- Final Paper –

PPP PROJECTS IN GREECE: THE CASE OF ATTICA TOLLWAY

Theme: Innovative financing mechanisms for roads
Sub-theme: Public Private Partnerships (PPP's)

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Paper abstract:

Public Private Partnership (PPP) is a generic term describing the relationships formed between the private sector and public bodies, often with the aim of introducing private sector resources and/or expertise, in the procurement of public sector works and services.

Public authorities of the European Union (EU) member states and of other countries often have recourse to PPP arrangements in the undertaking of infrastructure projects, in particular in sectors such as transport, public health, education and national security. At EU level, it was recognized that recourse to PPP's could help to put in place the development of the Trans-European networks, which had fallen very much behind schedule, mainly because of lack of adequate funding. The state of PPP development varies widely between the EU Member States, but PPPs are established as one of the tools which are available to EU State governments.

Greece has adopted PPP's for some years now, as a valid method of procuring public services and since then, their use has been spread rapidly. Attica Tollway, known as Attiki Odos to Greeks, is a pioneer PPP Road Project constructed on a Concession basis and constitutes the largest co-financed road project in Greece and one of the largest in Europe. Attica Tollway is the Ring Road of Athens, providing traffic decongestion of the city centre and its radial in direction routes. It provides a link to the national motorway network and direct access to the new Athens International Airport (AIA). The 65km-motorway enables quick access to many areas, which until recently were difficult to reach and it meets the transportation needs of millions of people. The quality of the construction, the care for the environment, the pioneer technologies used and the high-level of the operation services offered have all become subject of international acknowledgements and awards, while they have distinguished Attica Tollway as a model project used by the Greek State for advancing the reconstruction of five more Toll Road Concessions, covering about 1,000 kms.

PPP PROJECTS IN GREECE: THE CASE OF ATTICA TOLLWAY

1. Introduction of PPP's

Since the 1980's, the role of the private sector in the provision of public infrastructure and services has continued to grow. "Public Private Partnership" (PPP) is a generic term describing the relationships formed between the private sector and public bodies, often with the aim of introducing private sector resources and/or expertise, in order to help, provide and deliver public sector assets and services.

Public authorities of the European Union (EU) member states and of other countries often have recourse to PPP arrangements in the undertaking of infrastructure projects, in particular in sectors such as transport, public health, education and national security. At EU level, it was recognized that recourse to PPP's could help to put in place the development of the Trans-European networks, which had fallen very much behind schedule, mainly because of lack of adequate funding. The state of PPP development varies widely between the EU Member States, but PPPs are established as one of the tools which are available to EU State governments.

The key benefits of PPP's can be summarized as follows:

- Infrastructure funding shortfall can be supplemented through PPP.
- Infrastructure created through PPP's improves the quality of the project.
- Value-for-money PPP projects deliver greater value for money compared to that of an equivalent asset procured conventionally. The combination of design, construction and operation outweigh the higher financing cost and PPP focuses on the procurement process on the whole-life cost of the project and not simply on its initial construction cost. It identifies the long-term costs and assesses the suitability of the project.
- PPPs transfer the risk of performance of the asset to the private sector. The private sector only realizes its investment if the asset performs according to its contractual obligations. As the private sector starts recovering its investment long after the facility is available for use, the PPP structure encourages efficient completion on budget and without defects.
- Buildings and services which would not otherwise be affordable, they can now be under a PPP scheme and this is a major benefit that helps public authorities take a long-term strategic view of the services they require over a long period.
- The concept of PPP helps reduce public dept and frees up public capital to spend on other public services.
- PPPs encourage innovation and best practice. The expertise and experience of the private sector encourages innovation, thus resulting in reduced cost, shorter delivery times and improvements in the construction and facility management processes. Developing these processes aids the establishment of best practice.
- Repairs and maintenance-assets and services will be maintained at a pre-determined standard over the full length of the concession.

- PPPs enable investment decisions to be based on full information, as they require a defined analysis of project risks by both the public sector and the lenders at the outset.
- The tax payer benefits by avoiding paying higher taxes to finance infrastructure development, as PPP's are based on the "user pays" principle.
- The government or public authority still retains strategic control of the overall project and services offered.
- The process can assist in the reform of the public sector.

Greece has adopted PPP's for some years now, as a valid method of procuring public services and since then, their use has spread rapidly. Attica Tollway, known as Attiki Odos to Greeks, is a pioneer project constructed on a concession basis and constitutes the largest co-financed road project in Greece and one of the largest in Europe. It is the first Tollway developed in Greece under the PPP scheme and its success can be proved from the date the Concession Agreement was signed till today.

2. Attica Tollway (Attiki Odos) Construction Phase

2.1 Description of Attica Tollway

Attica Tollway (Attiki Odos), has been designated by the European Union to be part of the Trans European Network. It extends along 65 km and enables quicker access to areas which, until recently, were either unapproachable or required a great amount of travel time. Attica Tollway is the road axis connecting about 30 municipalities of the Attica region, the region surrounding Athens, meeting the transportation needs of millions of people, on an annual basis.

Attica Tollway is one of the biggest Peripheral Ring Roads in Europe. It is an urban-suburban motorway-type roadway, with a general cross-section of three (3) lanes of traffic in each direction, accompanied by an emergency lane. The central median, assigned as a traffic island reserved in the very early designs for the development of suburban railway, has indeed been developed and the railroad is operational since 2004. Attica Tollway constitutes a unique infrastructure project by European terms, since it is essentially a fully access-controlled Tollway, within a metropolitan capital where the problem of traffic congestion is really acute.

The major technical characteristics of the Project can be summarized as follows:

Project features	*Value*
Total length (including the Egaleo Motorway link)	65 km
Service Roads / side roads network	150 km
Interchanges	29
Roadway bridges / Overpasses	100
Roadway bridges / Underpasses	25
Total length of Tunnels and Cut & Cover Sections	15.36 km
Customer Service Centres	9
Toll Stations	39
Total number of toll lanes	195
Electronic toll lanes	55
Mixed toll lanes with toll collectors	140

Table 1: Major Technical Characteristics of Attica Tollway

2.2. The history of the development of Attica Tollway

The idea of building a freeway (motorway)-type facility dates back to 1963, when Wilbur Smith came from the United States to undertake the first ever regional traffic planning study for the city of Athens and its metropolitan area. Sprawling development to the north of Athens over the years, the decision in the late 70's to build the new airport in its present location at the Mesogeia area (Spata) and the decision to build a city connector road along the foothills of the Mountain of Imittos in the early 90's modified the initial Wilbur Smith concept of the "ring" road, and transformed Attica Tollway into an urban freeway-type facility that serves the heart of the city. Tolls became necessary, not only as a tool of contractual arrangements for developing a Concession Contract, but as a major traffic flow "filter" to provide congestion management.

Since the 60's, decades had passed-by without any real attempts to get the road going, mainly due to the lack of funding, coupled with its high construction cost. The project real advancement began in 1985 when it became part of the official transportation infrastructure plans for the metropolitan Athens area, along with the goal of organizing the Olympic Games, initially planned for 1996 (marking the 100th-year anniversary of modern Olympic Games), and eventually organized with much success in 2004. Thus, the early 90's decision of the Greek Ministry of Public Works to adopt the method of co-financing the road through a Build–Operate–Transfer contract, proved successful, as it is widely recognized that without Attica Tollway, the traffic handling during the period of the Olympic Games, would have been extremely difficult.

Time schedules for such a project were difficult to develop, as there was no prior experience in the country for dealing with PPP's and Concessions. The international tender process lasted four years, and the tender which was announced in 1992, was awarded to the lowest bidder (that of Attiki Odos JV) among the three international consortia that participated in the process. The concession agreement was signed on the 23rd of May 1996 between the Greek State and the Concessionaire Company named "ATTIKI ODOS SA", a date that has marked the Concessions in the country, ever since. Following this, the agreement was ratified by the Greek Parliament in December of 1996, but the financial close of the transaction materialized in March of 2000, as, on the basis of extensive negotiations, the full contractual documentation was prepared to the satisfaction of the Lending Group which undertook the obligation to provide funding for the Project. The motorway was built and opened to traffic in sections, with the first section linking with the new Athens International Airport opened to traffic in March 2001 and the full road in June 2004. Therefore, Attica Tollway met the crucial deadline for the 2004 Athens Summer Olympics Games, built on-time and on-budget.

The Concession Agreement provides for the maximum toll rate, which cannot be exceeded. It also includes a safety mechanism securing the interests of the Greek State through a maximum Return on Equity. The Concession period would extend for a maximum number of years (25 years, plus awarded compensation), or it would end earlier if the maximum Return on Equity (RoE) has been reached.

2.3 The financing of the Project

The project's financing has been ensured through four sources of funds, including Greek State Contribution utilizing EU Structural Cohesion Funds, Private Equity subscribed by the Concessionaire Company and loans obtained from the European Investment Bank (EIB) through guarantees offered by Commercial Banks and loans offered by Banking Institution, part of the group offering the Guarantees to EIB's loan. The Project's construction cost of about 1,3 billion Euro was roughly covered as follows:

- 35% Greek State contribution (about 40% of this was provided by EU)
- 50% loans (Commercial Banks loans and EIB loans)
- 15% private equity plus toll revenue from sectional operation

The land expropriation cost was undertaken entirely by the Greek State.

About 25 international banking institutions, with the Bank of Tokyo -Mitsubishi acting as the Intercreditor Agent, were solicited by the concessionaire to subscribe and underwrite the risks associated with the project and they were rewarded, since all contractual provisions were smoothly fulfilled. In particular, the Commercial Banks had two main functions: to guarantee the EIB Loan during construction period and to provide commercial loans. The guarantees for EIB Loan were required until transferred to the Greek State upon completion of the construction of each Section of Tollway.

The realisation of a project of such scale met significant difficulties during its long path of development. The financial close was delayed, mainly because of uncertainties surrounding the project imposed by among others the design changes ordered by the Courts for reasons of environmental protection. These uncertainties increased the risks for the banks, delayed the signing of the financial agreement and forcing both the public sector and the private sector to provide funds to begin construction, before the financial close was reached. This "unusual" treatment was the result of exclusive deadlines imposed by the EIB to the financing of the Athens International Airport, which was under construction at the time and the road was the only meaningful access to the Airport. Through extensive negotiations between all parties involved, solutions were developed to face this "abnormal" condition and amendments to the concession contract were introduced, leading to the satisfaction of the banks and, hence, financial close was reached.

It is important to mention that the absence of legislation specifically authorizing PPP contracts has resulted in the obligation to have the contract being ratified by the Greek Parliament, so that it vests the authority of a "Law" vs. "Contract".

The contribution to the financing by the EU Cohesion funds through the Greek State financing contribution, enabled the so called "hybrid PPP structure", which was essential to the project's success, as it was the first PPP in the road sector in Greece and the project required strong State support. Therefore, the EU co-financing created value for the national government, as it reduced the financial commitments that would have otherwise been made to the sponsors. This reduced the discounted cost of the project for the national budget.

2.4 Risk Allocation

The project was structured as a real toll Design – Build – Finance – Operate (DBFO) following the classic Build – Operate – Transfer contractual principles, with strong government financial backing during construction. It followed the structure shown below:

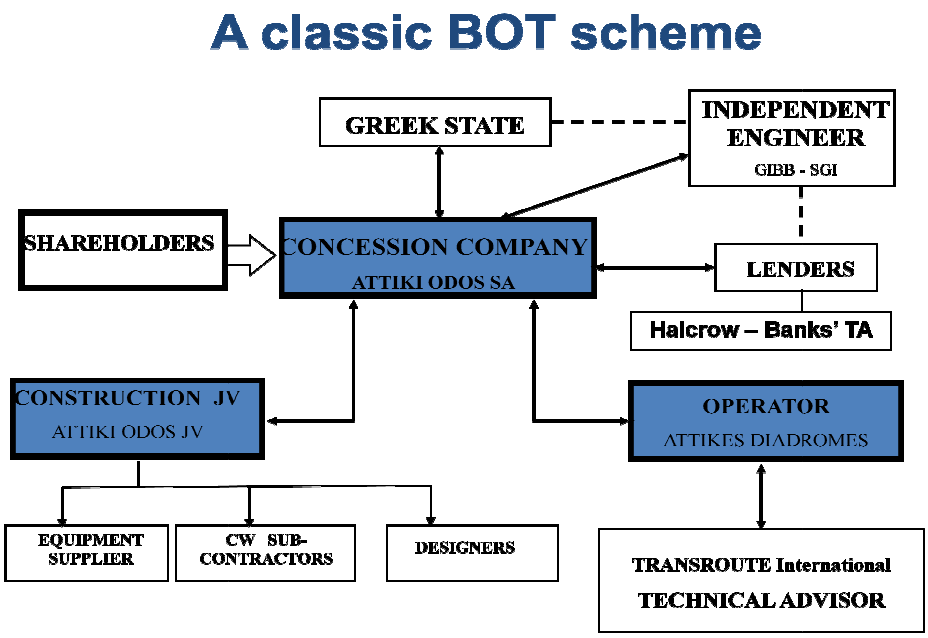

Figure 1: The Concession Structure of Attica Tollway

The contract originally signed included an overall construction period of 5 years. Design changes and modifications imposed by court rulings requiring changes in the alignment of the route, additional works to reduce the environmental impacts and the Greek State request to construct the suburban railroad needed for the Olympics, in parallel with the road,, warranted a time extension for the construction of an additional year and a half, creating an enormous time-pressure on the contractor. Regardless of any entitlement to extension of time, the Contractor had to finish all works before August 2004, as there would not be an extension or postponement of the August 13th 2004 opening day for the 2004 Summer Olympics.

Land expropriation risk was allocated to the Greek Government. Considering the difficulties of expropriating land in a old and densely-populated city such as Athens (as opposed to expropriating in the countryside), the Concession Contract allocated full risk to the public sector, as the Greek State had the obvious advantage in controlling this risk, because of the legal power to expropriate.

Design and construction risk was allocated to the Concessionaire, a risk passed on to the Construction Joint Venture named "ATTIKI ODOS CJV", a Consortium including all 14 Attiki Odos' initial shareholders, who were all at the time small by international standards Greek Construction Companies, through a lump sum contract. The concession contract included provisions limiting this construction risk. For example, in the case of a construction cost increase for changes to the original design (which actually took place), the Concessionaire and eventually the Contractor had the right to request this additional cost from the Greek Government.

Most of the operation and maintenance risk was allocated to Attiki Odos, which signed an operation contract with a separate company ATTIKES DIADROMES SA

(Attica Tollway Operation Authority), with initial shareholding of 51% by the sponsors (the Joint Venture of the 14 Greek Contractors) and 49% by Egis Projects, a French Toll Road Operator, shareholding that today stand at 80% for the Greek Contractors and 20% by Egis. The Operator undertook the operation and routine maintenance risk, while the risk of heavy maintenance stayed with the Concessionaire.

Overall, the Greek government was able to transfer construction, operation, and maintenance risks and responsibilities to the SPV Concessionaire Company "Attiki Odos SA" under the Concession Contract. The lenders to the SPV were therefore fully exposed to these risks, mitigated as they might be through the construction and operation subcontracts. However, EIB's policy is that of not undertaking construction risks, and it will usually accept remaining project risks, only after a period of satisfactory operation and the demonstration of acceptable cover ratios. Accordingly, as it is usually the case, the EIB loan was guaranteed by the Commercial Banks during construction. Once construction was complete, the EIB allowed these guarantees to be replaced by a guarantee issued by the Greek government.

In this way, the Greek government did effectively transfer construction risk to the SPV, but has taken traffic risk back through the guarantee, albeit at a reduced level compared with the risk at the outset.

3. Attica Tollway (Attiki Odos) Operation Phase

The primary concern of Concession partners, once construction was finished was to ensure the smooth and continuous operation of the Tollway and to provide high-quality services to the motorists. One of the main issues affecting the success or failure of a new tolled toad is based on the public's acceptance to pay tolls, as it is a fact that people generally oppose the payment of tolls. This fact greatly jeopardizes the success of any Tollway, as it can make financing very difficult, while in the case of a DBFO project, it can affect the project's revenue stream. In order to mitigate the risks of people opposition to paying tolls and either refusing to use the new Tollway, or limiting the number of trips, it is essential to provide not only what is required by contract, but also a level of service which is offering people "their money's worth", contributing to the user's feeling that they are getting what they pay for.

With the above being the paramount goal of the Operating Company, the day-to-day activities of the Attica Tollway Operation Authority include:

- Traffic management & safety of users
- Detection / intervention / management of incidents
- Routine maintenance of infrastructure and fixed equipment
- Maintenance of special vehicle fleet and machinery
- Development of proposals and ideas for major maintenance plans and improvements
- Toll Collection
- Design of Electronic Toll schemes & management of commercial packages
- Monitoring of the users complaints
- Public Relations and Communication
- Crisis Management

At Attica Tollway, a high level of service is provided in all important fields, including traffic safety and incident management, roadway maintenance, Electronic Toll Collection (ETC) as measures of performance targeting overall customer satisfaction. As a result of this, Attica Tollway has met and exceeded traffic forecast expectations, even during 2010, a very difficult time with lots of financial problems experienced in the country. The traffic evolution from opening until recently is shown on Figure 2 below.

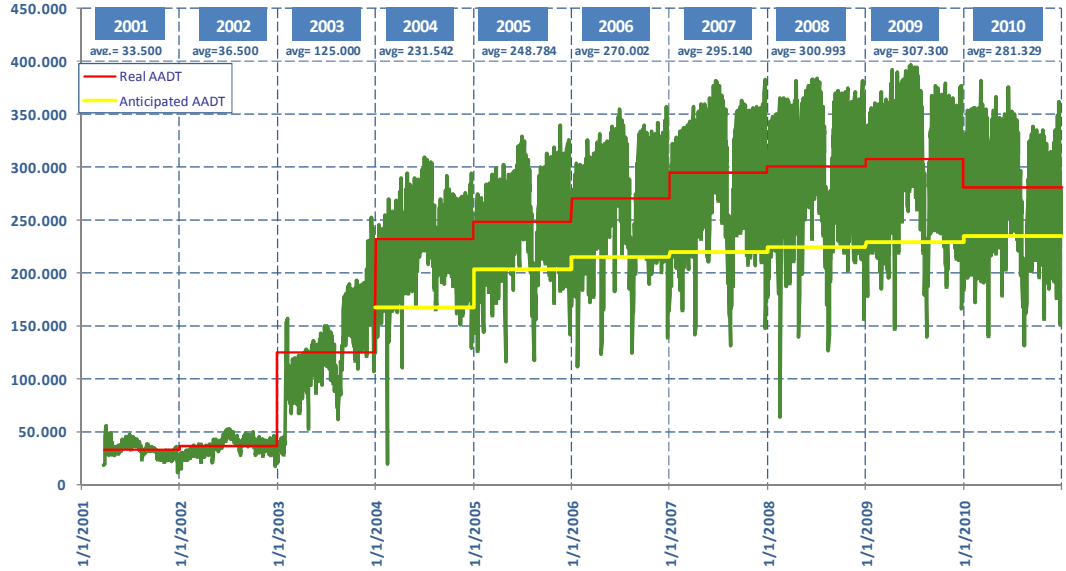

Figure 2: Annual Average Daily Transactions (Mar. 2001- Dec 2010)

Attica Tollway is offering a significant improvement to the traffic conditions experienced in the metropolitan area, while also benefiting the economy by modernizing the overall infrastructure. Also, as far as safety is concerned, road-user satisfaction with regards to level of safety currently stands at levels above 95%, despite the high traffic volumes. Time-savings, and hence reduction in fuel consumption, have also been significant. Figure 3 below demonstrates those time-savings, as perceived by the Users of the Tollway. As shown, more than half of the trips along Attica Tollway occur with significant time savings in the order of 16-30 minutes per trip.

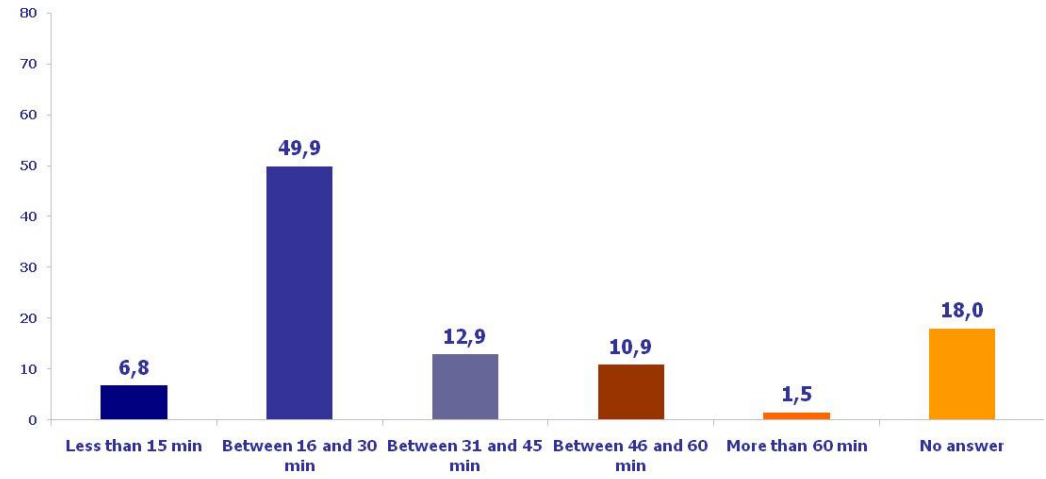

Figure 3: Perceived Time Savings from the users of Attica Tollway (% of users)

Attica Tollway played a critical role in the development of urban and land-use planning requirements for the metropolitan area of Athens. The presence of Attica Tollway was a major stimulus for the development of the Messogia Basin (east boroughs of the metropolitan area), since it provided a direct link to these areas with the centre of Athens. In addition, Attica Tollway contributed to the improvement and modernization of the road infrastructure, the creation of thousands of employment positions, while also providing direct links between all means of transport and area infrastructure (airports, metro, suburban railway, containers stations). It is notable that the operation of Attica Tollway to standards rising above and beyond basic satisfaction of users has become the subject of global recognition, with the Operator ("Attikes Diadromes SA") winning many prizes and awards of international statute from prestigious associations such as the Toll Excellence Award awarded by the International Bridge Tunnel and Turnpike Association (IBTTA), the 1st Prize Traffic Safety and the Global Road Achievement Award for Environmental Mitigation, both presented by the International Road Federation (IRF), the Service Award by the Transportation Research Board (TRB), the Super Brand Award for name and quality recognition and may other prizes and recognitions. This exposure on the international front has contributed to the recognition of performance of the newly established new industry of toll road operators in Greece.

Finally, its successful implementation of the Project has led to the realization of the next generation of PPP Projects of Motorway Concessions in Greece, including the five Toll Road Concessions of the former National Highway system, starting a new era for the construction of large-scale road infrastructure projects in Greece.

4. The development of new Toll Road PPP's in Greece

Based on the success of Attica Tollway and on the experience gained by the overall Greek construction industry, a vast program of motorway concession projects all over Greece has been developed, with a total budget that exceeds €8,5 billion. Five projects are awarded to concessions to upgrade old roads including construction of new sections and rehabilitation of old routes totalling more than a 1,000 kms, together with passing on responsibilities of operation and maintenance to the Concessionaires from the first day of the Concession period commencement. These new Concession Projects are Moreas, Olympia Odos, Aegean Motorway, Ionia Odos and Central Greece Motorway, as shown in figure 4. All these projects will be developed on the DBFO basis and all of them are part of the Trans-European Networks (TEN) constituting the backbone of the interurban highway system of the country, a network supplemented by the 950 kms of the newly completed east – west motorway of Egnatia Road in northern Greece The financing of the five new Concessions is by means of using both public, as well as private funds. The Concessionaires will build and/or improve existing road infrastructure and will in return operate, exploit and maintain the new, as well as the existing motorways conceded to them, for a concession period extending for 30 years. After expiration of the Concession period, the assets will be delivered to the Greek State, which shares toll revenue with the Concession Companies.

In the following map (Figure 4) which is presenting the Major Highway Network of Greece, the five new Toll Road concession projects, as well as the Attica Tollway and Egnatia Road are graphically depicted.

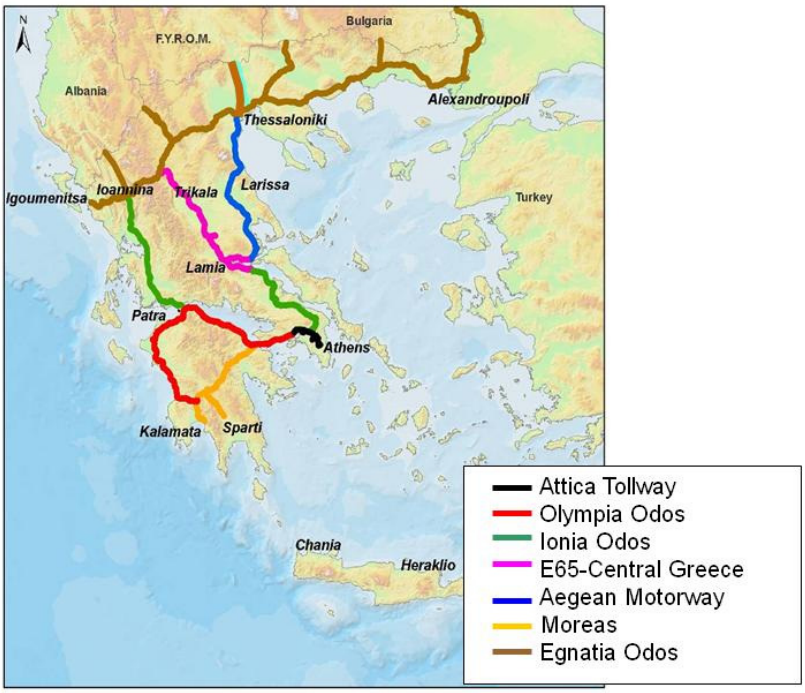

Figure 4: The map of new concession projects in Greece

The main objective of the development of this massive road program is to improve mobility along the territory of Greece, create development opportunities, enhance safety and increase the level of service offered to the Motoring public. However, as Greece experiences a severe economic downturn, this has limited public funding, while the austerity measures imposed have contributed to lower than pre-crisis conditions traffic and toll revenue, the future of these projects is not secured, as their bankability under the original scheme is at question. It remains to be seen if, in the spirit of good and balanced public-private partnership, the stakeholders involved will face the new economic realities by enacting modifications to the financing plan which will permit the much needed development of these roads.

5. Conclusions

The Attica Tollway project had to overcome many challenges and obstacles related to delivering of a project of a considerable size and complexity in a built-up urban environment.

Problems faced were resolved successfully and Attica Tollway is a good example of true PPP motorway development, not only in Greece, but also in at the international level. Certainly, Attica Tollway has been the catalyst for the 14 small Greek Contractors merging into two large groups; that of the **ELLAKTOR**, the largest Construction and Concession Group in Greece and that of **J&P,** the second largest such group in the country, capable of undertaking important infrastructure projects. The successful construction of Attica Tollway placed the Greek construction industry at a high performance level constituting the Greek entities competitive with big, well

established international companies in the project finance market and the operation of large infrastructure projects.

The success of the new tolled roads will be measured by people on the basis of getting "their money's worth", for paying the toll needed to advance the quality of the road contributing to the user's feeling that they are getting what they pay for. The success of Attica Tollway has created an opportunity for extending the development of further road infrastructure projects in the area of Attica, to compliment and complete the Athens ring roads, without imposing additional tolls to users, simply by exploiting the existing infrastructure. The experience gained by the Greek construction industry through the development of Attica Tollway shall be used as the driving force for setting back on track the vast program of the new motorway concession projects all over Greece, which are in a derailment course, if the public and private partners do not manage to take courageous decisions.

References

- "Developing Public Private Partnerships in New Europe", Price Water House Coopers pg 7-14, 2004
- European PPP Expertise Center "European PPP Report 2009"
- "Green Paper on Public-Private Partnerships and Community Law on Public Contracts and Concessions" COM (2004) 327 Final
- Halkias B., Deighton J. "Road Financing: How Sponsors, Administrations, Contractors and Lenders Are Sharing Risk: Attica Tollway Example", Presentation to 85th Annual Meeting of the Transportation Research Board January 22-26, 2006
- Halkias B., Papadimitriou F., Tyrogianni H., Politou A, "Public Private Partnerships for Highways, Bridges and Tunnels: The PPP approach for the Toll Road Sector in Greece", Presentation to the 2nd International Symposium on Freeway and Tollway Operations, Hawaii 21-25 June, 2009
- "Hybrid PPPs: Levering EU funds and private capital", Price Water House Coopers - PFIAF January 2006 pg 24-32
- International Road Federation "Urban Road Networks: Benefits of a Public-Private Partnership Approach", 2011
- International Road Federation : "Public/Private Partnerships; Beyond the financing aspects, 2008" Discussion Paper
- International Road Federation "Urban Road Networks: Benefits of a Public-Private Partnership Approach", 2011
- International Road Federation : "Public/Private Partnerships; Beyond the financing aspects, Discussion Paper, 2008
- Koklas G., Botsari O., Drimeris K. "The new road network across Greece" Presentation to the 2nd International Symposium on Freeway and Tollway Operations,Hawaii 21-25 June, 2009
- Papandreou K., Tyrogianni H., "Level of Service in Concession Motorway Projects", XXXV ASECAP Study and Information Days, 2007
- "Public-Private Partnerships: Models and trends in the European Union", DG Internal Policies of the Union, Directorate A, Economic and Scientific Policy, IP/A/IMCO/SC/2005-pg. 161
- The International Project Finance Association, available at http://www.ipfa.org/about_pf.shtml
- Tyrogianni H. "PPPs Anticipation and Reality Generates Innovation in Financing: The Case of the Attica Tollway", Presentation to the 75th IBTTA Annual Meeting and Exhibition, Vienna, 7-10 October 2007
- The World Bank Group "Private participation in infrastructure database", 2008