000; should this trend continue, it may point towards a relative decoupling of energy consumption from economic activity.

CC1 GREENHOUSE GAS EMISSIONS BY SECTOR

Key policy question: What is the trend in Malta's greenhouse gas emissions?



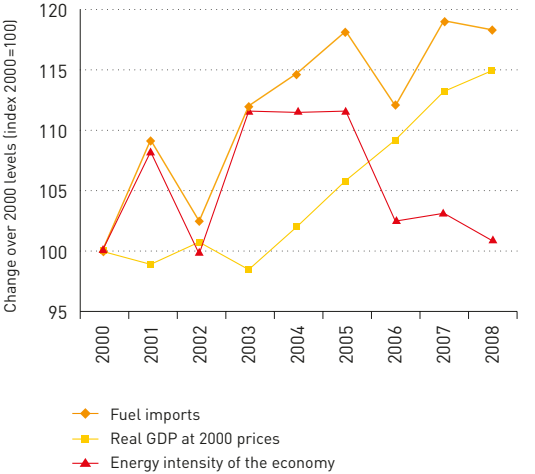
Source: MEPA

Greenhouse gases (GHGs) trap heat within the atmosphere, giving rise to increasing average global temperatures. Much of the observed global warming in recent decades can be attributed to GHG emissions from human activities.[39] Despite its vulnerability to climate change, Malta's GHG emissions are low due the nation's size in geographic, demographic and economic terms.[40] While Malta's GHG emissions are estimated to have increased by 2.6%[41] between 2006 and 2007, there has been an overall rise of 49% between 1990 and 2007. The flattening in the chart may be due to the switch from coal for energy generation. The energy sector[42] was the principal contributor to Malta's GHG emissions in 2007, at 88.7% of total, followed by waste at 6.6%, while agriculture and industrial processes together with solvent and other product use sectors, contributed less than 5%. The category Land Use, Land-Use Change and Forestry refers to estimates of carbon dioxide emissions and removals by particular vegetation types, and is estimated to contribute a removal of 1.92% of emissions.[43] Emissions per unit GDP fell to 669,910 tonnes per billion Euros at 2000 prices in 2007 from 797,275 in 1990, such that there was an overall decrease of 18% in this period,[44] possibly reflecting a degree of decoupling of emissions from economic development over the whole time period. There are however significant fluctuations when comparing over shorter time ranges.[45] Per capita emissions (7.102 tonnes per capita in 2007) grew by 33% in this period, although this trend seems to be stabilising over recent years.[46] Despite this increase, in 2007 Malta still had a relatively low GHG emission rate per capita when compared to the EU-27 average (10.2 tonnes per capita).[47]

CC2 ENERGY INTENSITY OF THE ECONOMY

Key policy question: Is Malta's economy becoming more energy-efficient?

Energy intensity is a measure of the energy Malta uses to create a unit of GDP. It is the ratio between total energy produced and GDP.[48] For Malta, net fossil fuel import values[49] may be used as an estimate of total energy produced. Energy intensity decreased slightly from 0.22 kilograms of oil equivalent per unit GDP (kgoe/€) in 2007 to 0.21kgoe/€ in 2008. The overall trend since 2000 has been for the energy intensity of the economy to decrease slightly. Should this trend continue it may point towards a shift towards a relative decoupling of energy consumption from economic activity.



Source: NSO; NSO 2006,2008b, 2009a



LAND

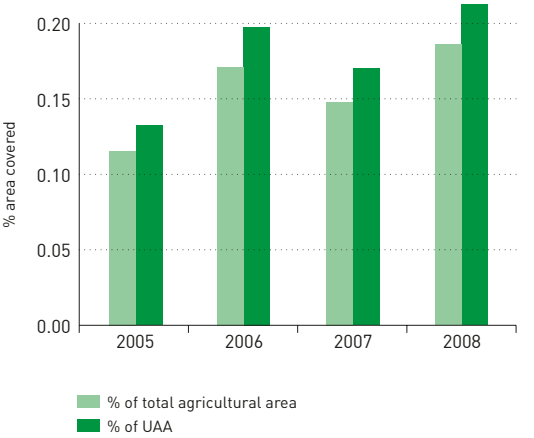
KEY FACTS:

- As at end 2008 there were 14 organic farmers registered in Malta, cultivating 22 hectares, equivalent to 0.2% of total agricultural land.
- Agriculture is Malta's predominant land cover (51%), followed by urban areas (22%) and natural vegetation (19%).
- By end 2008 62 Urban Conservation Areas had been designated and 1,904 cultural heritage buildings, monuments, features and archaeological sites were scheduled.

L1 % ORGANIC FARMING

Key policy question: What percentage of Malta's agriculture land is under organic cultivation?

Organic farming,[50] respects natural systems by emphasising environmental protection and animal welfare, thus reducing or eliminating the use of synthetic pesticides, herbicides, chemical fertilisers, growth hormones, and antibiotics, as well as gene manipulations.[51] As at end 2008, there were 14 registered operators of organic products in the Maltese Islands, covering 21.78ha,[52] increasing from 17.3ha[53] in 2007, and representing approximately 0.19% of total agricultural land, and 0.21% of Utilised Agricultural Area (UAA). It is estimated that in 2008, 50% of organically cultivated land was used for the production of fresh vegetables, melons and strawberries, 11% was used for the production of root crops, and another 11% was used for the production of olives.[54] Nevertheless, in comparison with other EU countries, in 2007 Malta had, together with a few other nations, a very low share of organic agriculture in total agricultural production.[55]



Source: MSA; NSO 2008c



FRESH WATERS

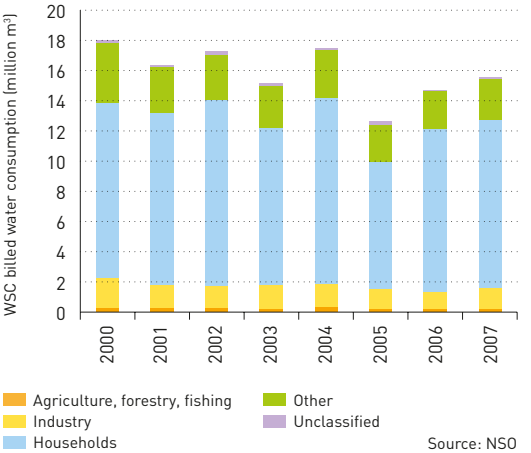
KEY FACTS:

- Total WSC water production fell by 6% between 2004 and 2008, to almost 31 million m^3.
- There was an overall decreasing trend in WSC billed water consumption between 2004 and 2007, when consumption fell by 11% to almost 16 million m^3.
- Nitrate values in two thirds of WSC pumping stations exceeded the EU limit value of 50mg/l in 2007, although nitrate concentrations declined marginally between 2000 and 2007 (by 0.6mg/l).

W1 BILLED WATER CONSUMPTION BY SECTOR

Key policy question: What is the trend in billed water consumption?

Potable water supply in the Maltese Islands comes from two sources, groundwater and desalinated water. Groundwater is abstracted from the aquifers while three reverse osmosis plants located across the Islands are responsible for producing desalinated water. Households, agriculture and industry are the major consumers of billed WSC water.[56] As indicated in the chart, in 2007, the main consumer was the domestic sector, using 72% of total billed water, followed by the industry sector, utilising 8%. The agriculture, fisheries and forestry sectors used 2% of total billed water in 2007. Although between 2006 and 2007 billed water consumption increased by 5% to 15.6 million m^3, an overall decreasing trend in annual billed water consumption was recorded between 2000 and 2007. This may be due to an increase in unaccounted-for-water,[57] increasing reliance on abstraction from private boreholes, and enhanced end-user efficiency as a result of the increase in prices following the introduction of the fuel surcharge after 2004.[58]



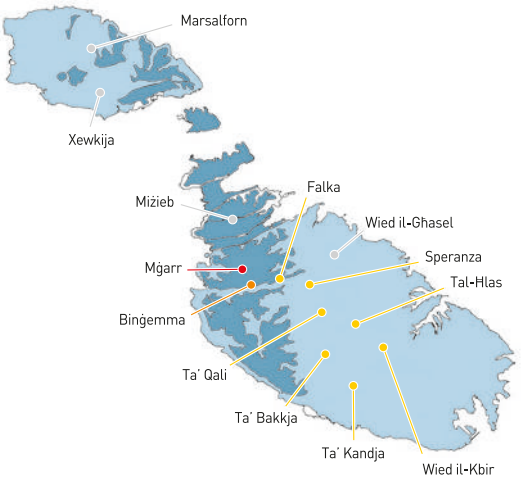
Source: NSO

Note: The above values refer to actual consumption, and estimated consumption is not included. The Unclassified sector refers to economic units which could not be classified by NACE code (statistical classification of economic activities in the European Community).

W2 NITRATE LEVELS AT WSC PUMPING STATIONS

Key policy question: What is the status of groundwater with respect to nitrates?

As in 2006, nitrate levels in two thirds (9 out of 13) of WSC pumping stations exceeded the EU limit value of 50mg/l in 2007. Once again, the highest value (161mg/l) was recorded at Mġarr perched aquifer, decreasing from 168mg/l in 2006. The highest nitrate concentration in the Mean Sea Level Aquifer (MSLA) system was recorded, as in 2006, at the Speranza pumping station, where the concentration decreased from 111mg/l in 2006 to 97mg/l in 2007. Overall nitrate concentrations at WSC pumping stations have decreased by 0.6mg/l per annum between 2000 and 2007. Under the Water Framework Directive Malta is bound to achieve good water status (defined by the 50mg/l limit in the case of nitrates) by 2015.[59]



Nitrate levels in 2007 (mg/l)
(WFD trigger value=50mg/l)

- > 150mg/l
- 100-150mg/l
- 50-100mg/l
- 0-50mg/l

Upper Coralline Limestone aquifer system
Lower Coralline Limestone aquifer system

Source: MRA

W3 CHLORIDE LEVELS AT WSC PUMPING STATIONS

Key policy question: What is the status of groundwater with respect to chlorides?

While no limit value for chloride concentrations in drinking water currently exists, values higher than 250mg/l would be detectable by taste.[60] This standard is not meant as a qualitative one reflecting groundwater quality, but an organoleptic parameter relating to taste. To this end, Malta is currently in the process of developing a threshold value for chlorides in groundwaters as per the obligations of the Groundwater Directive.[61] As expected, in 2007 the highest chloride concentration was recorded in the MSLA system, at Ta' Kandja (1,367mg/l), although this declined by 5% between 2006 and 2007. As in 2006, chloride concentrations were at their lowest in the perched aquifer system at Falka, where a value of 172mg/l was recorded.

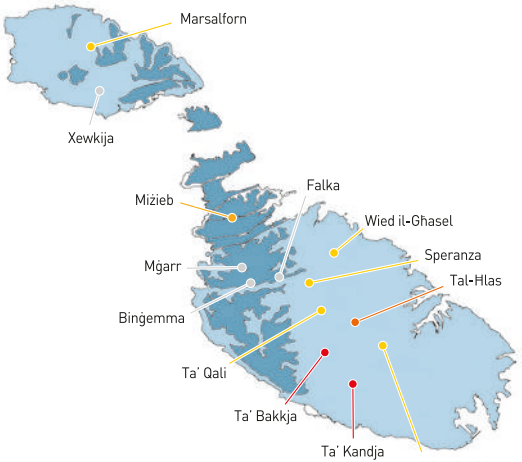
Chloride levels in 2007 (mg/l)

(WHO drinking water quality standard=250mg/l)

- 1,400 to 1,750mg/l
- 1,050 to 1,400mg/l
- 700 to 1,050mg/l
- 350 to 700mg/l
- 0 to 350mg/l

- Upper Coralline Limestone aquifer system
- Lower Coralline Limestone aquifer system

Source: MRA



Note: WHO drinking water standard may be used as a benchmark for groundwater but remains a very high standard in this context.



COASTAL AND MARINE ENVIRONMENT

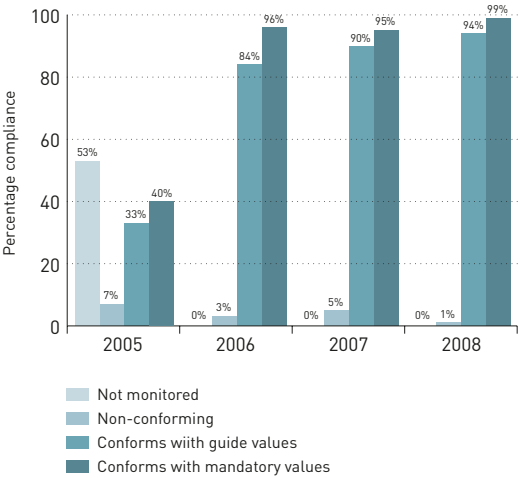
KEY FACTS:

- 99% of Maltese bathing waters satisfied EU bathing water standards in 2008.
- Two marine protected areas had been designated at Dwejra, Gozo, and Ras ir-Raheb/Rdum Majjiesa as at end 2008.
- Shipping tonnage reaching Maltese ports increased by almost 70% between 2000 and 2008.

CM1 BATHING WATER QUALITY

Key policy question: Do Malta's bathing waters meet international standards?

A high level of bathing water quality is crucial for public health and the environment. Under the EU Bathing Water Directive[62] bathing waters must comply with mandatory values, and Member States are encouraged to ensure that their waters also comply with more stringent guide values. Malta is also obliged to achieve bathing water quality standards under the Barcelona Convention.[63] Percentage compliance with EU mandatory values increased by 4 percentage points between 2007 and 2008, such that in 2008 Malta's bathing waters were 99% compliant with EU bathing water standards. Percentage compliance with the more stringent guide values also increased by 4 percentage points, reaching 94% in 2008. While in 2007, 5% of bathing sites were non-compliant with mandatory EU values, only 1% was non-compliant in 2008. In 2008, all sites complied with the Barcelona Convention, and classified either as the mandatory Class 2 (48%) or as the more stringent and non-mandatory Class 1 (62%). The number of Class One sites increased by almost 12% between 2007 and 2008.



Source: DEH



RESOURCES AND WASTE

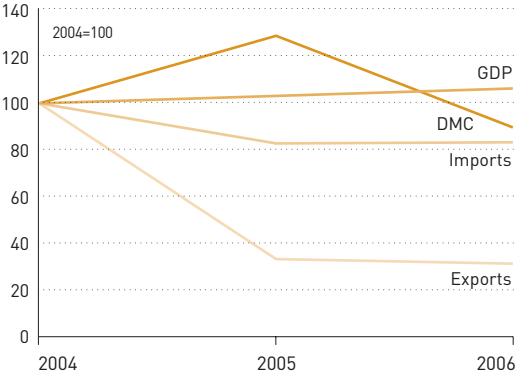
KEY FACTS:

- Domestic material consumption, which measures the material consumed in a national economy, fell by almost 5% between 2004 and 2006.
- Between 2004 and 2006, the amount of waste generated fell by over 9%.
- Municipal waste generated increased by 6% between 2004 and 2007.
- Waste recycled increased by more than 3 times between 2004 and 2008, but fell in 2008 due to weak international recycling markets.

WS1 DOMESTIC MATERIAL CONSUMPTION

Key policy question: What is the trend in domestic material consumption in Malta?

Domestic Material Consumption (DMC) is used as an indicator to estimate the quantity of material consumed by a national economy,[64] and is calculated on the basis of the sum of total national mineral extraction and imports (direct material input) less exports.[65] Overall, DMC in Malta fell by 4.8% between 2004 and 2006, resulting from lower levels of domestic extraction and imports. Direct extraction[66] fell by 10.6% in this period, due to lower levels of mineral extraction. The mass of imports used in Malta's economy also decreased in this period, by 17.3%, largely due to fewer imports of fossil fuels. In the same period the mass of exports decreased by 69.3%, mainly due to a reduction of 84.1% in fossil fuel exports.[67] The fact that GDP at real prices rose by 6.7% in this period, despite the fall in domestic material consumption, suggests that economic activity is becoming less resource-intensive. Indeed, the increasing material productivity,[68] which indicates the relationship between material use and economic activity, suggests growing material efficiency that points to some progress towards sustainability. Despite limited data comparability,[69] it emerges that Malta had a relatively low level of domestic material consumption per capita in 2004,[70] when compared with EU countries such as United Kingdom, Italy and Greece.

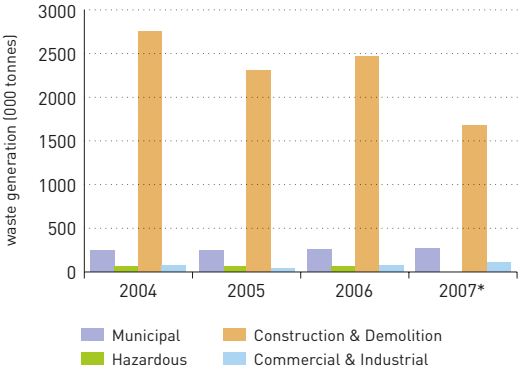


Source: Gazley and Moncada 2008

WS2 WASTE GENERATION

Key policy question: What is the trend in waste generation?

The environmental impacts of waste generation and management include air pollution and the contamination of surface waters and groundwater. Impacts also include land take-up for landfills, loss of natural resources, and negative effects on human health. In line with EU standards,[71] waste generated is divided into 4 principal categories: municipal waste; hazardous waste; construction and demolition waste; and, commercial and industrial waste. A new dataset for waste generated has been drawn up, and includes data derived from other licensed waste operators, as well as data from the inventory of hazardous waste based on production estimates from industry.[72] Between 2005 and 2006[73] waste generation increased by 7%, with the majority of it being landfilled (80%), while the rest was recycled, stored or exported. Some construction and demolition waste was also disposed of at sea. Between 2006 and 2007 municipal waste generated increased by 5%, to 265,947 tonnes, while commercial and industrial waste generated increased by 46% during the same period. Hazardous waste generated amounted to 53,600 tonnes in 2006, 97% of which was stored for export.



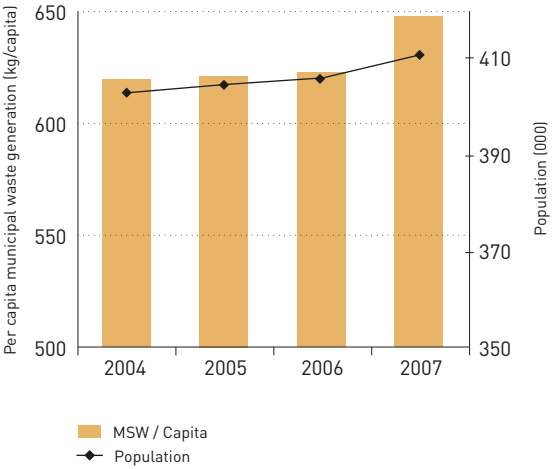
Source: NSO

* 2007 data is subject to review. In addition 2007 data for hazardous waste, recycled construction waste and part of the data for waste disposed of in privately-owned quarries was not available at the time of publishing.

WS3 MUNICIPAL WASTE GENERATED PER CAPITA

Key policy question: What is the trend in municipal waste generation?

Municipal waste includes waste collected from households, as well as other waste similar in nature and composition to waste from households.[74] This waste stream is currently the best indicator for assessing performance in terms of generation and management of waste.[75] Between 2006 and 2007, municipal waste generated[76] increased by 5% to 265,947 tonnes.[77] The majority (93%) of this was landfilled. Municipal waste recycled decreased between 2006 and 2007 due to the temporary closure for upgrading of the Sant' Antnin waste treatment plant, which is Malta's principal waste recycling facility. In 2007 each Maltese resident generated 648 kilograms per capita (kg/capita), increasing by 25 kg/capita from that produced in 2006. While municipal waste generation in EU25 is projected to increase by 25% over 2005 values by 2020, growth in Malta is expected to exceed 60%.[78]



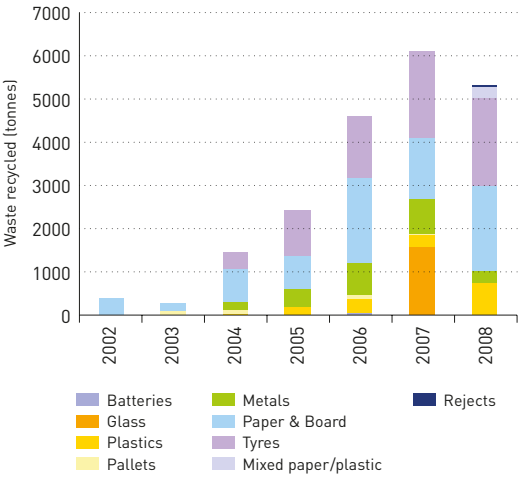
Note: 2007 data is subject to review.

Source: NSO

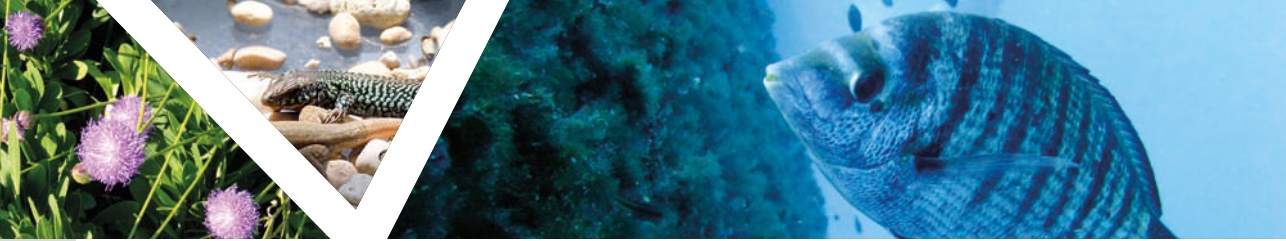
WS4 WASTE RECYCLED

Key policy question: What is the trend in waste recycling?

Waste recycling is the best waste management option after prevention and re-use, since it diverts waste from landfill. Between 2007 and 2008 recycling decreased by 13% to 5,317 tonnes, due to a drop in demand for recyclables, which is highly dependent on international markets. Tyres made up 39% by weight of all recycled waste in 2008, followed by paper and cardboard at 37%, while recycling of plastics increased almost threefold in the last year. Bring-in-sites are an important part of Malta's recycling infrastructure, and between 2007 and 2008 the amount of material collected in Malta's 226[79] such sites increased by 46% to 4,107 tonnes. By end 2008, 4 (Mgħtab, Mriehel, Hal Far and Luqa) out of the 5 civic amenity sites planned were operational. These centres received 23,318 tonnes of waste between December 2006 and December 2008. The centres, established with the help of EU Structural Funds, allow the discarding of bulky household waste, thus improving the collection of certain types of waste and increasing the recovery of secondary materials. In addition, the Recycle Tuesdays initiative collected 4,250 tonnes of separated waste from households between May and December 2008. However, the overall amount of waste recycled remains relatively low, at only 7% of municipal waste generated in 2007.



Source: WasteServ Malta Ltd.



BIODIVERSITY

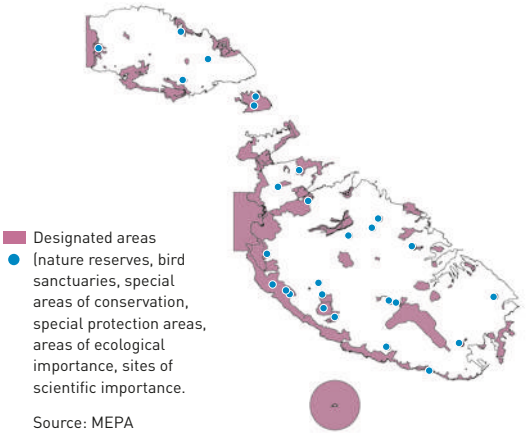
KEY FACTS:

- As of end 2008, just over one fifth of the land area of the Maltese Islands had been afforded legal protection.
- 64% of Maltese habitats and 44% of Maltese species listed in the EC Habitats Directive are considered to have an inadequate or bad conservation status.
- By end 2008, 13% of the Maltese Islands formed part of the Natura 2000 network of protected sites for habitats and species of European Community interest.

B1 NATURAL AREAS DESIGNATED

Key policy question: What are the trends related to designation of natural areas?

In order to protect its important habitats,[80] Malta designates Special Areas of Conservation (SACs) in line with the EC Habitats Directive[81] and Special Protection Areas (SPAs) in line with the EC Birds Directive.[82] One additional SAC was designated in 2008, such that at this date Malta had a total of 43 SACs (including 2 marine areas). 35 of international and 8 of national importance. The terrestrial sites covered 13.3% of land area, while the marine sites, one between Rdum Majjiesa and Ras ir-Raheb, Malta, and the other in the limits of Dwejra, Gozo, covered 11km^2 of territorial waters. By end 2008, Malta's SPAs had reached 13, covering 16.34km^2 or 5.18% of land area. Malta also has three Nature Reserves affording protection to islets and 29 affording protection to trees, together with 26 Bird Sanctuaries.[83] Furthermore in 2007 all beaches and swimming areas in close proximity to urban areas or major roads, including 11 specifically named beaches were afforded legal protection from hunting.[84] As of December 2008 Malta had 73 Areas of Ecological Importance and/or Sites of Scientific Importance scheduled under the Development Planning Act (1992), wherein specific policies guide the type of development that can take place. In total, the Maltese Islands had 20.5% of its land area under some form of legal designation related to nature protection as of end 2008.



Source: MEPA

B2 STATUS OF MALTESE HABITATS AND SPECIES OF EUROPEAN COMMUNITY IMPORTANCE

Key policy question: What is the status of Malta's species and habitats of European community importance?

Some Maltese habitats and the species inhabiting them are important both nationally and at a European level. Charts 1 and 2 indicate the status of habitats and species listed in the Habitats Directive and found in Malta. The status categories used are: Favourable; Unfavourable – Inadequate; Unfavourable – Bad; and, Unknown. The status of 29% of Maltese habitats and 36% of Maltese species listed in the Habitats Directive is still unknown, and a significant amount of these relate to the marine environment. In addition, 64% of habitats and 44% of species have a bad or inadequate conservation status. Stringent measures are required for these to attain favourable status, while further surveys are needed to assess the status of habitats and species with unknown status.

Source: MEPA/EC 2008

Chart 1: Conservation status of habitats of European community importance

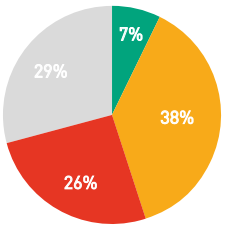
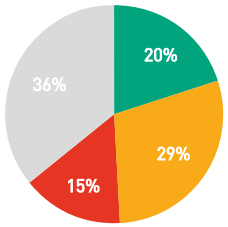


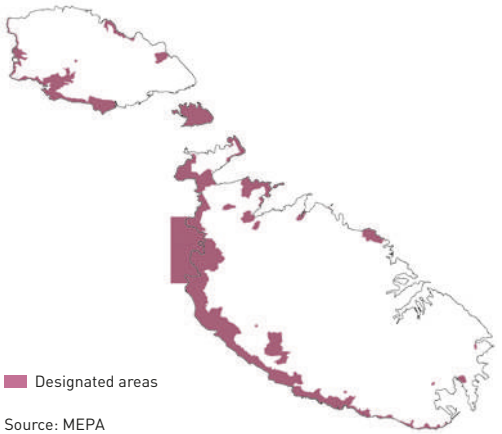
Chart 2: Conservation status of species of European community importance



B3 SITES DESIGNATED AS PART OF THE NATURA 2000 NETWORK

Key policy question: Has there been an increase in sites designated to form part of the EU Natura 2000 network?

Some of Malta's habitats and species are also protected on a European scale. Indeed, a number of areas have been designated as part of the EU Natura 2000 network. This is a network of protected sites across the EU, designated under the Habitats[85] and Birds[86] Directives, which merit special conservation measures since they support habitats and species of community interest.[87] The Natura 2000 network is one of the principal tools used by the EU to assist with halting the loss of biodiversity.[88] Sites designated under the Habitats Directive correspond to Malta's SACs of international importance, while those designated in line with the obligations of the Birds Directive correspond to its SPAs. As of end 2008 Malta had designated 27 terrestrial sites covering 41km^2 or 13.06% of land area, and one marine site[89] with an area of 8.5km^2, as sites under the Habitats Directive to form part of the Natura 2000 network. As of June 2008, the 27 terrestrial sites designated under the Habitats Directive were considered 93% sufficient in affording protection to the Maltese terrestrial habitats and species of Community interest. By December 2008, Malta had also designated 13 SPAs covering 16.34km^2 or 5.18% of land area,[90] which are automatically Natura 2000 sites. In some cases, the area of SAC and SPA Natura 2000 sites overlap.[91] MEPA is working on the selection of marine sites so as to enhance the network in this respect.



Source: MEPA



POLICY RESPONSES

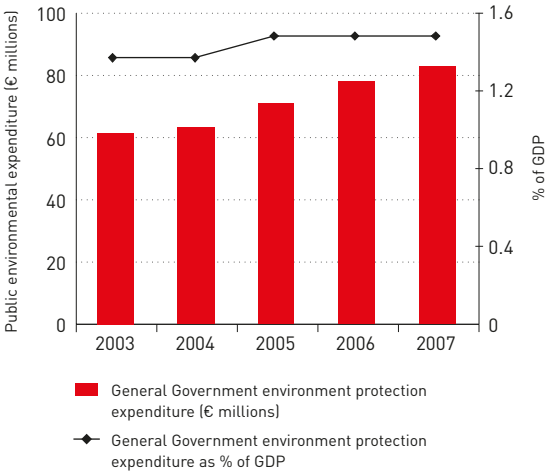
KEY FACTS:

- Between 2004 and 2007 public environmental expenditure increased by 31%, rising to €82 million, which was equivalent to 1.5% of GDP.
- In the 2007/2008 scholastic year, 76 schools took part in the EkoSkola programme, with 30,000 students participating.
- Between 2005 and 2008, 54 pieces of legislation concerning the environment were published.
- In 2008 an IPPC permit was required for 14 industrial installations coming from the chemicals, energy, waste management and animal-rearing sectors.

PR1 PUBLIC ENVIRONMENTAL EXPENDITURE

Key policy question: What share of GDP is government spending on the environment?

Public environmental expenditure provides an indication of the scale of the state's response to environmental issues. General Government environmental expenditure (based on Eurostat's Classification Of the Functions Of Government [COFOG]), amounted to €81.8 million in 2007, up by 6% from the revised 2006 figure of €77.1 million.[92] In 2007, this expenditure represented 1.5% of GDP, as in 2006, and over 90% of it concerned solid and liquid waste management. Almost 60% of total expenditure in 2007 was absorbed by solid waste management, in good part reflecting ongoing work on engineered landfills and recycling facilities. More than one quarter of the expenditure was allocated to wastewater management, mostly due to the capital expenditure on treatment plants. The protection of landscape and biodiversity absorbs approximately 10% of General Government expenditure in this area. Pollution abatement and other environmental functions absorb minor proportions of such expenditure. An important dimension of this funding originates from international sources: during 2004-2006, almost €120 million originated from EU sources.[93]

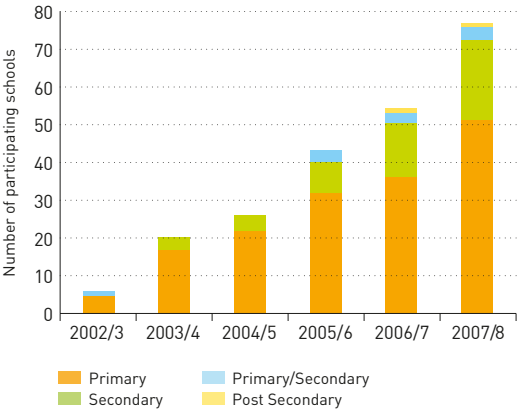


Source: NSO 2009g

PR2 SCHOOLS COVERED BY EKOSKOLA

Key policy question: How many schools are taking part in the EkoSkola environmental education programme?

The 2007/2008 scholastic year registered another increase in schools taking part in the EkoSkola environmental programme. A total of 76 schools were involved, 22 more than in the 2006/2007 scholastic year, which amounts to approximately 43% of all schools, most of which provide primary education. During the 2007/2008 scholastic year, some 30,000 students participated in the programme through their schools, 5,000 more than in the previous scholastic year. During 2007/2008, St Bernardette Primary School B in San Ġwann was awarded the Green Flag, a prestigious internationally recognised and respected eco-label indicating high school performance, bringing the total of awarded schools to 4. In addition, St Joan Antide School in Gudja; St Benedict College, Girls Junior Lyceum in Santa Lucia; St Thomas More College, Primary A in Zejtun; and, Gozo College Xewkija Primary School achieved Silver Award status. The Bronze Award was given to St Benedict College, Gudja Primary C; St Benedict College, Safi Primary C and St Michael School in Qormi. Eco-Schools is an international school programme for environmental management and certification, as well as sustainable development education.[94] Coordinated in Malta by Nature Trust (Malta), the programme involves student participation, decision-making, planning and activities, and contributes to the implementation of Local Agenda 21 in the local school community.[95]

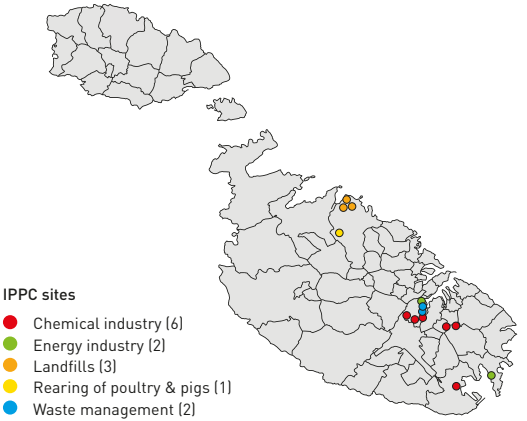


Source: Nature Trust (Malta)

PR3 SITES REQUIRING INTEGRATED POLLUTION PREVENTION AND CONTROL PERMITS

Key policy question: Which operations present the highest environmental risks?

Operational permitting is one of the most important tools for ensuring the achievement of environmental quality standards. MEPA's three-tier permitting system ensures that, due to their nature, scale or environment significance, certain types of activities are obliged to obtain operational permits, which are themselves underpinned by regular environmental audits. The Integrated Pollution and Prevention and Control (IPPC) Directive and its corresponding national legislation provide a framework for this.[96] With the aim of minimising pollution from key point sources, the IPPC legislation requires operators of particular installations to obtain authorisation based on the achievement of particular environmental standards. The legislation takes an integrated approach, covering the entire environmental performance of the plant, and obliging operators to use best available techniques. The IPPC process also includes public participation, by means of which citizens have access to applications, permits, and the results of releases monitoring. As of end 2008, 14 installations in Malta required an IPPC permit, down slightly from the 15 installations requiring a permit in 2005. At this



Source: MEPA

point, 6 of these installations had been permitted. The majority of the other installations were at an advanced stage in the IPPC permitting process.[97] IPPC installations include operations in the chemical and energy sector, certain waste management facilities, and a larger animal rearing unit.

ENDNOTES

1. NSO 2007a.
2. PA 2001. This estimate has lately been further substantiated by the fact that between the 1995 and the 2005 Census, the number of households grew by 17% or 20,000 households (2,000 per year). See NSO 2007a.
3. NSO 2007b.
4. AdT Licensing and Testing Department.
5. NSO 2009b.
6. These were gas oil and fuel oil.
7. NSO.
8. MRAE 2006.
9. NSO 2008a.
10. NSO 2009d.
11. July to September.
12. NSO 2009e.
13. NSO 2009f.
14. Lower and Upper Coralline Limestone.
15. Globigerina Limestone.
16. Annesi-Maesano *et al.* 2007.
17. EEA 2005.
18. PM_{10} refers to particles with an aerodynamic diameter smaller than 10µm while $PM_{2.5}$ refers to particles of diameter smaller than 2.5µm, with the latter being the more dangerous for human health due to their deeper lung penetration.
19. EEA 2005.
20. Klumpp *et al.* 2006.
21. Compounds that are required for the formation of O_3.
22. EEA 2007.
23. Nolle *et al.* 2005.
24. The EU Air Quality Directive (2002/3/EC).
25. The reason for this is that the nitrogen monoxide present in high concentration levels in these areas reacts with O_3 to form nitrogen dioxide, thus reducing O_3 concentrations.
26. See indicator A2 on O_3.
27. EC 2006.
28. http://www.epa.gov/iaq/voc.html, accessed on 26th September 2007.
29. Permanently alter the genetic coding of a cell.
30. Nolle *et al.* 2005.
31. HSE 2007.
32. WHO 2006a.
33. Nolle *et al.* 2005.
34. Council Directive 2005/33/EC on the sulphur content in marine fuels.
35. Versteng *et al.* 2007; CEC 2005; EEA 2007.
36. Versteng *et al.* 2007.
37. NSO.
38. NSO.
39. IPCC 2007.
40. MEPA 2009.
41. All percentages in this indicator are as calculated in terms of carbon dioxide (CO_2) equivalents for CO_2, methane, nitrous oxide, hydrofluorocarbons and sulphur hexafluoride 'without' LUFLUF.
42. Including the energy industry, and transport and fuel combustion in the industrial, commercial, institutional and residential sectors.
43. MEPA 2009.
44. MEPA 2009.
45. For example between 2000 and 2005, when the trend was increasing.
46. MEPA 2009.
47. EEA 2008.

48. EEA 2005.
49. Almost all energy is generated from imported fossil fuels, whether this is in power plants, motor vehicle engines, or other combustion processes. Amounts used refer to gross inland fuel consumption (net of aviation and bunkering).
50. Council Regulation (EC) No. 834/2007.
51. EEA 2005.
52. Of these 15.58ha have been fully converted, while 6.2ha were in the conversion period.
53. In the conversion period.
54. MSA.
55. Latest figures available from Eurostat.
56. Note that annual WSC billed water consumption is based on billing dates not consumption dates. Some billing may take place in the year following actual consumption.
57. NSO.
58. MRA.
59. As at end 2008 the Nitrates Action Plan is being revised by a dedicated Nitrates Action Group composed of representatives from the Office of the Prime Minister, the Ministry for Resources and Rural Affairs, MEPA and MRA.
60. WHO 2006b.
61. 2006/118/EC.
62. 2006/7/EC.
63. Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean.
64. EC 2001.
65. However, the mass of materials and biomass extracted from the domestic environment forms only part of the materials used in an economy, since imports play a large part in material consumption.
66. Domestic extraction comprises the mass of material extraction associated with biomass, which includes items such as fish and crops, and mineral extraction.
67. Exports of fossil fuels from Malta mainly consist of bunkers, however these does not exclude exports of waste oils, or other oil products which are brought to Malta to be exported again to other countries.
68. Calculated by dividing GDP in real terms by DMC.
69. Eurostat indicates comparability limitations for DMC calculations between the different EU Member States, due to use of different methodologies.
70. Latest Eurostat data for DMC, as at publication of Gazley and Moncada 2008, was for 2004.
71. Regulation (EC) No 2150/2002.
72. The new dataset should not be compared to data published in previous SOERs.
73. Since at time of publishing 2007 data was not yet complete, analysis of total waste generation for this year is not provided.
74. Article 2 of Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.
75. EEA 2005.
76. Consisting of mixed municipal waste, street cleansing residues, bulky waste and mixed municipal waste.
77. NSO.
78. ETC/RWM 2008.
79. Not including a further 200 located in schools.
80. The designation of areas protected is an important conservation tool since the majority of species is becoming extinct due to habitat destruction (Haslett 2004).
81. 92/43/EEC.
82. 79/409/EEC.
83. This figure includes the Addolorata Cemetery and San Anton gardens. Such protection is also afforded to within 50 metres of any other cemetery in Malta and Gozo, as well as to all public gardens. For more information refer to LN 79 of 2006.
84. LN 39 of 2007.
85. 92/43/EEC.
86. 79/409/EEC.
87. For more information, see http://ec.europa.eu/environment/nature/natura2000/index_en.htm, accessed on 11th November 2009.

88. CEC 2006.
89. The proposed sites were included in a Commission Decision in March 2008.
90. Candidate Natura 2000 sites proposed as per the obligations of the Habitats Directive are evaluated by the European Commission prior to inclusion in the network while SPAs are automatically included upon submission.
91. http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=3640, accessed on 15th June 2009.
92. The General Government sector includes central government as well as regulatory authorities (but not MEPA, which is classified as 'housing' under COFOG, since separate data for its environmental and planning expenditure is not submitted) and public sector environmental operators such as WasteServ Malta Ltd.
93. Ernst & Young Ltd. and Cordina 2008.
94. http://www.eco-schools.org, accessed on 24th September 2009.
95. http://www.ekoskolamalta.com, accessed on 24th September 2009.
96. Council Directive 2008/1/EC.
97. For more information see http://www.mepa.org.mt/ippc-applications, accessed on 3rd November 2009.

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ACKNOWLEDGEMENTS

Anthony Sammut (MRA); Charles Bonnici (DEH; George Cassar (MRA); Gordon Cordina (UoM); George Guillaumier (Wasteserv Malta Ltd.); George Said (NSO); Henriette Putzulu Caruana (Wasteserv Malta Ltd.); Jeffrey Galea (NSO); John Mangion (MRA); Joseph Bonello (NSO); Manuel Sapiano (MRA); Robert Mizzi (NSO); Francis P. Farrugia (MSA); Vincent Attard (Nature Trust Malta); Paul Pace (UoM)

PHOTO CREDITS

MEPA ImageBank, WasteServ Malta Ltd, Malta Tourism Authority.

ACRONYMS

AdT	Awtorità dwar it-Trasport (Malta Transport Authority)
CFC	Chlorofluorocarbon
CO_2	Carbon dioxide
COFOG	Classification Of the Function Of Government
DEH	Department for Environmental Health
DMC	Domestic Material Consumption
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gases
IPPC	Integrated Pollution Prevention and Control
MEPA	Malta Environment & Planning Authority
MRA	Malta Resources Authority
MSA	Malta Standards Authority
MSLA	Mean Sea Level Aquifer

NH_3	Ammonia
NO_2	Nitrogen dioxide
NOx	Nitrogen oxide
NSO	National Statistics Office
O_3	Ozone
PM	Particulate Matter
SAC	Special Area of Conservation
SO_2	Sulphur dioxide
SPA	Special Protection Area
UAA	Utilised Agricultural Area
UV	Ultraviolet
VOC	Volatile Organic Compound
WHO	World Health Organisation
WSC	Water Services Corporation



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