

## **Environmental planning for Low Carbon Cities: the Greek Case**

### **1. Introduction: Sustainability and urban environment. New trends in the planning for low carbon cities**

The degradation of the urban environment - which makes part of the general environmental crisis- in combination with the progressive urbanization on European and international levels, have drastically changed our concepts of urban planning and development. The environmental planning for cities constitutes a theory as well as a practice in the context of the wider planning framework aiming at the protection of the environment. During the last twenty years and more particularly during the last decade, we have adopted and applied new policies and practices taking aim at an environmentally friendly and more effective management of the urban areas.

The urban environment issues are on the agenda of the majority of the projects of both state authorities and the local governments of all the countries in the European Community, because nowadays 50% of the population on earth lives within the cities. During the last decades, the number of urban centers with a population higher to 10 millions has increased rapidly. In 1950, only the population of New York was over 10 millions; nowadays, there are 20 such megacities, among which Tokyo is the biggest since its population comes up to 36 millions. More than 80% of the total population in the European Union lives in the cities. (In Greece, the corresponding percentage is more than 65%). Nowadays, the traffic management, the solid and water waste management, the planning of open green spaces network, the energy management, the protection and enhancement of the architectural heritage constitute the particular «challenges» concerning the total upgrade and «recuperation» of the urban space in the European and Greek urban areas. It is also a question of issues that, in order to be solved, demand a new combination between the environmental and the spatial planning.

What seems to be crucial is that no matter how these problems are faced, their approach depends on the possibility of integration of the various sectoral activities and policies. It is characteristic that the guidelines that are given through the written documents of policy of the EU (Green paper on the urban environment, 1991, Report on the sustainable cities, 1996, Green paper-Towards a new culture for urban mobility, 2007) as well as the OECD (environmental policies for the cities in the '90s) primarily focus on organizational issues and secondarily on sectoral ones. (EC 2007) They make reference to issues that concern the coordination, the integration of processes, the application of innovative approaches etc. Also, the U.N. Organization refers to the same issues through the Istanbul Declaration (June 1996) in the framework of the 2<sup>nd</sup> United Nations Conference on Human Settlements (HABITAT II Agenda - Urban Agenda).

The main objective is to (re)establish viable human settlements, which should grow and operate according to the principles of security, equality before the law, hygiene, bioclimatic architecture, ecological construction and environmental prudence. However, the today's complex reality shows that this objective can be achieved only through the model of a flexible and integrated planning. Consequently, the care for every aspect of the environment constitutes a primarily organizational and political issue. In this case, the process is as important as the essence of the problems. Moreover, the complexity of the problems has rendered necessary the use of modern technology and new methods of management (Beriatos, 2005).

On the other hand, given the climate change, the adoption of the objective of low carbon cities that applies the principle of the viable (sustainable) development (the development that

respects the environment and meets the needs of the future generations) imposes a new course of action as far as the policy of the urban environment improvement is concerned. This mainly concerns Greece, where the cities suffer from a lack of organization at any level, and they have been transformed into «defenseless» and vulnerable areas to every natural or technological disaster and the quality of life has been downgraded dramatically. The abovementioned information especially concerns the large Greek urban centers, not only in the framework of the improvement of their environmental quality but also in the framework of the survival of their residents, an objective which demands a serious and systematic effort in order to be achieved. In view of facing the environment of the large metropolitan areas according to the principles of a sustainable development, it is important to adopt concrete principles of politics, as well as specific implementation mechanisms. Consequently, there is a lot of work for the local authorities that wish to fulfil the today's expectations and needs, as far as the care and the management of the urban environment are concerned.

## **2. The Greek reality : a critical review of urban development policy**

### ***2.1 A brief history of urban planning during the three last decades***

In Greece, the '70s constitute a period of fragmentary efforts, while since the '80s and during '90s a cohesive environmental policy within the urban and residential areas was gradually formed. Greece made certain steps and developed particular actions that complement one another and integrate the principles of the sustainable development as far as the urban planning is concerned and implement the environmental policy for the urban development at two levels: At the first level, this integration is undertaken through a series of new institutions in the field of architectural design and urban planning:

a) The reformation and updating of the General Building Regulations Code (twice every 15 years) has always constituted the basic context for the spatial planning and the building construction. New provisions are introduced into the Building Regulations in order to protect and upgrade the built environment and avoid the waste of energy.

b) A new law was adopted (Law no. 2508/97) concerning the urban sustainable development and replaced the previous law that was in force since 1983 (Law no. 1337/83). The new institutional framework aims at an integrated planning for all the cities and settlements of the country. According to this law and the need for a rational use of natural and cultural resources, the urban development contents with the most necessary structure, while more detailed projects of urban renewal are possible to be implemented within downgraded urban areas and historic centers of cities, in order to enhance and regenerate the urban space. Also, the law provides for specific financing tools, in order to supply with economic and urban planning incentives that could lead to the implementation of these programs. At the same time, the law provides for the highest possible decentralization of political and administrative competences and financial resources, as well as for the participation of the local actors, environmental institutions, NGO's and citizens. In combination with the abovementioned institutional framework, the proper Ministries (of Environment and Planning, of Development, of Interior Affairs) present a series of pilot studies and works, in order to support the initiatives of Local Government that aim at informing and sensitizing the public opinion for a better understanding and dealing with the environmental problems in the cities.

At the second level, an environmental urban planning policy is being implemented through a series of policy options and selected actions that are part either of the expired planning period (CSF 2000-2006) or the current one (CSF 2007-2013).

The actions refer to the basic issues that concern the urban centers and were mentioned at the beginning: (energy, traffic, waste, etc.). A general remark is that the initiatives that are

undertaken at the European level about this particular issue, influence significantly Greece, although there is always a relative delay as far as their adoption and implementation are concerned. Moreover, Greece is obliged to comply with E.U. legislation (Directives etc). Since it is impossible to refer analytically to all issues of urban development, we'll make a brief reference to some of them and mainly to the issue of energy management, as the basic aspect of environmental planning. A selective reference of the most important problems-issues of environmental planning in Greek cities must comprise the following themes: public transport, solid and water waste, and energy management.

## ***2.2 Mobility in the Greek cities: liveliness but also chaos***

The movement for a sustainable urban mobility in the Greek cities presented a promising progress at the beginning of the '80s, through the approval of the master plans of Athens and Thessalonica metropolitan areas, as well as the Structural Plans in all the Greek cities and towns, in the framework of the Urban Reconstruction Operation. Also, during the next decade (mid '90s) the progress, regarding the urban mobility, was significant due to the positive effect of related European guidelines and projects. However, later on, during the current decade, these projects and programs were abandoned, causing negative consequences to the Greek movement for sustainable mobility.

In particular, Greece did not perform satisfactorily in the framework of the well known project "Car free cities" of the past decade, that was supported by hundreds of municipalities-members of a European network. A small number of Greek Municipalities (Aghioi Anargyroi, Amaroussion, Volos, Larissa, Neo Psychico, Rhodes and Athens) have been founding members and have participated in the activities of this network. Since then, a series of relevant Policy Documents and Directives were published, such as the most recent Green Paper "Towards a new culture for Urban Mobility", without changing the basic policy principles. In particular, the new Green paper includes the following challenges-issues:

a) free-flowing towns and cities, b) greener towns and cities, c) smarter urban transport, d) accessible urban transport, e) safe and secure urban transport; these challenges-issues do not constitute new ideas, proposals or policies in relation with those described in the former documents. However, Greece still has not implemented these policies.

Nevertheless, during the current decade, Greece made an achievement: the new public works and infrastructures in Athens for the Olympic Games, such as the construction and operation of the tram, the metro and motorways (e.g. the ring road: Attiki Odos). However, a few years after their construction, these motorways suffer from congestions. Moreover, the promotion and construction of new subterranean parking spaces did not release the center of Athens from the traffic-jam, since the number of private cars increased dramatically by 50% (from 1,6 millions in 2000, nowadays the number of private cars is more than 2,5 millions). Still, the property index has not reached the saturation point, in an area of 4 millions of residents.

At the same time, the situation in the rest of the Greek cities has worsened, because of the general increase in the private car property index. Nowadays, the consequences are visible not only during the summer period (June to September) because of the tourism, but also during the winter, due to the absence of radical measurements concerning the removal of private cars from the provincial cities centers. In other words, the main problem still is the inability to create new behaviors and attitudes that would reduce the unnecessary urban movements and would face the problem in a serious and radical way.

## ***2.3 Solid and water waste and air pollution in Greek cities***

The problem of the **solid waste** is serious in Athens as well as in the other Greek cities. The recycling, reuse and composting indices are lower compared with those in other European

countries. As a result, the quantities of waste that end up into landfills or uncontrolled waste disposal areas are significant. For instance, the quantity of solid wastes generated in the metropolitan area of Athens is about 5600 tones per day, which means 1.4 kilos per capita (the total population of Athens is about 4 millions). At national level the waste generated are more than 5 million tones per year, (13.700 tones per day) that is about 0.45 kilos per capita per day. The Greek wastes contain large quantities of water, organic and biological elements that complicate their combustion. The institutional framework and the management system that was established during the beginning of the last decade and provided for a rational use of different disposal methods –according to the particularities of the country- was never implemented. Today, under the pressure of the EU sanctions, there is an effort of the state authorities to violently enforce the abovementioned management system of solid wastes, a procedure that causes serious tensions and reactions. As a consequence the relationship between state and citizens, which was never good in Greece, is now facing another important crisis.

Moreover, the water waste management presents serious problems. In the early '90s the ENVIRREG project offered an important impetus to the solution of the problem. This project financed the construction of sewage system and water waste treatment plants (WWTP) in the large and medium-sized coastal Greek cities. Of course, there are many more problems either within the wider metropolitan regions of Athens (Attica) or in various tourist areas of the Greek regions and provinces that do not dispose of the necessary water waste treatment plants and of the necessary sewerage. For instance, the scattered urbanized area around the new Athens airport, along the eastern coasts of Attica, up to the historic place of Marathon, with a population of 250.000 people, does not have a sewage network or any WWTR, due to local - social and political- conflicts, despite the possibility of Community financing.

The atmospheric pollution (the well known smog) and its dangerous pollutants mainly concern the metropolitan areas of Athens and Thessalonica. Not a serious achievement has occurred and as a result the problem remains acute at the expense of the health and the quality of life quality of the inhabitants. It is worth mentioning that, despite the infrastructures made on the occasion of the Olympic Games, the Greek capital still features among the most polluted / downgraded European and world-wide cities because of the air pollution, which nowadays affects the rest of the urban centers in Greece, such as Patras, Volos, Larissa, Herakleion, Kavala and where it takes various forms.

As a conclusion, it should be mentioned that any evolution (positive or negative) of these problems combines with the character, the governance of the country (conservative or progressive), as well as with the culture and the behavior of the Greek society, which is influenced by local tradition, as well as by external factors. Nowadays, the administrative and political system begins to awaken, under the pressure of the community legislation, despite the political cost.

#### ***2.4 The decisive role of energy planning in the urban environment and development***

For every city or urban area, its capacity to produce an adequate, clean and affordable supply of energy constitutes an important (if not the most important) condition for its development. As it happens in all natural ecosystems, likewise in the human habitats (settlements - cities), the energy flow is a key factor for maintaining their balance and regular operation. However, while energy is necessary and crucial as far as the existence and the continuation of any productive activity is concerned, at the same time it constitutes the main threat to air pollution and in general to the creation of the greenhouse effect on a global level. This important double role (positive and negative) of the energy in urban life justifies on the one hand the importance that central and local governments attribute to it and on the other hand requires the establishment of a prudent energy policy, in order to promote the

development and protect the environment. Furthermore, the developmental and environmental aspects of the energy problem are compatible goals. The reduction of consumption needs for energy is combined with the reduction of the air pollution, which is the main problem in contemporary cities. This pollution comes from the excessive consumption of energy, and a waste of the energy resources. So, the energy saving is the greatest source of renewable and clean energy! This objective is combined and complemented with the policy of making use of renewable energy sources (RES), which are the key element of the environmental policy for a sustainable development.

In particular, 30-40% of the total energy production is consumed in the European urban areas, in order to meet the human needs of working and living conditions (heating, cooling, lighting, etc.); this energy production contributes to the creation of 40% of the total amount of CO<sub>2</sub>. Unfortunately, Greece is in the first rank in energy loss and waste. The coefficient of the «energy intensity» (i.e. the ratio of domestic energy consumption to Gross Domestic Product) compared with those of other European countries with similar profiles is one of the highest today. This means reducing the energy efficiency and thus wasting energy. The opposite happens in other countries. To be noted that this situation takes place in a country where the dependence on oil is still very high (over 60%). Especially, the residential - tertiary sector suffer from a tremendous energy waste both in private buildings (houses, offices, hotels, shops) and public buildings (hospitals, schools etc).

Private and public buildings, in Athens and other Greek urban areas present a great variety and diversity as for their structural, functional and morphological characteristics since they have been built in different periods. This creates significant differences in their equipment for air conditioning (heating - cooling), which is generally characterized by excessive waste of energy; the higher consumption is observed in hospitals and hotels. This shows the necessity -in economic and environmental terms- of taking energy saving measurements in the tertiary and residential sector. Especially, in public buildings, State Authorities have the possibility of direct intervention in the modernization and improvement of the existing building stock, as well as the enforcement of new regulations on energy efficiency in new building constructions, which can be the object of pilot projects and can serve as examples of best practices.

In this effort, there were and still are many difficulties and problems that are owed to the structural weaknesses of the Greek energy system (lack of primary energy reserves, difficulties in the commercialization of renewable energy sources, lack of energy consciousness, etc.); these weaknesses do not allow substantial and spectacular progress and achievements in the short term. On the other hand, one should pay special attention to the need of coordination of fiscal and financial policy (exemptions, subsidies, etc.), in order to comply with the policy in the residential / urban area sector that is conducted by the Ministry of Environment and Planning. However, the regulations concerning building constructions related to improving environmental conditions refer to the urban environment, while legislation on financial incentives refers to the investments in productive activities. But even this controversial legislation has problems. For instance, heat insulation regulation, in force since 1979, although it contributed to the spread of a new concept for building constructions, however it was not implemented sufficiently due to the lack of an adequate administrative control system. Likewise, the Law n.1512 of 1985 provided for the possibility to offer incentives for the energy saving and the use of renewable energy sources in existing and new buildings; this law was not activated for 12 years.

In the mid '90s, with the help of a Committee of experts (composed of representatives of Ministries and other competent institutions), the Ministry of Environment and Planning elaborated the first Action Plan «Energy 2001» concerning the measurements in order to save energy and use renewable energy sources in the residential sector (Karavassili, 2008). In particular, this Plan referred to actions that can take place either on the existing or the new

building constructions, as well as at town and city level throughout the country. Also, the Plan specified the measurements contained in the National Program on Climate Change. These arrangements harmonized the Greek legislation with the Community Directive SAVE 93/76/EU (stabilization and reduction of the CO<sub>2</sub> emissions through the energy efficiency) and also formed an integrated institutional package that begun to be implemented gradually through a process of a broad participation and public dialogue aiming at a social consensus and initiatives to be taken by stakeholders involved at all levels. More specifically, this institutional package included:

- The Common Ministerial Decision n.21475/4707 (Official Gazette n.880/B/19.8.98) by the Ministers of Environment, Development, Public Administration and Decentralization and National Economy through which the legislation of the country harmonized with the Community Directive SAVE 93/76/EU (“Stabilization and reduction of the carbon dioxide emissions through the energy efficiency”).
- The assignment to the Center for Renewable Energy Sources to prepare a New Regulation that would replace the thermal insulation regulation, which would be issued in the framework of Article n.4 of the abovementioned ministerial decision and in accordance with the Article n.26 of the General Building Regulation. This New Regulation was called “Rational Use and Energy Saving Regulation” and introduced new standards and specifications for the study of building constructions, aiming at their better energy efficiency and the minimization of the environmental impacts. However, this regulation was never entered into force due to reactions by organized financial and manufacturing interests. Since then, the only developments have been the renaming of the Regulation on Rational Use and Energy Saving to “Regulation on Building Energy Efficiency” and the transfer of competence to the Ministry of Development in 2005. The administration of this Ministry began working out the bill that led to the Law n.3661/2008, which provided through a Common Ministerial Decision for the approval of the Regulation on Building Energy Efficiency (Art. n.3, §1); this approval has not taken place until nowadays.
- The implementation of Executive Decrees of the Article n.6 of the Law n.1512/85 on «Incentives for Energy Saving» and the adoption of regulations and technical guidelines of bioclimatic design, energy management and ecological construction (water saving, waste recycling, ensuring quality of indoor air, etc.) in the context of sustainable planning (sustainable housing, sustainable buildings, sustainable materials).
- The establishment of a staff administrative structure at central level for the elaboration of a Policy on Energy Management and Saving, especially in building construction section. This mechanism has not taken place so far.

In terms of implementation, a series of projects, financed by the Ministry of Environment, is promoted. These projects are supported by actions aiming at informing the public opinion, educating and professionally training, throughout the country, in cooperation with jointly responsible ministries, local authorities and institutions. These actions also aim at raising awareness among engineers, technicians and other professionals groups related to the building construction, as well as among users.

### ***2.5 A Special reference to Habitat Agenda and Local Agenda 21 Projects***

In Greece, from 1972 until 1992, i.e. the time between the World Summit in Stockholm and that of Rio, the spatial planning tried to integrate the environmental and sustainable dimension through various means such as the Agenda 21 Project, which was the most important «product» of the Rio Summit, but did not evolve in Greece in a satisfactory way. Despite the fact that from 1994 to 1997, the national reports were written and submitted to the U.N. Commission for the Sustainable Development, the promotion of the Local Agenda

21 Projects «tripped» the insufficient organization and know-how of the Greek local governments that could not work out such projects. Particularly, in 1996, the local authorities undertook the first pilot project; by that time, the deadlines set by the time schedule had expired. With the help of the Central Union of Municipalities and Communities of Greece and the collaboration of ICLEI, the municipalities of Chalandri and Amaroussion -in Athens metropolitan area- made an substantial effort of the LIFE program. In any case, it is obvious that these initiatives can not be considered as sufficient, even not as the minimum required for an E.U. Member State. The Project failed also due to little help that the responsible ministries of Environment and Interior Affairs offered to the local governments.

Two years later, in March 1998, a congress was organized in order to promote the HABITAT AGENDA Project in combination with the Local Agenda 21 Project. The Habitat Agenda Project constitutes the Global Action Plan for the Sustainable Development of Human Settlements, which was elaborated and adopted at the second World Summit of the U.N., held in Istanbul in 1996, as mentioned above. The Global Action Plan recognizes that although the problems and challenges for Human Settlements have become global, each region, each country, even every city and settlement face specific problems which require special solutions. It is particularly important that the local governments are recognized as the most important factor for the implementation of the Habitat Agenda Project. In October of 1994, the National Habitat II Committee was established aiming at preparing the Greek participation for the World Summit in Istanbul. The main task of the Committee was to elaborate the National Report, which described the objectives, the priorities and the main action lines for achieving the objectives of the Summit. The National Report presented the National Action Plan for the Cities and Housing for the period 1996-2000. In November 1997, the National Committee was re-established in order to be the main coordinating and guiding institution for the implementation of the Habitat Agenda Project in Greece, through the contribution of representatives of all ministries and institutions, whose activities were related to Sustainable Urban Development at national, regional and local levels.

The National Action Plan for the period 2000-2006 aimed at promoting a pilot initiative to enable and support 60 Local Governments (chosen out of 490, which responded to the call for proposals) for the preparation and implementation of integrated local projects for Sustainable Development (Local Habitat Agendas). The objective was these projects to be an example of best practice for all local governments in the country and also to be financed by the 3<sup>rd</sup> Community Support Framework. Unfortunately, there has been again a failure, because many local governments tried to participate through typical projects -already completed- in order to earn extra credits. As a result, the interventions were accidental and fragmentary, without any qualitative aspect. This also proves the lack of coordination which is necessary in an integrated program, responding to the problems related to the wise management of cultural and natural resources.

### **3. The necessity of elaborating a new policy for Greek low carbon cities**

On the basis of the commitments as described in the international convention on climate change and in accordance with the policy documents of the European Commission (Green Paper 22/6/05) and E.U. Directives: 2002/91/EC and 2006/32/EC repealing the old Directive SAVE 93/76/E.U., Greece undertook two main actions: firstly, the elaboration of a National Plan (Ministry of Environment 2002), (for Reducing Greenhouse gas emissions 2000-2010, and secondly the adoption of the Law n.3661/2008 (on measurements to reduce the energy consumption in building constructions), which constitutes the integration of the Directive n.2002/91 in the national legislation, with a delay of five years (European Parliament and Council 2002 and 2006).

Apart from the fact that the abovementioned Directive is relatively weak and does not set strict limits in energy consumption, the relevant Greek law -according to the Technical Chamber of Greece - is just a simple and poor translation of the Directive without deep and substantial study for its integration, since important aspects of the Directive are omitted or distorted (Technical Chamber of Greece 2008a). The Law distinguishes for its improvisation and does not focus on the key objective of the energy saving; it was just voted so as the country could avoid condemnation by the European Union Authorities (Official Gazette, 89A 2008). Furthermore, both the Directive and the Greek Law, exclude -without any specific reason- the buildings of religious worship and public gatherings, despite the fact they consume a lot of energy. The same happens with the country sides houses (second homes) that operate less than four months a year, even if this four-month period is long enough for a significant consumption of energy. Eventually, the Law does not even correspond to the timid provisions of the Directive, so a minimum benefit can be gained from it. According to this Law and the Directive n.2006/32/EC which has not yet been integrated into the Greek legislation, a Common Ministerial Decision was issued (Official Gazette 1122B 2008) on the "Measurements to improve the energy efficiency and energy saving in the public and the wider public sector". These measurements replace the use of oil by natural gas; they impose the maintenance of the air conditioning installations and set standards of lighting, ventilation and internal temperature. It is worth mentioning that the public buildings, according to the National Plan for reducing greenhouse gas emissions (2000-2010), are considered to be among the most waste energy constructions.

On the basis of this Law, in June 2009, a Common Ministerial Decision was issued and introduced a Special Development Program for photovoltaic systems in buildings, on terraces and roofs. According to this regulation, a grant can be given for works and interventions in buildings, aiming at saving energy in the critical residential area where 2/5 of the total energy is consumed. There are several objections to this regulation concerning the field and the process of implementation by the administration. However, since the regulation has not even been tested in practice, we can not draw credible conclusions (Official Gazette 1079B (2009).

Finally, during this period, another bill is being prepared that would transfer to the Greek law the last directive n.2006/32 of the European Union on "measurements for improving the energy efficiency during its final use and services in energy sector". Along with the changes on the institutional level, there are several initiatives from the ministries of Environment and Development, the private sector, Non Governmental Organizations and other scientific institutions. For example, in the framework of the renovation and restoration of old buildings, as well as the construction of new ones, a dialogue has already started on smart solutions, regarding the greening of roofs and terraces on multistory constructions in Athens. Such an initiative is that of the Ministry of Environment and Planning that promotes the creation of green roofs with economic, aesthetic and energy saving benefits (Technical Chamber of Greece 2008b).

It is obvious that the implementation of the new regulations in the field of saving and generating energy from renewable sources (e.g. solar), requires - especially in countries like Greece- a major effort that will be based on new organizational structures and anti-bureaucratic mechanisms and on the necessary interdisciplinary collaboration, as well as on the cooperative action of public services, scientific centers and research institutions. It is also clear that a key component of such a policy for low carbon cities is the seeking of innovative actions, especially in the privileged field of architecture and building constructions. For these reasons, it is necessary to adopt a new national strategy that incorporates the latest developments and achievements of technological progress and promotes new ways of the land management in urban areas through the necessary institutional arrangements and new social practices and attitudes.

#### 4. Conclusions

It is clear that during the last years, the Greek environmental and energy policy has improved, contributing to the creation of low carbon cities in order to provide economic benefits and improve the quality of life of all social groups and especially those living in deprived and downgraded areas.

The general guideline is to promote actions aiming at the rational use and management of non-renewable resources, as well as at ensuring the possibility to renew the renewable resources. In this framework, the development of low carbon cities is faced through the green building, the bioclimatic architecture and other innovative arrangements in the field of architectural and urban design; this development should be combined with the policy against social exclusion.

Certainly, the environmental and social problems and the challenges that the cities are facing at the dawn of the 21st century are many and do not lend themselves to easy solutions. However, consistency and continuity in the new planning guidelines and constructive cooperation with all the stakeholders that are involved in the decision making are the necessary conditions and the one way course for improving the quality of life for all citizens and for achieving a sustainable urban development in places where more than 50% of the population of our planet are live and work.

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