

Galifianakis, Vasileios

Conference Paper

Ecological Planning in Built Environment

46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Galifianakis, Vasileios (2006) : Ecological Planning in Built Environment, 46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/118359>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Ecological Planning in Built Environment

Abstract

The downgrade of natural environment in the last decades is obvious and the source of problem is located in urban centers. Respectively, the solution of the problem should be sought there. The ecological urban planning aims at the upgrade of urban space, redefining its relationship with residents.

The present article methodizes the approach to the ecological urban planning and it is one of the there are too. Particularly, it essays an approach to the ecological urban planning through the management of those elements that compose the operation of a city and concerns the management and the control of green space, energy, water, transports, litter and society. In this way, a catholic consideration and management of the urban space, as well as a set of policies and actions for its upgrade, is achieved.

Furthermore, specific references to examples in Greece – problems and perspectives – are made. Coinstantaneously, the study of international and European cities that have achieved a high level of quality of life is the proof that the ecological city does not constitute a utopia, but a challenge for the society, the planners, the local governments and the residents-users.

Finally, the institutional frame and the policies, that support the ecological urban planning, are analyzed, as these are the base for its implementation.

Introduction

In the early 1980, that it was realised that the cities constitute the source of most serious environmental matters, as it was mentioned before, and intense concern from the increasing energy crisis was dominated, "new utopia" appeared: the sustainable development. As Chondrou- Karavasili writes (2002, pg. 128): "A utopia that soon accomplished to prevail in the ideological and scientific sector, but couldn't convince the politicians, far more the constructors. This utopia came back in the forefront in the decade 1990-2000, when planning acquired a more "ecological" conscience, in order to face the matters of the increasing air pollution, traffic suffocation, but also the hostility of the cities, the long distances between residence and work".

The cities are the centre of almost all human activity. The greater percentage of human population lives and works there. The needs of persons are increased, causing the

exceeding exploitation of nature and natural resources. If the balance between city and the nature is destroyed, the consequences – as long as distant they appear - possibly they will be catastrophic. The air pollution, the traffic, the neglect of built environment and the lack of a strategic urban planning led to lower standard of living.

On that paper there's an effort to approach the sustainable development and particularly the ecological planning. However, the lack of a specific plan to organize actions that can increase the quality of the urban environment is obvious. Especially in Greece, there are general plans and laws that have to do with the environmental protection but either these are too general or they are opposed to each other.

The main object of the paper is to propose a way to “organize” the urban environment in order to have an integrated outlook of the urban problems. Moreover, a set of actions for the urban upgrade is recommended on each specific field.

Ecological urban planning into the frame of sustainable development

The ecological urban planning, in the frame of Urban Ecology, for the last 30 years report that their mission is to create Ecological cities. According to M. Zacharouli(<http://apn.gr/pylh/0911-Astikh.html>): “Cities are the center of the ecological catastrophe. Everything in the biosphere is connected, and cities, with strong consideration, are part of the global ecosystem. So, if the cities are in the middle of the ecological crisis they could be the center of the solution. The last years, a global movement has taken place, looking forward to the building of ecological cities.”

One of the first adherents of urban ecology was prof. Ekhart Hahn, who, in his project “Ecological Planning” (Oekologische Stadtplanung) in 1987, allocated those elements that have to be taken into account for the sustainable development, and recommended the necessary measures to be accomplished. In 1990, the international project “Ecological Urban Reconstruction” (Oekologische Stadtumbau) set eight directions, conflated theoretical researches and case studies. The directions set by that project are:

- Morality and respect of man,
- Participation and Democracy,
- Organized in networks,
- Return to nature and the experience of senses,
- Controlled urban mix and density,
- Respect of “genius loci”(Genius of a place),
- Ecology and economy,
- International Cooperation.

(Gauzin-Muller, 2003)

Those eight directions, connected to a strategy of ecological urban development, constitute the action frame of ecological planning.

ECOLOGICAL MANAGEMENT AND PLANNING OF THE URBAN SPACE

In that action frame, as set above, an approach of ecological planning of built environment is attempted through the management of those elements and operations that compose the urban space. Particularly, those elements and operations are allocated as follows:

- green
- energy
- water
- transportation
- garbage
- community

The selection of the above, as the basis for the application of ecological urban planning, was made for the best research of the environmental problems and the set of actions for the urban upgrade. The analysis of these elements and examples of successful applications of the ecological urban planning in the European and international space follows.

GREEN SPACE'S MANAGEMENT

Green space features one of the oldest and simultaneously important characteristics of city which were created in order to cover the need of recreation and get people closest to the nature. The urban green spaces are considered worldwide, except from their comeliness, a place of recreation, shelters of fauna and vital elements of a healthy city. When we talk about green we refer to places as parks, gardens and green ways.

The course of green spaces' planning

The lack of green spaces' planning in Europe was, up to the last decades, as a result of green spaces' regard as an aesthetic intervention (Beer, 2002). However, according to P. Brand (1996, p. 357): "By the time that the contemporary environmental concern is connected with not only the global crisis but also the individual sensitivity, the romantic behavior for the nature at the urban planning is not realistic any more [...] Nevertheless, taking into consideration the scientific uncertainties that surround the environmental thought, could be said that the "moral basis" for urban - environmental interventions in the urban space, includes elements of romantic sensitivity".

The contemporary planning includes the reconstruction of green spaces and their management in order that water, garbage and energy can be regulated more effectively (Tjallingi, 1995).

Greencluster is an organization compiled by five ongoing EU funded research projects which are addressing, from different perspectives, the function of green space in the urban environment. Rather than presenting the results of these individual projects in a fragmented way, the projects have come together to present their findings in a co-ordinated manner in order to enhance their impact.

The five ongoing projects of the Greencluster, are each addressing the various functional values of green space. These functions include their contribution to social, economic and

environmental well being of the city. As the projects range in their approaches from fundamental to applied and from highly technical to primarily participatory and communicative, there is an academic challenge in demonstrating how the projects can supplement each other and together be more than the sum of the constituent parts (www.greencluster.org).

Vegetation and urban microclimate

The phenomenon of urban heat island effect is often presented in intensely urbanised areas, where the buildings, the asphalt and the cement absorb the solar radiation and release it in the urban environment, causing important increase of temperature. At the period of summer months, it is calculated that the temperature in the urban heat island differs, at 6–8 °C, with the temperature in the around area.

Vegetation improves the urban climate in many ways:

- the trees, that absorb water with their roots and with evaporation, they often moisten the dry air of cities (evapotranspiration),
- the greenery regulates the temperature, and cause the fall of the temperature at 1-4°C at the summer period,
- the chlorophyll stores the carbon dioxide and releases oxygen,
- the leafage assembles the dust and the toxic gas, decreasing the atmospheric pollution (10 acres of forest assembles on average 50t of dust every year)

Plants and especially the trees in the city can improve the microclimate with the shading, impeding the pollutants, decreasing the noise, absorbing carbon dioxide and emitting oxygen. The density of trees, the orientation, the different types of vegetation, the control of wind with the suitable placement of trees and the ideal distance from the buildings constitute the most important ways of control of local environment and microclimate (Dimoudi and Nikolopoulou, 2003).

The green surfaces contribute against the sound's harmful effects. The vegetation enervates

the transmission of sound. The effectiveness of this natural “sound wall” depends on the density of vegetation and the type of plants, replacing the artificial “sound walls”, which are used in major streets, where their placement is not possible. Moreover, according to a research of the Aristotle University of Thessalonica, the vegetation close to busy streets can decrease the intensity of noise from vehicles up to 10 decibel. (<http://www.2810.gr/index.php?gt=show&id=25434>).

The vegetation contributes in the regulation of water and in their natural regeneration, as it increases the capacity of soil in the absorption of water, while a part of water that is retained by the plants is filtered slowly in the soil. By that way water gets through a natural cleaning before it gets to the aquifer. The sufficient land cover with vegetation deters the ground’s erosion and contributes in the reduction of floods.

Finally, the growth and maintenance of flora and fauna constitutes an element of a healthy ecosystem and an indicator for the ecological viability of region. The major ecological advantage that a green space offers, is its role as biotope and reserve for a lot of species of birds, small animals, incisions but also marine fauna. At the same time, the flora is also strengthened with the growth of different species of plants supplementing the ecosystem. Thus a unique space-ecosystem is created by which man had been isolated (Jim and Chen, 2003).

Virtues of green space

The urban green space has more advantages as they encourage:

- the physical and psychological balance of residents,
- the social meetings, in the parks and the areas of recreation,
- the forestall, rural, horticultural and economic activities,
- the maintenance of natural heritage, the protection of fauna and flora and the effort against the erosion.

The creation of green spaces merges the natural environment with the urban space, giving most of the natural environment's advantages.

Smaller green spaces in neighborhood cover the daily needs of man for contact with the nature. These public places are those that them make feel more familiar and play the more important role in the daily life of residents oppose to the large spaces far away from their houses. Indeed, big forestall areas around the urban space may have great ecological importance; however the small parks, incorporated in the urban space, are directly connected, and in particular powerful, with the local daily life (Van Herzele and Wiedemann, 2003).

The detailed green spaces' planning looks forward to creating a "protective" space, in which access will be possible for the majority of users, providing, at the same time, the neighborhood with new activities (Jim and Chen, 2003). The park can offer a place of recreation and relaxation, space of meeting and a way to escape from the everyday routine. Indeed, by the time residents take a hand in creating green spaces, green spaces become the extension to their houses (Chiesura, 2004).

As a public space, it can encourage informal social meetings (Jim and Chen, 2003), something that nowadays seems difficult. The planner has to design comfortable and accessible places to residents, so that they can feel closer to the specific place. The need for growth of social relations that has been lost imposes the intervention, while the planting can have basic attendance in the promotion of this idea. The spaces of green contribute also in the intellectual culture of residents offering the ideal environment for cogitation. Generally, the parks as a free space provide in users the sense of freedom and independence contrary to a high density urban environment.

Another aspect in planting in public spaces in a neighborhood is that, a public space with imposing trees and impressive planting that offer an attractive spectacle, can create a characteristic picture of neighborhood, as a unique symbol.

The green spaces revive the neighborhood, creating an opposition to the hard forms, dull colors and the heavy substance of buildings, stimulating the senses with simple and harmonious colors, sounds, smells and movements.

Ecological urban interventions with use of vegetation

The possibilities of planting trees and other plants in urban space and much more in a residents' area are not limited only in the creation of parks. The ecological planning of an area imposes the completed management of green.

The specific green spaces are possible to be connected with greenways creating a complete ecosystem. A network of green spaces and greenways can improve the microclimate of the urban area, and the conditions of flora and fauna's growth.

The use of inner open spaces and their landscape gardening constitute a question that should be taken into consideration in new buildings or regeneration of an area. In Greece anything but effective is the management of inner open spaces, even if the General Building Law forecasts the "Concession of inner open spaces in common use" and the creation of "Active Blocks" with articles 12 and 13. On the contrary, other countries have achieved important results replacing the impenetrable surfaces with greenery. In Copenhagen, a policy of landscape gardening of inner open spaces began at the decade the '70, creating totally '1 ha of green per year (Gauzin-Muller, 2003).

ENERGY'S MANAGEMENT

The energy's management constitutes one of the most important sections of ecological urban planning, as the downgrade of urban space comes from its thoughtless consumption and the pollutants that cause its production. The objectives and the actions for the ecological management of energy are:

- energy production from renewable sources
- reduction of energy's consumption

The world's energy consumption has been doubled at the last thirty years. The electricity, the hot water, the heating and the transports, comforts that influence our daily life, depend from the natural resources of planet. The reserves of oil and natural gas are decreased fast and their export becomes more and more difficult and costly. The abatement of energy's consumption of these fossil fuels, that relieves the reduction of greenhouse effect, constitutes one from the main obligations of Rio's Congress. But also the maintenance and the improvement of standard of living require fundamental revisal of the energy strategy and a powerful political will that is accompanied by economic motives.

Internationally, the renewable energy represents a market in growth, with an increase 40% per year (Gauzin-Muller, 2003), contrary to Greece the market of which is found in embryonic stage.

The European Union with Directive 2001/77/EE "For the promotion of electricity produced by renewable sources in the internal market of energy" imposes the increase of use of renewable energy up to year 2010 for the EU-members. For Greece the percentage of energy production that should be come from renewable sources is 20,1%. In 2005 that percentage for European Union was 7,8% and in Greece 8,4% from which only the 1,6% comes from wind energy, small hydroelectric, biomass and domestic solar energy, while rest 6,8% from big hydroelectric.

The energy planning of building areas aims at as the saving of energy, the guarantee of conditions of comfort and the exploitation of locally available renewable sources in order to cover the needs of buildings, blocks and the whole area. Sources as the sun, the wind, the biomass, the geothermic, the movement of sea and rivers are not exhausted. Respectively, the forms of energy that can exploit are solar energy, wind, biomass energy that concerns in the energy of timber and biogas, geothermal, hydroelectric and waves' energy.

Solar Energy (Direct profit)

The total solar radiation that reaches in the surface of ground includes a direct profit that emanates from solar beams, when the sky is clean, and a diffuse profit, when it is covered by clouds, the exploitation of which contributes in the ecological prospect.

In the centre of Europe, the mean quantity of solar energy received per year in a surface 1m^2 is about 1.000 kWh (Gauzin-Muller, 2003). Roughly the half energy emanates from the diffuse solar light, so that it allows the use of solar heaters all along the year, even if their output is weaker in winter. Obviously, Greece possesses more favorable place in contrast with the most European countries.

The complete exploitation of solar energy requires the right orientation of buildings maximizing the faculty energetic and passive heating. For this reason a lot of models of energy profit's calculation are applied (Compagnon, 2004) aiming at his maximization and at the same time the minimization of consumption of energy for refrigeration and heating. Apart from the right orientation, actions as the use of urban density according to the climatic conditions can attribute reduction of energy's consumption at 5-15% (<http://www.spitia.gr>).

Photovoltaic Energy

Photovoltaic Systems collect the solar energy and convert it to electricity (<http://www.spitia.gr>).

The almost small market of the photovoltaic systems and the great manufacturing cost is the biggest problem for the maximum use. Many countries used economical measures to give spur to consumers to use photovoltaic energy.

The application of photovoltaic systems is an easy solution as its placement on the roofs does not create a space problem. Moreover, its placement can be used on such a way to support the building's form unless it is in a traditional village.

In 1999, Germany started a promotion to encourage the households, the communities and the industries to use photovoltaic energy. The aim of this promotion, which last 3 years, was to set 400.000 m² collectors per year. With an annual reduce of CO₂ emissions of 75.000 tn, this measure contributes at the reduce of greenhouse effect (Gauzin-Muller, 2003).

In Greece, the competent ministry applied its policy in 1996 with the Action Plan "Energy 2001" (Ministry of Environment, 2000). According to this programme, photovoltaic systems will be used in the public buildings in order to make them model for the other private buildings. One of the applied examples is the energy reform of the laborite flats in Taurus Area (Congress CRES, 2004)

Wind Energy

Wind energy is a renewable energy with great productivity of electricity by the use of wind turbines without serious environmental effects. The wind turbines are used either with battery in small stations or supplementary to photovoltaic systems, and are connected to the network. A wind energy system converts the kinetic energy of the wind to mechanical or electrical on many applications such as battery charge and water pump in distant areas.

Wind energy is very common in Europe. In 1999, the European continent covered the 67% of the worldwide ability (5.000 MW). In 2000 the European wind park produced 12.000 MW - 6.100 MW in Germany, 2.300 MW in Denmark and 2.250 in Spain. The present foresee assumes 60.000 to 85.000 MW before 2010.

The offshore wind parks in Europe produces more than 9.000 MW. The biggest wind energy project is in Belgium along its shores.

The problems that the wind turbines face in the urban space are:

- Lack of a law framework and spatial planning
- Noise annoyance
- Visual annoyance
- Cost

The law framework for the wind park placement and distributive turbines is one of the most important problems in Greece. So that the public opinion can change and stop the placement of the wind turbines (Kaldellis, 2003). By the time there is no law framework for the legal placement, the highest limb of the law can stop every action for the placement of wind parks in Greece. It is clear that planning is of great importance for the development.

The contemporary wind turbines are very quite machines according to the power they produce and with the continuous improvement they become more and more quite. The noise reduction takes place on either the source or the conduit. Furthermore, the wind speed needed for the turbines to produce electricity is too low so that its noise is covered by the natural sounds (wind noise on trees and bushes).

The visual annoyance is more subjective than objective; however, it's better than a coal plant. Moreover, according to researches of European countries such as Germany, Netherlands, Denmark and UK, the effects on the fauna and especially on birds are inconsiderable (Slessor, 2003).

The turbines' cost is also considerable, however the new technologies and the use of cheap materials (Slessor, 2003) make the investment advantageous.

Biomass' energy

The biomass has to do with the energy of timber and in the biogas. Their source can be from urban waste, rural production (remains of timber, animal outcast) as well as by-products of industry (from elaboration of foods or organic matters). With suitable

elaboration, the biomass is changed in biofuel. The combustion of this gas is used for electricity production, with big output but also decreased environmental repercussions (www.spitia.gr).

With regard to its use in the urban environment, the replacement of oil boiler rooms with timber boiler rooms constitutes important alternative source of energy. The reduction of emissions CO₂ and S that is achieved with the reject of oil, as well as the big output from the combustion of timber, led to their support from the European Union (Gauzin-Muller, 2003).

In 2000, in France 1.000 industrially and almost 500 urban timber boiler rooms existed. Starting at 1999, the timber boiler room of Autun, in the Morvan, constituted concrete example of the global thought of sustainable development. This boiler room of 8 MW that are connected with the urban network of tele-heating, covers the 70% of heating needs for 3.500 residences. It replaces two oil boiler rooms and allows perceptible reduction of emissions CO₂ (11.000 t/year) and S (280 t/year) (Gauzin-Muller, 2003).

A successful application is pellets, a standardised fuel from biomass, which is used widely in Europe, United States and Canada, while recently certain companies showed interest to begin production and their disposal in Greece (Stamati, 2004).

The most contemporary plant of biogas in Europe is in Neubukow, in north-eastern Germany. The organic litter is converted in electricity and heat. This plant develops 80.000 t/year of gas that contains 65% methane. One unit of co-production converts 3,25 millions m³ of products annually and produces electricity for 2.000 houses and heat for 1.500 residences (Gauzin-Muller, 2003).

The geothermal energy

The geothermal energy is produced with the transformation of hot water or water vapour that is found in enough depth under ground in electricity. The temperature of geothermal

fluid varies from location to location and it can be from 25 °C up to 350 °C. In the urban environment, where the temperature is lower, the geothermal energy is developed for the heating of every building. When geothermal fluid have high temperature (above the 150 °C), the geothermal energy can be used mainly for the production of electricity. Our country, because of her subsoil, is rich in geothermal energy. In the region of South Aegean the temperatures of geothermal fluid are very high, while regions rich in geothermic energy, with fluid lower temperatures, are scattered in country.

Hydroelectric Energy

In the hydroelectric construction the energy from the fall of water is transformed in electricity, by a turbine. Even if in the hydroelectric construction they are not produced harmful gases, in the big dams they are taken into consideration and other environmental parameters, as flood-preventing construction, the quality of water, as well as the influence in the life of fishes. Accordingly, only small scale hydroelectric (with power less than 30MW) are considered “green”, while big scale they are considered simply “clear”.

The hydroelectric energy is available in most European countries and its management enough easy. In France 90% of “green” energy (15% of total) is hydroelectric. In Greece 80% of “green” energy (6,8% of total) is hydroelectric.

WATER MANAGEMENT

In a community, the water’s management, according to the ecological approach ensures at the same time:

- the protection of the aquifer and the outward water,
- the limitation of potable water consuming, a more and more rare natural source, and guaranty of its quality,
- the reassurance of the ecological treatment of used water
- the minimization of the used water that need to be treated in order to reduce the cost for its clearance,

- the limitation of the non-penetrable ground to stop the overflow of rivers and streams,
- the use of tanks in order to collect the rainwater for irrigation and the improvement of the microclimate. (Mouritz και Hedgcock, 2003)

Avoiding floods

The last years, floods afflict Europe with great disasters. It is the result of the dams' destroys, the deforestation, the insufficient works on the river-beds and the banks and the non-penetrable grounds. So, complete solutions are demanded for the minimization of the dangers,

The first measure is the prohibition of building on the river-beds. Furthermore, the natural environment close to the rivers and a system of dams must be recreated.

In Greece, floods are a huge problem, causing much damage on properties and human life.

Collection of rainwater

The use of the rainwater is one the most important actions of the ecological management of the water. Furthermore, in areas with heavy rainfalls, such as in Greece, floods are avoided.

Communities can start taking simple and inexpensive measures for the limitation of the water use in public buildings and places and the regimentation of sanitation that save water in every case of new buildings or renovation.

The collection of rainwater is very common in Germany and in many greek anhydrous islands, such as Cyclades, Kythira, Ithaca etc., for the water supply to houses, public buildings, even at industry. The collection of water is effectual when used all year. A lot of industries use that method as they need great quantities of water, which raise the total cost. Furthermore, they get a more ecological picture in contrast to the hard one they already have.

The area Urbane Gewasser around the headquarters of Daimler-Chrysler at Potsdamer Platz, in Berlin, is the best example at the field of rainwater's collection. There's a network of "rivers and lakes", covering an area of 12.500 m², which is a constitution of ecology and design, creating a peaceful and relaxing pouch in the middle of a high density commercial district. The rainwater is stored in tanks of 2.600 m³ capacity. The 7.700 m³ of water collected every year are used in toilets, irrigation, and in urban lakes (Gauzin-Muller, 2003).

The non-penetrable ground and the artificial surfaces

The correct water management requires a balance between the "grey" non-penetrable surfaces and the "green" penetrable ones. The recent catastrophes show that this balance has locally destroyed and it is necessary to be obtained again. There are many measures that are applied and attest its effectiveness, such as:

- financing for the roof's gardening,
- use of material that let the water to penetrate the ground, such as, grass or leaky flagstone,
- Gardening on every free space around buildings,

Green on roofs

In the urban areas the concrete, the stone and the pitch prevail. The huge buildings slow down the wind speed and choke it. That's exactly what creates the high temperatures, the limited humidity and the concentration of atmospheric feculence.

Greenery, on roofs, can stop these effects and improve the microclimate. Thank to the evapotranspiration and the wetness of soil, the humidity refreshes the air and holds the dust. Furthermore, it helps the insulation of the building, reducing the energy needed to cool or heat the house. It also stops the fast water flow that creates the floods.

At the International Green Roof Congress that took place in Germany (2004), new elements

for its contribution to the ecological and urban planning were showed, as also new technologies and architectural bents. The roof of the commercial center of Banco Santander is the biggest “green roof” globally with an area of 1.000.000 sq ft².

THE TRANSPORT’S MANAGEMENT

The application of ecological urban planning creates a new way of approach of urban space and its planning as well the management of transports that influences the economic capacity of region and the quality of life of her residents. The management of transports constitutes important factor of optimization of urban environment and it includes action that have to do with the traffic control, the parking lots, the maximization of urban transport’s use, bicycles’ use and, of course, actions that gives right of way to pedestrians.

The traffic control

The consuming behavior and the low cars’ prices lead to the continuous increase of its use. This increase amounts with the tension of many harmful effects as the atmospheric pollution, the emissions that cause the phenomenon of greenhouse (CO₂), the sound harmful effects but also the road accidents.

For the restriction of harmful effects of car, there are a lot of policies which many cities apply:

- Policy of transfer and parking that encourages the use of urban transport. This action forecasts motives (low prices of tickets, speed, sufficient network, “Park and Ride”) as well as sensitization of residents,
- Car pooling that aims to the increase of complement of private cars that are used mainly by the workers to and from their work. This system is applied mainly in USA where the distance between residence and working place are long,

- Car sharing aims to the reduction of property of private cars. or withholding of its increase. Substantially, each neighborhood allocates a small number of cars and which are available to the residents of neighborhood under condition of renting,
- Improvement of vehicles and reduction of toxic emissions with use of more ecological fuels. In big urban centers, as New York, the reduction of urban solid waste is combined with their use for the production of “green” fuels as methanol and hydrogen (Larson k.a., 1996).

Public Transport

The development of the public transport –Bus, Underground, Tram- is an absolute need for the environmental protection. Actions that have to do with public transport are:

- Amplification of the bus line network in order to protect the city centre.
- More frequent bus routes at the suburbs
- More attractive routes and low fees
- Improvement on services, quality and security
- Use of transport that does not emits gas and use alternative fuels which are less harmful to the environment (Larson et al., 1996). Tram is one of the most “green” mean of transport. Statistically, it improves the standard of living in downgrade areas and redefines the road network. Furthermore, it stops the non-penetrable surface with the greenery between the tram lines (Gauzin-Muller, 2003). In Athens, the tram is still at an early level.
- Application of the program “Park and Ride”, which encourage the users to leave their car on peripheral parking lots that are close to underground and bus stations, and use the public transport. This method was used on the most Olympic Cities in Greece but it didn’t apply in Athens, close to underground stations.

Bicycle as a mean of transport

Bicycle is the most equable mechanic mean of transport, the most environmental friendly and economical. Its presence in the built environment constitutes a sign of culture. Conversely, its absence is an alarming value of the cultural decay (Aravantinos, 1997).

The need for minimal space makes the bicycle extremely flexible and autonomous. The ecological transport planning has to protect the bicycle and treat to it as every mean of transport. The bicycleways' planning is essential for the safe of its users.

Bicycles have already taken up the centers of Copenhagen, Helsinki, Amsterdam, and Freiberg. Conversely, in Greece such bicycle networks absent, with only a few examples as Karditsa.

Priority to pedestrians

In many European countries, the movement on foot is fostered by the development of pedestrian precinct's network in the city centers with the creation of delightful and safe streets.

In areas of organized building, the creation of a pedestrian precinct's network is an easy process; however, in the city centers or old areas it's more difficult. In a residential area, where the car traffic is to low, the creation of pedestrian precincts and greenways, as the ecological planning specifies (Searns, 1995), is easiest. It can be successful by the:

- Creation of parking lots, in such a way to cover the whole area so that the residents can approach their house easily.
- The use of clear spaces of the buildings even as a part of the precinct's network
- Development of the public transport

GARBAGE MANAGEMENT

The reduction of the garbage and its optimum elaboration is one of the major global problems. The continuous increase of their huge bulk, as a result of the modern society and the urban centers, constitutes one of the major brainstorming at the Kyoto Conference.

In Greece, there are many problems at the planning of organized places of garbage deposition. The main reason is the behavior of the residents as no one wants these places close to their houses –even if they are in the proper place and under specific conditions. As a result, the occurrence of strikes and demonstration is very common.

At the neighborhood level, the garbage management relies on the 3 R's, Reduce-Reuse-Recycle.

The garbage reduction at the source can provide:

- Save of natural sources that are used as raw materials,
 - Reduction of the emissions at the production process,
- and give economic inducements:
- By the reduction of the raw materials for the producer (therefore reduction of the cost)
 - By the reduction of the total cost of the products for the consumers. (EPA, 1995).

The products' reuse is also a very important action for the household's garbage reduction. Using products with longer lifetime and better quality give the opportunity of reuse, reducing the household expenses.

The recycling is based on the selective collection, which started in Germany at the early 80's and adopted by the European Union. Its aims are:

- the isolation of toxic waste (medicine, batteries, etc.)
- the reuse of those stuff that can be recycled (glass, paper, metal, plastic)
- the demarcation of the biodegradation for the reduce of the total garbage.

The selective collection at the recycling depends on the resident's participation. In order to be successful, there's a need of the necessary equipment at every household and workplaces. In many European countries, every household is equipped with specific bins for recycling and non-recycling products, as also those that can be converted to compost.

Furthermore, the industries must be ready to use products from recycling and the consumers must support that system by buying the products coming from a second process.

URBAN GOVERNANCE AND SOCIAL MANAGEMENT

The improvement of the life's quality at the urban space includes the reduction of the social isolation and secures the social balance between different categories of residents living at the same place. For the achievement of that goal, the actuation of the local government, the municipal services, the professionals and the local associations.

Urban and social mix

The problems of the security's lack, which many communities face, show the importance of:

- Urban mix that join the residential, commercial and other areas,
- The social mix of residents of different categories.

Participation of users

The application of a sustainable and ecological urban planning involves the cooperation between the local authorities and the users from the beginning of the planning (Participatory Planning). The awakening and the participation of the residents is a major factor for the process of planning.

The residents' participation on the planning is a long and difficult process but always necessary for the sustainability, even if some mistakes are happened. Among the first

ecological experience of the 80's, many of them failed, as they didn't take into account the users' opinion or their behaviors either because the users weren't ready or they weren't educated for a responsible and ecological way of living.

The environmental intervention adjusts easily to cities, where the local democracy is more active. The district of Vauban in Freiberg is one of the best examples that participatory planning had great success. At the reformation of the former barracks, Forum Vauban, a committee of perspective residents, worked on a project of urban planning. This helped the continuous sustainable and social control of the district. Similar examples applied in Berlin at the 80's and 90's by the Stadtforum.

In Greece, the participatory planning can't be characterized as successful. The "Neighborhoods' Urban Committees" didn't have the expected results. Problems such as the exaggeration, the demagogy and the lack of a program of education, were factors that choke the effectuation of urban planning (Lalenis, 1995). All these problems resulted to the discontinuance of that institution. However, the re-introduction of an institution similar to the former one with more specific power is necessary for the amplification of the participatory planning.

Ecological education-awakening

Communities must play an important role to the awakening for the environmental protection. It is the key to the approach of the ecological thought. A few planners and ecological associations are not enough to upgrade the cities. The contribution of the residents can be gained with an organized project that will enlighten them about the huge environmental problems and their treatment.

In Maeder of Austria, the community decided in 1994 to set up an Ecological College, for the ecological support to awaken the children in order to respect the environment

THE INSTITUTIONAL FRAMEWORK AND THE POLICIES THAT SUPPORT THE ECOLOGICAL URBAN PLANNING

The over-concentration of population in the big urban centers of European space the last decades corresponds in over-concentration of environmental problems. The urban centers' needs for energy (35% on the total) have result the production of 45% of dioxide of coal as well as the production of those substances that cause the phenomenon of greenhouse effect.

For the confrontation of big environmental problems of urban centers and a more ecological urban planning, the EU has developed the European Spatial Development Perspective in the frames of sustainable land-planning planning amining at the promotion of rational use and management of energy. This drawing is reported in the total of European space and through this is fixed subjects of planning of cities.

In Greece, the institutional framework is more complicated and approaches the ecological planning indirect, as presented below.

THE GREEK INSTITUTIONAL FRAMEWORK

In national level, there is not a particular institutional framework or a policy that is referred specifically to the environment and the cities. However, there are some laws and national projects that encourage the ecological urban development.

Greece, in the last years, has introduced a new institutional framework in order to go with the European Union to the sustainability. This new institutional framework promotes and directs the development of new forms of urban planning and buildings to an ecological approach.

In 1986 the law for the “protection of environment” (1650/86) is introduced in order to protect and apply the principles of ecological planning but also it accords national with the European framework.

In 1997 the law 2508/97 was established (Sustainable development of Cities and Settlements of Country) to replace – actually to complete – the law 1337/83 (Residential Law) including provisions for the application of extensive reformations of urban space, with important institutional, economic and other motives. This law gives the opportunity to downgraded districts to adopt the principles of ecological planning.

In 1995, the Greek program on the “Climate Change” was worked out and was approved by the Ministerial Council, which aimed at the emissions’ stabilization, that cause the greenhouse effect and particularly the CO₂, at the levels of 1990. It was about to concrete meters of energy saving and use of renewable energy in the industry, the transports, domestic and commercial sector (Nikolodimos, 2004). This program follows the more general “European program for the climatic change” in the frames of conformity of European Union with the Protocol of Kyoto.

The Action Plan “Energy 2001”, that was worked out by the Ministry of Environment Planning and Public Works and the CRES, also concerns in meters of saving of energy and use of renewable energy in the built-up sector in combination with policy of motives.

The Laws 1650/86 and 3010/02

Law 1650/86 was the first, actually, law to harmonize the Greek institutional frame with the international efforts for the protection of environment. With main tool the Project of Environmental Consequences, it is the first time to forecast and to deter all kind of harmful effect to the environment. The relation with the ecological planning is not of course direct but it supports the general environmental planning, promoting simultaneously the minimization of use of natural resources and their replacement with renewable sources of energy.

The 1650/86 was introduced for the Greek facts, but it can in no case be characterized complete. The law is limited in individual projects and activities, while it could include actions and interventions in entire urban regions in order to protect the urban environment.

The need of harmonization of the above law with the directives of European Union of (97/11 EU and 96/61 EU) led to the establishment of new environmental law 3010/2002.

The positives of this law are:

- The adaptation in the European institutional frame.
- The regrouping of activities and the probable production of specifications per kind of activity
- The import of environmental evaluation in precocious stage (former Project of Preliminary approval of Arrangement) (Famellos, 2002).

New residential law 2508/97

The establishment of law 2508/97 for the “Sustainable Development of Cities and Estates” constituted the improvement of the previous residential law 1337/83. Objectives of that new law is the completion, the improvement and the overshooting of “provisional” role of 1337/83 as well as the adaptation of traditional model of urban planning in the requirements of sustainable development. The objectives were achieved partly as the new law, on the one hand covers the basic gaps of 1337/83 (without, of course, to ensure the required cohesion, functionalism of applied urban legislation), on the other hand the objective of sustainable development exhausts his ambitions at some directional principles and planning tools, without to involve certain radical transformation of prevalent model of urban planning (Giannakourou, 2004).

The new law supplemented the precedent with provisions for the application of extensive reformations of existing urban web, with important institutional, economic and other motives. The establishment of this law strengthened the significance of sustainability and gave new meaning in the urban ecology.

The reformations constitute the main tool for the upgrade of downgraded areas. An achieved reformation should serve the objective of sustainable development; to improve the urban environment, mainly the natural, and the social balance, but simultaneously to attract investments. The change to a more ecological reformation does not exclude the other two dimensions, but on the contrary offers new innovative possibilities for their development.

The law 2508/97 determines the criteria to characterize a district reformation's able, the process of development of reformation's project, the institutions of concretization, the means of urban intervention and the financial means. Even if the institutional frame for the reformations exists many years, the applied examples are few. The delay was owed mainly in bureaucratic reasons, but also in the gaps of Greek institutional frame. It should be added the Greek inexperience on issues of reformation and the lack of powerful and constant political will.

However, this law created a more flexible frame of urban intervention that Greece and the urban centers needed. With the reformations it is achieved:

- The ecological sensitivity,
- The completion of urban gaps and the re-establishment of continuity of urban web without ghetto's creation,
- The reuse of existing buildings with reformations in the buildings
- The development of participative processes of local communities that allows the social acceptance and contributes in the concretization of reformation
- The cooperation of public and private sector.

It is explicit that law 2508/97 and reformations that this determine constitutes perhaps the most useful tool for the urban slum clearance and historic centers of big urban centers. The minimization of bureaucracy, the cooperation of public and private sector and the participation of citizens at the level of planning, are basic elements for the success of reformation. European programs, as URBAN, constitute a chance for the reformation of downgraded regions as they offer the essential financing resources.

The Greek Program for the Climatic Change

The Greek Program for the Climatic Change substantially constitutes the factual harmonization of Greece with the commitment that the European Union undertook signing the protocol of Kyoto.

According to the characteristics of each country-member their obligations are distributed. Thus, for Greece, according to the distribution of EU, an increase to 25% was allowed, a percentage that comes from the size of country and the intense development that takes place.

The “European program for climatic change”, that is under way since the last three years, aims at the consultations between interested as governments, industries, NGO etc. The aim of consultations is the determination and the study, of realistic actions that will strengthen the effort of concretization of obligations that EU received.

The project “Energy 2001”

The project “Energy 2001” gave a new (for Greece), perception on the planning, not only buildings, but also urban and built-up units. The project proposed a frame of actions and tools for the achievement of its objectives, which are:

- the study and manufacture of new buildings and urban units of high environmental and energy output in frame of the principles of sustainable-ecological planning,
- the specifications’ establishment of town planning of extension, revision, social housing projects and private urban units,
- the specifications’ establishment for the configuration of suitable microclimate of space environment,
- the establishment of: control tools, certification and management of applications,
- the increase of building activity with interventions of improvement of energy attribution of central installations of (heating, refrigeration, lighting, hot water) in built-up units,
- the increase of competitiveness of clean building technologies,
- the rise of quality of life,

- the modernization and improvement of provided services,
- the typological integration of systems of saving of energy and Renewable Energy
- the promotion of ecological architecture and ecological energy planning.

The National Actions that encourage the sustainable development of settlements

There are projects of urban planning for the creation of City Plans for those which do not allocate, as well as for the improvement of existing plans. Particular accent is given in the development of land-planning in ecological sensitive regions, in coastal regions and islands.

Projects for the protection historical and traditional regions, that aim at the improvement of standard of living in the cities, in selected Greek cities, traditional settlements and tourist regions, so that the quality of life get improved.

Special Actions

- Re-establishment of traditional centers of cities
- Re-establishment of landscape in regions where has been executed or is executed big technical works
- Alleviation of aesthetic pollution, with accent in the tourist regions
- Import of "Areas of Built-up Control"
- Promotion of bioclimatic planning of buildings and settlements
- Taking of meters for the protection of men that lives close to industrial areas that are in danger from accidents.

Special Projects are also financed, which include interventions in local and regional level in the thematic sectors: atmosphere, water, litter, transpositions, noise, planning of ground, urban development, environmental sensitization and legislation.

More specifically:

HABITAT II. In the World Conference of United Nations on the Human Settlements in Istanbul in 1996 it was realised that the five sectors on which more attention is required, are:

- Development of information and know-how for the urban environment
- Improvement of the strategy for the environment and the decision-making
- Application of environmental policies
- Enactment of environmental planning and environmental management
- Effective use of resources for effective changes in the way of life.

AGENDA 21. Agenda 21 constitutes the World Action plan for the Development and the Environment. Most of the objectives of Agenda 21 can be realized through actions in local level in cities. The principles of local Agenda 21 were introduced in Rio in 1992 and the sectors of actions that include the management of litter-recycling, traffic, urban environment, energy saving, environmental education, green spaces, ecological models of consumption and participative processes (local democracy).

An example to this direction is the Program for the Local Agenda 21 of Marousi-Halandri Municipalities that tries to include a frame of actions for the environment in a wider frame of policy for the sustainable development aiming at the permanent improvement of local environment and the configuration of standard of living in the everyday life (Kokkosis, 2004).

CONCLUSIONS

Summarizing, it comes that the application of the ecological urban planning, is essential for the upgrade of the urban space, in order to achieve the corresponding standard of living. The complete ecological planning must take into account a wide spread of policies-actions for the management and the control of green, energy, water, transport, garbage and society.

Studying separately the above elements that constitute the urban space can't lead to the desirable result. There's a need of the complete face of the problems and a complete approach of the urban space.

Consequently, the proper application of the basic principles of the ecological planning is enough to cause a dynamic change to the contemporary urban space, which will be reflected so into the landscape by the improvement of the “picture” as into the society by the standard of living.

The study of international and European cities, which have achieved a high standard of living, applying some of the principles of ecological planning, is the proof that the ecological city is not a utopia, but a challenge of society, planners, local authorities and the residents.

In Greece, ecological planning is still at a low level but there are made many efforts for its development. However, it is very important to introduce a new frame of laws to support the idea of the ecological planning and guide the planners, the authorities and the residents to secure the standard of living of the future generations.

BIBLIOGRAPHY

Aravantinos I. Athanasios (1997), *Urban Planning: For a sustainable development of the urban space*, Symmetria, Athens

Beer A., Delshammar T., Schildwacht P. (2003), *A changing understanding of the role of greenspace in high-density housing - a european perspective*, Built Environment, **29**(2), 132 -143

Brand Peter, *Urban environmentalism: in the twilight between vice and virtue*, Urban Design International, **1**(4), 1996, Routledge, 357-360

Giannakourou G. (2004), *The institutional framework of greek cities: Historic transformations and contemporary statements*, The development of greek cities, 2nd Edition, Editorship Oikonomou D.-Petrakos G., Publications pf University of Thessaly-Gutenberg, Volos, 457-480

Chiesura A. (2004), *The role of urban parks for the sustainable city*, Landscape and urban planning, **68**, Elsevier, Netherlands, 129-138

Compagnon R. (2004), *Solar and daylight availability in the urban fabric*, Energy and buildings, **36**, Elsevier, Switzerland, 321-328

CRES (2004), *Energy Reformation of two labourite block of flats in Municipality of Tauros*, E.U. Project Thermie 1997-2000, Municipality of Tauros, Ministry of Environment, Spatial Planning and Public Works, Ministry of Development

Dimoudi A., Nikolopoulou M. (2003), *Vegetation in the urban environment: microclimatic analysis and benefits*, Energy and Buildings, **35**, Elsevier, Greece, 69-76

Enayetullah I. (2000), *Experience of Waste Concern in Dhaka*, Urban Innovations, New Delhi

EPA (1995), *Spotlight on waste prevention*, EPA's program to reduce solid waste at the source, USA

Gauzin – Muller D. (2003), *Οικολογική Αρχιτεκτονική: 29 παραδείγματα από την Ευρώπη*, Κτίριο

International Green Roof Congress (2004), *The globalised green roof market of the future: trends and challenges*, Stuttgart

Jim C.Y. (2004), *Green-space preservation and allocation for sustainable greening of compact cities*, *Cities*, **21**(4), Elsevier, 311-320

Jim C.Y. and Chen S. (2003), *Comprehensive greenspace planning based on landscape ecology principles in compact Nanjing city, China*, *Landscape and Urban Planning*, **65**(3), 95-116

Kaldellis J.K. (2003), *Social attitude towards wind energy applications in Greece*, *Energy Policy*, **33**, Elsevier, Athens, 595-602

Coccosis H. (2004), *Policies for the environment in cities*, The development of greek cities, 2nd Edition, Editorship Oikonomou D.-Petraikos G., Publications of University of Thessaly-Gutenberg, Volos, 481-490

Lalenis K. (1995), *Urban Governance and Participatory Process: The chance of EPA and the weakness of greek Planners*

Larson E., Worell E., Chen J. (1996), *Clean fuels from municipal solid waste for fuel cell buses in metropolitan areas*, Resources, conservation and recycling, **17**, Elsevier, 273-298

Morancho B. A. (2003), *A hedonic valuation of urban green areas*, Landscape and Urban Planning, **66**, 35 - 41

Mouritz M. and Hedcock D. (2003), *Water Sensitive Design: An Ecological Approach to Urban Development*, www.urbanecology.org.au/ecocity2/watersensitivedesign.html

Nikolodimos D. (2004), *Bioclimatic Planning – Study on the School of Engineering in Pedio Areos*, Diploma Thesis

Santamouris M. (2004), *Sustainable power choices for the urban environment*, “Technika Chronika”, March-April

Searns R. (1995), *The evolution of greenways as an adaptive urban landscape form*, Landscape and urban planning, **33**, Elsevier, USA, 65-80

Slessor C. (2003), *Catching the wind*, The architectural review, **214**

Speers A. and Mitchell G. (2000), *Integrated Urban Water Cycle*, National Conference on Water Sensitive Urban Design – Sustainable Drainage Systems for Urban Areas, Melbourne

Sukopp H. (2002), *On the early history of urban ecology in Europe*, Prislia, Praha , 373-393

“Ta Nea” (Greek newspaper, 28-12-2004), Stamati L., Fuels from...sawdust, pg. 47

“Ta Nea” (Greek newspaper, 29-4-2005), Stamati L., “National Division” for Aeolus, pg.17

Van Herzele A. and Wiedemann T. (2003), *A monitoring tool for the provision of accessible and attractive urban green spaces*, Landscape and Urban Planning, **63**(2), 109-126

Famellos S. (2002), *Greece and environmental policy*, www.e-telescope.gr,

Chondrou-Karavassili M. (2002), *To a sustainable planning of built environment: Ecological building*, Aeichoros, **1**(1), Publications of University of Thessaly, Volos, 128-141

WEBSITES

- (<http://yosemite.epa.gov/oar/globalwarming.html>)
- www.actionbioscience.org
- <http://eetd.lbl.gov/HeatIsland>
- Ζαχαρούλη Μ., <http://apn.gr/pylh/0911-Astikh.html>
- <http://www.teriin.org/opet/articles/art6.htm>
- <http://users.fth.sch.gr/kalodimos/PRESS/prasino.htm>
- <http://www.asda.gr/elxoro/ntouros.htm>
- www.windpower.org
- <http://www.2810.gr/index.php?gt=show&id=25434>
- www.minenv.gr