

CURRENT CONDITIONS  
IN THE REGIONS ON THE PATH  
OF THE EGNATIA MOTORWAY

cohesion mobility  
balance environment

1<sup>st</sup> spatial impacts report - March 2005

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The present report on the spatial impacts of the Egnatia Motorway is based on the results obtained from the indicators used by the Egnatia Odos Observatory as well as on the results of research carried out under the title “Spatial Impacts of the Egnatia Motorway: Report on the Current Conditions in the Zones of Influence”, which was elaborated by a research team of the Aristotle University of Thessaloniki (AUTH) with the funding, and under the supervision, of Egnatia Odos A.E.

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## Foreword by the Chair of the Board of Directors, Egnatia Odos A.E.

It is with a profound sense of satisfaction that I welcome this 1st Spatial Impacts Report by the Egnatia Odos Observatory. The Observatory is an innovative initiative by Egnatia Odos A.E. born from our collaboration with the European Union and thanks to its financial support. Its mission is to record and evaluate the spatial impacts of the Egnatia Motorway, in full harmony with the endeavours of the European Union to measure the impact of the Trans-European Networks on social, economic and territorial cohesion.

The development and running of the Observatory is not restricted to the simple role of a source that provides records and analyses of data: Its ambition is to constitute an efficient tool that supports suitable policies devised by competent development bodies responsible for the implementation of regional and spatial planning programmes.

At the European level, the Egnatia Motorway constitutes an extension of Pan-European Corridors IV (Vienna – Thessaloniki), IX (Helsinki – Alexandroupoli) and X (Berlin – Thessaloniki) cutting across Europe from North to South. As such, it plays a significant developmental role for the Balkans and South-Eastern Europe, and it is by virtue of this role that it has been included among the fourteen priority projects of the Trans-European Transport Networks.

It is our view that the Egnatia Motorway, along with its vertical axes, will have a decisive effect on the development of the whole of Northern Greece and, more broadly, on the national territory. Thanks to the Egnatia Motorway, Greece will play a more dynamic role towards shaping the budding regional Balkans and South-Eastern Europe market, providing high standard communication and transport channels, as well as creating opportunities for further commercial and cultural exchanges between these regions and the wider European area.

It is already clear that, at the local level, sections of the Egnatia Motorway in Eastern Macedonia & Thrace Region have been operating and delivering results, which are linked to a significant increase in mobility. The Kastania By-Pass section has also brought about the transformation of transport connections in Western and Central Macedonia Regions with regard to the traffic characteristics.

In this respect, the importance of this Report is by no means negligible, since it is the first documented and official record of the initial conditions and early effects of the operation of the Egnatia Motorway sections in Northern Greece. Investigating issues such as mobility and accessibility, economic and social cohesion, the balanced urban systems and urban networks, as well as the quality of the environment, the 1st Spatial Impacts Report of the Egnatia Motorway presents a broad synopsis of the main results obtained from the indicators monitored by the Egnatia Odos Observatory. Although it would be premature to draw conclusions at this stage, it is nonetheless clear that the Egnatia Motorway constitutes one of the vital axes of development in Northern Greece.

By means of the Observatory, Egnatia Odos A.E. monitors and evaluates the developmental impact of the Egnatia Motorway. This is done by considering the conditions in respect of the project's pre-

and post- implementation stages. It is in this way that it will be possible to obtain a clear picture of the motorway's impact on social and economic cohesion, on spatial organisation and, finally, on the transport system and the environment in Northern Greece.

The Report that follows, and all the information processed by the Egnatia Odos Observatory, are at the disposal of all bodies involved in the planning and decision-making process for territorial cohesion and regional development in the wider area of influence of the Egnatia Motorway. We hope that this information will prove useful to them at times when informed and competent choices need to be made, and decisions reached, for the development and cohesion of this region.

**Apostolos Goulas**

**Chair of the Board of Directors, Egnatia Odos A.E.**

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## Executive Summary

The present "1st Spatial Impacts Report of the Egnatia Motorway" seeks to evaluate the current conditions of development and of the environment over a broad area crossed by the Egnatia Motorway system and of its vertical axes. The area in question comprises five Greek Regions: Eastern Macedonia & Thrace, Central Macedonia, Western Macedonia, Epirus and Thessaly. The Report is based on the examination of the results provided by 30 indicators, with the help of which a number of issues were investigated, such as: patterns relating to traffic and mobility of the population across the road network; degree of accessibility of the Regions and of their centres; detection of intra-regional inequalities; degree of convergence with the European Union (E.U.) average; structure of the urban system; and, finally, estimated environmental impacts resulting from the operation of the motorway.

In fact, this 1st Spatial Impacts Report constitutes an evaluation of the conditions at an early stage of the project in the area of the five Regions, and of the various transformations that were recorded once the first phase of operation of the Egnatia Motorway had taken place. Measurements which relate to the 1990s are considered to draw a picture of the situation as it had been shaped before the construction of the Egnatia Motorway, and constitute foundations on which to base estimates regarding its impact in the future.

The first chapter of the Report provides basic information about the project and the role it is expected to play in terms of development. The Egnatia Motorway constitutes a receptive axis towards which converge Pan-European Corridors IV (Vienna-Thessaloniki), IX (Helsinki-Alexandroupoli) and X (Berlin-Thessaloniki), all of which lead from North to South. The Egnatia Motorway has thus acquired the status

of a project of major importance in terms of development for South-Eastern Europe. It is for this reason that the Egnatia Motorway was included among the 14 priority-projects of the Trans-European Transport Network and it benefits, on this account, from substantial funding from the European Union.

The funding guaranteed by the European Union for the axis so far amounts to € 4,640 M plus V.A.T. (joint funding from the European Union and national resources). The net amount from EU funds is € 2,290 M. All of the above funding is intended for the construction of 586 km of new motorway. In addition, the European Investment Bank has approved five loans for the Egnatia Motorway projects to a total of € 1,950 M, to cover part of Public Expenditure. The Egnatia Odos A.E. Company is responsible for the management of the construction process as well as the operation, maintenance and exploitation of the motorway. In view of the later, it has already proceeded to compiling a set of guidelines for both the implementation of innovative transport telematics and automated traffic control systems.

The Egnatia Motorway is fed by 9 vertical axes that provide links to 5 maritime ports and 6 airports. Four of these vertical axes constitute extensions of Pan-European Corridors. Egnatia Odos A.E., in addition to the main axis, has undertaken the design and construction management of three important vertical axes that constitute sections of the Trans-European Transport Networks. Specifically, these are the axes: Siatista-Krystallopigi, Thessaloniki-Serres-Promachonas, and Ardanio-Ormenio. The cost for the completion of these axes is estimated at approximately € 800 M, while the guaranteed funding for it is € 430 M.

As far as the progress of the project is concerned, 487 km out of the total of 680 km of the Egnatia Motorway were open to traffic



towards the end of 2004. This represents 72% of the axis. In the Region of Eastern Macedonia & Thrace, the sections of the motorway that were open to traffic represent 36% (174 km) of the total, in Central Macedonia 23% (112 km), while the construction work in Epirus (45 km, 12%) and in Western Macedonia (62 km, 16%) presents serious technical difficulties, having encountered challenges of a geomorphological nature and environmental restrictions.

The Egnatia Motorway, however, is not simply a modern motorway. The first question asked by everyone may well be directed at issues such as the progress of the actual operation of the 680 kilometres of its total stretch. But the real stake lies with issues relating to its wider contribution in terms of the development of the area within its sphere of impact. The Egnatia Motorway with its vertical axes has implications not only on the transport and communication systems as a whole, but also on the regional development and the spatial structure, as well as on the environment. At the same time it provides opportunities for the broadening of economic and cultural exchanges with the neighbouring Balkans. Besides, this development-oriented dimension of the Egnatia Motorway project is taken into consideration within the broad scope of policy making, both at a regional / local level and in national and even European terms. The Egnatia Motorway, as a backbone of regional development, has given rise to expectations, which bring up for discussion the need to start on a course of coordinated action and effective collaboration involving public and private bodies.

The second chapter includes the statement of intent, an outline of the scope of the project and an introduction to the system of indicators of the Egnatia Odos Observatory. The Observatory stands as an innovative initiative on the part of Egnatia Odos A.E. in so far as

it responds in practical terms to the perceived necessity of evaluating and monitoring the spatial impacts of the Egnatia Motorway. This is carried out in full harmony with the endeavours to assess the impact of the Trans-European Networks on development and cohesion at the European scale. In other words, the Observatory is developing into a strategic tool of information and support for policies and programmes of regional and spatial planning, at the service not only of the Company's Management, but also of all the Regional and Civil Authorities and development agents in the motorway's wider area of influence. The Observatory grounds the continuous monitoring and analysis of the spatial impacts of the Egnatia Motorway in a system of indicators, operating on scientifically documented specifications, methods and tools that characterise current international good practice.

The indicators system of the Observatory consists of a total of 50 indicators which, thanks to specific and measurable values, make it possible to estimate in a comprehensive manner the spatial impacts of the Egnatia Motorway and its vertical axes. For the system to be operable and in order to preserve the concordance with the specific categories of spatial impacts of a motorway, the indicators fall under three major headings: socio-economic indicators, indicators for environmental issues, and transport indicators relating mainly to the operational characteristics and effects of the road network. Each indicator corresponds to determined spatial fields of implementation which are the Zones of Impact of the Egnatia Motorway. Five Zones of Impact have been established and these were determined as follows: first, the zone of the axis itself to a depth of 500-1,000 metres; second, the widest geographical area of the Prefectures and Regions which are crossed both by the Egnatia Motorway and by its vertical axes; and finally, a wider area in the Greek and Balkans territory,

which is affected as a result of the changes brought about to the transport system as a whole.

The third chapter unfolds the scope and the conceptual framework of the analysis handled by the Report. In order to produce a synthetic evaluation, the indicators monitored by the Observatory were divided into categories and assessed on the basis of their consistency with four fundamental parameters that relate to key-objectives of European policy:

- (a) mobility and accessibility,
- (b) economic and social cohesion,
- (c) urban balance and networking,
- (d) quality of the environment.

The following chapters of the Report develop and analyse the results of indicators in the light of the four parameters.

To start with, the fourth chapter presents the general profile of the Regions crossed by the Egnatia Motorway and underlines the linking of the project, and more specifically the Observatory, with the provisions for development and spatial planning in Northern Greece. The basis for this is provided by the Regional Operations Programmes under the Community Support Framework and the Regional Framework for Spatial Planning and Sustainable Development enactments.

Next, the fifth chapter follows with the presentation of the results of indicators dealing with issues regarding the "mobility and accessibility" parameter. They relate to measurements of such features as the traffic volume, the composition of the traffic, travel time and time-distance relationships. Traffic volume measurements, which were carried out in 2004 point to highest levels on the sections of the motorway crossing the peripheral area of Thessaloniki, and in

particular between K4 (TITAN Exit) and Serres Interchanges. It is worth noting that, for almost all of the sections of the Egnatia Motorway in operation, the daily traffic volume comes to the level of, or exceeds, the 70% threshold of the figure predicted for the year 2010. Moreover, it is estimated that over the whole length of the Egnatia Motorway the composition of the traffic is relatively uniform. A break down of the traffic composition reveals that the majority of vehicles (80-90% of the total number) are passenger vehicles or vehicles of similar size. On most of the sections of Egnatia, it is estimated that the average speed pitches near to the recommended speed (120 km per hour) while, once completed, Egnatia will allow optimal reductions in travel time in Northern Greece. More specifically, it is estimated that the travel time from Thessaloniki to Igoumenitsa will be reduced by more than 180 minutes, while the travel time from Thessaloniki to Kipi (on the Greek-Turkish border) will be reduced by about 120 minutes.

In a next stage, the Report examines issues of accessibility for every Region in relation to the population, as well as to the market size and the labour force that benefit, owing to enhanced access opportunities from, and towards, other areas. It is estimated that the total population that will directly benefit in terms of mobility and accessibility once the system of the Egnatia Motorway and its vertical axes are fully in operation, represents one third of the population of the country. This is an observation of prime importance. Concerning the market size, it has been calculated that in the year 2000 the Gross Domestic Product (GDP) which was yielded by the five Regions en bloc totalled € 40,928.4 M, which represents one third of the total national GDP. Central Macedonia yielded over half of the GDP of the five Regions put together, while the smallest contribution was made by Western Macedonia and Epirus (under 10%). The distri-

bution of the labour force over the five Regions reflects the distribution of the population and the market size. In more specific terms, 50% of the labour force is concentrated in Central Macedonia, while Western Macedonia (7%) and Epirus (8%) claim the smallest share.

The Chapter on “mobility and accessibility” proceeds with the evaluation of the transformations regarding the accessibility of urban centres and the generated gain for every Prefecture. This evaluation follows the SASI model (Socio-Economic and Spatial Impacts of Trans-European Networks), used by the European Union to assess the impact of the Trans-European Networks (TENs-T). The results show a clear improvement in terms of accessibility, particularly for the most remote areas. At the same time, the Egnatia Motorway acts as a link for, and improves the accessibility of, other means of transport (five ports, 8 airports, a railroad network including terminals and frontier stations). It also improves the accessibility of areas of special significance (18 Industrial Zones, a wealth of tourist and cultural attractions etc.). The extent to which, however, these beneficial transformations will lead to regional convergence or, on the contrary, to backwash effects to the benefit of more developed regions, will depend on the successful implementation of development and spatial planning policies as a whole, and not solely on the operation of the motorway.

The sixth chapter presents the results obtained from the indicators in relation to the “economic and social cohesion” parameter. The indicators of crucial importance for the evaluation of economic and social cohesion are, first of all, the level of growth (calculated on the basis of the Gross Domestic Product per head) and the rate of unemployment. On the other hand, significant information is also obtained from indicators that provide a breakdown of the

composition of production and employment, as well of the foreign trade. For all these indicators, it is necessary to analyse the underlying conditions, the most important transformations experienced with reference to the previous five or ten years, as well as the way in which these measurements compare with corresponding measurements on a national and European levels. In the year 2000, at the regional level, the highest Gross Domestic Product per head (GDP p/h) was recorded in Central Macedonia, followed closely by Western Macedonia, while Epirus was found to have the lowest GDP p/h. In relation to the convergence with the Europe of the 15, Central Macedonia pitches itself on the same level as Greece (67.9%), again, followed closely by Western Macedonia (67%). The least affluent areas are the Regions of Thessaly, Eastern Macedonia, Thrace and Epirus, where the GDP p/h for the year 2000 stands below the national average and much below the European average. In the period 1996-2000, Epirus, however, experienced the highest annual rate of GDP p/h increase, and the most marked rate of improvement in terms of convergence with European levels.

On the other hand, the calculation of the average unemployment rate for the five Regions en bloc produced a figure around 12% in 2001. Western Macedonia experienced an unemployment rate significantly higher than this average (16%), while Thessaly experienced the lowest unemployment rate (11%). The results provided by the indicator for “composition of production” underline the clear dominance of the Tertiary industry sector, as the latter produced more-or-less two thirds (2/3) of the total Gross Value Added (GVA) of the five Regions. In second most important position is the Secondary industry sector, which produced 24.4% of the total GVA, while the Primary industry sector produced 10.6% of the total GVA. Addressing the issue of the composition

of employment, it would appear that 54% of the population of the five Regions is employed in the Tertiary industry sector. In second position of importance for employment is the Secondary industry sector, which gathers 24% of the employed population and, in third position is the Primary industry sector with 22%, a high enough percentage, however, as compared to the European average (European Union 15 = 4.2% for 2001). As regards foreign trade, it appears that the exports-imports ratio in the zone of the five Regions is equal to 0.86, while for the country as a whole it is equal to 0.40. This fact demonstrates the exportation-oriented nature of trade in Northern Greece.

In the seventh chapter, the results provided by the indicators relating to “urban balance and networking” are presented, as well as other data of the research around these issues. They refer to measurements such as the population distribution, change and density, the urban networking, the gravity of, and the mobility between, the urban centres in the five Regions. In the course of the 1991-2001 decade, the population of the five Regions increased as a whole by 6.7%, a percentage more than twice above the growth rate in the E.U.15 (3%). The rate of increase is particularly impressive in the four (4) urban centres of Thrace (Alexandroupoli, Xanthi, Orestiada and Komotini) where it fluctuates between 16.1% and 32.1%.

Generally speaking, the Egnatia Motorway system with its vertical axes has an influence on the organization of the settlements, by reducing distances and facilitating communication between them. More specifically, the Egnatia Motorway induces significant changes in the urban centres networking. According to the results of the National Origin-Destination Survey 2002, the mobility between urban centres at the cross-regional level is on the increase. This is resulting from either the creation of new moves or

the demand for moves which was pre-existent but which could not be met because of the poor quality of the road network available (depressed demand). A remarkable indication of the Egnatia Motorway’s dynamic impact on the networking of urban centres is that the pattern of mobility between the cities of Kavala – Xanthi – Komotini – Alexandroupoli increased by between 85% and 150%. On the other hand, the rural areas and smaller settlements benefit in a different way. For these areas, the significant factor is how successfully the main motorway connect with a dense and reliable web of secondary roads and interchanges, making it thus possible to serve the network of the smaller towns and of any other settlements. On the whole, the study of the parameter “urban balance and networking” fully demonstrates the role played by Egnatia as a generator of conditions for the interconnection of the urban centres, and for spatial re-organization towards more polycentric systems.

In the last chapter, the Report presents the results obtained by the indicators relating to the parameter “quality of the environment”. Noise pollution, air pollution, the fragmentation of environmentally fragile areas and, more broadly, the alterations affecting patterns of land use and land value, are all regarded as crucial indicators in the evaluation process of the environmental impact of important transport projects such as the Egnatia Motorway. In this context, the Report initially points out that on the basis of the CORINE Land Cover categorization it is estimated that, over a total distance of 680 km, the land which the axis crosses is divided as follows in terms of percentage and use: 68% cultivated agricultural land, 30% uncultivated natural areas, 1% aquatic ecosystems and 1% urban areas. Besides, 6% of the total length of the axis itself cuts across protected areas (Natura 2000 and Ramsar). When this occurs, provision has been made for specific technical solutions to

limit the impact on the environment.

As far as the noise pollution indicator is concerned, using a prediction model, it is estimated that the percentage of the population which is exposed to noise levels between 60 and 70 dB(A) is negligible and is localized in the periphery of Thessaloniki and in the plains of Central Macedonia (a scarce 0.1% of the population of Central Macedonia). The air pollution indicator which was evaluated, with the use of a prediction model for issues surrounding this parameter, revealed that allowable limits are possibly exceeded only on the sections of the motorway in the peripheral area of Thessaloniki, where it is expected that the traffic volumes circulation would be the highest.

As for the impact on the greenhouse effect, it was estimated that the total CO<sub>2</sub> emissions by vehicle/km remain relatively even across different sections of the motorway. They fluctuate at levels of a similar order, although slightly below the total CO<sub>2</sub> level for the country as a whole and the overall level for the European Union. On the other hand, the number of settlements that could potentially be affected by the road network is reduced from 97 (before the construction of Egnatia) to 75 (after the construction of Egnatia). The diversion of the traffic away from the important urban centres, where the majority of the population lives, causes a qualitative improvement in their living conditions. As concerns the fragmentation of natural areas and crossing with surface waters, it appears that the Egnatia Motorway affects such ecosystems only to a limited extent, compared to the effects of the road network without Egnatia.

On the whole, the impact of the Egnatia Motorway in terms of traffic circulation patterns on the road network, on increased mobility, on the networking of urban centres and on the improvement of accessibility, is positive and immediate. It is expected that alterations of this

order will have a decisive effect on the cohesion of distinct areas of the Northern Greece and, more generally, on its spatial model of development. It is worth noting that in some of the sections where the Egnatia Motorway operates (the Eastern region) some of the observed macroscopic changes appear to be of a particularly positive nature. Finally, the earliest results of the environment-related indicators show that the Egnatia Motorway either has a limited and controlled impact or, on the contrary, and in spite of the increased traffic volumes, leads to the creation of conditions which are significantly more desirable than the conditions prior to Egnatia.

When the focus is specifically directed onto the five Regions crossed by the Egnatia Motorway, the first distinctive feature is, undoubtedly, the dominance of the Region of Central Macedonia. It claims a little less than half of the five Regions' total population, and stands as the most developed area, since it has historically cumulated the most significant advantages, in close connection with the existence of the Greater Thessaloniki Area. As concerns the development trends of the five Regions, a fair number of divergences can be observed in the case of every parameter. The Region of Central Macedonia presents the highest rate of population increase, clear trends of intensification of the market, but also a high unemployment rate without falling trends. The Eastern Macedonia & Thrace Region, which stands in the third position in terms of population size and experiences a rate of increase that matches the average national level, presents a low GDP growth rate. At the same time, the high percentage of its labour force in the Primary industry sector is worthy of note. In addition, this Region is characterized by a fairly balanced network of urban centres that show a perseveringly increasing trend towards interconnection. Western Macedonia, the least populated of all five regions, appears to enjoy together

with Central Macedonia the highest GDP p/h as well as a clear trend for employment in the Secondary industry sector. It is, furthermore, distinguished by the highest unemployment rate and it is the only Region where this rate is on the increase. Epirus, the Region in fourth position in terms of population size, may be the least dynamic in terms of its market size but stands out, however, with the highest GDP growth rate. It is also characterized by a trend in employment firmly rooted in the Tertiary industry sector. Thessaly, finally, which stands in the second position in respect of its size among the five Regions, lags behind in terms of its population growth and of the importance of its market size. It is also important to note that, at a national level, Thessaly contributes substantially to the domain of agricultural production.

The 1st Spatial Impacts Report establishes, on the whole, the true potential of the Egnatia Motorway to function as a development axis complementary to the “traditional” PATHE (Patras – Athens – Thessaloniki – Evzoni) axis. As a transport infrastructure and especially as an inter-regional road network which links the main centres of development of Northern Greece, it has an immediate impact on the overall improvement of the economy and on quality of life. At the same time, however, it will be necessary to link up with complementary regional development policies and plans. These will thus enhance the productivity of the existing framework, spatial organization and the protection of the environment. Particular attention must be paid to the more vulnerable areas, which are the ones mostly exposed to the intensely competitive context of an expanding European Union.

It is hoped that this Report will contribute to the dialogue and to the cooperation efforts between development agencies towards the improvement of the planning and deci-

sion-making processes on issues of transport infrastructure and regional development. At the same time, it is expected to become the basis for the future expansion and documentation of the developmental role played by the Egnatia Motorway. Besides, through this Report, the Egnatia Odos Observatory is ambitious to open up the scientific discussion and contribute towards an integrated and systematic evaluation of the spatial impacts of important transport infrastructure projects in Greece and South East Europe.