

# **Greece after the Gold Rush - Land Development Impact Analysis and Sustainability of the 2004 Olympic Infrastructure**

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**Key words:** Land development, land management, Olympic Games, Urban Regeneration

## **SUMMARY**

Organizing and hosting the 2004 Olympic Games (OG) has proved to be a challenge not only for Greece's capital city but also for the entire national administration. The success of the Games shows that Greece has the potential to achieve its goals. Looking ahead, as mentioned by several key players, Athens has a strong potential for redevelopment in its role as a functioning metropolitan region of the eastern part of the enlarged European Union and the Middle East.

While the Games may have generated short-term economic gains, such as more jobs and increased revenue, the real gold is in the long-term changes to the urban fabric of the city. Achieving this result required strategic planning by the government and the local authorities of Athens and Attica, linking economic, social, environmental and planning objectives to land policies.

This paper investigates the general benefits of hosting the OG, and makes a research on the impact of the OG on land development on previous host cities. The 2004 major impact of OG on redevelopment strategy and land management aspects, such as urban regeneration, infrastructure improvement, and environmental protection are examined. As good land management is considered to be the key for a general economic growth, a brief research and an initial economic assessment of the OG impact is also made.

The gained experience in aspects relevant to land management, such as: cooperation between public and private sectors and examples of successful public-private partnerships; the need for good land administration and land management; the need for compulsory land expropriation for the acquisition of land necessary for the Olympic Infrastructure; and the necessary land policy initiatives for the post-Olympic sustainability of the constructed Olympic venues are analyzed.

Finally the general conclusions of this study are given and a proposal is made. In this proposal, the further need for a specific Spatial Information System (SIS) for managing the Olympic venues is emphasized. This SIS will provide the tools for the systematic decision-making and action plan for the sustainability of the Olympic athletic infrastructure in the future.

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## **1. BENEFITS OF HOSTING THE OLYMPIC GAMES**

“Event-led development” is a concept that has been under consideration since the nineteenth century. Recent studies show that a community may experience regeneration through the hosting of major events like conferences, athletic competitions and artistic shows and concerts. This practice may assist in the effort to improve a community’s infrastructure, transportation systems and environmental protection projects. Tourism as well as urban development and reconstruction may be affected positively leading to economic growth, prestige and global recognition not only for the community, but also for the whole country.

Since it’s revitalization, OG has been increasing in scale. It has become the world’s most prestigious sporting event held for over 100 years in recent history. It is of such magnitude that it has a significant economic impact on a host city and, for smaller countries, on a host nation as a whole. While the actual event may last for only 30 days, preparations may begin even 10 years in advance and may entail considerable investment expenditures that can have long-term economic significance.

Especially after the 1960s, due to the technical advances achieved in telecommunications and TV, OG attract broad international interest. The increasing scale of the event, and the created income through participation, media rights and sponsorship, lead to more investment in athletic facilities and general infrastructure. Thus, modern OG generate major urban change and leave behind a substantial urban legacy. The most positive key players have characterized the Games as “an opportunity to bring forward long-term plans and to accelerate the pace of change”.

From a surveyor’s perspective, this event is one of the most characteristic examples of the possible impacts of particular land management policies. It shows clearly and within a short period of time what effect the organization of such a big event can have in land management and the economic growth of the hosting city. It also creates experience in aspects like: managing big projects (costs, delays in construction time, public/private partnerships), dealing with land use restrictions and regulations and developing up-dating mechanisms according to the emerging needs, monitoring the changes in market land and real estate values, and researching the impact on real estate markets.

In general, the benefits of hosting the OG are several but they can vary depending on existing circumstances such as: strength of the host city’s economy, level of existing infrastructure and the amount that needs to be invested in the preparation stage for sports facilities. It also depends on the land policy and the priorities set by the hosting city.

## **2. MAJOR LEGACIES OF THE OLYMPIC GAMES RELATED TO LAND DEVELOPMENT AND URBAN REGENERATION IN VARIOUS HOST CITIES**

International experience shows that despite the diversities, there is no doubt that the OG offer an economic stimulus for a period longer than 15 years and they leave significant financial impacts together with major interventions and changes in land development and infrastructure improvements.

Since its birth in 776 BC, though the main purpose of the Games was competition among athletes, they had evolved into a real cultural event, where philosophers, intellectuals, poets, sculptors and the entire world of arts participated and created the true dimension of the Olympic ideal. Since that time, the Games have always been an instrument for promoting physical and economic recognition.

In this respect urban planners, architects, land surveyors, attorneys, economists, appraisers and land policy makers are facing the challenge to find the proper land management methods in order to give positive answer to the remaining hot questions: “Are those billions of Euros, necessary for the organization of such events, well-spent?” and “How can they have a positive lasting impact on the urban fabric of the host cities after the final gold medals are awarded?”

Using the Olympics to revitalize run-down urban areas is a theme common to the recent host cities. According to IOC guidelines, a number of principles including recycling, renewable energy sources, public transport, and environmental protection are to be considered (IOC, 1993). New infrastructure, additional to the new sporting facilities such as airports, hotel accommodation, public transportation, water and sewage systems, telecommunications and urban landscaping is required to ensure the effective operation of the OG and to raise the national prestige of the hosting country.

Studying the OG development, it can be said that until the 1956 OG, most of the new infrastructure made by the host cities involved the construction of substantial sports facilities, with the most important appearance of the first communal establishment for athletes in the form of an Olympic Village for the Los Angeles Games in 1932. Many of the athletic constructions were of significant architecture and were considered to be the legacies of sporting facilities for the host cities. Considerably more impact on urban infrastructure than any previous OG happened in Berlin, in 1936, since the Reich government was willing to make large investments important for purposes of political propaganda.

According to one observer (B., Chalkley, St., Essex, 1999) the 1960 Rome OG established the new era in the history of the Olympic Games by producing both sports facilities and improvements in urban infrastructure such as: new roads, a municipal water supply system, a new airport, improved public transportation, street lighting, illumination of monuments and decorative improvements in the city.

Later, in 1964, Tokyo impressed by constructing a main highway network and underground railway lines, improving the water supply and waste management systems, establishing

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standards of public health by regular garbage collection, renovating public toilet facilities, cleaning streets and rivers, and introducing food hygiene controls and checks.

Another example related to significant urban regeneration was the preparation of the 208 ha venue in Munich, in 1972; the restoration of the historic part of the city; the underground parking facilities; the new expressways of 145km length; and the Olympic Village suitable for 10000 athletes. In the post-Olympic era, the village was used to house middle and lower income families, and it became a successful self-sustaining community. But, the OG in 1972 were overshadowed by the terrible terrorist attack which introduced one more major aspect for future events, the security issue.

Despite the impressive Olympic stadium, the Olympic village with two 19-storey buildings of 980 apartments, the famous Olympic Park designed by the French architect Taillibert, and the general infrastructure, the 1976 Montreal Games clearly highlighted the high economic risk the host city undertakes, especially when political opposition appears along with the technical and construction problems due to the use of new materials and techniques.

The Seoul Games of 1988 seem to have had the largest program to date by spending US \$14 billion for regenerating the Chamsil area, making transport improvements, urban beautification and environmental protection projects, and in 1992 Barcelona continued the extended role of the OG as a catalyst for urban development. The two main locations selected for sporting facilities and the 130 ha Olympic village area, the new marina, the transportation and utility networks, the renovation of city's cultural infrastructure, and the regeneration of Barcelona's 5.2 km seafront have transformed the landscape.

The 1996 Atlanta games were under the total responsibility of a private, non-profit organization whose major responsibility was the development of sporting facilities. Besides those facilities, the other main infrastructure-legacy was the Centennial Park and its inner city regeneration. Unfortunately, traffic congestion, administrative and security problems again led to negative criticism. Yet, commercialization was what characterized the Atlanta OG.

The 2000 Sydney "Green Olympics" established new trends and indeed gave an emphasis on environmentally friendly infrastructure and sustainable development which included public transportation and the Olympic Village, an example of good practice in solar power usage acting as a model for eco-sensitive design. Sydney managed to transform a swamp into residential communities in the city.

The Athens 2004 OG impressed by the construction of luxurious, high tech, modern sport facilities, the provision of increased security, the cultural Olympiad and the emphasis given on cultural features, the improvement of general infrastructure, the regeneration of the seafront of Athens, and the increased quality of value-added services to improve Athens metropolitan role in the south-eastern part of Europe. More analysis about Athens OG impact on land development is given below.

Recently environmental issues are becoming increasingly important, particularly in the selection phase for the OG. One of Beijing's strongest arguments, in its attempt to emphasize the significant environmental concerns of the city, was that it would have "cleaner air than Paris" by the year 2008.

Urban regeneration, Olympic Villages, general infrastructure improvements, sports facilities with great technical and architectural value, environmental improvements and long term tourism promotion are considered to be the top legacies of the modern Games. The relevant research of the past OG shows that each city follows its own unique approach, though.

The degree to which cities are able to achieve significant long-term benefits from the above legacies, depends on the investment made for the OG, and on the country/city's willingness and experience to make a number of necessary pre and post-Olympic choices related to land management, land policy and economic issues, such as:

- Level of tourism infrastructure built for the OG and the related administrative measures taken to further improve tourism, including quality of the tourism and cultural attractions and provided services
- An on-going promotional campaign
- Re-use of the newly constructed sports facilities with reliance on the Olympic experience to attract other major hallmark events
- Competitiveness in the business environment and an entrepreneurial approach
- Intelligent application of fundamental land administration and management principles, such as: act quickly, make the necessary legal changes in the land uses in some of the sports venues, establish public-private partnerships for their viable management, and adopt systematic, business and technical approach in decision making instead of following sporadic, and old fashioned political practices.

## **2.1. The Impact of the 2004 Olympic Games Redevelopment Strategy on the potential role of Athens Metropolitan Area**

Besides the on-going general infrastructure improvement activity in Greece and Attica area, and the works of major national interest such as the construction of the new airport, the metro, the "Rion-Antirion" Bridge, national road network improvements, ATTIKI ODOS Road network, Tram Line, etc (Figure 1) the Olympic preparation program also included some other general infrastructure improvements, plus the specific construction activity in 57 basic works for the installation of the necessary Olympic facilities (competition and non competition venues), and numerous other necessary works of smaller scale (V,Charalampidou, G, Vrachalis, 2002).

The construction of the basic Olympic Projects included:

- 24 construction works for the competition venues
- 2 telecommunication projects (the International Broadcasting Center of 55,000sqm and the Main Press Center, of 52,300 sqm, building complexes next to the OAKA area)

- 14 major road section and intersection improvements (5 of them refer to road connections with the Olympic athletic facilities)
- 3 major public fixed rail transportation projects (the Attica Suburban Railway Network, Metro extensions, Tram Line)
- the construction of the Traffic Management Center
- the construction of the Olympic Village
- 7 Press Villages
- 5 projects of the Public Power Corporation

Table 1 shows a classification of the Olympic Infrastructure and its geographic distribution and Figure 2 shows the Olympic venues and the Olympic Transportation network (Athens 2004) in the area of Attica.



Tram line



Metro line



ATTIKI ODOS Road Network



Rion-Antirion Bridge



Athens Airport El Venizelos

**Figure 1.** The Major General Infrastructure Improvements

In parallel, a major project for the security of the OG was introduced. Numerous other projects, such as: the illumination of the monuments, solid waste management studies, renovation of building facades in the center of Athens, upgrading of archaeological sites, renovation of ancient theaters and museums to serve theatrical productions of the Cultural Olympiad, and construction of new museums were undertaken for the Olympic period.



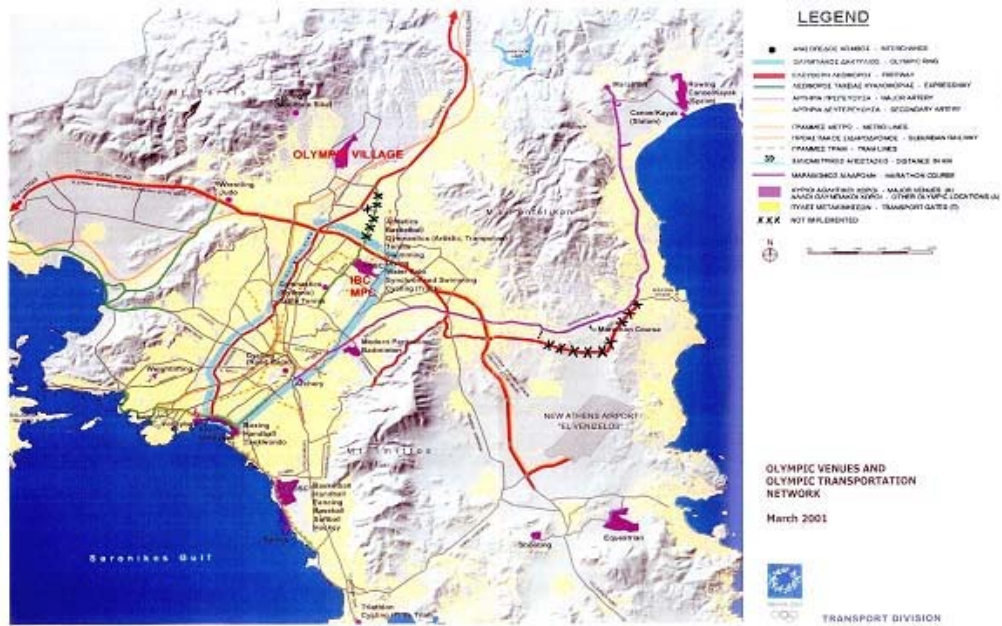


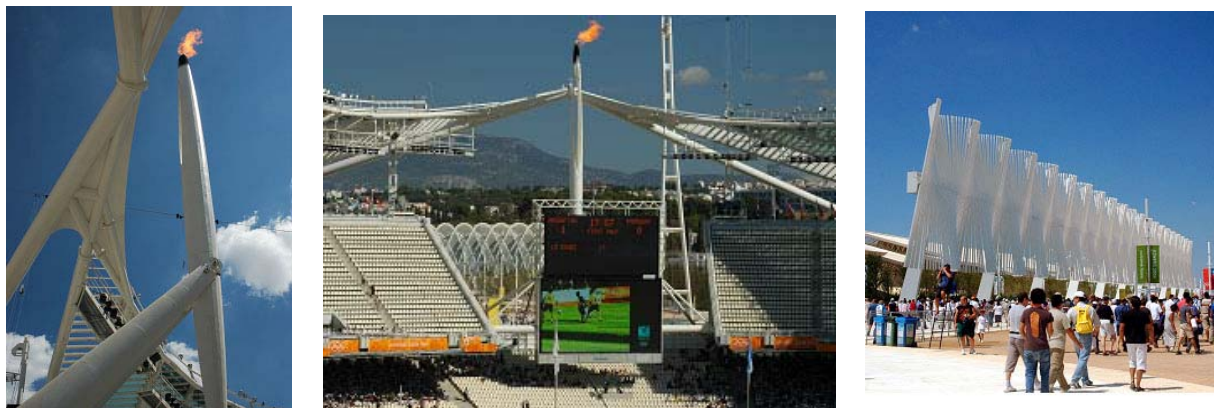
Figure 2. Olympic Venues and Olympic Transportation Network (Athens 2004)

Athletic facilities	Residential premises	Infrastructure works
<b>Ag.Kosmas</b> <ul style="list-style-type: none"> <li>Sailing Olympic Center</li> </ul>	<b>Ag.Andreas</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>Athens Tram</b> <ul style="list-style-type: none"> <li>24 km., 48 stations</li> </ul>
<b>Athens</b> <ul style="list-style-type: none"> <li>Ethnikos Premises</li> <li>Panathianiko Stadium</li> </ul>	<b>Amygdaleza</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>Attiki Odos</b> <ul style="list-style-type: none"> <li>65.3 km, 32 main interchanges</li> </ul>
<b>Galatsi</b> <ul style="list-style-type: none"> <li>Olympic Center</li> </ul>	<b>Maroussi</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>Attiko Metro</b> <ul style="list-style-type: none"> <li>17.3 km, 23 stations</li> </ul>
<b>Goudi</b> <ul style="list-style-type: none"> <li>Olympic Hall</li> </ul>	<b>Olympic Village</b> <ul style="list-style-type: none"> <li>124 hectares</li> <li>2,292 residences</li> </ul>	<b>ISAP (electric railways)</b> <ul style="list-style-type: none"> <li>25.6 km, 23 stations</li> </ul>
<b>Dekelia</b> <ul style="list-style-type: none"> <li>Olympic Training Center</li> </ul>	<b>Pallini</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>International Airport</b> <ul style="list-style-type: none"> <li>16 mil. passengers</li> <li>220,000 tons cargo</li> </ul>
<b>Faliro</b> <ul style="list-style-type: none"> <li>Peace and Friendship Stadium renovation</li> <li>Coastal zone reformation</li> <li>Karaiskaki stadium</li> <li>Fencing Hall</li> <li>Olympic Center</li> </ul>	<b>National Technical University of Athens Campus</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>Varis-Koropoiu Ave.</b> <ul style="list-style-type: none"> <li>Widening</li> <li>Vari settlement deviation</li> </ul>
<b>Helliniko</b> <ul style="list-style-type: none"> <li>Olympic Complex</li> <li>Olympic Canoe-Slalom Center</li> </ul>	<b>National &amp; Kapodistrian University of Athens Campus</b> <ul style="list-style-type: none"> <li>Press Village</li> </ul>	<b>Kifissias Ave.</b> <ul style="list-style-type: none"> <li>Multi-level interchanges (Psychiko, St.Barbara, Filothei)</li> </ul>
<b>Liossia</b> <ul style="list-style-type: none"> <li>Olympic Hall</li> </ul>		<b>Kifissos Ave.</b> <ul style="list-style-type: none"> <li>Multi-level interchanges (Posidonos, Pireos, Iera Odos, P.Ralli)</li> <li>Watercourse regulation</li> <li>Motorway construction from Pireos to Posidonos)</li> </ul>
<b>Markopoulo</b> <ul style="list-style-type: none"> <li>Olympic Shooting Center</li> <li>Olympic Equestrian Center</li> <li>Athens Horse Racing Course</li> </ul>		<b>Kymis Ave.</b> <ul style="list-style-type: none"> <li>Connection to the Olympic Village</li> </ul>
<b>Maroussi</b> <ul style="list-style-type: none"> <li>Renovation/Upgrade/Unification of Athens Olympic Sports Complex</li> <li>International Broadcasting Center</li> <li>Main Press Center</li> <li>Olympic Tennis Center</li> <li>Olympic Aquatic Center</li> </ul>		<b>Marathonos Ave.</b> <ul style="list-style-type: none"> <li>Classic Marathon route</li> <li>Pallini deviation</li> </ul>
<b>Nikaia</b> <ul style="list-style-type: none"> <li>Olympic Weightlifting Hall</li> </ul>		<b>Papandreou Ave. (Pireaus)</b> <ul style="list-style-type: none"> <li>Connection to Pireaus port</li> <li>N.Faliro-Schisto Highway</li> </ul>
<b>Peristeri</b> <ul style="list-style-type: none"> <li>Olympic Boxing Hall</li> </ul>		<b>Posidonos Ave.</b> <ul style="list-style-type: none"> <li>Alimos multi-level interchange</li> <li>Olympic Venues connection</li> </ul>
<b>Schinias</b> <ul style="list-style-type: none"> <li>Olympic Rowing and Canoeing Center</li> </ul>		<b>Souliou Ave.</b> <ul style="list-style-type: none"> <li>Construction</li> </ul>
		<b>Schinias Ave.</b> <ul style="list-style-type: none"> <li>Construction</li> </ul>
		<b>Stavros-Rafina Ave.</b> <ul style="list-style-type: none"> <li>Construction</li> </ul>
		<b>Marcopoulo</b> <ul style="list-style-type: none"> <li>Access from Lavriou Ave.</li> </ul>
		<b>Suburban Railway</b> <ul style="list-style-type: none"> <li>Athens Railroad Center</li> <li>17 stations</li> </ul>

Table 1. Classification of the Olympic Infrastructure- geographic distribution (Zentelis, 2004)

Among the various sporting facilities and competition venues, those of technical, land management, or architectural and design interest are:

- The centerpiece of sporting facilities: The *Olympic Stadium*. Among other major architectural innovations for the general upgrading of the Athens Olympic Sports Complex (OAKA) area (Figure 3), the roofs of the Olympic Stadium and the Olympic Cycle Race Course became the most famous. The architectural and structural study of those roofs (Figures 4a, 4b) was commissioned to the well-known Spanish architect Santiago Calatrava, who also had the responsibility for the general aesthetic upgrading of OAKA. The Olympic Stadium roof was constructed totally of steel and weighs 18,000 tn. Due to other construction works in the stadium area the roof was assembled at a distance of 70m away from its final location and was moved to the right place by sliding at 3-5m per hour. The Olympic Stadium is considered to be the centerpiece of architectural improvements in Athens; it is said that in a city where the most famous building is 2,400 years old, the Olympic Stadium is useful shorthand for modernization, and will serve as a beneficial anchor for its global repositioning efforts. Visitors to Athens can see an example of a major advancement in the history of structural engineering. For millennia bridges and buildings were erected with all structural members in compression. The Parthenon Temple and the columns of Olympieion are examples of this. Stone, the principle element in these structures, has great compressive strength and was shaped to form foundations, walls, columns, beams, arches and buttresses. Many of these structures stood for thousands of years as can be seen in Athens. With the advent of the iron industry in the 19<sup>th</sup> century engineers began to fashion bridges using chains in tension made of iron links for suspension of road decks. This technique progressed with the development of tensile structural steel making possible the stringing of cables and eventually, the graceful suspension bridges we see everywhere today. A most dramatic example of this is Calatrava's graceful cable-suspended roofs of the Olympic Stadium. Visitors to Athens may enjoy the World's finest examples of this advance in structural engineering (Figure 5).



**Figure 3.** Examples of the upgrading of OAKA area





(a)



(b)

**Figures 4.** Santiago Calatrava's Olympic Stadium and Cycle Race Course Roofs



**Figure 5.** Examples of major advancement in the history of structural engineering

- The *Olympic Rowing and Canoeing Center in Schinias* area (of 123 ha) (Figure 6), close to Marathon, which also included an environmental project and restoration of the wetland biotope. The water used comes from the fresh water Makaria spring (Figure 7) with a percentage of salty sea-water included though, due to topographic characteristics. Its post-Olympic use is not yet decided; it may be used for competition events and training in water sports, but since it will require large operating and maintenance costs it may be used for other environmental activities such as bird watching and recreational purposes combined with the sea and the pine forest.



**Figure 6.** Schinias area



**Figure 7.** Makaria spring

- The *Olympic Complex in Goudi* (of 4,500,000 sqm), with the modern Pentathlon venue (shooting, fencing, swimming, horse riding, cross country racing) and the Badminton Indoor Gymnastic Hall (Figure 8).



**Figure 8.** The Olympic Complex in Goudi (Hellenic Association of Consulting Firms, 2004)

- The *Equestrian Center and new Race Track in Markopoulo* (of 2.11 ha), site of the ancient city Myrinounda and the temple of Aphrodite. Archaeological excavations in progress during its construction resulted in numerous modifications to the master plan (Figure 9).



**Figure 9.** The Equestrian Center and new Race Track in Markopoulo (Hellenic Association of Consulting Firms, 2004)



- The *Olympic Shooting Center in Markopoulo*, the *indoor Wrestling Hall in Ano Liossia Attica*, the *Nikaia Olympic Weightlifting Hall*, the *Peristeri Boxing Hall*, the *Olympic Sports Hall for Table Tennis and Rythmic Gymnastics*, and the construction and refurbishment of 5 stadiums (*Pankrition, Pampeloponnisiako, Panthessaliko, Kaftanjoglio and Karaiskaki*) of which 4 are in the Olympic cities of Hraklion, Patra, Volos and Thessaloniki and 1 in Piraeus (Figure 10).



Pankrition, Hraklion



Pampeloponnisiako, Patra



Panthessaliko, Volos



Kaftanjoglio, Thessaloniki

**Figure 10.** Construction and refurbishment of the 4 stadiums in the Olympic Cities Hraklion, Patra, Volos and Thessaloniki. ( Hellenic Association of Consulting Firms, 2004)

Works such as the *reshaping of Faliron Bay*, together with the *Sailing Centre* at Aghios Kosmas and the *Hellinikon coastline*; the regeneration projects of Athens; the fully modern *road network and the Rail Transport networks*; the remodeling of *Athens Olympic Sports Complex (OAKA)*; and the sport facilities complexes in Attica area are among the major necessary Olympic innovations, which had been lacking in prior Greek general infrastructure planning. The impact of those will be examined in the following chapter. (Hellenic Association of Consulting Firms, 2004)

All Olympic works have been commissioned to the private sector for their construction. The operation and management of a few of them, though, is under public-private partnership.

### ***2.1.1. Regeneration of Faliron Bay and the seafront of Athens***

Due to a major highway constructed along the coastline in the 1960s the area (of 77 ha size and 2.5 km length) has suffered from noise, pollution and floods. In 2004, Faliron hosted three Olympic venues: Beach Volleyball, Handball and Tae Kwon Do. The planning

objectives in this area were: a) to connect the urban fabric with the coastal strip, b) to create an urban seafront and enhance the natural and historical environment of Faliron landscape, c) to protect the neighborhoods from floods and solve the broader water flooding problems of the Athens basin, d) to remedy the negative traffic impact and upgrade the housing area, and e) to establish a metropolitan focus by providing athletic, recreational and cultural activity infrastructure in the area. The Olympic phase infrastructure projects (Figure 11) in the area include the construction of: Ilissos river estuary, flood-protection dry canals, the Esplanade road (of 800m length and 50m width) connecting the urban fabric with the coastal zone, and the Tramline. Building projects include the Beach Volley Ball open stadium, Athletic Marina development, Reception and Information building, and the Handball, Tae Kwon Do Stadium for 8000 spectators.



**Figure 11.** Infrastructure projects in Faliron area

Unfortunately, due to time constraints, some remaining projects in the Faliron area are scheduled for the post-Olympic phase. These include relocation of the coastal traffic artery to the south, construction of a large canal and some more anti-flooding devices of the broader area, construction of two pedestrian and automobile flyovers, and creation of the Ecological Park between the two estuaries of Kifissos and Ilissos rivers. The future constructional needs of the Sailing Centre for a post-Olympic function, in order to serve as a 16,5 ha marina of a capacity greater than 1200 yachts, include the construction of the marina and the creation of a public coastal park as the natural continuation of the Metropolitan Park of Athens.

The construction of the new Faliron Marina with a capacity for 18 mega yachts and 270 vessels, adjacent to the “Irinis & Filias” stadium, together with its administration, management and financial benefits was assigned by law to a private company, which belongs to the state, named Hellenic Tourist Properties.

The rehabilitation of Flisvos Marina (of 304 yacht capacity) aimed to upgrade the port and on-shore facilities. The extension of the main breakwater, construction of a complex outer port facility and the proposed on-shore facilities are intended to upgrade the landscaping design of the area.

The Training Facility at the National Athletic Youth Center (of 78.3 ha and coastal frontage of 7.5 km) at Ag Kosmas is a sports complex accessible from both the coastal zone and the Athens city center. It includes: refurbishment of existing facilities, new facilities (Football,

Hockey and Archery fields, roof structures over one of the three swimming pools), and new temporary facilities for indoor training.

The Hellinikon Olympic facilities were built in the northern section (210ha) of the broader area (Figure 12a), site of the former airport of Athens. The infrastructure includes the Baseball Centre (two fields of play with 12,000 and 7,000 seating capacity), the Softball Centre (of 5,000 seating capacity), the Hockey Centre (two fields of play with 15,000 and 5,000 seating capacity), the Basketball and Handball Centre (of 15,000 seating capacity), and the Fencing Centre (two competition areas of 3,500 and 5,000 seating capacity). Existing structures of the former airport were used to house the functional requirements. Some of the above athletic facilities are to be temporary and they are will be removed after the Games. Also, the Olympic Canoe Slalom center (5,000 spectators capacity) was built in the Hellinikon area (Figure 12b). The spatial layout has good prospects for being a viable installation in the future. The authors of this paper are developing a project for the creation of a Spatial Data Infrastructure to support decision-making in the above area.



(a)



(b)

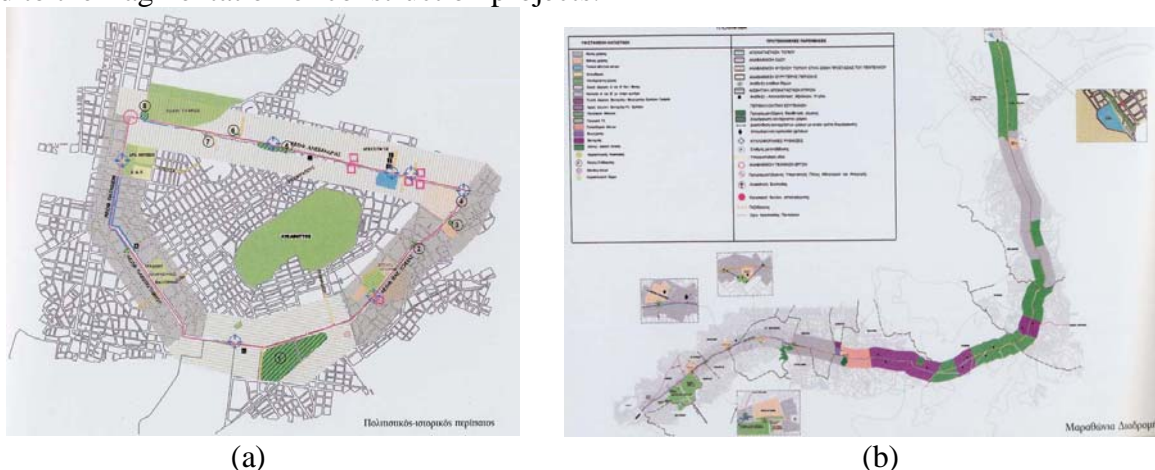
**Figure 12.** (a) Hellinikon Olympic Facilities at former airport  
(b) The Canoe Slalom Center (Hellenic Association of Consulting Firms, 2004)

### ***2.1.2. Urban Regeneration projects for Athens***

The regeneration projects for Athens are considered to be among the biggest projects in the history of the city of Athens intending to provide much needed open “breathing” space and unifying many of Athens archaeological sites. The master plan regarding the aesthetic upgrading of Athens, as a metropolitan center of international standing, had a budget of 380M €, consisted of 82 projects, and was financially supported by European community and national funds through the 3<sup>rd</sup> Structural Program. It had three major targets: a) the integration of the historic presence of Athens into its current urban and social structure, b) the integration of the new Olympic infrastructure into the city’s structure, and c) the mapping of the necessary urban and traffic adjustments related to the construction of the above mentioned



infrastructure with regard to the total regeneration projects taking place in the city. Based on the master plan, the Hellenic Ministry for the Environment, Physical Planning and Public Works proceeded to the actual implementation project. The implementation projects included the regeneration of the “entrances” to the city (upgrading of a number of main road arteries and public transportation stations), the upgrading and creation of new public squares, the creation of alternative routes within the city (the creation of a historic-cultural route of Athens (Figure 13a), routes for cyclists in the central areas and at the shoreline, the regeneration projects on the surrounding area of the Olympic infrastructure (the marathon Road (Figure 13b), the Olympic Circle, the OAKA area and other athletic avenues), and the regeneration of the suburban area (including area of archaeological sites). The majority of the projects were implemented. A number of obstacles, however (late beginning date, less funds than expected), led to the fragmentation of construction projects.

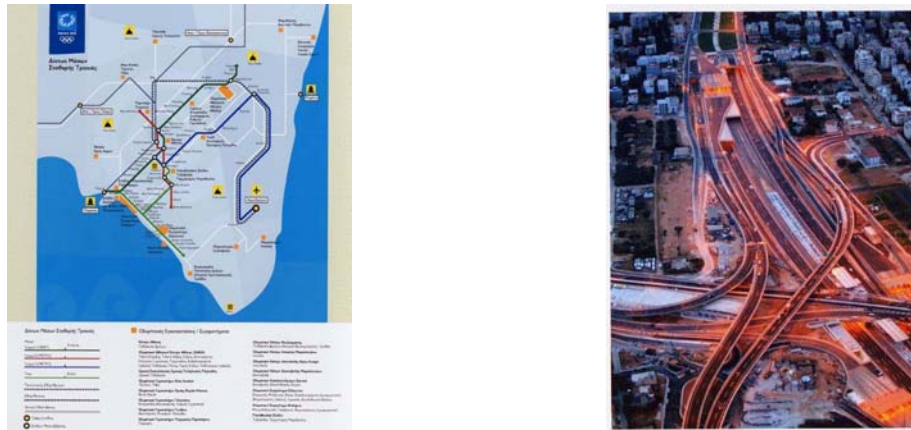


**Figure 13.** The Regenerated Historical/Cultural Route in the center of Athens (left) and the Regenerated Marathon Route Zone (right) (Hellenic Association of Consulting Firms, 2004)

### 2.1.3. Transportation and Traffic Management Projects

Transportation is considered to be the centerpiece of Athens’ infrastructure program (Figure 14). Athens new airport, one of the finest in Europe, and new trains, trams, and ring roads, are designed to drastically cut down congestion, smog and noise pollution (V. Charalampidou, G. Vrachalis, 2002).





**Figure 14.** Transportation Projects (Hellenic Association of Consulting Firms, 2004)

The Olympic Transport Strategic Plan was prepared in 2001 and was the basis for implementing all related projects. Traffic management projects were carried out for 5 sectors of Attica which included road section and intersection improvements, prohibition of left turns, parking and circulation prohibition at critical locations, modernization of signaling system, introduction of special express bus lines, etc. Two new fixed rail systems (light rail and suburban railroad) were introduced. The existing new metro lines were extended and the old metro line, servicing the Piraeus Port and the Center, the large sports complexes, the Athens City Center and the airport, was improved in capacity. All stations were totally renovated, modernized and upgraded. Special care was given to improve public awareness of the special and continuously changing traffic conditions during the games.

More specifically, the layout and structure of the Attica Suburban Railway network is structured radial to the main urban area of Athens Basin. A trunk corridor, of a length of 18km, crosses Athens Basin and connects the three major railway stations: the Piraeus Port Station, the Central Railway station of Athens, and the Acharnes Transportation Center (SKA). This corridor is common for all suburban railway services in Attica. Seven modern stations were built parallel to the axis of Attiki Odos, a limited access highway, to facilitate traffic. The octagonal terminal station at the Athens International Airport, with a 1400m<sup>2</sup> passenger hall, is linked to the main terminal building by a pedestrian bridge upgraded for sun and wind protection, and equipped with moving corridors, and can assure a high traffic density up to 12 trains per hour in each direction.

The Central Railway of Athens was totally refurbished and extended. Eleven new, electrified lines replaced the existing old tracks, while new piers and additional necessary facilities were also built. The Acharnes Transportation Center serves the northern half of the Athens Basin, as well as the rest of the Attica Prefecture, with a total influence area population of 1.5 million out of the 3.8 million of Metropolitan Athens.

The new, non-polluting tramlines connect Athens seafront (Glyfada, Voula and Faliron areas, Figure 14) with the center of Athens city. The extension of metro included the construction of 4 new metro-lines of total length 14km and 13 new stations.

The improvements of the existing road network and the construction of new parts included among others, the upgrading of the total Marathon Route (40km) (Figure 13b), and the Olympic Ring Road (new flyover bridges, pedestrian facilities, new roads connecting the Olympic venues) to decrease congestion. In addition, the construction of Kifissos Avenue, at a cost of 265 M € that indicates its magnitude, included a complex of technical, hydraulic and road works with reference to Kifissos river. It converted the river to a road and hydraulic artery, connecting the north section of Attica's basin to the sea. The additional construction of bridge complexes serves all traffic directions.

#### ***2.1.4. Remodeling of Athens Olympic Sports Complex (OAKA)***

The remodeling of Athens Olympic Sports Complex (OAKA) included several new constructions. The Tennis Center, which consists of the central stadium (of 8,500 spectators capacity), two stadiums (of 4,000 and 2,000 spectators capacity) seven auxiliary and six training fields, including restaurants and entertainment areas. In the Aquatic Center the building management system, the sound reinforcement system and the lighting installations have been reconstructed and new pools were built. The upgrading of all indoor areas within the Olympic Stadium covers a total area of 30,000 sq km, in addition, the new "Doping Control Center" (1,576 km<sup>2</sup>) and house facilities for the Administration, Press, VIP and athletes were built. (Hellenic Association of Consulting Firms, 2004)

#### ***2.1.5. Olympic Village***

The design, form and location of the Olympic Village (Figure 15) have a dramatic impact on the urban redevelopment of the host city. The selection of the site for the Olympic Village, at the foot of Mt Parnitha, has an approximately 20-year history. The final proposal for the Acharnon Basin site was made by the Technical Chamber of Greece (the umbrella association of all university graduated Greek engineers), and was approved in 1988. The first master plan was made for the candidacy bid for the 1996 Olympics. The final plan had a floor area ratio of 0,5, which creates an urban plan for the Post-Olympic use. The village consists of 2,300 apartments and could accommodate 18,000 athletes. It has a post-Olympic capacity of a permanent community of 10,000 residents. The area includes the archaeological square of Viaduct Adrianos. The basic goal of this project was the creation of a prototype settlement. The architectural challenge was not the structural peculiarity of the village but its size, and how to avoid modularization and standardization that is frequently seen in an organized urban structure. The color study for every type of building unit was important in achieving the final result. The "Village" area's land use is now transformed into residential, commercial and public uses. It is expected that it will serve to discourage rampant urban sprawl of Athens (Hellenic Association of Consulting Firms, 2004).



**Figure 15.** Olympic Village

### **3. ECONOMIC ISSUES AND EXPERIENCE GAINED IN LAND MANAGEMENT POLICIES RELATED TO THE ATHENS 2004 OLYMPICS**

This paper is not trying to quantify the full economic impact of the OG 2004 since this is a very complicated model that includes uncertainties and is spread over time. Economic assessment should be subject of a thorough study that will take into consideration several factors such as tourism income, side business, macroeconomic effect caused by the improved infrastructure, bid costs, investment expense, delay and preparatory costs, construction activity and reduction in unemployment, operational and security costs, jobs, revenue from the Games (TV, tickets, sponsorships, etc), maintenance of infrastructure, post-Olympic use, urban regeneration, international reputation and so on.

OG have been increasing in scale especially after the technical advances in telecommunications and TV in the '60s. In the Olympics of 1896 only 311 athletes participated coming from 13 countries, while in 2004 the number of athletes increased into 11099 coming from 202 countries. It is very difficult to judge whether it is really an economic stimulus. A brief research on budget balance in past Olympics shows that Munich 1972 and Montreal 1976 had negative results for tax payers and since then organizers became more conservative in making expenses on general infrastructure. The result of that movement was most clear in Los Angeles 1984 where there was a US \$215 M surplus due to the introduction of commercialization. Atlanta 1996 and Sydney 2000 created no debt, while Seoul 1988 and Barcelona 1992 had improved their infrastructure but also managed financially viable Games (Tibbott, 2001). Athens 2004 economic assessment is not published yet but it is known that it was a huge investment both in general infrastructure and in sports facilities in Greece.

The economic sustainability of all the above-mentioned Olympic Infrastructure demands good land management regulations and policies. Experience gained in land issues in the preparation stage, is of great value both for the post-Olympic stage in the host city, but also for the future host cities.

A close analysis of Athens 2004 issues, such as: the procedure for compulsory Land Expropriation, the establishment of Public Private Partnerships and the adoption of several relevant legal and administrative decisions, can show that new trends in land management have been created in Greece due to the OG. Projects, which under traditional, time-consuming land policies and procedures would have needed decades to develop, and others, which indeed have been pending for decades, finally were completed on time.

### **3.1. Tourism Promotion and related land policies**

OG attract the highest level of media attention, compared to any other hallmark event or exhibition. There are both positive and negative examples in the international literature of how this can affect tourism. For example Sydney 2000 Games earned US\$2 billion income by global publicity, Barcelona 1992 experienced a 21% annual increase in international convention business for the next 5 years, Atlanta did not receive the kind of media attention it would ideally have liked during the OG, nor did Greece so far.

The very successful and safe organization of the Greek event, though, attracted world's interest and admiration and increased the national pride to an impressively high level. It actually enhanced the "brand" of the city and the nation. Hellenic Olympics proved to have an immense and diachronic value that may have a considerable impact on foreign policy, the nation's image, the economy, culture, infrastructure, environment, and standard of living. The new look of Athens (urban, transportation and telecommunication improvements, together with the environmental, architectural and beautification improvements) have dramatically changed city's international picture.

The Hellenic tourism increased during 2000-2002 period, but it suffered a setback due to the Iraq war, SARS outbreak in 2003, bad publicity, uncertainty and construction delays, increasing cost, inflated hotel rates, fear of terrorism, unfair predictions by international press about the inability of Greeks to complete facilities on time, etc. In 2004, during the Games tourism increased again due to the improvements in specific infrastructure (90% of the 70000 hotel rooms were renovated), improvements on service levels (plethora of direct Easy Jet flights), cultural Olympiad, cultural events (eco-tourism, conference-tourism), etc.

Recent additional governmental and private sector decisions to increase tourism attraction include among others: The 30% reduction of hotel rates, the construction of a new big convention center, the all week/ full day operation of shops in tourist areas, better administration and extension of opening hours of the archaeological sites and museums up to late afternoon. All these administrative decisions have been under discussion for several years but only now has the nation become determined to adopt them.

In addition, the improved health, education, sports and entertainment sectors in Greece, due to the OG, are expected to create regional population movement within the Balkan area, thus increasing the housing and construction sectors and supporting Athens' emerging metropolitan and competitive regional role in relation to the on-going processes of economic globalization / localization and political re- territorialization.

### **3.2. The Cooperation between Public and Private Sectors - The Contribution of Academics in the compilation of the Works.**

Greece is the smallest country to host the Olympics in over 50 years. As shown above, previous hosts followed varied policies according to the local attitudes to public expenditure and the role of the state in this task.

Although Hellenic governments decided that the state should undertake the responsibility and the compilation cost of almost all infrastructure projects, and despite the fact that they still follow a social approach, i.e. the Olympic Village, which was built by the Workers Housing Organization with state budgets, is now being granted by lottery to house low-income families, with a symbolic price of 700 € /sqm, Greece has managed to establish a relatively new era of business approach in land management issues, with some successful Public-Private-Partnerships (PPP). Some major development works, such as: the construction of the new airport of Athens, the "Rion-Antirion" bridge, the "Karaiskaki" stadium, and the "Attiki Odos" highway network have been the first PPP construction projects in Greece.

The institution of PPPs first started in Greece in 1991. The first project was the study, construction, financing and management of the new airport "Eleftherios Venizelos". The task was commissioned, after a competition, to the German company Hochtief AG and the contract was signed at the end of 1994. The estimated cost was 2billion € (prices 1993) and the period the airport will be under the private company is 50 years. The state share to the construction cost was 60% (besides the budget for land compensation). The project was finished in 2001.

Also in 1991 started the procedure for a second project of 1 billion € (prices 1993), the "Rion-Antirion" bridge. The private company was expected to finance the construction by 15% and be paid back through the tolls collection, in the next 42 years (construction time 7 years included). Bank loan was 43%. Public sector also had a 42% share of the total construction cost (besides the budget for land compensation). The competition finally took place in 1993 and in 1996 the contract for the commissioning of the work was signed between the state and the private company. When the total needed budget was secured by additional contracts the original contract became valid in 1997. The project was completed in 2004.

In 1992 started the 1<sup>st</sup> phase for the PPP for the "Attiki Odos" highway network, of a total cost 2 billion € (prices 1993), and in 1995 the final commissioning was made. In 1998 part of the project was stopped by the Hellenic Court, some of the contracts were amended, and finally the project continued. The state contribution to the construction cost was 40% (besides

the budget for land compensation), and the concession period is 23 years. The project was completed in 2004. (Karnesis, 2000)

The refurbishment of the “Karaiskaki” football stadium, with a total cost of 80 million € (prices 2002) was another positive PPP example. The project started in 2003 and was finished in 2004. The cost, which was totally covered by the private sector, will be recovered by a percentage on the tickets’ income and the rents for the rooms and the real estate (13 bars, building for TV and press, 40 VIP boxes, 2 restaurants, shops of an area of 6,500 sqm, a museum, administrative offices, parking area, etc) existing both in the inside and in the surrounding area of the stadium, for 49 years. After that period, the management of the stadium will be given to the owner of the stadium, which is the Hellenic General Sports Secretariat.

Several other smaller PPP projects have been successfully completed among them the new Faliron Marina, the Olympic Village for the Press, and a few underground parking stations in the center of Athens.

The rest of the construction works were commissioned to the private sector by tenders and were financed by state budgets. 64 Hellenic consulting firms were involved in the construction of the Olympic infrastructure.

The Hellenic academic contribution of the National Technical University of Athens to the study and construction phases and to the organization of the Games was also valuable. Nine big research projects related to the: parameters analysis of Olympic Transportation network, development of a decision-making system for the designing of metro-lines, capacity and pricing estimation in the Suburban Railway axis, modernization of the water resources monitoring and management system of Athens, study with natural modeling of the Olympic Sailing Center of Ag Kosmas, the seafront of Faliron Bay, the water field for the Olympic Canoe Slalom of Hellinikon and the Rowing and Canoeing Center in Schinias, were successfully compiled. In addition, the involvement of Hellenic academic experts in most of the above mentioned major works (construction of the Olympic Sport facilities, accommodation facilities and general infrastructure and redevelopment projects) was immense (National Technical University of Athens, 2004).

The country’s whole potential was utilized, in order to achieve the desired result. The cooperation between various involved sectors was excellent and unique. However, as it has happened in other hosting countries, too, the international assistance from other countries especially in the fields of planning know-how and technology was necessary and successful, too.

### **3.3. Delays and additional necessary Parallel Projects**

The sectors and agencies involved in the organization of the Games are many and this demands a good coordination among them, a precise determination of responsibilities, an



immediate taking of decisions regarding important matters and most importantly the materialization of these decisions in a strictly fixed schedule.

Despite winning the bid for the OG in 1997, due to several land management issues major construction work did not commence until 2000. Thus, expenditure on the Olympic project has been concentrated in the years 2003 and 2004. A widening of the government's budget deficit was the result of the above.

Most of the delay up to the year 2001, was due to the existing legal, cultural, administrative and social situation in Greece - the "habits of the past", such as:

- Time-consuming traditional procedures and legislation for acquisition of privately owned land (land expropriation), necessary for the constructions (resistance of local people and/or local authorities to cooperate and allow the construction of the Olympic infrastructure in their area, complicated existing legal framework and traditional procedures, need for compilation of new laws, and difficulty in adjudication of the owners due to the lack of a modern Cadastre and land administration System),
- Lack of an advanced land administration system,
- Public opposition in use of state-owned land,
- Restrictive land use regulations (mixed-land use was not allowed for the operation of the Olympic athletic venues)
- Lack of experience in the public sector to work efficiently under pressure,
- Lack of coordination of all public agencies involved in Land Administration and development (Potsiou, Ioannidis, 2002), and
- The demand for additional archaeological documentation projects, due to the discovery of several archaeological sites during the excavations for the constructions.

The procedure for the acquisition of the necessary privately-owned land (land and real property expropriation) for the construction of the numerous Olympic infrastructure and sports facilities in time, and the complicated existing procedures about the mixed-use permits on public/state owned land and real property for the same reasons, demanded a modern and technologically advanced land administration Infrastructure, which was not existing in Greece (Potsiou et al 2001), thus making the task of adjudication of rights and mixed-land use permits a time-consuming task.

The slow progress of the "Hellenic Cadastre" project since its beginning in 1995, and the complicated existing, operating person-centric "Hellenic System for the Registration of Transfers and Mortgages" for the security of land tenure in Greece, with its major disadvantage of lacking cartographic reference, have been among the main obstacles of the adjudication and compulsory expropriation process.

In addition, many local citizen assemblies appealed local authorities, and also several local authorities appealed the state to the court as well, claiming:

- environmental protection reasons such as forest land and century-old tree protection in the area of Athens and Attica and

- the illegal -according to the existing legislation and planning regulations- change of land uses (from residential or agricultural to commercial and business use with a considerable increase of floor area ratio)
- . For most of the constructions, such as the telecommunication centers, people insisted on a temporary construction alternative (S.Suki, 2001), while for some others they demanded the most expensive solutions to achieve maximum environmental protection, such as for the construction of Attiki Odos highway tunnels.

Most of the privately-owned land, necessary for the construction of the major infrastructure works (Attiki Odos, metro lines, suburban railway, tram, ring road on Hymitos mountain, etc), has been acquired through “compulsory expropriation” time-consuming methods, which demanded numerous legal regulations, additions, and modifications, Regulatory Decrees and Ministerial Decisions, that without the Olympic deadline’s pressure would have taken several decades to proceed. Yet, the compilation and the ratification of this new Olympic Games legal framework from the Hellenic Parliament was not an easy and quick task. Serious concerns delayed the process; among them concerns about: the social resistance of the individuals affected and of public agencies (especially the local authorities and those who owned public/state real property), the pressure for extremely high financial compensation or other balancing advantages, the “opposition” mood of some public agencies, and the extreme environmental concern. (Horomidis, 2005)

One of the quickest examples for the whole compulsory expropriation procedure (i.e. decision for the particular location, determination of temporary expropriation values, dismissal of owners and acquisition of real property) was considered to be the case of the Olympic Village, which was completed in 7 months.

Numerous archaeological surveys were compiled during the construction of the Olympic infrastructure. According to the valid Hellenic legislation, whenever during the excavations for any kind of construction some archaeological findings appear, the whole construction process is stopped and restrictions are applied by the Archaeological Service in the land according to the importance and the kind of the findings. In most of the cases such restrictions are very strict (UN/ECE 2004) and can result to a total enchaining of any possible use of the land parcel. Special arrangements for the documentation and field surveying were done for all the places when new archaeological sites were found during the excavations for the construction of the new Olympic infrastructure.

### **3.4. Land Market and Post-Olympic sustainability**

As a result of the positive climate created after the Olympics, Greece is now considered to be a reliable place for international investment on land.

More than 9 billion € were spend -mainly derived from public finance, the most problem-fraught area of the economy- for Olympic Games 2004; a 30 day-spectacle, which was over 7 months ago. Both the debt and the fiscal deficit have to be addressed and the Hellenic

government has to deal with a complex post-Olympic reality. Today's main challenge is to facilitate the creation of a favorable business environment by providing investment motives.

Long-term benefits in Real Estate Market through private investment attraction, and post-Olympic sustainable use of the existing Olympic facilities need smart thinking and depend on:

- The level of the existing general infrastructure
- Land administration and land management Infrastructures and policies (UNECE, 2005)
- General legislative framework in land administration and land management (UN/ECE, 2005)
- Quick compilation of additional necessary legislation changes
- Real Estate fair taxation policy (Potsiou, et al 2002)
- Creation of business-friendly climate: institutional arrangements to improve integration across administrative areas, flexibility in minimizing bureaucratic procedures and improving service delivery, simplification of formalities and land use restrictions for enterprise creation
- Stability in land-use regulations, simplification of restrictions, focus rather on land-use monitoring and not on restrictions in ownership (Foster, 2003)
- The competitiveness of the business environment so as to attract corporate buyers.

To optimize development in a "city-region", and to exploit its potentialities, political focus should be directed towards upgrading the economic, institutional and social base, which is a prerequisite for entrepreneurial success. Besides the improved general infrastructure, education and health system, and the efforts made to change into a business-friendly and competitive environment, Greece's strongest points to attract investment on the Olympic Infrastructure are following.

Greece offers:

- legal certainty, as the rules and laws it applies are the same or very similar to those in the more industrialized EU countries,
- Macroeconomic stability and the strong currency of a European Union area member,
- A sound banking system, with an extended network in all Balkan and Middle East countries.

Attention should be paid so that focus will be directed to benefit the region and not only to enrich individual firms (Knapp et al, 2003).

Today, the Hellenic government is facing the challenge of managing the annual maintenance cost of the athletic infrastructure made for that purpose, estimated to be approximately 85-100 M €. In fact, government is considering the strategy for transferring part of that cost into the private sector. Bids for Public-Private-Partnerships in operation and management of the athletic infrastructure will be submitted in September 2005. Government's main concern is to create a systematic approach to avoid flooding the market with services that are in direct competition.

Critics have already started to talk about “an Olympic adventure” or lack of planning or better about a weakness of incorporating such major initiatives into an integrated framework. Exaggerated national enthusiasm for undertaking the organization of the OG was followed by a period of exhausting activity and by national pride for achieving a successful result. After that, responsible for the Games fell into an inactive condition. Partially, this might have happened because some new key-players and decision-makers follow traditional approaches and resist adoption of the experienced gained in land management during the preparation stage. The burden feeling of some is that this 30-day spectacle is over but its consequences will load the Hellenic citizen for many decades. In addition to the above negative criticism, extreme political worries arise again about possible governmental preference in decision-making based on economic rather than environmental criteria.

Government, on the other side, trying to balance between political cost and economic costs talks about the preparation of a legal detailed framework, carefully studied, to be submitted to the Hellenic parliament, which will be based on principles of combining sustainable development with quality of living and environmental protection.

The construction cost of 14 athletic installations, which were built to host the OG was 860 M €, which together with the value of land parcels becomes 1.5 billion €. This is the estimated total real state “Olympic property”. For the sustainable post-Olympic management of this property, a private company that belongs to the State is called “Olympic Real Estate”.

In the meantime different intergovernmental approaches appear. The Ministry of Finance, thinking forward, seriously considers the possibility of mixed commercial/athletic post-Olympic use of the venues. The Private sector, quite normally, asks for additional motives such as increased building coverage and plot ratio factors, and additional complementary uses to pure athletic use so that enterprises will be more attractive. On the other side the Hellenic Ministry of Environment, Physical Planning and Public Works still resists to the full commercialization of the Olympic Infrastructure.

Conflict also continues about the “post-Olympic” use of the “Ellinikon” area, the 540 ha area of the old airport of Athens, which is even bigger than the New York City’s Central Park.

#### **4. LESSONS LEARNT - CONCLUSIONS**

- The gradual increased scale and needs of the modern Olympic Games have increased the opportunities for broad land reforms and urban regeneration in the hosting cities, thus bringing an impact on land development and land management issues. A series of land management activities takes place in the periods before, during and after the Games, which might otherwise have been long delayed or even cancelled and which were necessary for the city to compete for a place in the “global cities network”. Administrative, legal and financial flexibility play a key role.
- Organizing major events can bring people and key players together, establish good cooperation between government and opposition, public agencies, academics and private

firms, increase national pride and self-respect, and enhance the image of a city and a nation. Public administration is characterized by bureaucratic forms in decision-making. In order that cities might exploit the full potential of hosting the Olympics, different approaches are demanded characterized by speed, flexibility, initiative, networking and a willingness to work with a range of other public and private-sector bodies. Traditional bureaucratic politics have to be replaced by a more entrepreneurial approach.

- There is a lack of institutional mechanisms which would provide public-public partnerships and cooperation in Land Management in Greece. This is also proved by the development reflected in the Hellenic Cadastre project. Two Prime Ministers have taken personal responsibility for the preparations of the Olympic infrastructure with successful results. There is a need that this close coordination will be continued for the sustainability of the Olympic infrastructure in the future, but also for all land management issues. This has to be guaranteed by the Law, or official regulations and close monitoring in Land Administration and Land Management projects. Many countries also face similar problems so the compilation of guidelines would help to serve that lack.
- Experience was gained by the new models of public-private-partnerships established for the construction and operation of major infrastructure works. This experience has to be assessed and improved for future projects. In addition experience is gained in land management issues that can support future activity in the field and make Greece a worthwhile destination for investment and trade.
- OG have a huge impact and involve research in Architecture (new constructions, materials, structural engineering), Landscaping, Urban Planning, Spatial Planning, Marine Planning, Architecture of Temporary Constructions (ephemeral architecture), but also in Land Management issues (land uses, expropriation, valuation, etc). Spatial Information Management plays a major role in all the above but also in pollution monitoring, traffic management, electro-communications, and security management.
- The importance of existing Spatial Data and the impact created by the Lack of Cadastre and National Spatial Data Infrastructure brought a serious delay in land management issues related to the OG.
- Land administration and land management problems (lack of coordination agency in LA, restrictions on land use, legal procedures necessary for land use changes, democratic procedures, public awareness, etc) have been identified and some procedures have been modified especially for the OG.
- For most of past host cities of the modern OG, including Athens, many of the proposed infrastructure improvements had been discussed for years, but the Olympics provided the necessary catalyst to bring projects to fruition. Fortunately recent host cities have learnt costly mistakes of earlier hosts, minimizing investment in temporary facilities and maximizing investment in long-term projects. Transportation has been the centerpiece of Athens' infrastructure program.

- Athens' key to success was having Zeus in its backyard as well as prevailing spirit in multidiscipline scientific cooperation, good public-private cooperation, academic contribution, public understanding, and support from all political parties. Good coordination among all interested parties is most needed for the future activity in this field.
- An example of best practice is good coordination, precise determination of responsibilities, an immediate taking of decisions regarding important matters and, the materialization of these decisions in a strictly fixed schedule.

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Since 1982, she works as Private Surveying Engineer - consultant, mainly in Photogrammetry and Urban Planning studies. Since 1986, she works at the Lab. of Photogrammetry of NTUA, teaching Photogrammetry, Cadastre and Cartography and participating in research programs.

Her research activity focuses on the fields of Cadastre, Land Administration, SIM, terrestrial and digital Photogrammetry. Since 1982 she participated in many FIG (Com7 and Com3), CIPA and ISPRS meetings presenting her work.

1992-96 and 1996-2000 elected member of the Bureau and Treasurer of the Hellenic Society for Photogrammetry and Remote Sensing.

1994-97 she worked for CIPA Bureau (International Society for Architectural Photogrammetry), as secretary to the President.

1998-2001 Technical consultant at Ktimatilogio SA (Hellenic Cadastre)

Since 1998 she participates in UN-ECE WPLA and CERCO meetings

1998-2001 chair of WG3.1 of FIG Com3 (organized the Athens 2000 Com3 annual meeting)

Since 1999 national delegate of the Technical Chamber of Greece in FIG general assembly

2001-2003 elected member of the Bureau UN-ECE WPLA

2001-2004 Vice-chair of FIG Com3, chair of WG3.3 of Com3

2002-2004 elected member of the Bureau of the Hellenic Society for GIS

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Chryssy A. Potsiou and Panagiotis Zentelis

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Cairo, Egypt April 16-21, 2005

various national & international scientific magazines & conferences. His academic experience is dating since 1970 through teaching in various graduate and post-graduate courses, seminars, diploma theses and Ph.D. theses, along with research activities and vast professional experience in relative fields since 1968. He is a member of the Hellenic Society of Photogrammetry and Remote Sensing, the Association for Geographic Information (AGI), the International Association of Assessing Officers (IAAO), the Urban and Regional Information Systems Association (URISA), the Hellenic section of the International Council of Monuments and Sites (ICOMOS-Gr), the Hellenic Institute of Valuation (HIV), the Urban Land Institute (ULI Europe) and numerous committees, working and task groups.

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