URBAN ENVIRONMENTAL RESTORATION The case of Athens

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1. Introduction

The Urban environment in today's city consists of all these factors formating a frame for the contemporary citizen, which may be aesthetically upgraded, functioning well and above all atmospherically " healthy ". What is of prior importance is the level of atmospheric clarity. Photochemic smog, the aggravation of the greenhouse phenomenon and the hole in the ozon layer, are problems demanding immediate and radical action. The "green environment" in the 21st century mega – cities, is " asked " to "filter" the inevitable polluting emissions while at the same time create an image of peace and relaxation. The rapid expansion of urban centers minimizes the greenery in a time when its expansion and upgrading has become an issue of top priority. The fast growing construction within the urban web, in combination with the transport and communication net needed, form the basic parts of the urban environment and thus significantly influence its quality level. The above factors in combination with the politistic resources of the city, as well as their incorporation in the functional web of the city, mainly form its physiognomy. In the light of these data, the interventions in international, national and local level of all the organizations involved, become greatly important, transforming the issue of the protection and upgrading of the environment, into an aspect of radical and courageous political decisions.

In the light of the 2004 Olympic Games, Athens is asked to make the most of a unique opportunity. The green spaces and the general function of the city, as well as its physiognomic level and atmospheric conditions, could be upgraded in a high degree. In this way, the opportunity for the elevation of the politistic wealth will be given, signaling a new direction to the "Olympic Games" which will be more closely connected to the "Olympic Spirit", more closely connected to culture, arts and tradition. This presentation aims to focus on the attempt in the field of Urban Environment and especially on consequences of

intense urbanization, traffic congestion and the atmospheric pollution, as well as on the special conditions in the wider area of Athens in the light of the forthcoming Olympic game of 2004.

2. Urbanisation in the 21st Centrury

Even though various attempts have been made in the past few decades, urbanization was impossible to be stopped. Nowadays, 80% of the Europeans live in cities, a fact which has resulted to Europe becoming the most urbanized area in the world. In fact 21 European cities have a population of over one million citizens and 344 cities of over 50.000 citizens. [1] Big cities live in the fever of dramatic technological development, international competition, cultural integration, while at the same time, suffer the consequences of many problems, like traffic chaos, the pollution of the atmosphere, criminality and social exclusion. Contemporary big urban centers have diverted traditional values while the chasm between "the rich" and "the poor" is becoming continuously wider. Not rare is the phenomenon of the lack of uniformity in the development of the areas of a city. For example the suburbs of Manchester and Lion, have more elements in common than the centers of those cities with their region. [2] However, the consequences of poverty which are social, political and cultural exclusion, drugs, violence and criminality should be at any cost overcome before they have devastating consequences. Another important characteristic feature of cities in the frame of globalisation, is the rapid development of competitive relations in aspect of financial interest, in contrast to their co-operation in other issues of common interest.

Today, the management of the Urban Environment should incorporate every political, social and economic initiative in the frame of the environmental protection towards sustainable development. The main factor of the downgrading of the atmosphere is the consumption of energy by industries, transport and the covering of households needs. The two last cause significant gathering of pollutants, the main of which are SO2, Ozon, harmful substances creating smog, lead and others. It has been observed that 80% of the big cities with population over 500.000 appears to exceed the limits of pollution at one or more pollutants at least once per year. The most common pollutants during the winter months are SO2 and floating particles resulting to some cities like Milan, Torrino, Belfast, Stuttgart and Berlin presenting the gathering of pollutant during the summer months appearing in degrees much above limits, threatening at least the 80% of citizens of urban European centers. [Table 1]

The nowadays construction of the modern city has been greatly affected by financial activities of the past. Serious attempts have been made in the past few years to reorganize spatial design in order to eliminate one- dimensional trade uses causing security problems during the night, while at the same time to enhance the sense of "neighbourhood" parallel to the use of public means of transport. One of the positive elements of the modern megacity is the element of politistic and cultural monuments, a pleasant change in the troubled city of today. Their elevation and incorporation in the functional web of the city, is an attempt of multiple benefits in cultural-social-financial-touristic level.

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	1995	1997	1999
G.Britain	19	9	11
Sweden	-	-	-
Finlande	10	2	2
Portugal	0	-	6
Austria	30	20	21
Hollande	21	14	10
Luxemburg	-	-	-
Italy	42	55	83
Ireland	10	2	1
France	23	19	12
Spain	2	33*	25
HELLAS	68	53	94
Germany	32	23	24
Denmark	9	5	7
Belgium	42	23	20
*: 1998 -: No Data (Days			

TABLE 1. The Exposure of the urban population in ozon rates above the limits

3. Transport in the contemporary city

After 1990, European cities start to suffer from traffic congestion, which has gradually affected the economical image of regional areas and the wider social and financial cohesion. The European city is said to be threatened by suffocating in the center and paralysing at the edges. [3]

At the threshold of the 21st century the traffic problem has been proved to play perhaps the most serious part in the shaping of the urban environment. It is obvious that sections like the following are seriously affected.

Pollution of the atmosphere with consequences:

- To health.

- To the change of climate in our planet.

- To the distruction of the ozon layer.

- To the acidification of environmental problems.

- To the creation of local photochemical smog.

The physiognomy and aesthetics of the modern city.

The function of the city.

The maintenance and elevation of the politistic heritage.

Transport of today is the main cause of emission of gases which badly affect the atmosphere. More particularly, the fifteen country members of the European Union during the year 1994 appeared to have the following percentages in the emission of gases polluting the atmosphere: CO 69%, CO2 24%, NOX 63%, NMYOC 47% and other emissions $10 \sim 25\%$.

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FIGURE 1 Contribution of the transport sector

[Figure 1] [4]. In 1998 CO2 reached the percentage of 28% [5]. In the period 1980 ~ 1990 the emissions of gases at transport appeared to have greatly increased, while after 1990, with the appearance of catalytic converters and unleaded petrol, a significant decrease was observed. In the predicted course of gases causing the greenhouse phenomenon for the period 1990-2010, transport is in the fact the only section with an estimated raise of 45,8% when the total of sections is estimated to reach a 2,1%. [Table 2]

In Mt Equivalent to CO2	1990	Prediction for 2010	2010-1990
Energy supply	1421,7	1276,6	-10,2%
Industry	757,1	686,1	-9,4%
Transport	753,1	1098,2	45,8%
Households	447,5	440,0	-1,7%
Private and Public Services	175,6	188,9	7,6%
Agriculture	417,0	397,6	-4,7%
Waste	166,4	137,3	-17,5%
Total	4138,3	4224,8	2,1%

TABLE 2. Predicted evolution of emission of gass of Greenhouse phenomenon for the period 1990-2010

However, a lot of problems remain unsolved like starting catalytic converters and various emissions of gases from diesel machines. At the same time, a big part of the reduction of NOX and NMYOC emissions is eliminated by the increase of traffic and the large number of vehicles. Unfortunately, predictions are rather pessimistic for the future. It has been estimated that in the period 1990-2010, the 90% of the increase in CO2 emissions will be due to transport. The wider pressure and the successive effects of pollution caused by traffic – industries, are illustrated in [Figure. 2]

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FIGURE 2. The Multi-pollutant/multi-effect approach

Particularly hopeful is the recent announcement of the U.S.A. Ministry of Energy for the immediate support of technology of elements with a Hydrogen base (Freedom Car Program) contained in the air, the oxidation of which produces electric energy with only residues water vapour. Lets not forget that the U.S.A. with a population of 5% of the global population, consumes the 25% of the petrol of Earth mainly in the form of gasoline. The first mass production of hybrid machines (gasoline and electric machines) is expected by 2004. Nevertheless, it is widely known that Toyota and Honda have already developed hybrid cars with a 40 miles per gallon of gasoline autonomy.

It is obvious that the particular situation can be only dealt with a series of structural and functional interventions, while at the same time the target should be limiting the wide use of private cars.

The measures taken should be:

- An integrated rail transport system [Underground – Tram – Train], which would cover the wider urban areas.

- A transport net with a web of peripheral roads diverting traffic away from the city center.

- Production and use of ecological means of transport (technological evolution – taxing motives).

- Reduction of vehicle emissions by using ecological fuels.

- Functional land use to avoid traffic pollution.

At this point, we should emphasize on the fact that the serious problem which is soon bound to appear, is strongly related with the aimed financial development which will inevitably increase the need of transport of "man" and "goods". The above should be tackled with care, combining both development and the protection of the environment.

4. Environment and the atmosphere

In the beginning of the 21st century, social, economical and most of all environmental problems appear in cities. The observed downgrading of the environment has led to the downgrading of the quality life of citizens of big urban centers, reaching the number of 280

million people in European level. The last thirty years are characterized by a constant downgrading of the atmospheric environment. It is worth mentioning that,

- 2 billion tones of waste are produced by the E.U. state-members every year, with a 10% annual increase.

- CO2 emissions caused by transport and households are predicted to increase at least until the year 2010.

- The quality of life in urban areas is continuously downgraded (pollution – sound pollution).

The environmental issue has become an issue of top priority in international and European level. Taking as a starting point the United Nations Convention-Frame for climate changes in the Rio Di Janeiro Conference in 1992 and the Kyoto Protocol in 1997 for the reduction of emission of gases causing the greenhouse phenomenon, the international community is directed towards the protection and upgrading of the environment. In a European level, the dramatic deterioration of the environment has activated the whole community. Initiatives and action has been taken since 1982 for the curbing of the observed environmental downgrading. The Amsterdam Convention has elevated environmental protection and sustainable development to an issue deserving the attention of the whole community. The "5th Action Scheme for the Environment" aiming at the realization of the decisions taken at the Rio Di Janeiro international convention of 1992, has covered the period of 1992-1999 and initiated a series of actions in five sections with high rates of pollution (Industry – energy – transport – agriculture – tourism).

The partial success of the "5th Action Scheme for the Environment" made us realize that even if progress in reducing pollution levels was made, problems in certain areas remain. The basic conclusion is that the approach towards the whole environmental issue should change. It has been estimated that top priorities should be: [6]

Immediate estimation and incorporation of every political – financial – social initiative and action with the environment.

New boost and extra care for dealing with difficult environmental problems.

Strict application of the existing environmental legislation by all state – members.

Emphasis on the active participation of private initiative and of European citizens by giving strong motives towards environmental protection.

The above directions were included in the "6th Action Scheme for the Environment" covering the period of 2000-2010.

5. The urban environment of Athens

5.1 Generally

The quality of life in a contemporary city is a web of physical and technical elements which is formatted by the following parameters:

- Development of flora.

- Substructure in technical and transport works.

- Upgrading of physiognomy.

- Politistic inheritage.

- Clarity of atmospheric environment.

The today reality of the wider area of Athens, highlights the necessity for the development and preservation of the flora in the area of Attiki. Organising the Olympic games of 2004 has on the one hand negatively affected the already problematic greenery due to technical works, but on the other hand may offer the opportunity of making Athens more "green". The nowadays population of Attiki has reached the 4 million contrasted to the 2,1 million citizens of 1961. It is estimated that by 2020 the population will probably reach the 5 million. The environmental pollution is of the highest in Europe. Industrial waste, emissions from means of transport and household activities compose the web of atmospheric "suffocation". Taking the above into consideration in combination with the chaotic urban planning reality, the limited transport net, greenery and over – population, can only make us realise the insurmountable problems the city has to face.

5.2 Transport - net

In today's Athens the ratio of 248 private cars per 1.000 citizens had a dramatic increase of 400% in the last 25 years. It has been predicted that the total amount of vehicles will be increased by 83%, while the transportation, reaching today the number of 7.000.000 per day, will be increased by 37%. [7]. Studying the combination of today's situation of vehicles , streets, population and public means of transport can only make us realize that by the year 2020 Athens will be an impossible city to live in. The data mentioned stress the importance of immediate action for the solution of the problem with the following targets for the year 2020:

- Increasing free highways by 15% of the total
- Increasing speed in public transport from 21 km/h to 30 km/h
- Reducing CO by 50% and smoke by 35% within the city center.

It was impossible to predict that the measure taken in 1982 in Athens which was banning odd or even number – plated cars from the city center on alternate working days, would in the long term have opposite from the desired effects. A disproportionate increase of private cars appeared as well as traffic congestions in other central districts of Attiki (e.g Glyfada, Kifissia, Marousi) aggravation of air pollution etc [8]

CARS	48	54,5%
PUBLIC TRANSPORT	26,5%	
TAXI	11,1% 10,5%	
PEDESTRIANS	7,9% 11,1%	10
	OD RES	ST OF MONTHS

The way of transportation of Athenians

FIGURE 3 : The way of Transportation Of Athenians

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Figure 3 illustrates the strong preference of Athenians to private cars for their transport. However this is not surprising since travelling by private cars takes 27 minutes in contrast to the 47 minutes needed when using public transport [9]. The above data emphasize the importance of the exclusive use of public means of transport in the near future parallel to an integrated railway system predicted to cover the needs of 60% of the passengers of public transport.

The Olympic Games of 2004 are the first step of partial integration of works towards the total integration in 2020. Everything will in fact be judged on Friday 20th of August 2004 at 6.00 in the evening when 730.000 spectators will be transported [10] in the total of 5.200.000 throughout the duration of Olympic Games. In order to materialize the objective aims for the solution of the traffic – transport problem in the city, the initiation of a series of measures is needed the basic of which are:

- Top priority to the completion of the metro net with length 106 km.
- Construction of an extended suburban and tram railway in Athens



FIGURE 4: Ring roads of Attiki

- Materialization of four "transport rings" covering the whole area of Attiki [Figure 4]
- Hastening of big transport interventions (Olympic ring roads Attiki highway)
- Development of underground parking spaces in both Athens and the district
- The design of a wide net of bus-paths directed to railway stations

- Development of reliable modern technology Public Means of Transport (hybrid buses etc) and encouraging the public to use it, emphasizing on the younger generation

- Development of ecological means of transport like bicycles, electric cars and electric motor bikes with the necessary substructure.

5.3 Atmospheric Pollution in Athens

The observed rise of temperature in Athens is parallel to the development of the photochemic smog burdening the city atmosphere and Attiki in general. Atmospheric pollution and smog appeared for the first time in Athens of the '60s when it was identified as similar to the equivalent smog of Los Angeles. Even though today the rates of some basic pollutants like sulphur dioxide and lead have been reduced, smog unfortunately seems to

have been transformed, with ozon the top pollutant. The converging scientific view is that the car remains the main cause of photocemic smog in Athens as a result of the creation of nitrogen oxide and ozon (chemical reaction between hydrocarbonates and nitrogen oxide) [11]. High remain the rate in oily micro-particles and benzolium contained in unleaded petrol (cancerous pollutants). The evolution of emitted pollutants in Athens between 1990 and 1999 and the consequences to human life in Greece is of the same rate with lethal car accidents. In other words, 1342-7247 more deaths annually due to short and long term effects respectively while the evaluation of the social cost reaches the 548 – 2096 billion drachmas [12].

It should be pointed out here that the orientation of the basin of Attiki in combination with wind coming from the sea (batis) frequently traps atmospheric pollutants at the foot of the surrounding mountains (Menidi – Maroussi etc). As a result the two basic pollutants of the photchemic smog of Athens, nitrogen dioxide and ozon, often exceed the limit which is 400 micrograms and 180 micrograms per cubic meter of air respectively. Therefore the situation can only ameliorate when north winds blow. The problem caused by the combination of high temperatures and the emission of high degree of pollutants is thus obvious

The following should be included in the course of action concerning Athens and Attiki in general:

1. The completion of a modern traffic and transport net in the entire area of Attiki

2. Immediate exploitation of every possible development of renewable sources of energy with emphasis on solar and wind energy

3. Avoiding the use of private cars in the city center systematically and at the same time increasing the use of ecological means of transport (hybrid cars – bicycles etc)

4. Preservation and expansion of greenery as much as possible in the whole Attiki

5. Development of a complete system of measurements of atmospheric pollutants both in the center and the periphery with focus on the production of new types of pollutants (ozon – benzolium – cancerous micro particles)

6. Wide use of natural gas in the production of electric energy, industry and domestic use.

7. Focus on the application of the Kyoto Protocole for the reduction of CO2 by 5% comparatively with 1990

6. Conclusion

"We have failed as far as securing longterm sustainable development of the natural environment is concerned" [13]. Having accepted this fact, the European Union illustrates the limited results of both Universal and European attempt for the protection and upgrading of the environment, in most of the sectors. Particularly in the level of the urban environment, the aggravation is rather intense, while on the other hand the protection and upgrading of urban space demands long-term action. The final results of such an attempt creates, as it is known, the "physiognomy of the space" which according to Prof. J.Stefanou is not always easily defined, in relation to factors aiding and elevating it. [14]

In every case, the function of the city in combination with its traffic and transport web, compose the basic substructure in order to be able to materialize the protection of the

Ευγενία Γ. ΑΘΑΝΑΣΟΠΟΥΛΟΥ (1916-1992 μ.Χ.)

Γεώργιος Κ. ΑΘΑΝΑΣΟΠΟΥΛΟΣ (1916-1983 μ.Χ.)

ΔΗΜΟΤΙΚΑ ΤΡΑΓΟΥΔΙΑ ΠΕΡΙΟΧΗΣ ΣΟΦΑΔΩΝ

Αθήναι, Ιούνιος 1997

urban environment. On the other hand, the observed over-urbanisation and the limitation of open areas and green spaces can only deteriorate the already problematic urban reality, the management of which has been a top priority in European level since 1990. [15] It goes beyond doubt that the aimed "sustainability of the urban environment", demands radical measures to be taken in the next decade. Thus, action should be taken in all levels concerning the urban web focused on the following: Better management of land uses, rational use of energy sources, effective traffic policy, strict legislation for the protection of the atmosphere, preservation – expansion of greenery and finally elevation – promotion of cultural sources.

Following such an environmental policy throughout the years to come, can only allow us to be optimistic for the divertion of the today's situation.

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