

# TOWARDS A LOW CARBON SOCIETY: THE NATION'S HEALTH, ENERGY SECURITY AND FOSSIL FUELS

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## EXECUTIVE SUMMARY

- THE EXPLOITATION OF RENEWABLE AND ALTERNATIVE SOURCES OF ENERGY AND ENERGY CONSERVATION
- THE REDUCTION OF URBAN AIR POLLUTION DUE TO ROAD TRAFFIC
- PROMOTING BICYCLE USE
- AIR POLLUTION IN MALTA AND ITS ADVERSE HEALTH EFFECTS

### Introduction

Air quality monitoring has demonstrated the presence of a significant degree of urban pollution from fossil fuel combustion in Malta.

Traffic is a major source of pollution to which the population is exposed. This pollution occurs mostly at street level and poses a public health problem.

Malta is still totally dependent on fossil fuel for electricity generation. This is an additional source of air pollution, as well as of excessive carbon emissions.

Improvement in air quality and reduction in its harmful effects on health can only be achieved through the reduction of air pollution.

To do this we must burn less fossil fuel and encourage energy conservation.

This report addresses the question "What must we do to reduce pollution from excessive burning of fossil fuel and enhance Malta's energy security?"

The report is divided into four parts:

- PART I deals with the exploitation of renewable and alternative energy sources and energy conservation
- PART II is devoted to the reduction of urban air pollution caused by road transport
- PART III is on how bicycle use should be promoted in Malta
- PART IV is an overview of the effects of air pollutants on health.

The measures that need to be taken overlap four key priority challenges listed in the EU Sustainable Development Strategy for the period until 2010. These are:

- Climate change and clean energy
- Sustainable transport
- Sustainable energy consumption and production
- Public health.

## Air pollutants and their adverse effects on health

There is strong scientific evidence which indicates that individuals exposed to air pollution from traffic and other sources have a shorter life expectancy than those living in less polluted cities.

The pollutants generated by vehicles include: particulate matter, benzene and other hydrocarbons, oxides of nitrogen, ozone, sulphur oxides and carbon monoxide. Diesel or petrol powered motor vehicles are the leading contributors of toxic pollutants which directly affect health of the population. All of these pollutants have significant health impacts.

The black smoke emitted by diesel-driven buses and vehicles on our streets is an abundant source of toxic particulate matter, which may be responsible for increased cardiopulmonary mortality and a higher incidence of lung cancer in coming years.

Short-term exposure to high levels of air pollution is associated with an overall deterioration in respiratory symptoms, exacerbations of asthma, lung inflammatory reactions, cardiovascular system disorders and increased medication usage in susceptible subjects, such as asthmatics, the elderly and patients with chronic obstructive pulmonary disease.

Long term scientific surveys have demonstrated that chronic exposure to pollution is associated with reduction in life expectancy due to death from a variety of causes, mainly cardiopulmonary mortality, lung cancer and, possibly, other malignant disorders such as leukaemia, and adverse birth outcomes.

A serious effect of prolonged residence in areas with high ambient fossil fuel pollution is retardation of lung development in growing children and adults.

Electricity generation and road transport are both sources of air pollution that cause significant health risk.

Reduction of emissions from fossil fuel engines is a necessary measure to reduce health impacts of transport-related air pollution.

Risk reduction requires a decrease of exposure to many pollutants at all levels. There is no level at which the health effects become negligible.

The adverse health effects of pollution are especially noticeable in subjects living close to major roads; in particular, it has been shown that this increases the likelihood of developing cancer.

Lung cancer deserves special attention as it is relevant to the situation in Malta. The evidence is now compelling that air pollutants, especially particulates derived from combustion of fossil fuel by internal combustion engines, which are responsible for an excess of cases of lung cancer. Results from large scale prospective studies have shown elevated risks of lung cancer in urban or industrially polluted areas, by up to 1.5 times, or more, even with adjustment for smoking. Fossil fuel consumption in Malta has increased significantly over the past 20 to 25 years consequent upon the enormous increase in private motor car ownership and a huge expansion in the construction industry. The long-term health effects of the consequent increase in pollution still remain to be seen, and care should be taken in future statistical assessment of lung cancer incidence to factor in the possible positive effects arising out of a decrease in smoking into mathematical analyses of cancer incidence so as not to overlook increases in cancer rates due to pollution. Since there is a long latency between exposure to the pollutants and the appearance of cancer, it could be reasonably predicted that we have yet to see an excess of cancer cases in the present adult and young generation in Malta in the coming years as a result of the cumulative effect of past years of exposure to air pollution, especially particulates.

A delayed effect in the causation of breast cancer arising out of early exposure to pollutants is also suspected. Some adult cancers have been traced back to environmental exposures early in life and there is a strong possibility that parents not experiencing any ill health because of exposure to pollutants may give their offspring an 'environmental heritage' which could result in disease later in life.

Children are more susceptible to air pollution than adults because of the many different ways children respond to

air pollution. They do not respond to air pollution in the same way as adults because they may not notice warning symptoms of the effects of pollution, or they may ignore them while preoccupied with their activities. Children also spend more time outside than adults and are often outdoors during periods when air pollution is at its highest, and tend to exert themselves harder than adults when playing outside.

In particular, there is evidence which shows that children living in polluted areas sustain losses in lung function even when they do not cough or feel discomfort. Thus, lung function values in children exposed to pollution fall beneath the expected normal or predicted value for their size and age, indicating that lung function development has been retarded.

The prevalence of asthma, both among children as well as young adults, has steadily increased over recent years so that asthma, especially childhood asthma, is now a common disease. The pattern of this increase strongly suggests an important environmental cause, especially air pollution, and there is concern that the increase in prevalence of asthma may be attributable to increasing road-traffic related pollution. This is supported by the parallel nature of the increase of air pollution due to the increase in vehicle usage alongside the noted increase in the prevalence of asthma.

A scientific survey in Malta has shown that the level of consumption of asthma medication and hospital admission rates from traffic-congested areas such as the Fgura, Cottonera, Gzira and Msida areas is two to three times higher than expected when compared to other areas. The association between asthma and road-traffic pollution was also demonstrated specifically by another survey in Malta. In this study a significantly higher prevalence of asthma in a town with heavy through-traffic (Fgura) led to the conclusion that the prevalence of asthma or asthma-like symptoms at this site was among the highest ever recorded internationally. It was considered highly probable that the high rate of asthma was a direct result of atmospheric particulate pollution.

### Air Quality Findings in Malta

Initial air monitoring findings suggest that ambient levels of major pollutants associated with fossil fuel combustion are high in urban areas such as Floriana, Sliema, Pieta, Hamrun, Fgura and Birkirkara that are subject to heavy traffic. Floriana is a site of major concern owing to the high levels of traffic-related particulates observed here.

Nitrogen oxide pollution was found to be consistently high in built up areas especially in Floriana, Hamrun and Sliema.

High levels of ozone were also observed in areas away from high traffic density in Malta and Gozo. It is possible that transnational ozone transport is of significance in Malta.

### Energy Generation, Conservation and Transport

Measures to reduce greenhouse gas emissions and air pollution must be aimed at both sides of the energy equation: energy generation and energy conservation. In terms of carbon emission and pollution, more can be achieved through energy conservation measures than can be generated from renewable energy.

These measures are the subject of this report. They are summarized as follows:

- allocating high priority to large scale electricity generation from renewable and alternative sources by exploiting immediately available options.
- importation of clean electricity from the European grid,
- increasing energy efficiency of buildings,
- encouraging energy conservation in the home and other settings such as industry and public buildings,
- reducing dependence on private car use,
- encouraging a shift to low or zero carbon transport, including cycling,
- improving public transport.

This needs a broad holistic approach across the board. Everyone has a part to play.

There is no single solution. A multitude of measures must be implemented in such a way that the additive effect

will achieve results.

Such measures need the cooperation of several Government ministries.

The Health Department in the Ministry of Social Policy must act as a driving force in anti-pollution measures because of the public health implications of both pollution and climate change.

Local councils and non-governmental bodies should also be active in the process.

A wide-ranging educational process must be an integral component of the pollution reduction initiatives suggested in this report. The educational process should be aimed at overcoming indifference and inducing a change in attitude and behaviour. It is important that people are made aware that they are part of the problem and that they are aware of the environmental dimension of the high carbon way of life.

Exhortation through education alone is not enough. A key element will have to be fiscal measures aimed at promoting conservation.

The 'polluter pays' principle should be applied, while making sure that the less well-off and low consumers are not put at a disadvantage by pricing policies.

Energy pricing policies must include curbing energy and fuel use by private transport by gradually removing subsidies and charging the true price for fuel.

Providing electricity and water at a rate lower than its actual production cost sends the wrong message to consumers and does not encourage conservation. Attempts at persuading people to use less energy and water, or to install energy saving devices and domestic electricity generation units, are unlikely to succeed as long as electricity continues to be subsidised. The price of electricity must be raised to a realistic level, targeting the heavy consumer while sparing the low consumer to the greatest extent possible.

### European grid

Malta might be in a position to buy nuclear (or greener) electricity from the European grid. Connection to the European grid will go some way to reduce local pollution and ensure energy security.

The proposed installation of a 200 MW cable connection to the European grid must be exploited with the utmost urgency, as Malta's generation capacity is overstretched and will soon be working without a safety margin even before the Marsa power station is decommissioned in 2012.

### Wind energy

Every effort must be made to exploit available and affordable wind technologies in the immediate future.

Land based or near-offshore wind energy needs to be the basis of Malta's first step in the pursuit of diversity in the mix of feasible large-scale exploitation of renewable energy.

The advantages of feasibility and low cost of land-based wind energy outweigh the disadvantages. The question of land based wind energy should be reappraised urgently and in a realistic manner. Offshore wind energy should be regarded as a second, more expensive option.

Use must be made of our local expertise so as to arrive at a well-informed decision.

Since there are so many misconceptions about wind energy, it is important that the public is correctly informed and the necessity of tapping this source emphasised.

Proposals from private companies to erect wind farms on land or in our shallow waters close to shore should be invited. At least one large land based wind farm should be built in order to permit a true assessment of the potential and acceptability of wind energy in Malta and provide hands-on experience in handling renewable energy.

Subsidies aimed at encouraging the use of “Micro-wind” are already in place. These should be made more attractive. Malta Environmental and Planning Authority [MEPA] should provide guidelines for the roof mounting and placing of wind turbines.

## Photovoltaic Energy

Photovoltaic (PV) appliances adapt well to Malta’s flat rooftops as small-scale, decentralized electricity generating installations.

Widespread use of PV could provide a significant amount of clean electricity and go some way in reducing Malta’s dependence on fossil fuel for electricity generation.

The government should pursue the aim of increasing clean electricity production from renewable sources by encouraging wider use of rooftop PV potential in houses, factories and office blocks by offering a better payback price for buying surplus electricity and making subsidies as attractive as possible.

Educating the public and increasing public awareness is essential to encourage uptake of clean energy systems. PV installation must be promoted through an information campaign both as an environmentally positive initiative and also as an investment. This will particularly be the case where the householder is encouraged to become a net supplier by being better rewarded for surplus electricity.

Malta’s incentives compare poorly with the incentives offered in other EU countries where the pay-back on excess energy returned to the grid is high. The best incentive for PV systems is to offer an attractive rebate cost for surplus energy rather than giving capital grants.

Interest-free loans and flexible payback schemes via electricity bills could be offered so that customers can spread the cost over the number of years that suit them.

PV installation should be made obligatory in new buildings. This is a time when people are paying out large sums for a new property, so the extra cost of installing an obligatory one-kWp unit or more, depending on the size of the property, can be more easily absorbed. The saving on meter installation will add to the attraction.

Roof space on government buildings, hospitals and schools should be utilized.

If sufficient flat roof space is not available, as in the case of high rise blocks, the possibility of incorporating vertical PV panels and window panes in the external structure of the buildings has to be exploited. Integrated PV (and other energy-efficiency measures such as wall insulation) should be made mandatory without delay in all new tower blocks.

MEPA’s regulations regarding installation of solar systems on facades must be revised.

The possibility of a legal or other remedy for the problem of obscuration of installed solar panels by adjacent new high buildings should be studied.

The possibility should be considered of making PVE installation obligatory with purchase or installation of air conditioning equipment.

## Biomass

More education is needed so that consumers are made aware of the benefits of biodiesel.

Car manufacturers should be made to support the use of biofuels.

Government tax on biodiesel must be substantially reduced to encourage its wider use.

Anaerobic treatment of solid waste and other organic waste, such as animal manure, can yield up to 5% of our

renewable energy needs from generating biogas.

The government should actively pursue its declared policy of encouraging energy recovering technologies for exploitation of Malta's sewage sludge, animal waste (pig, cattle, poultry) and municipal solid waste to the fullest possible extent to provide an alternative energy source for generating electricity.

### **Solar Water Heating**

Solar water heating (SWH) should be promoted both as an environmentally positive initiative and a system which can deliver larger quantities of hot water than an electric boiler for little or no money.

Government should encourage wider use of SWH systems by making the subsidies as attractive as possible. The incentive should be increased so that the payback time is reduced.

Soft loans payable back through electricity billing should be introduced to help the less well off. Payback could possibly be built into water and electricity bills.

The possibility should be considered of supplying and fitting solar heater water heaters free of charge to low income earners who are exempt from the electricity bill surcharge.

The process of application and refunding should be made as straightforward as possible by reducing bureaucracy to a minimum and the subsidy on solar panels discounted at the time of sale.

Campaigns on energy efficiency in dwellings and offices should include installation of SWH.

SWH should be made mandatory in existing hotels. Subsidies could be created to ease installation costs.

Installation of SWH must be made mandatory in all newly built housing, hotels, tourism projects, factories, office blocks and other buildings where solar water heating is relevant or feasible.

Methods of incorporating SWH in new high rise buildings should be sought.

Roof space must be utilized for SWH panels in schools, hospitals and, if appropriate, government buildings.

Mandatory solar heating should be introduced as has already happened in Spain.

Restrictive planning regulations should be removed.

### **Energy Conservation and Energy Efficient Housing**

The huge potential of energy conservation for saving energy and reducing carbon emissions through improving thermal efficiency in buildings and housing is underestimated.

The potential for energy saving from introduction of energy efficiency in housing and buildings can be as high as 40% of a country's global energy requirements.

An educational process aimed at creating a culture of conservation through greater awareness of the importance of energy-saving measures must be integral to any conservation measures.

Leaflets or booklets on simple energy saving measures aimed at reducing domestic energy consumption should be readily available. Conservation should be promoted in the media.

Energy saving plans for government departments, schools, colleges and university should be drawn up. Such a project could involve school students.

Suggested energy (and water) saving measures tips could accompany electricity bills.

The question of energy efficiency in buildings should be addressed with urgency. Zero- or low-energy building concepts should be integrated in the government's strategy for new buildings as soon as possible.

In the case of all proposed large new buildings, which are likely to be responsible for high consumption in the long term if they are not energy efficient, granting of permits should be made conditional on conformity with Legal Notice 238 of 2006.

Energy audits should be offered to householders free of charge to create awareness of the importance of energy conservation.

The programme of introducing financial incentives for energy saving appliances should be extended to low-energy electric lighting.

Old-style fluorescent lighting tubes and incandescent bulbs should be phased out in domestic homes, commercial and government buildings.

Replacement of inefficient (or unnecessary) light sources with energy efficient bulbs in commercial establishments and government buildings – and in the home – should be encouraged through education and financial incentives.

Ways should be found to induce people to substitute air-conditioning by floor or ceiling fans.

Thermally driven cooling systems using waste heat and solar assisted air conditioning systems have now been developed and the possibility of employing this and other technologies should be encouraged.

### **Energy Conservation in Industry**

The introduction of energy efficiency by our industrial establishments could yield a worthwhile reduction in emissions and pollution. Appropriate financial incentives to encourage energy efficiency should be devised.

Add further incentives, such as awards to companies and staff for green ideas and practices in industry.

Industries should avail themselves of facilities aimed at helping them to identify energy inefficient practices and methods of implementing best available techniques

Industries should be encouraged to introduce simple, universally applicable energy-reducing measures such as installation of energy saving lighting, switching off unnecessary lights during daylight hours and using roof space for photovoltaic electricity generation and solar water heating.

More specific measures might include shifting to solar technology for space heating and cooling, recycling heat, staff car pooling, giving drivers training in eco-driving, using more fuel efficient (or electrically driven) delivery transport, keeping these vehicles well maintained.

Energy performance audits should be obligatory for all industries.

As for all other consumers, electricity should be charged to industry realistically so as to force conservation measures and decrease wasteful practices.

### **Reducing Pollution by Private transport**

The basic aims are to:

- reduce dependence on private car use,
- encourage a shift to smaller, more fuel-efficient vehicles or to low or zero carbon transport, including cycling,
- improve public transport,

- encourage use of public transport, walking and cycling.

The recommendations fall into three main categories.

- **Education:** to induce environmental awareness and a shift in attitude away from the private car toward public transport, walking or cycling.
- **Planning and Road re-engineering:** to discourage car use in built up areas and encourage walking, cycling and public transport.
- **Tax measures:** to deter ownership of unnecessarily large polluting vehicles and excessive use of cars in general.

The approach must be holistic and all possible approaches must be pursued. A great many small initiatives need to be taken; the additive effect of these will be significant.

There needs to be a change in attitude to the car. This will need an educational process on a wide front so that quality of life starts to be measured in terms of freedom from pollution and a healthy lifestyle, rather than car ownership.

Since urban planning and design can influence health, the Health Department should be involved in both planning and education so as to reduce the health impacts of traffic as far as possible. Reducing car dependency will yield the double health bonus of decreasing pollution in our streets and favouring increased physical activity.

Public understanding is an essential ingredient in creating a culture of social responsibility through awareness of the environmental significance of overuse of private transport.

Education must be an integral component of every initiative aimed at reducing pollution so that vehicles will be used in an environmentally responsible manner.

The Health Promotion Unit should organize projects aimed at inducing behavioural changes in such a way that avoiding or diminishing polluting activities becomes a part of everyday life

Community leaders (local councils) should consider it their duty to keep themselves informed on environmental matters and to take steps to reduce or eliminate threats to the health of their community.

Information about the need to reduce pollution should be disseminated through awareness campaigns using all available media (radio, television, posters and brochures).

Encourage walking and cycling and emphasise the health benefits of exercise.

Emphasise the importance of using a small fuel-efficient car and keeping it well-maintained.

Carbon emission and fuel consumption data of cars must be prominently displayed on posters at the point of sale and in all promotional literature such as technical manuals, brochures, advertisements in newspapers, magazines and trade press.

Reinforce awareness of the environmental threats of polluting activities.

Make parents aware of the threat to the health of their children growing up in a polluted atmosphere.

Advertise ways to reduce fuel consumption.

Introduce eco-driving (or "smart driving") and Good Driving Practice lessons for driving licence applicants. Organise similar training courses for new and established drivers.

The principles of eco-driving and improved behaviour toward cyclists should be incorporated into the driving licence test.

Future street planning should give due consideration to pedestrians and cyclists - not to optimizing the flow of motorized traffic and provision of parking space.

The starting point for any traffic reduction in residential areas should be making the roads more user-friendly for pedestrians and cyclists so that there is a trend toward non-car mobility for short journeys. De-engineering main streets into minor streets is regarded as the biggest single initiative to encourage a modal shift from motor vehicle use to walking or cycling.

Local councils should aim to create conditions that encourage people to use their car less and promote a life-style which includes more physical activity by making the road environment in their community more pedestrian friendly and safer for children.

Advanced methods of traffic calming are needed in order to reverse the vicious spiral of increasing pollution from excessive use of private transport by diminishing car use in agglomerations and residential areas so as to promote walking and use of bicycles.

This can be achieved by creating peaceful car-free zones in conjunction with public transport improvements by various means, including pedestrianisation with access limited to residents' cars, narrowing of streets, conversion of streets into social spaces and other measures aimed at reducing unnecessary car use.

Planning policies should be designed to avoid unnecessary increases in the need for long distance mobility particularly between home and work, education and shopping.

Proximity to shops and commerce to residences should be preserved as much as possible to cut down on traffic.

Consideration should be given to the survival of small neighbourhood grocers and corner supermarkets, which often provide a social focus for the elderly and less well off and encourages people to walk rather than use a car.

Efforts should be made to relocate local kindergartens and junior schools nearer to homes. Large stores and supermarkets should be redirected nearer to town centres to cut down on the necessity for vehicle transport.

The Health Department should take part in decisions related to urban and road planning in order to ensure that the interests of pedestrians and their health are catered for.

Health impact evaluations of all new road projects should include distances from residences, schools, and recreational sites. Such evaluations should also focus on possible increases in pollution due to greater traffic congestion caused by new property developments in densely built-up areas.

Traffic impacts must be given more importance in impact assessments of large new developments or new apartment blocks. The potential for subsequent increases in pollution from heavier local traffic congestion must be taken into consideration and given more importance.

Conditions should be created to promote smoother flow of traffic by removing unnecessary traffic lights and wider use of roundabouts and, in particular, removal of traffic humps so as to ensure that traffic flows more efficiently, thus reducing fuel consumption.

A change in policy is needed when adding controlled parking zones. Care should be taken that it does not result in a higher turnover of cars and more pollution.

There should be more pedestrianised streets in town centres and creation of more space for people to walk.

Road engineering policies and design must start to include provisions for discouraging the passage of traffic through town centres.

The polluter pays principle could be applied to parking. A ('carbon' or 'eco') tax could be levied on commercial car park fees and parking meters installed elsewhere.

Speed limit signs should be introduced near institutions such as schools, shopping streets and supermarkets, as well as in the vicinity of zebra crossings so as to reduce car traffic around schools and motivate students to walk or cycle to school and residents to use a bicycle for shopping. A 25kph speed limit should be imposed wherever possible in residential neighbourhoods.

Since reduced driving speeds can cut fuel consumption and pollution, speed limits should be enforced widely so that cars are obliged to cruise nearer to economical speeds on major roads.

Except in wide dual- or multiple- carriageway roads with uninterrupted fast flowing traffic, pedestrian crossings controlled by traffic lights (pelican crossings) should be removed and replaced by highly visible, well-signposted zebra crossings.

Financial deterrents to discourage car use have a vital part to play. The new tax regime should also encourage fleet renewal so as to get old polluting cars off the road.

The polluter pays principle should be used to discourage the purchase of unnecessarily large or heavy cars and make the purchase of small, fuel-efficient cars and cleaner forms of transport more attractive. This should be based on carbon dioxide emission tax bands – and consequent polluting capacity – of the vehicle.

The tax structure should be such that the differential in purchase taxes between large high carbon emission vehicles and small fuel-efficient cars with low carbon emission becomes so wide that it will induce purchasers to buy small fuel-efficient vehicles, hybrid vehicles or electric vehicles.

Measures should be found to discourage the purchase of diesel-powered vehicles (this includes heavy goods vehicles) that emit more toxic particulates than petrol-driven vehicles.

Excessive dependence on the car and the use of high consumption cars should be discouraged by raising the price of fuel.

The proceeds from regressive taxes should be diverted to financing and subsidizing a good public transport system.

Purchase taxes, annual road tax and fuel price increases should be introduced gradually and announced in advance, so that impacts on businesses will be sustainable by allowing car importers and garages to adjust to the changes.

Businesses should be encouraged to switch to more fuel efficient vehicles such as electric delivery vehicles by subsidies and tax concessions.

Parking meters should be installed at suitable sites such as commercial and entertainment centres to discourage excessive car use.

Means must be devised to discourage importation of second-hand vehicles. Such imported second-hand vehicles should conform to the same EU standards as new vehicles. This should be applied particularly to commercial diesel-powered vehicles.

All vehicles (whether commercial or private) should be taxed at the same rate.

Loopholes whereby unnecessarily heavy, polluting “pick-up trucks” are taxed at a reduced commercial rate, through being misclassified as ‘commercial vehicles’, should be closed. The abusive practice of buying such cars for recreational use under the pretext of commercial use must be stopped.

Incentives on the purchase of electric cars and other low- or zero- emission vehicles, such as hybrid cars, should be made more attractive.

Bicycles and electric motor kits for bicycles should be VAT-exempted

Diesel-fuelled buses should be excluded from thickly populated areas and replaced by electric buses.

Government services should be streamlined to minimise, as far as possible, the need to travel by creating “one stop” facilities.

The use of home shopping by phone, fax and the internet so as to reduce shopping car journeys should be encouraged.

Car sharing should be encouraged.

Malta must participate fully in Car Free Days and European Mobility Weeks to raise awareness of the realities of pollution associated with excessive use of the car and its negative effect on health and quality of life.

### **Improving Public Transport**

The standard and effectiveness of public transport no longer meets current mobility and needs to be improved.

Malta’s transport problem requires new thinking and a long-term view. Measures to improve transport must be integrated and include the environmental dimension.

Encouraging passengers back on to buses can only be achieved through high standards of public transport.

The measures already proposed for reducing private car use must be matched by an improved public transport system.

The starting point for public transport reform must be the vehicles themselves. Air quality and carbon emission targets set out by the EU cannot be met without a shift in policy towards clean, green public transport.

The potential of water transport in the harbour area should be exploited.

Increased revenue arising out of taxes aimed at discouraging excessive private car use should be diverted to subsidizing an improved and environmentally-friendly public transport system. This should be combined with private financing or public-private partnership.

The presence of buses that emit black smoke in our crowded urban environment is unacceptable. Firm action should be taken against buses that emit black smoke – which is known to be carcinogenic. Immediate action needs to be taken to prevent tampering with bus engines and inferior fuel use.

The quality of public transport service needs to be improved through implementation of the range of measures set out in Part II of the report.

The Valletta bus terminus has outlived its usefulness and should be removed, reduced in size or relocated. This could be facilitated by introduction of a comprehensive harbour ferry service and new nodal transport routes throughout the island.

Public transport reform should focus on a major network of connections between towns exploiting less polluting modalities such as trolley or hybrid buses and a smaller network of neighbourhood bus services serving smaller local hubs to provide an efficient local public transport in, or between, larger neighbourhoods or urban sprawls using electric buses.

Diesel-powered buses should be phased out and replaced by less polluting buses.

Reduction of pollution from old buses must receive immediate attention. Interim measures might include some form of tail-pipe filtering to reduce particle emissions.

Alternative cleaner public transport should be explored. The introduction of trolley buses is an option which should be seriously considered. Modern electricity-driven trolley buses are used in over 340 modern cities world-

wide, and their use is increasing as a result of heightened awareness of pollution and climate change.

Hybrid buses also offer an alternative form of clean transport.

Water transport must play a major part in transport around the harbour area. Such a transport system could provide considerable social, tourism and industrial benefits by virtue of the fact that almost 20% of Malta's population lives around the harbour area.

A harbour ferry network could take pressure off buses that operate around the harbour thus relieving congestion with bus traffic.

A well-designed ferry service could provide direct connections between the communities of Kalkara, Vittoriosa, Senglea, Cospicua, Marsa, Valletta, Pietà, Msida, Ta' Xbiex, Manoel Island, Gzira and Sliema.

A ferry transport system will also facilitate removal of the unsightly terminus at Valletta City Gate.

Besides revitalizing a historic part of Malta, a harbour ferry system itself will constitute a strong tourist attraction.

Passengers should be allowed to take bicycles on all ferries.

Ferries that run on photovoltaic energy should be investigated.

The possible siting of a ferry tunnel at some point beneath the Valletta peninsula, which will join both harbours, should be studied.

### Promoting Bicycle Use

A policy officer should be appointed in ADT specifically responsible for the promotion of cycling.

Measures to encourage cycling fall under the following headings:

- Modification of motorists' behaviour
- Infrastructure – Cycle paths, Cycle tracks, Cycle lanes
- Local council initiatives
- Education
- Car Free Days, Mobility Weeks etc.
- Tourism
- Incentives

Modification of motorists' behaviour is the most important stratagem in promoting the use of bicycles. It overrides the provision of cycle lanes and other cycling amenities.

Specific legislation to protect cyclists on the road needs to be introduced and the Traffic Code revised in such a way as to favour and protect cyclists on the road.

The most important single measure is introduction of a minimum distance of at least one metre which overtaking vehicles must observe when overtaking cyclists.

Particular emphasis is to be laid on buses and heavy goods vehicles.

Regulations must be strictly enforced and a tough stance taken against motorists who disregard the rule.

Information about changes in the traffic code aimed at protecting the cyclist should be widely disseminated to make motorists aware of the new conditions.

High priority should be allocated to creating a safer road environment for the cyclist.

More emphasis needs to be placed in road planning on the needs of cyclists and pedestrians, rather than private

car use.

Residential and neighbourhood areas need to be made safer and friendlier to bicycles and pedestrians.

Cyclists are best served when they are treated equally as vehicles and the existing road system adapted to meet their needs.

Well-designed cycle paths and cycle tracks should be created where they are necessary and of benefit to cyclists but greater priority must be given to making cycling on roads safer by modifying driver behaviour.

Traffic management and highway design professionals should be sympathetic to cyclists' needs. Concurrently, advice of cycle associations or specialists should also be sought.

Road danger reduction for cyclists in residential streets might include 25kph zones and "de-engineering" main streets into minor streets.

Merely displacing cyclists from existing roads on to badly designed cycle paths without modifying motorist behaviour and attitude will not add to cycling safety and it will not encourage cycling.

Substandard cycle lanes which offer few or no benefits to cyclists should not be installed at all and they should be added only where it is quite certain that such a lane will be safe for cyclists.

Cycle lanes should be wide enough (1.5M), uninterrupted and continue into roundabouts with clear signs indicating priority to cyclists; they must allow good positioning of the cyclist at junctions.

Cycle tracks must have a proper surface that is smooth and not dangerous in wet conditions.

Painted white lines and signs indicating a cycle track along pavements of major roads are acceptable where pedestrians are absent or sparse.

Cycle lanes, paths or tracks should be regarded as forming a legitimate part of the transport infrastructure and maintained as such.

Long term road planning must take into account the inclusion of adequate segregated cycle paths on both sides of the road.

Roadside tree planting with a view to providing shade for cyclists (and pedestrians) using a cycle track is a good idea. Trees also make roads in neighbourhood areas more welcoming.

Separate cycle paths, unrelated to roads, should also be considered where a short-cut can be provided. If cycle racks are installed, a good start is to allocate secure cycle park areas at government departments, the university and at Mater Dei Hospital.

Government staff should be encouraged to cycle to work and ways found to incentivise such an activity.

### Local councils

Local councils must take part in popularizing the bicycle by making streets safe so as to enable people to walk or cycle rather than use a car.

Making certain neighbourhood areas off limits to cars, or subject to limited access, will help to make cycling safer for children.

The community, including children and youngsters should be integrated into the development of local mobility policies.

Educational material on cycling should be elaborated.

Local councils can cooperate in developing walk- and cycle connections between communities by creating a continuous network of dedicated bicycle paths.

Money is better spent on training for all road users and driver awareness campaigns to modify behaviour than on provision of inexpertly designed cycle lanes.

Budgetary allocation must be created to make possible initiatives and promotional activities aimed at encouraging cycling at both national and local council levels.

The social status of cycling needs to be improved by various means.

Vehicle drivers must be persuaded through specific campaigns and legislation to behave more cautiously with cyclists and to treat them with respect as legitimate road users on an equal basis. This will encourage cycling by helping people overcome their fear of cycling.

The public must be well-informed regarding the benefits of cycling both as a means of transport, as a sport and as a means of reducing pollution.

Well-designed cycling and walking route maps should be available free of charge.

The bicycle should start being integrated into the way of life as early as possible.

Bicycle training for primary school children and cycle proficiency training in schools should be given priority.

School sporting activities should include the bicycle.

Sport culture needs to be inculcated at our schools so as to condition children to take to the bicycle.

Incentives to encourage school staff to cycle to schools should be created.

Future urban planning should take the school transport factor into account with the ultimate aim of enabling large scale cycling to schools.

A functional cycle track or cycle path (but not lanes) must be created to motivate university students to cycle to the campus.

Full advantage should be taken of Car Free Days and Mobility Weeks to encourage people to use bicycles and give people the opportunity to convert to the bicycle.

Malta should be promoted as a tourist cycling destination.

Electric bicycles, electric conversion kits and bicycles and their accessories should be made VAT-exempt.

Bicycles should be allowed free of charge on ferries and, wherever possible, on other forms of public transport.

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