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**PROPOSAL ON  
URBAN MOBILITY STRATEGY  
IN ISSUES FALLING UNDER THE COMPETENCE OF THE  
MINISTRY OF THE ENVIRONMENT, PHYSICAL PLANNING AND  
PUBLIC WORKS**

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Work Group

(Decision made by the Minister of MEPPPW Nr. 2289οικ/24.01.08)

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- Ioannis Theofilis
- Panayiota Kaperoni

**Athens, March 2008**

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## 1. Introduction

### 1.1 General

#### 1.1.1 The Green Paper of the European Committee

The Green Paper towards a new culture on Urban Mobility was adopted by the European Commission on September 25, 2007 and is the result of a preliminary public consultation that lasted approximately one year. The Green Paper opens a new debate on the key issues of urban mobility aiming to set a common European agenda for urban mobility, while respecting the responsibilities of the Member-States. Within the Green Paper a presentation of transport and traffic problems in the European cities takes place, while recommendations on possible solutions are made using a comprehensive approach.

Unlike in the past, the European Commission maintains that Member-States cannot face all these issues on their own; there is a need for cooperation and coordination on a European level (principle of subsidiarity).

With this Green Paper, the Commission launches a second Consultation process, where all Stakeholders are entitled to contribute, with a view to presenting, in early autumn 2008, an Action Plan which will identify a series of concrete actions and initiatives towards better and sustainable urban mobility, making also reference to the optimum financial means ; it shall be possible for this Action Plan to be implemented on a community, national, regional and local level.

#### 1.1.2 Responsibilities of the Ministry of Environment, Physical Planning and Public Works (MEPPPW)

Some basic issues raised in the Green Paper belong to the sphere of MEPPPW's responsibilities, i.e., road network and traffic management, transport infrastructure (Metro, etc.), regional and town planning, environmental management. Certain other issues fall under the responsibilities of the Ministry of Transport & Communications (YME) (Public Transport Modes), the Local Authorities (pedestrian walkways, sidewalks, cycling lanes, etc.), as well as of the Traffic Police (implementation of the measures).

Thus, the MEPPPW needs to formulate an **Integrated Strategy on Urban Mobility**, which shall be transmitted to the European Committee and shall be applied in order to identify and implement the optimum measures towards the improvement of urban mobility in Greek cities.

It is clarified that the implementation of any measures towards the improvement of urban mobility falls under the responsibility not only of the MEPPPW, but of other authorities, especially the Local Authorities and, frequently under the responsibility of more than one authority, which must co-operate. The role of the MEPPPW is to set the framework and the basic principles of Urban Mobility Strategy within the Greek cities and support them with all its resources the relevant actions.

It is also clarified that that proposed measures are a non-exhaustive list.

### 1.1.3 Purpose of this Proposal

The purpose of this Proposal is to formulate an **Integrated Strategy on Urban Mobility** for Greek cities.

The present proposal concerns cities of over 10,000 inhabitants, where transport and traffic problems have already reached a certain degree of seriousness, as well as smaller cities and towns with seasonal variation of traffic, due to significant tourism development. The emphasis is placed upon the metropolitan areas of Athens and Thessaloniki, due to the special nature of their urban environment and the extent of the problems.

The Strategy presented in this Proposal can be applied to all Greek cities, from the small ones, to the large metropolitan areas, Athens and Thessaloniki.

### 1.1.4 The Working Group and its Tasks

By virtue of the MEPPPW decision No. 2289oik./24.01.08 a **Working Group of Specialists from MEPPPW and Attiko Metro S.A.** was established in order to prepare the Proposal concerning the Urban Mobility Strategy, consisting of the following members:

- **George Yannis**, Coordinator  
Chairman of the BoD - Attiko Metro S.A.
- **Ekaterini Sykianaki**  
Chairperson of the Executive Committee of the Athens Regulatory Plan Organization (ORSA)
- **Stavroula Bairaktari**  
Chairperson of the Executive Committee of the Thessaloniki Regulatory Plan Organization (ORSTh)
- **Epaminondas Toleris**  
Chief of MEPPPW's Special Committee for the Environment
- **Panayiota Kaperoni**  
Chief of the Department of Special Projects for the Development of Areas, General Planning & Projects Division of MEPPPW
- **Ioannis Theofilis**  
Chief of the Traffic, Signalling and Telematics Department of MEPPPW.
- **Angeliki Kopsacheili**, Secretary  
Attiko Metro S.A. Staff

The Working Group was supported, in synthesis and review of the proposal, by the following persons:

- **George Nathenas**, Traffic Engineer from the ORSA
- **Theopisti Perka**, Traffic Engineer from the ORSTh
- **Alexandros Koulidis**, Chemical Engineer – Environment Engineer (EYPE/MEPPPW)
- **Rallou Tsiroyianni**, Architect DEEAP / MEPPPW
- **Panayiotis Klimis**, Traffic Engineer – Attiko Metro S.A.

The Working Group completed the preparation of this Proposal through a series of Meetings, through:

- a) Synthesis of the individual policies on urban mobility promoted by the MEPPPW in the last years,
- b) Analysis of basic concerns, general principles and proposals of the Green Paper on Urban Mobility, in relation to the existing situation in Greece.
- c) Elaboration of **current issues on urban mobility in Greek cities**, falling under the responsibility of the MEPPPW, such as road network and traffic management, transport infrastructure (the Metro, etc.), regional and town planning and the environment.
- d) Carried out a **wide review** of relevant bibliography in the EU (such as the White Paper, the Mid-term Review of the White Paper, etc.), positions expressed by various Scientific Associations and Institutes, scientific and social forums and networks (such as the CIVITAS, SMART, MOBILIS, etc.), as well as the results of various Research Projects (e.g. TREATISE, etc.).
- e) Examined the views expressed by the following competent Ministries and bodies, which were invited to participate in a Consultation Meeting:
  - Ministry of Transport & Communications
  - Sub-Ministry of Public Order
  - Central Association of Municipalities and Communities
  - Local Association of Municipalities and Communities of Attica Region
  - Technical Chamber of Greece

## 1.2 The Need to Develop an Urban Mobility Strategy

Sustainable development of cities depends on a package of measures, aiming at environmental protection, economic development, social cohesion and cultural identity highlighting. To this end, one of the basic obligations in all government levels is **the promotion of sustainable transport systems and of a new culture on urban mobility, based on the following criteria: environmental** (energy saving, air pollution reduction, ensuring public health, rational use of the natural resources), **social** (ensuring economic, reliable, safe and flexible transportation for all citizens) **economic** (setting priorities in fund allocation, incentives, etc.).

In a city which incorporates all possible modes of transport (public transport means, private cars and taxis, motorcycles, bicycles and walking), Urban Mobility depends, to a great extent, on:

- urban planning organization of the central and suburban areas, and mainly on the location and interdependence of city functions, and in general on urban development model,
- the existing transport infrastructure (type, size, condition)
- the condition – configuration and management of the public areas
- the way of life, the standards of production and consumption and in general citizens awareness

- the systematic application of measures, rules and incentives implemented towards a sustainable urban mobility.

Transport service level in most Greek cities is rather low, especially when compared to the European standards. Greek cities are different but they face similar problems, with the most important being chronic congestion, absence of parking policy and low level of public transport services. These problems have many adverse consequences such as hindering of mobility and limited accessibility, environmental pollutions and in general **deterioration of the quality of life**.

Current status of transport system in Greek cities is highly connected with the chronic and complex “symptoms” of an **urban planning crisis** that strengthened the role of private car, leading to a distorted development of transport system, which in turn favors road transport and private car use.

Many of the existing problems could be characterized as irreversible, unless radical measures are taken, with immediate and long-term results. It is pointed out that any attempts to reverse current situation are extremely difficult, due to **the complexity of transport system** in each city (minor and/or major), and also due to the existing organization problems and the lack of funding sources.

Therefore, **an integrated strategy on urban mobility** with clear goals is required. Setting clear goals is necessary, because, not only it constitutes a rational basis for the identification and application of policies and measures, but also because it will allow the evaluation of the overall strategy as well as the individual measures.

Given the above-presented problems, a strategy on urban mobility must set as goals optimization of transport system, environmental protection and quality of life.

Given these goals **the policies** to be adopted must be based upon a complete, to the extent this is feasible, approach, which shall combine the most suitable answers to each problem: prioritized development of transport infrastructure, advanced and modern traffic management, technological innovation, development of clean, safe and smart transport, economic incentives and/or appropriate legislation.

First of all, **transport planning** must be a part of an overall planning including also other aspects of a city’s development. Only if the choices concerning the development of a city’s transportation system are combined with land use policies, new technologies utilization, healthy competition securitization and citizens equity, will these choices lead to substantial results.

Thus, the **first policy** on urban mobility is the **unified urban and transport planning**, since land use policies affect the form and the needs of the city and, therefore, they must keep up with transport networks development. Therefore, planning and development of transport infrastructure projects must be constantly in agreement and interdependent with the respective area planning and town planning provisions, and, vice-versa; these provisions must be properly co-related to the already existing transport infrastructure.

Further on, it must be recognized that supply of transport infrastructure must be accompanied by effective transport demand management as well as traffic management.

Therefore, the **second policy** on urban mobility is the effective transport and traffic **management**, which will optimize utilization of city's transport infrastructure. Measures under this policy can be the promotion of Public Transport use, parking management, improvement of accessibility through Transfer Stations and "smart" traffic control mechanisms, passenger information, upgrading of road safety, etc.

However, the sustainable growth of the cities does not stop to the above, since, apart from the development and effective management of transport infrastructure, its objective must also include **social cohesion**, highlighting of the cultural identity and environmental protection.

So, the **third policy** on urban mobility is the **re-organization** of urban area and the reallocation of urban space towards non-motorized **transport**. The promotion of non-motorized transport such as walking and bicycling, activities both friendly to the environment and contributing to fitness, absolutely depend upon public space configuration.

Finally, considering the densely populated and congested urban environment of the Greek cities, the **fourth policy** on urban mobility is the **promotion of technologies and measures favoring the environment**. In addition, it is widely accepted that the new technologies constitute a major factor to the solution of the problem concerning the improvement of the environmental conditions within urban areas. These new technologies must be utilized mainly towards the immediate improvement of factors detrimental to the environment, generated by the urban trips (noise, air pollution etc.).

Within the above general framework, the Strategy is formulated and structured in two principal directions:

- the definition of possible measures per **policy**, which shall allow the sustainable development of transport system in Greek cities and which shall secure quality of life and sustainable transport services, taking also into account the inherent contradictions within the transport system.
- the formulation of proposals concerning the implementation of **priority measures**, as well as about the **horizontal actions** required for their proper implementation.

## 2. Policy Issues of the Strategy on Urban Mobility

### 2.1 Urban Planning and Transport Planning

Transport planning is depended and guided by urban space structure, serving the targets of urban planning, being based on its principles and rules. Therefore, integrated urban planning and transport planning is vital for cities sustainable development..

Specific planning issues in integrated urban and transport planning policy are, among others: re-classification of road network, delimitation of central and traffic calming districts, parking management and design, prioritized development of transport infrastructure, definition of public transport precincts (where public transport and non-motorized modes are priority forms of access), land use and urban planning parameters (Plot-to-Building Ratio), etc.,.

#### 2.1.1 Prioritization of the Road Network and Creation of Low-Traffic Areas

The first step of the combined urban planning and transport planning consists in the road network prioritization and the development of low-traffic areas.

**The classification of the road network into categories** constitutes the step following the survey conducted about the environmental tolerances of the urban area, mainly at the city's arteries level. This is focused on the distribution of the city's acceptable loads . In this way, the transfer of the excessive local traffic loads from the environmentally sensitive areas (mainly residential areas) to the "stronger" zones of uses (mainly mixed and peripheral uses) is discouraged.

The above classification leads to the configuration of "ring-road" circulation system, which by-passes the inner zones of the city where the usages requiring protection are concentrated, such as the residential neighborhoods, schools, parks, hospitals, cultural centers and central areas with heavy pedestrian traffic.

The neighborhoods / low-traffic areas are surfaces corresponding to urban units. Therefore, **the ring-road systems with various hierarchy levels** correspond to three levels of town planning, namely: Local (neighborhood) – District (urban unit) – Periphery (city).



### 2.1.2 Balanced coordination of land use and transport planning

Land use and transport planning constitute two systems affecting each other. The development / organization and structuring of land use form an effective and efficient transport system, and vice-versa. The city operates effectively whenever the transport planning is adapted to it, through the **correct positioning of the networks and the prioritization of their development.**

The **policy of spatial structuring of land uses** affects the form of the city and the way its residents and visitors are traveling. At the same time, the transport planning directs the spatial policy for development, e.g., all around the world, the fixed route modes, on the one hand, provide services and absorb heavy passenger traffic loads and, on the other hand, constitute the tools to organize an area and to strengthen the model of specific clusters, as opposed to the model of urban expansion, which the trips by a private car are closely associated with.

There is a variety of policies for intervening in land uses, **aiming at influencing the choices for trips.** These policies concern both the micro and the macro scale of the city. The principal fields for their application in relation to the urban form are the following:

- size of the city
- density
- structure
- land uses accessibility
- Public Transport -oriented town planning
- variety of land uses
- micro scale configuration

In view of the above, the **common planning for urban activities and trips' configuration is more than necessary.** The mobility, the high value of a ripe innovation, in order to manifest itself in an environmentally compatible orbit (ecomobility), requires innovative tools and a new structure of policies, associated with an energetic, focused development of the city's Public Transport. The intervention towards this direction gives us the option to maintain the existing scheme of neighborhoods and prevents spreading of services into residential areas. The future planning should take into account that the maximum percentage of the available surface of an urban area has already been built. Therefore, the preservation and re-development of the existing neighborhoods shall be a priority in the planning, so that the dynamic of the new can be incorporated into the old scheme and structure.

The environment-friendly development of the city, along with a plan to manage the citizens' demand, to be based on the principles of the viable mobility, imposes a **program turn and focusing of the planning on the Public Transport (in view of serving trunk line transfers)** and, on a supplementary basis, on serving in the best possible ways transfers involving mild mobility means (walking, cycling, etc.).

The capital tool of an environment-sensitive planning is the creation of supra-local centers and the **urban re-development of areas**, in regions where better accessing conditions via fixed route modes of transport (metro, suburban railway, etc.) do exist. The concentration and mixing of several activities and uses in areas of Public Transport

selected central stations and, mainly, of the fixed route transportation modes, ensures multiple complicities towards a viable mobility. More specifically:

Firstly, the higher density of activities in areas well accessible via the fixed route transportation modes improves significantly the share of the Public Transport in both generated and resulting transfers. The urban web interconnects through the Principle Public Transport System, which is characterized by high performances in terms of capacity, reliability, rapidness, comfort, safety and accessibility. On the other hand, the intensity of the uses justifies a high level of services provided by the Public Transport (number of lines, frequencies).

Secondly, the mixing of uses in the area of each intersection of Public Transport confines the number of independent trips, due to the “compaction” of the chain (or of the ends) of the citizens’ transfers, the neighborhood of activities and the option for their combination.

Thirdly, concentrating activities in selected central regions instead of spreading them in the urban area reduces distance as regards transfers.

The resultant of the complicities consists in the significant reduction in the running vehicular km via private vehicles, energy saving and in a decrease of the environmental and social cost (air pollutant, noise, traffic accidents).

It is evident that **the grade of success of an integrated planning depends on the introduction of accompanying measures**, such as (a) feeding the stations with bus lines for their connection with the wider area and (b) the controlled parking facilities related policy, which discourages citizens from using their private vehicles. The bus lines extend the accommodation area of the railway modes beyond the areas of concentrated development. Ideally, the areas of concentrated development constitute concentric circles of a maximum diameter of 500 meters around the stations. As regards parking management, the modern trend in many European cities is to define the required number of parking places for private vehicles depending on the local level of services provided by the Public Transport, i.e. the alternative access means. The basic elements of this policy is, on the one hand, calculating both public and private parking places and, on the other hand, confining the places for long-term parking which are mainly addressed to people working in this area, as well as – to a smaller extent – to visitors, clients, etc. It is well known that the parking places attract the use of private vehicles; however, their confinement presupposes the development of environment friendlier and of high quality alternative (mass) transportation means in advance.

In summary, the logical sequence of the interventions must be as follows:

- (a) **Planning and development of new transport infrastructure, giving priority to Public Transport infrastructure and mainly of fixed route modes to feed development centers** and promote intermodality.
  - **Development of fixed route modes infrastructure:** the development and operation of fixed route modes systems must be examined as a perspective for the improvement of the environment and the development of the city, in general. In big cities, in which a fixed route transportation system already exists or is under construction, an evaluation of the impact and a programming for new extensions **must be performed** upon completion of each implementation stage.

- **Re-allocation of road space to the benefit of Public Transport**, by introducing additional measures to favor those, through traffic arrangements (exclusive lanes, priority in intersections, etc.), with the ultimate goal being road public transport to feed fixed route transport system – if any.
  - **New Road infrastructures**, mainly of peripheral nature, so that the road traffic to be channeled outside the central areas of cities.
- (b) Implementation of **parking policy associated with urban and traffic planning** (controlled parking in centers, parking piecing discouraging the use of private vehicles for commuting and to supra-local centers, development of transfer stations in the Public Transport System terminal and peripheral stations or at the terminations of major road axes leading to the city centers, etc.)
- (c) Development of **supra-local centers' network of multiple activities** and concentrated employment.

**The interventions' sequence is quite important** in view of maximizing the intended positive consequences. For example, the development of a controlled parking having not invested in advance to the Public Transport dissuades the attraction of jobs and re-directs the potential clients' and visitors' flows to other destinations.

**Urban planning** (positioning of significant high density land uses) of areas having not ensured in advance a satisfactory access via the Public Transport (and mainly, via fixed route transport modes), just aggravate dependence on private vehicles. It is well known that it is quite difficult for users to change *a posteriori* the means of transport they usually select.

The **synthesis of the urban area and the Public Transport** in the development intersections requires innovative solutions by the urban planning. Important elements consists in the positioning of activities centers as close as possible to the station, the internal networking of the area around the station through pedestrian ways directly connecting the station with the activities' center, the appropriate signage for the optimal identifiability of itineraries, etc.

The development of these centers, as well as the transfer stations becomes easier, on condition it is positioned in properties belonging to the transport organizations around their stations or through the utilization – height-wise – of their spaces; moreover, the suitable urban tools (e.g. **Controlled Development Zone**) for the institutionalization of the appropriate town planning arrangements do exist. The development of the real estate property in the surrounding area of the stations, in view of creating development centers that shall be accessible through the fixed route and the remaining Public Transport, generates a surplus value that can be – at least partly - attributed to the funding of the specific transport project.

It is for the same reason that **funding tools have been utilized for the formation of re-distributing mechanisms** to yield part of the surplus value of private rents from properties adjacent to stations, in order to contribute to the funding of those transportation projects that reveal and widen the range of the Fixed Route Public Transport.

## 2.2. Transport and Traffic Management

Effective transport and traffic **management** is an essential element of the Strategy on Urban Mobility, since it will optimize utilization of city's transport infrastructure. Measures under this policy can be private car restrictions, road pricing or congestion charges, the promotion of Public Transport use, parking management, improvement of accessibility through Transfer Stations and "smart" traffic control mechanisms, passenger information, upgrading of road safety, etc.

### 2.2.1 Traffic Management

Traffic management measures include the following:

- **Improvement of Traffic Signaling.** Technology-based traffic signaling improvements are essential, especially the implementation of traffic signaling that is traffic actuated. In Greece, these systems are not yet in full operation.
- **Public Transport Priority.** Public transport priority refers to measures such as intersections controls (physical or signaling) that give priority to transit services, creation/ operation of dedicated bus lanes or grade-separated right-of-way etc..
- Physical measures/ **constraints for private passenger vehicles**, such as traffic calming, low speed zones, development of pedestrian zones, etc.
- **Pricing measures to manage traffic** include road pricing, congestions charging or even environmental charges etc.
- Promoting **motorcycles use and circulation.**
- Goods vehicles as well rubbish-trucks restrictions (on routes, on delivery and pick-up hours etc.).
- **Employee incentives for** major industries, businesses, i.e. fund use of private buses.

### 2.2.2 Parking

Parking related measures include the following:

- **Priority to residents** and visitors short-term parking.
- Construction of new (mainly underground) **garages** outside central areas.
- **Parking pricing in specific control zones**, with the option to re-invest its revenue in the upgrading of transit services at municipal or metropolitan level.
- **Park and ride facilities**, in terminal or peripheral public transport stations.
- **Public parking facilities** (free) in suburban areas or at the beginning of central urban road arteries.
- **Program for the development and operation of private parking facilities**, with specific criteria as regards the prioritization of their development and/or funding.
- Securing motorcycles and bicycles **parking spaces.**

### 2.2.3 Intelligent Traffic

Passengers must be informed and be well aware of the best transport mode, the duration and the cost of their trips, taking into consideration traffic conditions. Measures towards this direction are the following:

- Introduction of **dynamic information systems for traffic and parking, as well as the environmental and meteorological conditions.**
- Introduction of **dynamic information systems** for passengers.
- Promotion of the **inter-modality** of several sub-systems (public transport, private transport, parking, uniform public transport pricing).
- The promotion of **smart pricing systems** (automatic tolls). The implementation of automatic tolls systems in motorways resulting in the reduction of the congestion in toll stations and the provision of better services to the drivers has already been initiated.
- **Vehicle navigation systems.** Navigation and Global Positioning (GPS) systems have already been added to the vehicles' equipment in Greece as well; these systems have been developed either by automobile industries or by private companies.
- **Development of Logistics.** Similar systems are already under development by freight transport sector in Greece.

### 2.2.4 Improvement of Accessibility

People change, they are growing old and long for flexible, comfortable, safe and accessible (both spatially and financially) transport. Certain measures towards this direction are the following:

- **PSN Facilities**, as regards designing their infrastructure and accessibility, installing facilities within vehicles, etc.
- **Transfer Stations**, combining two or more out of the following: fixed route transport modes, buses, walking, cycling, private vehicles, taxis, etc.).
- Uniform public transport pricing.

### 2.2.5 Road Safety

The most critical measures that can contribute to the improvement of the quality and safety of the road network are the following:

- **Forgiving and self-explaining** (with no surprises) **road infrastructure planning**, aiming at improving the drivers' behavior.
- Regular maintenance and **corrective renewals** in the road network.
- Identification and **improvement of accidents black spots.**
- Systematic **traffic surveillance** in view of improving the drivers' behavior.

### The Athens case

Especially for Athens, some additional measures are:

#### **Traffic Management**

- Public Transport Priority:
  - "Green wave"
  - Re-structuring of bus services timetables aiming at higher frequencies for bus lines "feeding" the Metro system

- Special bus itineraries in peak hours towards areas accumulating industrial and other business activities (along Kifissou Avenue, Athinon-Korinthou Avenue, etc.)
- Pricing: Introduction of environmental charges on traffic by imposing extra charges to the existing pricing systems.

### **Parking**

- Extension of price controlled parking to other Municipalities as well.
- Completion of the program for the construction of parking facilities and integration of new parking facilities in problematic areas of the Athens Basin.
- Program for policing illegal parking at critical points of the road network, to be implemented by the Road Police.
- Program for the utilization of information about parking places in critical parking facilities and provision of guidance to drivers through the proper information (Data are processed by the Traffic Management Center of MEPPPW and are, subsequently, transmitted to private information centers).

### **Intelligent Traffic**

- Collection and management of all data about works under execution in the road network by the Traffic Management Center.
- Updating of traffic lighting programs through the Traffic Management Center.
- Interconnection of the Traffic Management Center with other operational centers regarding traffic, exchange of information and their utilization.
- Extension of the Attica traffic management system to road axes not yet integrated therein.

### 2.3 Urban re-organisation towards non-motorized transport.

Urban re-organization towards non-motorized transport, such as walking and cycling, must be configured on the following basic axes relating to the urban planning and its implementation, namely:

- (a) **ensuring the necessary infrastructure**;
- (b) **promoting a package of measures** dedicated to the promotion of walking and bicycling.

However, the effectiveness of the measures to be introduced towards the aforementioned axes shall depend significantly on other measures and actions to be undertaken in the framework of this national Strategy and in accordance with the “Green Paper” towards a new culture for urban mobility:

- The investment on the provision of information, education and citizens’ sensitization
- The cooperation at all governing levels
- The systematic evaluation of measures and programs
- The institution of incentives
- The systematic control and the imposition of fines of reciprocal nature to law-breakers

#### 2.3.1 Infrastructures for non-motorized transport

In view of **ensuring the necessary infrastructure**, the strategy must focus on:

- **The modernization of the institutional framework concerning the principles and objectives, the methods and procedures of the urban planning, both at a general and specific levels.** Concerning the urban planning of areas integrated into the city plan, as well as the studies about the revision of approved city plans, the institutional framework (relevant legislation and specifications) should be improved, placing emphasis mainly on those elements and preconditions that ensure continuity of pedestrian and cycling networks , which shall be integrated into the every-day life of the city from a functional point of view and not simply from the point of view of leisure. These networks should also offer citizens the option for alternative transport, i.e. walking, cycling, from their residences to central and public facilities, whenever distance is not a prohibiting factor, as well as bicycle parking spaces at the borders of the central facilities, parks, etc. In particular, the institutional framework must be reformed, so that:
  - At the level of strategic town planning (Master Development and Town-Planning Scheme/Master Plan, Regulatory Master Plan), the basic operational network of the city that will focus on the promotion of alternative transport is secured from an institutional point of view.
  - At the level of specific town planning (urban planning/studies), the time required for the approval and implementation of the studies is reduced, while, at the same time, the essential procedures for participation are mandatorily adhered to , in view of sensitizing the local community and securing its commitment for the implementation of the said planning.
  - The specifications make obligatory the inclusion in the the urban planning/study for extension or revision of “mature” and acceptable traffic – transport studies, as well as of drafts containing details for the networks’

configuration (e.g. minimum clear width of sidewalks and cycle corridors) in view of ensuring unobstructed movement of pedestrians and bicycles.

- **The construction of the infrastructure according to a specific time and financial planning, towards a comprehensive approach**, so that the gradual construction is not executed in a piecemeal manner. This requires:

**To adopt planning principles** for the special architectural and other supporting studies for the configuration and development of the public area, using operational, aesthetic and environmental parameters (suitable materials, planting, equipment and signage for the configuration of sidewalks, pedestrian ways, non-motorized transport roads, etc.). To this end, the existing surveys and specifications, as well as the conclusions derived from the evaluation of already implemented studies and proper applications in Greek cities and cities abroad, must be utilized.

- To modernize **the technical specifications** of the studies concerning the configuration and re-development of public spaces **as well as the relevant regulations**. This also includes **the reformation of the applicable arrangements regarding the facilitations to Persons with Special Needs**, which are also targeted at facilitating the independent movement of all passengers;
- To coordinate as much as possible **the programs of different agents** (PUO networks, traffic signaling) during the preparation of designs and the construction of the projects for the re-development of public areas;
- **To implement pilot programs** in appropriate areas in order to establish the feasibility and serve as examples for wide-scale implementation;
- **To ensure uninterrupted maintenance of configuration projects**. This is a crucial parameter, which should be taken into consideration from the outset, when scheduling the construction of the projects for the configuration of the public areas in terms of securing the necessary funds and in terms of determining which agency is responsible.
- **To ensure unhindered pedestrian traffic** in the dedicated areas (sidewalks, etc.) by prohibiting parking of vehicles and the placement of other obstacles;
- To implement measures towards the control **of advertising panels location** in public areas and the facades of buildings.
- To **organize contests on a national level** in the framework of the environmental policy and the improvement of the quality of life, aiming at **promoting good practices** regarding the application and effectiveness of measures to increase the potential to walk and to integrate bicycle in the every-day life of citizens.

### 2.3.2 Regulations for non-motorized transport

As regards the promotion of bicycles as a transport mode, apart from the measures presented above aiming at ensuring sufficient infrastructure, other measures as well must be adopted, such as:

- **City bikes**. Pilot application of a system for renting or lending bikes under favorable terms at specific locations (central termini). The user shall pick-up and return the bicycle from/to specific points.
- **Free transportation of bikes** in public transport modes, construction of areas intended for protected parking of bikes.



- **Traffic arrangements** for cyclists as well, such as adequate signaling system, adjustment of traffic lights for continuous bike traffic flow, etc.

Given that both in **Athens and Thessaloniki**, public spaces do not lend themselves to the use of bicycles not even for recreational purposes and exercise, it is imperative that **initiatives are taken for the creation for bicycle corridors, beginning with the most appropriate areas, such as the coastal front and the parks.**

## 2.4 Technologies and Measures for the Environment

### 2.4.1 General Data

**New technologies are a significant part of the solution** to the problem concerning the improvement of urban mobility environmental performance. The utilization of new technologies may be directed either towards the direct improvement of the factors related with environmental burdens ensuing from urban transport or towards the improvement of the general characteristics of the way in which the city functions, so as to achieve indirect, yet, significant benefits for the environment.

### 2.4.2 Technologies for the reduction of vehicle exhaust emissions

Private vehicles and small or medium-sized freight transport trucks continue to be two of the predominant means of urban mobility, despite the efforts to direct , mainly passengers, to more collective transport. Due to the very frequent use of such private modes of transport, **even if small improvements are made to city vehicles and trucks, substantial environmental benefits are anticipated.** The most important technological evolutions and trends in this field are presented below, starting from those that can be implemented the soonest possible:

- Three-way **catalytic converters**, which oxidize CO and incombustible hydrocarbons, reducing subsequently the NO, were imposed on all petrol-engine vehicles, with the adoption of the Euro II Standard on pollutant emissions in 1996 and have contributed to a great extent to the restriction of emissions from these vehicles. However, there is still an insignificant percentage of old petrol-engine vehicles with exceptionally high emissions, due to the lack of catalytic converters as well as due to wear or defective maintenance. Recent data report that, from the approximately 5.5 million vehicles in Greece, approximately 1 million are non catalytic, are more than 20 years old, while about 400,000 vehicles aged 15-20 years, are also circulating equipped with first generation – probably malfunctioning due to age - catalytic converters, significantly inferior to three-way catalysts,. On the basis of the above and taking into consideration that approximately 88% of the vehicles in Greece are circulating within the cities, it is expected that there would be a significant benefit to the environment, if combined measures were implemented, targeted firstly towards older vehicles and then towards slightly newer vehicles . More precisely, incentives for the **withdrawal** of vehicles without catalytic converter (orwith a first generation converter at a subsequent stage), combined withcounter-incentives for their circulation, e.g. increased circulation fees depending on the emissions or the age of the vehicle, are expected to decisively reduce the total emissions generated by urban mobility. However, the problem of NO emissions from diesel-engine vehicles, and especially from trucks, still exists. However, through the implementation of Euro

V and VI Standards, the use of the **selective catalytic reduction (SCR)** is expected to be expanded to the diesel vehicles as well. Concurrently the wider use of more effective **filters for diesel-engine particulates** is anticipated, since the emission of such particulates is an issue of major concern. Therefore, the challenge, in this aspect, lies in **intensifying the rate at which old vehicles are replaced with new technology and environmental-friendly vehicles**. In view of the above replacement, it is advisable and imperative to implement some of the technological improvements described here below.

- in truck diesel-engines, **increase of efficiency** means reduction of fuel consumption and reduction of emissions. In this field, technological evolutions have matured, mainly in the form of high pressure direct injection engines (known as “common rail”). In combination with ever increasing frequency of turbo technology utilization, , the efficiency of the new generation diesel engines is substantially higher than the efficiency of the older diesel engines. In this case as well, the benefits to the environment are related to the rate at which the vehicle fleet is renewed.
- **Encouraging the use of compact vehicles** may also lead to significant benefits to the environment. It is worth reminding that the dead weight of a normal vehicle is far greater than the weight of the passengers and the luggage it carries. During the last years, in most European vehicle markets, limited steps have been taken to limit the size (i.e. engine displacement) and the weight of the vehicles. Unfortunately, buying and using a vehicle is strictly linked with deeply rooted perceptions that treat vehicles as a symbol of social status, a fact that leads many consumers to select vehicles which with large engine displacement, heavy and, therefore, less efficient as regards their actual every-day needs. Nevertheless, small vehicles start gaining more and more ground in the vehicle market; however, this fact is not directly linked with environmental considerations, but rather with their versatility in terms of utilization and parking. To this end, it is necessary to re-examine and possibly revise the incentives and counter-incentives formulating the taxation policy on the purchase and utilization of private vehicles, placing emphasis on the vehicle’s size and possibly the weight.
- **Natural gas buses** are already used in Athens with remarkable benefits as to the emission of pollutants and fewer benefits as to noise and CO<sub>2</sub> emissions. The benefits to the environment are combined with a significantly lower fuel cost. Therefore, the implementation of this solution to other cities as well should be promoted. Natural gas engines and the accompanying equipment (tanks, methane catalyst, etc.) constitute a mature technology; however, the extent of its application to the other categories of heavy vehicles, such as trucks, is very limited. If we manage to bring around this situation, then promoting the replacement of diesel-engine trucks with natural gas trucks, constitutes one of measures to restrict emissions from urban freight transport.
- **Hybrid vehicles constitute** one of the most promising technologies in the effort to restrict pollutants and greenhouse gas emissions, but unfortunately its application is very limited up to now. For the time being, only passenger vehicles utilize the hybrid technology, where a petrol engine is connected with one or two electric engines, so that the final output is produced with much less harmful

emissions. Power regeneration techniques are used in order to charge the vehicle batteries and drive the electric engines.. The final savings in the consumption and the reduction of the emissions range between 30-45% in hybrid vehicles, compared with a conventional vehicle of equivalent power. Moreover, the reduction of noise emissions is also significant, especially with regard to the engine generated noise and the exhaust generated noise. The consumer's range of choice in hybrid cars is still limited, however, the prevailing trends in the vehicle industry lead us to believe that the situation will soon be improved. The penetration of hybrid vehicles in the market is expected to be expanded with the production of models which shall be equivalent or even better to the conventional ones in terms of power, prestige and other characteristics. The increased cost is another counter-incentive discouraging buyers. Therefore, in order to increase the share of hybrid vehicles in the market, all actions should be targeted eliminating the above counter-incentive. The first tools to achieve this goal is the application of a favorable taxation concerning the purchase and use of hybrid vehicles, combined with a more favorable pricing of the relevant toll and parking fees.

- **It seems that the fuel and hydrogen cells vehicles** are a part of the final solution of the emissions and noise-related problem; however, the evolution of this technology and its wide availability is placed in the long-term future.

#### 2.4.3 Technologies for the reduction of fuel emissions

The six technologies presented above concern the technological break-throughs in the field of vehicles, while parallel evolutions in the field of fuel offer more opportunities for cleaner mobility. More precisely:

- The term "**Clean fuel**", often synonym to low sulphur content fuel, includes petrol and diesel which reduce the emissions of SO<sub>2</sub> and PM significantly. Moreover, the low sulphur content of the fuel increases the efficiency of three-way catalysts, and NO<sub>x</sub> reduction catalysts. Therefore, the reduction of sulphur content of fuel contributes to the reduction of CO, HC and NO<sub>x</sub> emissions. During the last years, the sulphur content of the petrol and diesel used in road transport has been reduced from 500 ppm to a community maximum (ppm) content limit of 50 ppm. An even lower fuel sulphur content limit of 10 ppm is expected to be imposed by community legislation, estimated to be put in force in 2009.
- **Biofuels** is liquid fuel produced by several types of biomass, such as specific types of crops, recycled or used seed-oils. The use of biofuels in vehicles reduces CO<sub>2</sub> emissions. Moreover, biofuels, contrary to fossil fuels, are renewable to a great extent. The two main biofuels are biodiesel (methyl ester from organic raw material) and bioethanol. Biodiesel is an alternative to diesel, while bioethanol is a petrol additive or substitute. In view of the recent increases in the cost of fuels, the attractiveness of biofuels crops has been significantly intensified, a fact which entails, however, many side-effects for food production. Our country lacks in facilities for processing the products of crops for biofuel .
- The main advantage in using **biodiesel** instead of standard diesel lies in the fact that biodiesel can contribute to the reduction of greenhouse gas emissions. The use of 100% biodiesel (a rarity) can reduce net CO<sub>2</sub> emissions by 40-50%, while

the use of a 5% blend, reduces the emitted CO<sub>2</sub> by 2-2.5%. These calculations are based on a comprehensive analysis of biodiesel life cycle, covering the cultivation of seeds, the production of biodiesel and the use of biodiesel in vehicles. In theory, biodiesel may be considered as carbon-free, since the carbon emitted during combustion has already been retained during the growth of the cultivated plant. In practice, however, the reduction of the emissions from biodiesel, produced in energy crops, is smaller, since the use of conventional fuels is a prerequisite for growing and cultivating these plants. The basic problems encountered regarding the penetration of biodiesel in the market are high production cost, partly balanced by lower taxation, as well as the non compatibility of modern engines with blends containing more than 30% of biodiesel. However, a side effect of the energy crops expansion is the increased price of cereals.

- **Bioethanol** can be used in fuel, blended in petrol at a maximum ratio of 5%. Bioethanol production is mainly based on the fermentation of carbohydrates from main products or by-products of agriculture, while other materials, such as collected waste from forestry and domestic waste, are considered as sources of raw materials. Nevertheless, the relevant technology is expected to be marketable after 6-8 years, as a minimum. The most significant environmental advantage of bioethanol is the reduction of greenhouse gas emissions. Moreover, the relevant reductions achieved are similar to the ones of biodiesel.
- As stipulated in Directive 2003/30/EC, member-states should ensure that a **minimum proportion of biofuels** and other **renewable fuels** are available in their markets. This proportion has been set at 2% for 2005, calculated on the basis of energy content of all petrol and diesel available in their market for transport purposes. This proportion should rise to 5.75% by the end of 2010. In summer 2005, this Directive was incorporated into the Greek legislation; however, Greece did not succeed in achieving the 2% target at the end of 2000, while there are doubts on whether the 2010 target shall be achieved .

Finally, **fuel cells** is the technology, which promises to practically eliminate the emissions from light vehicles, at least, in the long-term future. It consists in an Electro-chemical Hydrogen - Oxygen reactor, which produces water, heat and electricity only. Almost all vehicle manufacturers participate in fuel cells-related research programs; however, most of them believe that their respective products shall not be widely available in the market earlier than 2020.

#### 2.4.4 Environmental Pricing

The new environmental policy mechanisms of the European Union include the “polluter pays” principle.

This principle was dynamically introduced in 2000 through the approval of the White Book on environmental liability. Despite the fact that it acknowledged that certain Member States have laws in place to deal with liability for contaminated sites, it was also pointed out there is no harmonised approach in Europe as regards damage to nature. The White Paper concluded that the most appropriate option would be the approval of a framework community directive based on the “polluter pays” principle.

The polluter shall indeed have to pay: those liable for environmental damage shall be liable for compensation. In case of eminent threat for damage to the environment, those liable shall have to proceed with the enactment of dissuasive measures. In both cases, Europe shall enjoy higher environmental protection.

With regard to traffic and mobility, the implementation of this principle concerning the protection of urban environment may be effected through the introduction of environmental charges on road traffic either in the form of an increase in the existing charges or as new. More specifically:

- through escalation of the cost of road licence fees;
- by variable tolls at urban motorways depending on the environmental impact of the vehicle engine;
- through escalation of charges for controlled parking, depending on the environmental impact of the vehicle engine;
- through the imposition of an environmental pricing system for vehicles entering in the central area of a municipality depending on the environmental impact of the vehicle engine to those municipalities wishing to implement this measure;
- by encouraging the reduction of the vehicles' size and weight, e.g. through the imposition of an environment tax for new vehicles depending on the emissions per kilometre.

#### 2.4.5. Information and Communication Technologies

In parallel with and independently, up to a certain degree, from the technologies for the reduction of emissions from vehicles, **Information and Communication Technologies** may play a major role in the improvement of urban mobility environmental impact. **Tele-working, internet trade and services, tele-conferences or other advanced forms of distant cooperation** are expected to contribute to this end. ICTs contribute to the environmental performances of urban mobility due to their capacity to reduce the transports related to the conventional type of work, communication and trade. This contribution covers all three basic environmental sectors, i.e. air quality, noise and climatic factors. All actions for encouraging further expansion of the ICTs are currently implemented for reasons related to the modernization of the production process and the convergence with the community indexes. In the framework of a "cleaner" urban mobility, the improvement to the environment should also be added to these reasons. Given the lack of quantitative data, the magnitude of the benefit to the environment, resulting from the replacement of conventional forms of work, communication, exchange and services with the respective digital ones could be investigated, as a first step. Then, tools can be sought for the promotion of the ICTs on a priority basis in the fields where environmental improvement shall be more direct or greater. Concurrently, the technologically upgraded management of distribution and logistics may also contribute to the limitation of transport. As a consequence, it is necessary to examine the benefits to the environment and to proportionally encourage the specific choices .

#### 2.4.6 Tools for promoting environmental awareness

**Promoting environmental awareness** at both personal and collective level is part of a comprehensive strategy for urban mobility. The new Information and Communication Technologies as well as the new forms of collective action which arise nowadays and which shall arise in the future, which is endowed of a ever increasing web character, can and must be utilised in order to promote environmental awareness. **Information**

**activities, in combination with stimulation acts** and other initiatives are prime tools for implementing more urban environment-friendly practices in the citizens' every-day life and a broader environmental awareness of enterprises. However, while these activities and acts undertaken in the framework of the conventional communication methods were of limited range, the ever expandable use of ICTs at a domestic and business level, opens new horizons to directness, as well as to the possibilities and the results anticipated to arise from modern, targeted efforts to promote environmental awareness.

### 3. Proposals

#### 3.1 General

The **objectives** of the Urban Mobility Strategy are optimization of transport system, protection of the environment and upgrade of quality of life in the Greek cities. The Strategy formulated in this Report can be applied in all Greek cities, from the small cities to the large ones, i.e. Athens and Thessaloniki.

The Working Group proceeded with the preparation of this Report, based on a synthesis of individual urban mobility policies promoted by the MEPPPW during the last few years, as well as on a **thorough examination of basic concerns**, general principles and proposals stated in the “Green Paper towards a New Culture for Urban Mobility” issued by the European Commission (EC), as well as of the current and ever emerging issues of urban mobility in Greek cities. The Working Group completed the preparation of this Report having also taken into consideration the views of the competent Ministries and Authorities, which were invited to contribute their views during a special consultation meeting.

Based on these objectives, the following four major **policy** directions have been adopted and examined:

- Coordinated urban and transport planning
- Transport and Traffic management
- Urban re-organization towards non-motorized transport
- Technologies and measures for the environment.

A **series of measures** has been proposed for every policy, combining the most suitable solutions for each problem of urban mobility in the Greek cities: prioritized development of transport infrastructure, advanced and modern traffic management, technological innovations, development of clean, safe and intelligent transport systems, forwarding of environment-friendly travels, economic incentives and legislative regulations.

#### 3.2 Proposed Priority Measures

The proposed priority measures are summarized below for each one of the four major policy directions related to the Urban Mobility Strategy.

It is clarified that the implementation of any measures towards the improvement of urban mobility falls under the responsibility not only of the MEPPPW, but of other authorities, especially the Local Authorities and, frequently under the responsibility of more than one authority, which must co-operate. The role of the MEPPPW is to set the framework and the basic principles of Urban Mobility Strategy within the Greek cities and support them with all its resources the relevant actions.

It is also clarified that that proposed measures are a non-exhaustive list.

##### 3.2.1 Coordinated Urban and Transport Planning

In order for the cities to tackle the challenges of urban mobility it is necessary, among other things, to integrate several policy sectors starting from urban planning and

transport planning. The most significant measures related to this integration are summarized as follows:

**(a) Balanced coordination of land use and planning / management of transport infrastructure**

- Planning and development of new transport infrastructure, which shall contribute to the development of the city
- Development of a network consisting of trans-regional centers of multiple activities and concentrated office/job areas
- Parking policy related to the urban and transport planning.

**(b) Prioritized Development of Infrastructures**

- Development of fixed route modes infrastructure
- Re-allocation of road space to the benefit of Public Transport
- Development of areas and networks for non-motorized transport (pedestrians, bicycles).

**(c) Road Network Prioritization**

- Separation of central road arteries – connecting roads – feeder roads
- Development of peripheral road rings and radial connection roads
- Limitation of pass-through traffic by minimizing the capacity of the main roads in central areas
- Definition of precincts where non-motorized modes are priority forms of access) (e.g. residential areas)
- Designation of areas restricted to private cars (e.g. central commercial areas).

**(d) Promotion of Institutional Regulations related to Regional Planning and Town Planning**

- Simplification of the procedures for the detailed processing and implementation of Urban Planning for new urban centers
- Establishment of the structural (strategic) elements related to urban planning of the city (basic transport network, infrastructure and networks of non-motorized transport, public areas, etc.)
- Configuration of a more simple and realistic system for the allocation of urban planning cost to the various properties for the occupation of public areas required in the framework of urban mobility purposes (e.g. according to the Local Development Plan data obtained from the Local Authorities, according to the Land Registry data and by establishing a special fee for the expropriation of public areas).
- Updating of Regulatory Plans for Athens / Thessaloniki and approval of Regulatory Plans in the large urban centers, including also the specialized Planning of the transportation system of the city per sections.

**3.2.2 Traffic Management**

Given the rapid increase of the number of private vehicles in European cities, their residents have realized that private vehicles trips will only get slower and slower and the only effective policy for traffic management is the one systematically promoting and



supporting public transport.. The principal measures related to this policy are summarized below:

**(a) Priority to Public Transport Modes through:**

- Intersections controls (physical)
- Improvement of signaling in favor of Public Transport
- Creation/ operation of dedicated bus lanes or grade-separated right-of-way
- Re-structuring of bus services timetables aiming at higher frequencies for bus lines “feeding” the Metro system

**(b) Intelligent Traffic:**

- Traffic management using Intelligent Transport Systems (e.g. Traffic Management Center), placing particular emphasis on the dynamic management of traffic lights
- Promoting the interoperability between the Traffic Management Center and other systems in the city (public transport, parking system, etc.)
- Introduction of dynamic information systems for traffic and parking, as well as the environmental and meteorological conditions.
- Promotion of intelligent pricing systems (automatic tolls, controlled parking etc.)

**(c) Overall Parking Policy:**

- Parking policy giving priority to residents and visitors’ short-term parking
- Construction of new (mainly underground) **garages** outside central areas.
- Parking pricing in specific control zones,
- Urban logistics management

**(d) Upgrading of road safety:**

- Regular maintenance and **corrective renewals** in the road network.
- Identification and **improvement of accidents black spots**.
- Systematic **traffic surveillance** in view of improving the drivers’ behavior.

**3.2.3 Urban re-organization towards non-motorized transport**

In order to improve quality of life in Greek cities, it is necessary to apply a re-development policy for non-motorized transport. The most significant measures for the implementation of this policy are summarized as follows:

**(a) Infrastructures for non-motorized transport**

- Provisions concerning the structural aspects of the road (widths of sidewalks – road pavement – traffic islands)
- Development of networks of pedestrian and bicycle roads
- Maintenance and surveillance of pedestrian and bicycle roads, systematic upgrading of sidewalks, as well as their safe separation from vehicular traffic
- Development of pedestrian roads
- Development of bicycle parking spaces
- Development of protected corridors for PSNs

- Development of woonerfs
- Application of a series of low cost measures for speed restriction in selected residential areas (speed bumps etc.)

#### **(b) Regulations for non-motorized transport**

- Traffic controls for pedestrians and bicycles
- Traffic controls for PSNs
- Reformation of the institutional framework for PSNs
- Implementation of bicycle rental services

### 3.2.4 Technologies and Measures for the Environment

In order to address the accumulated problems of air pollution within European and Greek cities, it is necessary to apply an environmental-friendly technology policy, placing particular emphasis on gradual replacement of the fleet of vehicles by new cleaner vehicles. The most significant measures related to this policy are summarized below.

#### **(a) Technologies for reducing pollutant emissions from vehicles**

- Incentives for withdrawal of private vehicles not fitted with a catalyst and, subsequently, of vehicles equipped with a first generation catalyst, in combination with disincentives against the circulation of these vehicles, such as co-relating the road tax circulation fees with the vehicle age or the environmental pollution caused by these vehicles.
- Selective catalytic reduction and particulate filters on the diesel-powered vehicles
- Increased use of gas-powered buses, expanded use of gas to other heavy vehicles
- More incentives for using hybrid vehicles
- Further support to the research and production of vehicles equipped with fuel cells or hydrogen
- Introduction of a uniform exhaust and noise control card for all categories of vehicles, including motorcycles

#### **(b) Technologies for the reduction of emissions from fuel, by promoting:**

- "Clean" fuel with low sulphur content
- Biodiesel
- Bioethanol

#### **(c) Environmental Pricing (the "polluter pays" principle)**

Introduction of environmental charges on road traffic either in the form of an increase in the existing charges or as new as follows:

- through escalation of the cost of road licence fees;
- by variable tolls at urban motorways depending on the environmental impact of the vehicle engine;
- through escalation of charges for controlled parking, depending on the environmental impact of the vehicle engine;
- through the imposition of an environmental pricing system for vehicles entering in the central area of a municipality depending on the environmental impact of the vehicle engine to those municipalities wishing to implement this measure;

- by encouraging the reduction of the vehicles' size and weight, e.g. through the imposition of an environment tax for new vehicles depending on the emissions per kilometre.

### 3.3 Horizontal actions

The implementation of the aforementioned priority measures should also be accompanied by the necessary horizontal (supporting) actions.

#### 3.3.1 Institutional Regulations

Given that in essence the implementation of policies and measures for the improvement of urban mobility actually constitutes a **planning of special requirements**, it is necessary to proceed as follows, as regards all the aforementioned measures:

- Simplify and supplement an institutional framework regarding the urban and transport planning, as well as the implementation of the above
- Adopt technical specifications for planning and design, detailed specifications concerning DFDs and manuals
- Create a special fund with revenues deriving from the proposed measures for further funding of actions related to Urban Mobility.

#### 3.3.2 Urban Mobility Observatory

The program for the implementation of the aforementioned measures should also include their systematic and quantitative **observation**, assessing whether the individual measures and the Strategy as a whole have been successful or not.

The above shall be achieved through the following actions:

- Introduction of urban mobility indicators (e.g. average travel times, percentage of Public Transport Mode use, etc.)
- Creation of an Urban Mobility Observatory, ensuring the measurement and monitoring of the indicators, as well as the Strategy's cohesion in time, through:
  - collection, harmonization and utilization of the statistics for each city on a national level
  - provision of data to decision-makers
  - dissemination of data to the public
  - development of a database on best-practices, including a system for best-practices dissemination.

#### 3.3.3 Education, training and awareness

Education, training and awareness rising have an important role to play in **sensitizing the citizens**. It is necessary for a society to realize the necessity of the actions related to the improvement of Urban Mobility, in order to ensure the required social consensus. This systematic education, training and awareness rising will be on a national level and will use all available mass media (printed or electronic), so that all Greek citizens acquire a consciousness for proper behavior during their travels.

Active participation of citizens in the implementation of Urban Mobility Strategy constitutes the most important prerequisite for the successful implementation of the Strategy; thus, it should be supported, in the long run, by institutionalized and adequately funded procedures.