



# Advances in Transport and Infrastructure Development

# 13

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## Abstract

Considered as the forgotten piece of public policies, transport and infrastructure development in Greece have long been lagging behind. The situation derived from both structural inputs -a challenging topography-, a difficult historical context -repeated war destructions-, and the inability of public authorities to mobilize financial resources for long-term investment -the “weakness” of the State. This structural “underdevelopment” issue was early identified by the EU authorities as a major impediment to growth.

Against this background, Greece’s EU integration overturned the entire transportation system. As early as the 1990s, large-scale contributions from the Structural Funds produced impressive results, among which are to be found the achievement of the Nea Egnatia highway, the construction of the Rio-Antirio bridge, Athens’s subway inauguration, and the opening of the Venizelos International Airport. Out of this, Greece went through an overall revolution of its transportation means and infrastructure, with major outcomes on people’s lives, and regional vs. international integration.

## Keywords

Transportation · Development · Infrastructure · Public works policy

Territorial fragmentation and land compartmentalization make the matter of transportation a critical issue in Greece. The problem has been acute for long, but European integration and the objective to promote development in the outermost and least developed European regions early led to a

massive resource mobilization with the intent to create an enhanced regional convergence within Greece’s boundaries and simultaneously stimulate international, cross-border connectedness. The process would participate in reducing territorial imbalances between disconnected rural areas and the main urban centers while solving the acute problem of traffic congestion and high pollution in the most densely built-up areas.

Much attention has been placed on the recent transport “revolution” in Greece because this area of economic development offered the authorities a perfect way to showcase the efficiency of European development policy. Massive infrastructure investment thus began in the 1990s and gained momentum (Skayannis & Kaparos, 2013). Even the crisis years had limited effect on the plan, which makes it a “structural antidote” to the austerity packages imposed by the Troika over the years. Infrastructure investments are intended to improve the overall future competitiveness of Greece’s economy, participate in the global modernization of the country, and help meet sustainability goals. Not surprisingly, this was rewarded with a high priority on the national and EU agenda and many projects achieved great success, with major operations impacting both central and peripheral places. However, the process implied an enhanced dependence on foreign investment capital and contributed to increasing the indebtedness of the “recipient” country. This must not be overlooked.

The academic community is quite divided about the outcomes of infrastructure transport investments (Park et al., 2019; Short & Kopp, 2005; Berechman et al., 2006). Linking transport and economic growth might be more difficult than anticipated. The same applies to the reorganization of economic activity (access to market) and to the dynamics of territorial-geographical (im)balances. Regional convergence and divergence are not to be seen as static but dynamic systems inscribed in the history and geography of the country. Building a primary image of national imbalances and addressing the process of national development throughout

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history is thus a preliminary step to understanding the logic underpinning the current decisive transport development plans.

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### **Connectivity and Land Integration: Historical-Geographical Divides**

Greece has long been chasing after its territorial consistency. This state whose existence dates back no further than two centuries has been fighting over 126 years (1821–1947) for its national expansion before stabilizing its boundaries. Greece's history, in the area of territorial integrity, can thus be divided into two distinct eras: (a) the nineteenth century, with a state centered on "Old Greece," the islands (Cyclades and Ionian Islands), the Peloponnese, and Central Greece around Athens and its further expansion in Thessaly; (b) this troubled century ends with the Balkan Wars, WWI, and the Asia Minor Catastrophe (1912–1922) through the annexation of Epirus, Macedonia, Western Thrace, Crete, and the Northern Aegean Islands. "Mainland Greece" had reached its final development stage and shape.

Two kinds of logic entered into conflict in Greece: throughout the nineteenth century, an independent Southern Greece started developing an embryo of transport network centered on Athens while the rest of the "country" geared around Istanbul and its active development policy towards connecting Western Europe with the Middle East. To put it otherwise, two historical and geographically opposing rationales confront each other: Athens as an emerging "village-city" and its southeast cul-de-sac position, heading a country made of islands and peninsulas; and an "up-and-coming" country still managed by the giant, imperial city of Istanbul, governing its European regions (Rumelia) both as underdeveloped external areas -the desire of independence as a sign and consequence of backwardness (Chirot, 1989; Palairat, 1997)- and as a bridge towards Europe and its economic development opportunities.

Within the Ottoman Empire's history, the Tanzimat Reforms (1839 onwards) initiated a period of intense modernization (Köksal, 2019). Railway lines were identified as a priority, although other objectives had to be reached in the areas of road upgrading, bridge regulation, and sea connections vs. maritime transportation (Kostov, 2017). But all these measures were intended for the reinforcement of Istanbul's central position and control, Thessaloniki and Edirne being in Rumelia two pivotal cities able to support Istanbul's policy (Darques, 2000).

Seen from the angle of today's Greece, the nineteenth century thus opposes an emerging Athenian city lagging behind, and the Ottoman "hub" in Thessaloniki already in an advanced stage of development within Rumelia. This situation lasted about one century and ended with the annexation

of Macedonia and Thrace in 1912. It left deep traces in the area of economy. Before integration was achieved, Greece was "fragmented:" (a) Athens revolved around maritime integration, supported by an enhanced openness to international influences through culture and trade relationships (dependence); (b) Northern Greece around Thessaloniki (Epirus is a specific case study) was managed through mainland road vs. railway integration and development was driven by an "internal" Ottoman project, secondarily open to international investments.

"Internal" boundaries throughout the nineteenth century and their step-by-step withdrawal established breaches between formerly integrated areas of the Ottoman Empire, on a systematic basis. The outcome of this situation is the disintegration process implied by land fragmentation and wars: Destruction of most preexisting transport infrastructure, and enhanced isolation of peripheral regions and islands. This would create and shape Greece's later internal, and regional framework.

The outcomes of this long-term schizophrenic situation are many, even today: Land fragmentation is still the hallmark of Greece's geography. External boundaries were often "hard", which means that the process of national expansion ended up with long-term interruptions as regards international connections, be it in the area of sea or land transport. Topography further enhanced and still constrains spatial integration: Fragmentation is also an outcome of the mountain relief dividing Greece into "independent" basins, with a main divide between western and eastern Greece along the Pindus range. The other division derives from the archipelago, as an "independent" entity, separated from and intensely connected with mainland Greece (Panagiotopoulos & Kaliampakos, 2019).

Over the twentieth century, Greece's transport development project was a major technological, economic, and political challenge: Reducing fragmentation and enhancing integration. Through this course of action, Athens would become in the end the main beneficiary of progress.

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### **The Challenge of Regional Integration Through Transport Development Policy**

Without going back to the early infrastructure projects conducted in Greece as far as the nineteenth century (Corinth Canal, for instance), to understand the present challenges surrounding the key issue of transport and its place within the Hellenic society, economy, and geography, one has to assess at first the extent of ambitions remaining to be fulfilled, which implies to take a little trip back in history to try to determine how Greece got to this point today. Major imbalances do not emerge spontaneously and, as in other areas, historical geography plays a key role.



We must first get back to the North-South divide favorable in the first instance to the northern provinces (still Ottoman) before the annexation of Macedonia and Thrace in 1912 turned the situation around. While Thessaloniki was early connected through a railway line to Skopje-Üsküb in 1873, and to Istanbul-Constantinople in 1896, one has to wait until 1918 to see Piraeus and Athens benefit from a modern connection with the Macedonian capital (Figs. 13.1 and 13.2).

The situation within the late Ottoman Empire is extremely diverse (Stanev et al., 2017). The western and southern Balkan Peninsula remains completely sidelined, whereas the main Ottoman-European corridor connects Istanbul with Vienna through Sofia, Belgrade, and Budapest. Leaving

aside the major projects dedicated to enhancing international connectedness, the Ottoman backcountry is in a rather critical condition. Being landlocked is a major impediment to development for many local communities.

The situation even worsened at the beginning of the twentieth century. The destruction of the Balkan Wars and WWI, the resettlement of the Asia Minor refugees, and the state of public finance would open up an unbridgeable gap for the authorities. Not much progress would be achieved in Greece over the interwar period because most national resources were diverted to other land management priorities. And the series of setbacks did not stop. WWII and the Civil War dealt a fatal blow to the transport area through the mass destruction of the country's infrastructure (Fig. 13.3). It is estimated



**Fig. 13.1** Railway lines in the Balkan area, 1905. (Source: David Rumsey Map Collection, Wilhelm Koch, Verkehrs-Atlas von Europa, 1905)

Railway lines appear in red and national boundaries in light brown. Over this last period of the Ottoman Empire, Greece appears as an isolated place disconnected from the Balkan Peninsula, whereas Albania

and Montenegro suffer from their historic remoteness and remain uncovered. This map demonstrates how much the Balkan network model is eastward oriented. Thessaloniki is already connected to Belgrade and Northern Europe through Nish, and to Istanbul-Constantinople. There is no west-east connection





**Fig. 13.2** Railway lines in Greece, 1905. (Source: David Rumsey Map Collection, Wilhelm Koch, Verkehrs-Atlas von Europa, 1905)  
In the Hellenic Peninsula, railway development follows a local logic. Athens developed a small network mainly running in the Peloponnese. In Thessaly, a small line connects the port of Volos with Larissa and

Trikala. This independent network was built soon after the annexation of Thessaly in 1882. However, the connection between Livadia and Larissa is still pending. Western Greece and the districts bordering the Ionian vs. Adriatic Sea are isolated areas cruelly missing basic transport infrastructure

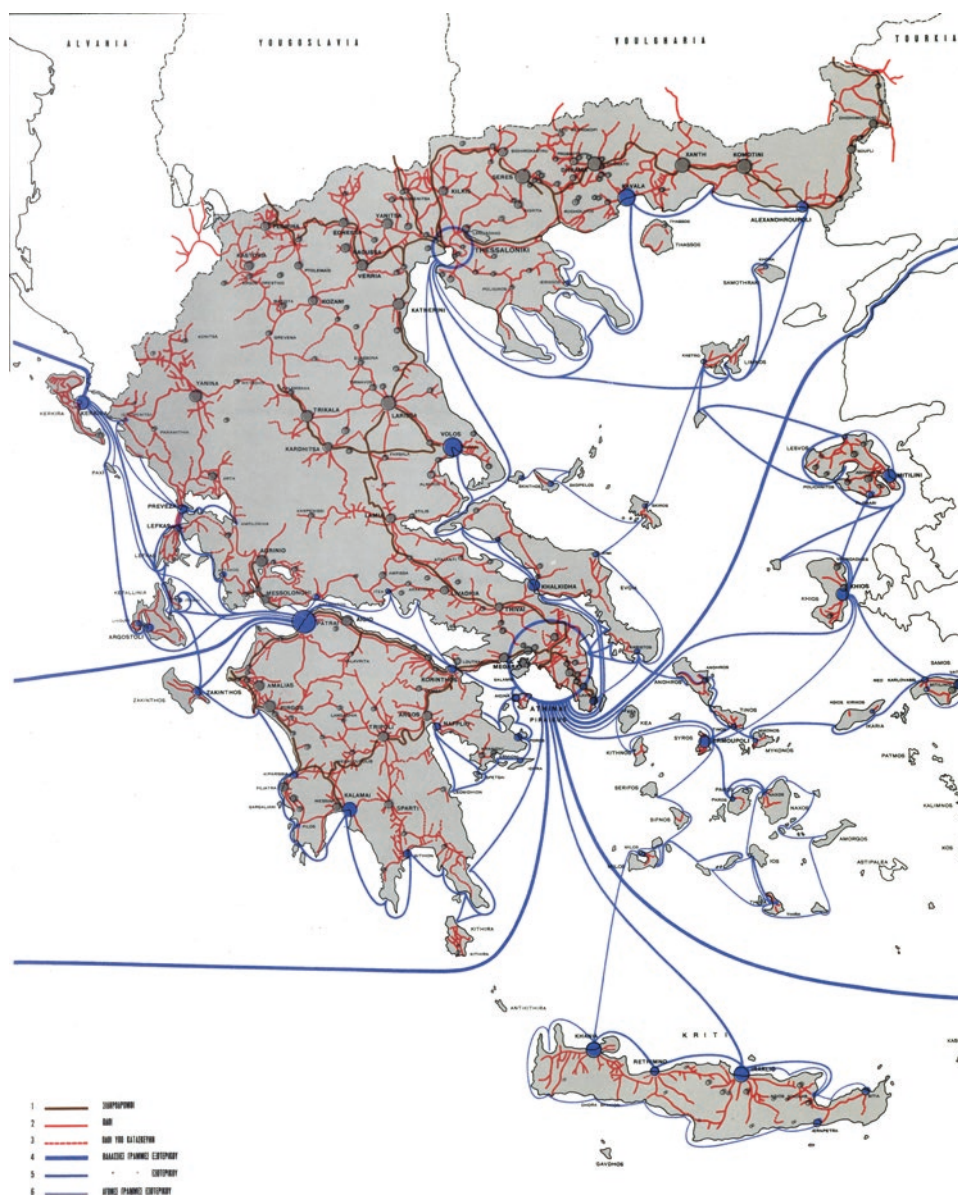
that 56% of the road network was ruined or damaged at the end of WWII (Ministry of Public Works, 1946). The railway network is reported to have been almost entirely destroyed.

So, with the return of peace and the post-war “golden years,” Greece reached a turning point. Major territorial challenges are to be faced: Re-creating land consistency through transportation means; completing the unachieved infrastructure development projects planned before the war, and managing this program within the context of a “weak” state where private initiative often takes the lead, leaving the central authorities in a chronic under-capacity situation, both in terms of public funding and decision support.

Another major input of the post-war period was the achievement of a complete territorial reversal. During the interwar years, Thessaloniki maintained its place as an active commercial city managing trade in the southern Balkans despite a partial disconnection from its century-long Balkan hinterland. During the Cold War, the situation worsened with the complete stoppage of all traffic with northern communist

countries. International trade was reduced to almost nothing. The situation lasted about half a century. This is a deadly blow thrown on Thessaloniki, whose existence within the global trade network remained only authorized “internally,” i.e., inside the national territory. Thus, in the course of history, the burden of isolation weighed at first on Athens (nineteenth century); the pressure then moved northward, the “new provinces” in Northern Greece being caught up in an underdevelopment spiral because of severe transport and exchange disconnections.

The post-Civil War era shall not deeply alter Greece’s overall transport pattern, especially as regards large infrastructure projects and heavy engineering works. Public efforts were mainly channeled at first on reconstruction, i.e., recovering functionality and dealing with basic transportation needs: Rebuilding bridges, repairing damaged roads and railways, and purchasing critical equipment through investments in the rolling stock. Progress was slow because of the limited investment capacity of the State, and



**Fig. 13.3** Land and sea transportation routes, 1940. (Source: David Rumsey Map Collection, (Ministry of Public Works, 1946))

On the eve of WWII, land integration moved forward although on a limited scale. Substantial infrastructure imbalances remain. The development of railway lines reached its “maximum.” Sea connections express the old dominance of Athens-Piraeus over national and international exchanges, especially as regards the islands and Crete. The effort shall then focus on the development of an efficient road network. The task is

a huge one. Many heavily populated rural places look forward to breaking out of their isolation. Western and Eastern Greece are connected by two main roads only: The first one follows the Thebes-Livadia-Missolonghi line; the second one connects Ioannina with Trikala through Metsovo, across the Pindus. Both journeys are very tiring, hence the early major importance of the Rio-Antirio boat connection, north of Patras. Greece first revolves around the Aegean Sea. Legend: Railways (black), roads (red), foreign and domestic sea routes (blue)

because of the new objectives assigned to public works enterprises: Developing the road network to reduce the isolation of less-favored inland regions. Public financial limitations are a lasting hallmark of Greece’s recent history until the EU could make a difference and improve the situation.

A few facts and figures shall highlight how far Greece lagged other countries in the transport area:

- The construction of motorways started only in the 1980s, with limited ambitions at first. Greece’s main transport system operated until recently almost exclusively with national roads limited to one lane in each direction. Within such a context, the increase in car and truck traffic induced dangerous behaviors and increased risk of accidents (systematic use of the roadside, normally reserved for emergency services). As a consequence, many basic transport



needs remained uncovered and time-distance ratios could be problematic, leaving entire districts cut off from central regions.

- The same applies to rail transport. Until the PAThE/P (Patras-Athens-Thessaloniki-Idomeni/Promachonas) higher-speed rail line project was adopted, traveling from Athens to Thessaloniki (500 km) took more than 6 hours using old wagons and short-winded locomotives. And this line was an exception. Considering the limited traffic both in the areas of freight and passengers, the authorities never agreed to upgrade the other antique, meter gauge, and provincial lines to comply with international standards.
- Public urban transport was reduced to a minimum in major cities, and especially in Athens. Leaving aside Line 1 between Piraeus, Omonia, and Kifissia (Fig. 13.2), in fact, a nineteenth-century open-air railway line running underground between Monastiraki and Attiki only (4 sections)-, no metro existed in Greece until 2000. The paucity of public transport reached huge proportions. The private initiatives took the lead in the form of almost monopolistic taxi services.

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### **Towards Infrastructure Modernization: The EU Projects**

In the transport area, Greece's EU integration completely changed the game. The critical need for modernization and the goal of an enhanced European connectedness met the interest of three stakeholders: Investors, industry and construction enterprises, and Greek people. The latter expected to bridge an obvious gap with most other EU countries, and access rapid transportation systems that were cruelly missing. The challenge is considerable and highly impacting in geographic terms: Major infrastructure works are known for their ability to change territorial and economic balances and to alter the course of development.

The country was early classified as a priority development zone by Brussels. And major works offered optimal visibility to European investment projects. Huge amounts of money were received in successive waves, and directed towards major engineering operations covering all parts of the country. Successful joint operations demonstrated the efficiency of European funding. Despite mixed results observed in other economic areas, public works offered a window to showcase how far the EU could make a positive difference in the lives of people (Dalakoglou & Kallianos, 2018).

The phenomenon reached huge proportions with the projects preparing for the 2004 Olympics. The construction of two new metro lines in Athens in 2000–2004, the almost simultaneous completion of the Attiki Odos, the opening of

the E. Venizelos International Airport in Spata in 2001, and the inauguration of the Rio-Antirio Bridge just before the Olympics were major events celebrated by Greek people and taken like an on-ramp to modernity after decades of relegation (Fig. 13.4, Table 13.1).

One might think that these initiatives heavily supported by European funding, commercial banks, and other public subsidies, and executed by major construction and civil engineering companies associated with local businesses would stop as the crisis escalated. The reality, however, is different. The continued national, European, and international investments in the transport area after 2008 might even be seen as a compensation policy -the EU as an effective and progressive force, despite the tight control and pressure put on the Greek population-, or as the expression of a “business as usual” situation for the EU authorities, with the intent to improve transport integration while serving their own interests.

Options were, however, discussed about the opportunity to propose a more cost-efficient design and limit the need for public financing through Public Private Partnership agreements and cross-subsidy practices. Typically, Greece's development in the transport industry is part of a broader framework involving neighboring countries, especially Bulgaria since its EU integration, but also Albania and Northern Macedonia -both being candidate countries. External connectivity is a fundamental underpinning of internal development programming.

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### **The Global Motorway Development Program**

Among the long list of improvements and changes, we shall retain a number of great achievements. In the area of motorways, Greece was starting from scratch in the 1980s. The first and main objective adopted by the national authorities was to facilitate transportation between Athens and Thessaloniki. The beginnings were a little tricky. Let us remember the long and seemingly never-ending works and associated traffic congestion observed along the 500 km-long Athens-Thessaloniki axis in the 1990s, at a time when national companies were in charge of building successive, small, disrupted motorway sections. One has to wait until the adoption of the EU standards and the capture of new markets by international companies for the infrastructure projects to speed up and gain power.

As regards motorway construction, the major program conducted between 1994 and 2009 is undoubtedly the Egnatia Odos (Fig. 13.5). This project took the name of the antique paved road connecting Rome with Constantinople, although its western section did not follow the old path. Instead of connecting Thessaloniki with Durrës (Albania), the “New Egnatia” would join Igoumenitsa (Epirus) across



**Fig. 13.4** The Rio-Antirio Bridge under construction. (© Regis Darques, 2002)

This major work put an end to an old 'tradition': Car and truck transfer by ship. In the end, with the achievement of the bridge in 2004, the

amount of the charge to be paid was so high that shipping companies continued their business

**Table 13.1** Main achieved and planned motorway projects, 1980s–2020s

Name	Connection	Distance (km)	Date started	Date completed
V.O.A.K.	Kastelli-Heraklion-Sitia	329	2002	2028
Ionia Odos	Kakkavia-Ioannina-Antirrio-Morea	430	2012	2024
Kentriki Odos	Panagia (Egnatia Odos)-Karditsa-Kalambaka-Lamia	174	2009	2024
Amvrakia Odos	Akti-Ionia Odos	48	2009	2023
A.T.H.E	Athens-Thessaloniki-Evzoni	550	1980s	2017
Olympia Odos	Elefsina-Rio	210	2008	2017
Moreas Odos	Corinth-Tripoli-Kalamata/Sparta	207	1980s	2016
Egnatia Odos	Kipi-Thessaloniki-Igoumenitsa	687	1994	2014
Attiki Odos	Elefsina-Stavros-Spata	65	1996	2004

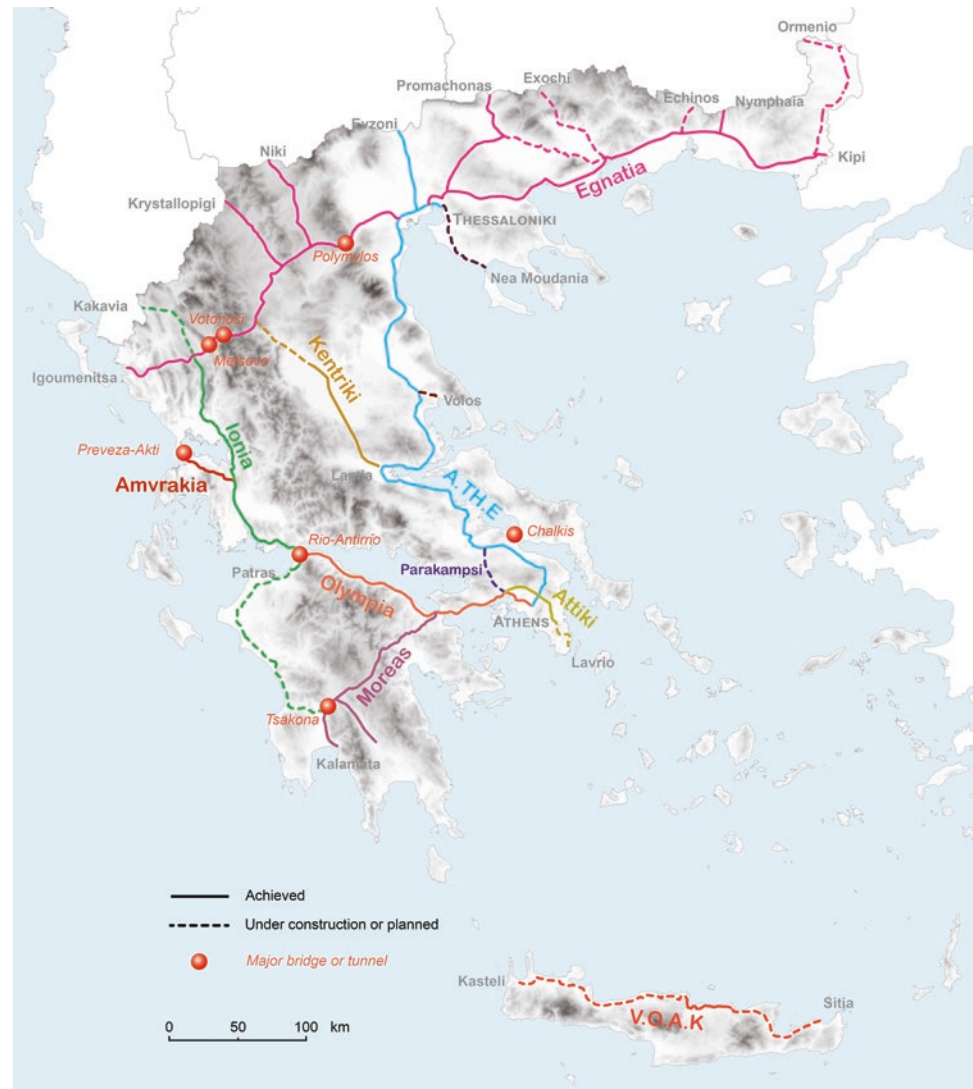
Source: Ministry of Infrastructure and Transport

the Pindus range. This 700 km-long project consumed considerable financial and material resources. The objective was to rebalance and redistribute the development potential across the country. Crossing the Pindus range in 3 hours only when the journey took about 7 hours was a real revolution. What was lost in folklore (traveling winding mountain roads among breathtaking landscapes, and enjoying meals in very popular road taverns) was gained in efficiency. At last, Ioannina, the Epirus main city, could break out of its isolation, hoping finally to change its surrounding mountain desert into a more prosperous land.

The Nea Egnatia was not only a national development plan. Through it, Thessaloniki regained a strategic Balkan regional crossroad function, managing both the access to Athens and opening its horizon to western Italian and eastern Turkish markets. Besides, the Nea Egnatia allowed for increased connectivity with former communist countries, with which few roads and railway connections remained really operational at the end of the communist era. Ten planned or achieved motorways would in the end fasten the Greek network with Albanian, North Macedonian, Bulgarian,

**Fig. 13.5** Achieved and planned highways in Greece, 1980s–2022. (Source: Ministry of Infrastructure and Transport)

The list is non-exhaustive. Many giant bridges and tunnels built along the Egnatia Odos are not mentioned. There are 42 km of bridges and 100 km tunnels along the Egnatia. Dotted lines: Most projects were approved and funded, although discussions are still ongoing about the schedule, especially in Crete



and Turkish border posts. Significantly, the timetable of works gave priority to the upgrading of the road vs. highway network close to the boundaries before proceeding southward and joining the Nea Egnatia (Figs. 13.6 and 13.7).

The second major development is the Ionia Odos. This axis that would in the end connect Kakavia with Kalamata through Ioannina and Rio-Antirio has been deployed in the middle of demographically and economically depressed areas. The Ionian side of Greece has long been the poor parent of capital investment, without any real development perspective, except in the area of tourism and farming. The Ioannina-Patras section was achieved in 2017, thus putting an end to the “core” eastern highway monopoly and leaving further developments to secondary axes. Greece is no longer centered exclusively on the A.TH.E. (Athens-Thessaloniki-Evzoni) backbone. It is now structured following a grid framework.

## The New Perspective of Railway Modernization

This first highway development stage is almost achieved (a 2700 km network by 2030), and the country now has to take up new challenges. Since the 2010s, efforts have focused on the railway network and on energy and freight in addition to passenger transport. The High-Speed Rail line (HSR) between Athens and Thessaloniki (with extensions to the northern boundary at Idomeni-Promachonas, and Patras) was upgraded stage by stage after 1996, through the construction of new lines, the modernization of old sections, and the full electrification of the system. To complete the operation, a new railway rolling stock is being purchased. Ultimately, the HSR Greek network (rather a unique line for the moment) should allow for a 200 km/h service, offering a





**Fig. 13.6** Han Kakavia, 1917. (© SHAT, Historic Department of the French Army)

“Hans” are a known Ottoman institution: These are rest houses positioned along main roads. The Kakavia Han was used as a border post just after Albania became independent (1913) without its boundaries

being clearly drawn. The dust road is still an internal, provincial, “Ottoman” axis connecting the Vilayets of Tepelen and Ioannina. Although the road seems to be quite badly maintained, modernity and progress already broke into people’s lives. Automobile vehicles replaced horses, mules, and pulled cars

reduced travel time on the main national route (3 hours between Athens and Thessaloniki).

In the years to come, the objective shall be to improve Greece’s railway network, once again freeing and de-compartmentalizing spaces, especially through the abolishment of the “Aegean” monopoly. This is a new revolution intended to fully change Greece’s nineteenth-century network, reinstating old ideas and plans drawn up as early as the 1920s that were postponed indefinitely because of the economic crisis in the 1930s and the Asia Minor refugee resettlement priority (Zartaloudis et al., 1997). With the Tempi train crash on February 28, 2023, and its more than 50 victims, everyone realized that a global and genuine reform of the system is urgently to be implemented.

The current project includes a network connection with different selected ports: Thessaloniki, Patras, Piraeus-Lavrio-Rafina (Athens), Kavala, and Alexandroupoli, turning those places into passenger, energy, and freight hubs (Fig. 13.8). Connections with airports are also part of the initiative. In the second phase, still under consideration, a new Alexandroupoli-Igoumenitsa railway line crossing the Pindus range should emerge. The project is called “Egnatia Railway,” mirroring through its name and framework the Nea Egnatia highway success story. A key parameter to consider is the place granted to Alexandroupoli and the Evros Valley: Alexandroupoli would gain momentum, serving as a gate for multimodal connection with Bulgaria, Romania, and the Black Sea, as an alternative to the Dardanelles Strait.



**Fig. 13.7** Kakavia border post, 2004. (© Regis Darques, 2004)  
The reopening of the Kakavia border post in 1989–1990 was more than a symbol. The boundary remained closed for about half a century and any disallowed intrusion within the military-controlled border area

Through this, Greece’s development trespasses former national visions for transport and encompasses a trans-border approach, forming part of the Orient/East-Med Corridor project. However, the challenges are many and the solutions are rarely obvious. The secondary railway lines inherited from ancient times are problematic, for different reasons. (1) Except along the Patras-Athens-Thessaloniki-Alexandroupoli axis, further railway developments would be achieved in depopulated areas, with minor cities to be connected and uncertain returns in terms of profitability; (2) upgrading older lines (often metric gauge) is a real venture in terms of cost-effectiveness and time-distance gains; (3) the competition between road and rail is effective for some time now, especially since the opening of the Nea Egnatia motorway, with passenger traffic already transferred from trains to buses along slower, less frequently used lines; (4) for obvious reasons (relief, population density in the most developed areas to be opened up), the overall cost of modernization is very high.

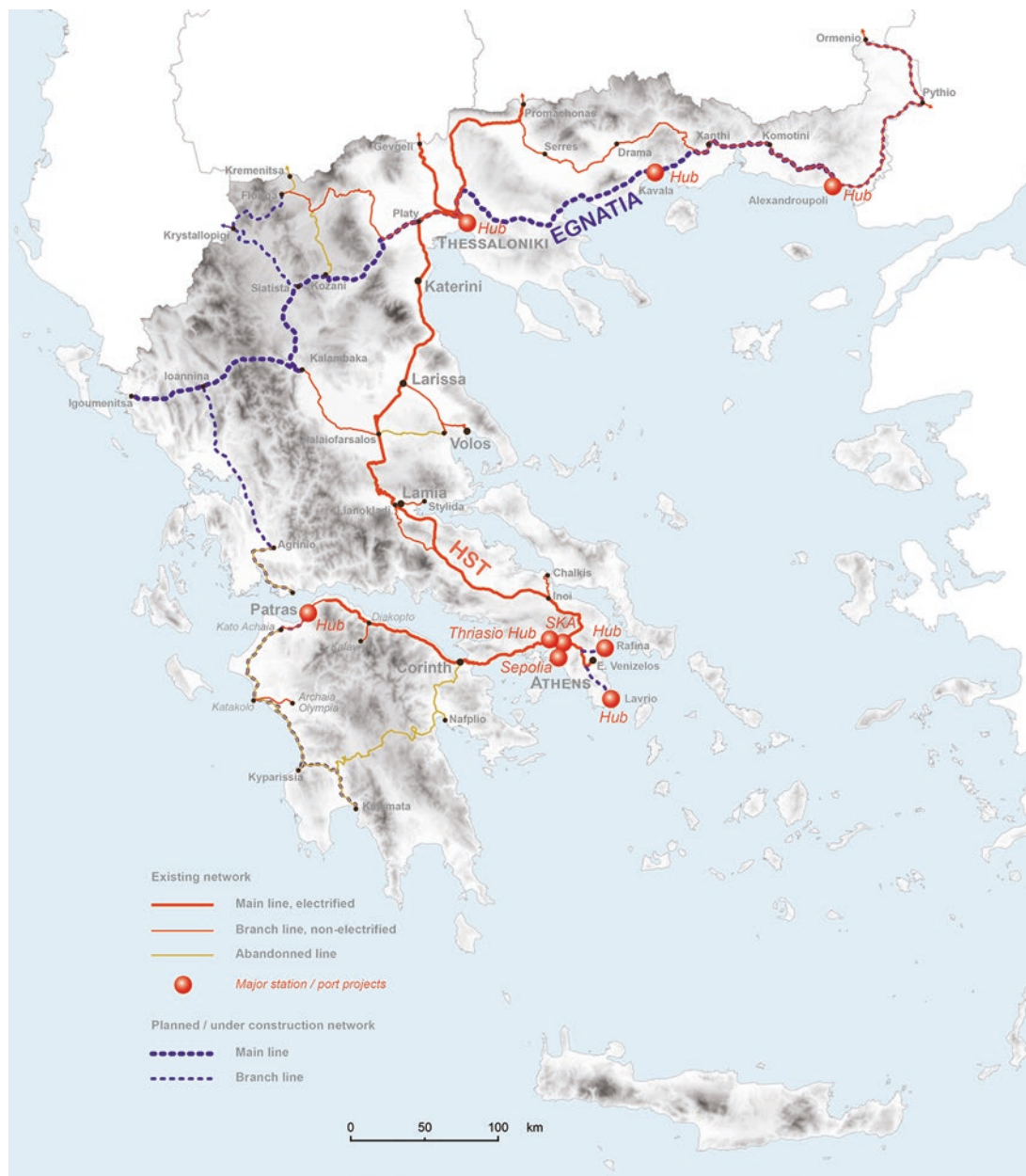
could be sanctioned by the authorities. This station is still today an extra-EU crossing point and has been the place of intense human traffic during the 1990s when Albania experienced large-scale emigration. It is also a major hot spot for drugs and illegal trafficking

### **The Thorny Issue of Urban Transport: Athens (and Thessaloniki)**

Another essential part of Greece’s upgrade path is the development or creation of two metro networks in Athens and Thessaloniki. These are to be seen as “last resort” solutions for heavily congested, polluted cities that postponed the deployment of important infrastructure projects for too long. Athens has long been a capital city “disconnected” from its immediate suburbs and outskirts (Fig. 13.9). The city was entirely dependent on automotive transportation, with a limited operational intra-urban bus system. Jammed city streets used to be the hallmark of active urban development in the post-war era; it became simultaneously the main obstacle to operational mobility, and a clear sign of underdevelopment over the years.

In Athens, leaving aside the historic Line 1 between Piraeus and Kifissia, works started in the 1990s, and the



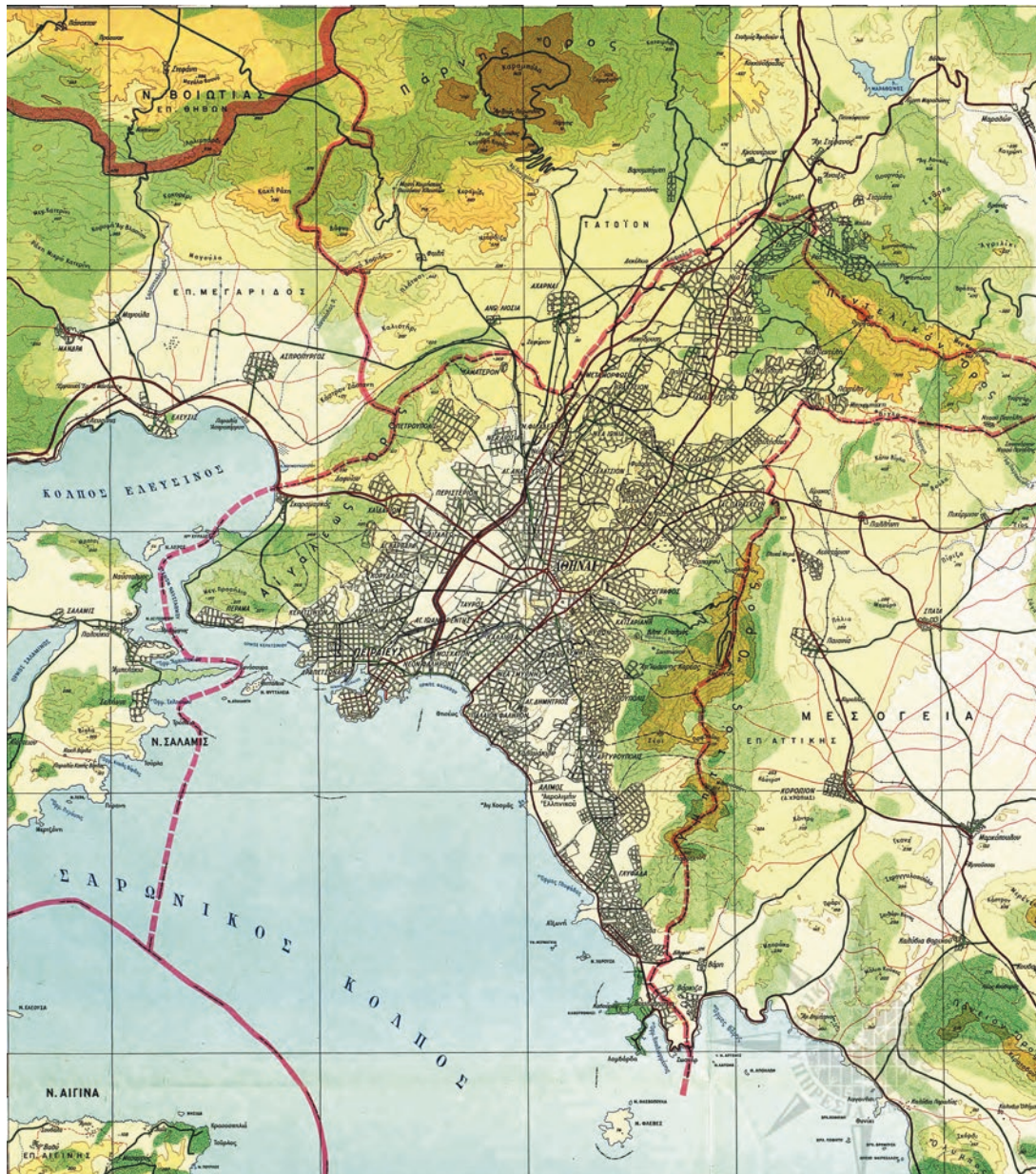


**Fig. 13.8** Achieved and planned railway lines in Greece. (Source: Ministry of Infrastructure and Transport, OSE)

main achievements were planned to be ready for the 2004 Olympics (Fig. 13.10). Paradoxically, Athens accepted changes to satisfy an “external” demand an international-wide event that would last a few weeks. Only external “pressures,” funding, and schedules could make things happen. Urgency was the precondition for a successful conduct of transport policy. This implies that the Athens metro was only part of a much broader development plan. The challenge was to help Athens leave its historic downtown walls and reach out to its dynamic outskirts. To put it otherwise, transport development both supported suburban development (especially in the northern and eastern parts of Attica) and created

the conditions for a structural collapse of its central districts. From that perspective, success was on the cards.

Presently, the authorities in Athens plan to extend the existing three lines and create a fourth one, but four other lines are already scheduled to be achieved by the Attiko Metro A.E., including a “circular” one (*kykliki*), which would breach the distributed star network adopted as a model reinforcing the weight of central Athens in the interconnection system. Even with a more densely distributed subway network, the system was thought of as an “urban” integration tool, occasionally trespassing the central Athenian Basin,



**Fig. 13.9** Athens and its transport network in 1975. (Source: ELSTAT) In 1975, Athens's population (central district, red lines) almost reached its maximum. The city did not trespass on its "natural" boundaries (Aigaleo, Hymettus, Pentelicus, Parnes Mountains). The Thriasio Basin to the West and the Mesogia Plain to the East remain places where historic villages and settlements are still shaping landscapes. With about three million people, the metropolitan area accumulated infrastructure under-

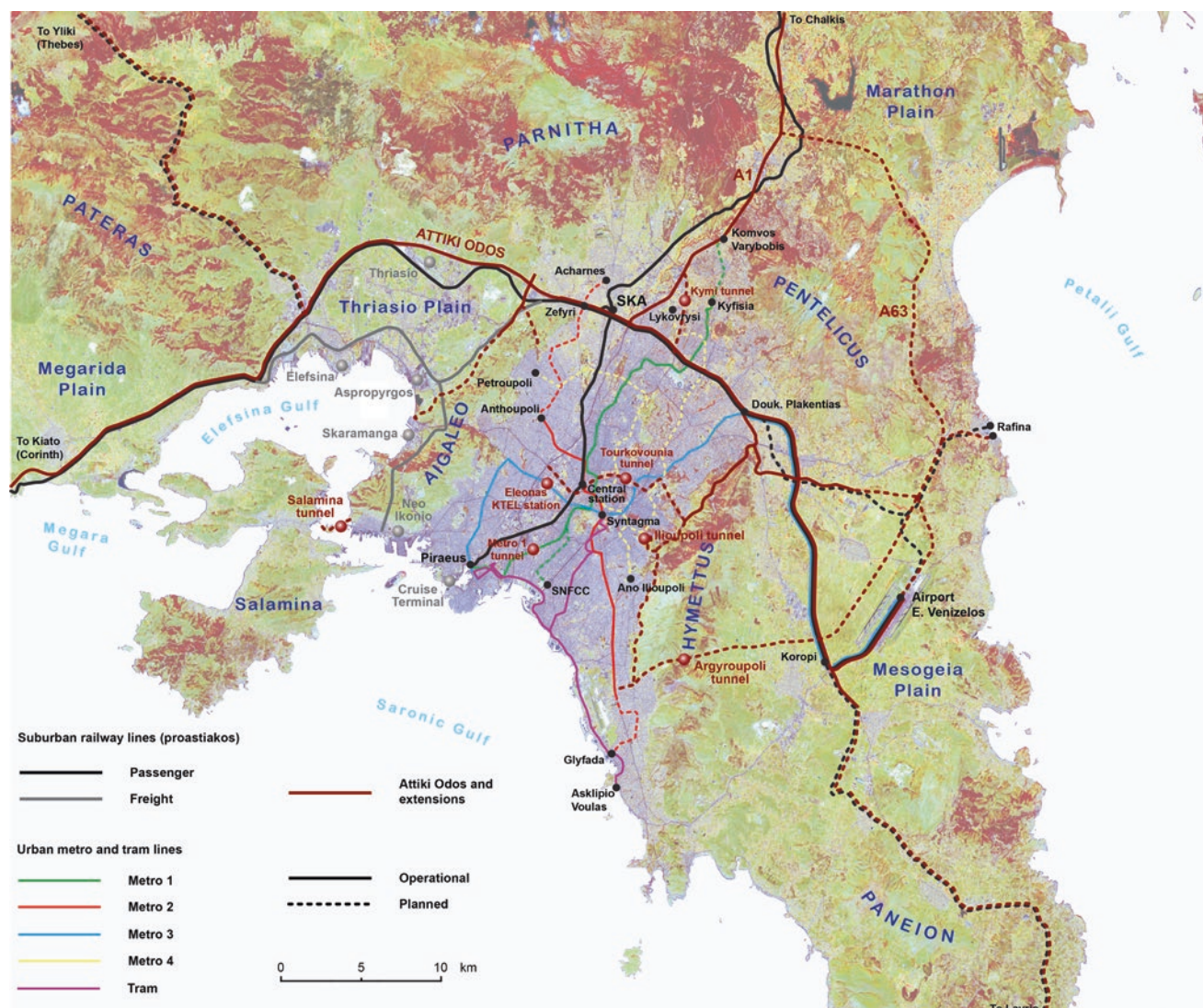
investment. The main axis connecting the capital with its hinterland is the National Road 1, a simple two-lane road (one in each direction, without a median strip). The conversion to motorway standards was achieved in the 1990s, i.e., when the population in central Athens was already decreasing. There is a chronic untimeliness and discrepancy between urban development and the upgrade of transport systems

especially beyond the Attiki Odos (the service to the E. Venizelos Airport is an exception).

Thus, the gap between the city and its transport system extends in time and space. Despite the demographic crisis, central districts should in the end obtain an operational metro system, whereas the "behind the mountain horizon" developing districts are cruelly missing a Regional-Express Network.

For now, strangely enough, the suburban railway system mostly uses modernized railway lines, with three destinations starting from Piraeus, through the Larissa Central Station: Chalkis, Kiato (Corinth), and the E. Venizelos Airport. The "variable geometry" of this network associating short and mid-distance destinations (Kiato, 100 km, 1 h 20 min, Airport, 38 km, 45 min, from Larissa Station) is obvious, demonstrating some vagueness in the definition of





**Fig. 13.10** Planned and achieved urban vs. suburban transport system in Athens. (Source: ESA, Sentinel 2A, OSE, Ministry of Transport, Ministry for Regional Planning, Attiki Odos)

The deconcentration process at work in the metropolitan area is rooted in the principle that central districts are entrapped in their historical urban development model, i.e., major street network changes cannot be

suburbs. Future developments include the service of Rafina and Lavrion, both to the East, but there are few signs that national and suburban networks would be clearly differentiated, which reflects the uncertain status of vast “beyond the walls” suburban areas where the automotive hegemony is expected to continue.

Significantly, the planned railway system validates and continues the old West-East division: Towards the Petalio Gulf, railway lines should operate mainly for passenger traffic. Westward, railway extensions and new facilities are intended for freight transport improvement. Starting from Neo Ikonio (Perama) and its container terminal (Cosco), freight transport would gain efficiency and increase its

conducted unless underground works are initiated. In the suburban area, there is a spatial East-West imbalance: (1) major road/highway projects are to be completed in the Mesogeia Plain as support to population growth; (2) on the west side, priority is given to industry/port development through railway connections. SKA is the acronym for “Acharnes Railway Station”

place within the European-Balkan goods transport system through the construction of an intermodal hub at Thriasio, to which the ports of Skaramanga, Aspropyrgos, and Elefsina would be associated. The operation is intended to allow for both a quantum and quality jump, raising Piraeus and Athens’s ports to an international level able to counterbalance the growth of other Northern Mediterranean ports. Not to overload the northern railway line to Thessaloniki, the Ministry of Transport planned to build a second connection with Thebes, bypassing the Parnitha Range to the West.

The highway vs. express road network follows the same pattern, although within a more favorable environment. The

coronavirus crisis gave a new impetus to private car mobility for many households reluctant to use public transport (Kopsidas et al., 2021). Most projects shall take place along the eastern coast of Attica, from the Marathon Plain to Lavrion, as a complement to the Attiki Odos backbone. The objective is to relieve traffic congestion in central Athens through a growing number of “external” connections between the Attiki Odos and major intra-urban boulevards. In terms of structure, two main north-south arteries shall complement the A1 motorway line, forming a grid: The first one along the Aigaleo, and the second one west of the Hymettus Mount. Three West-East routes are also planned, but here the task is much more difficult to achieve: (1) the Attiki Odos, already operational; (2) the seaside road from Glyfada to Neo Ikonio; and (3) a median path starting from the Mesogeia Plain to Skaramanga across two mountain ranges, the Hymettus and the Aigaleo. This option implies building two major tunnels through the Hymettus and the Tourkovounia hill range.

This general framework determines how much Athens and, globally, Greece’s transport system are currently engaged in a general modernization project exceeding all ambitions. The first obvious paradox is timing: This operation conducted almost directly by Brussels and heavily funded by the EU authorities (Juncker Plan) coincides with the economic crisis period. Alternatively, this raises the issue of indebtedness for a country already placed in a critical financial situation. The second surprising dimension is the discrepancy between legitimate ambitions (increased mobility, less-polluting modes of transport, enhanced efficiency) and the demographic collapse observed particularly in central municipalities, as if transport development was the by-product of a population downturn. Here, international markets and geostrategic interests collide with the “small life of people.”

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## Conclusion

Infrastructure development has been a main driver of Greece’s sectorial economic expansion over the last 30 years. Progress is impressive, although much remains to be done. In the first instance, through the development of a global motorway grid, modernization followed the path of a car-oriented model -the one widely adopted after the war and this policy was accompanied by a sharp increase in vehicle numbers until the 2008 crisis. The second current and projected transport revolution should see the antique railway network and rolling stock evolve towards a global renewal within the framework of sustainable transport promotion policies. The objectives to be reached are once again ambitious, and the initiative should revolutionize the industry within two decades.

Despite the evident success of these operations, we may note, however, that evaluating the payback for the already achieved projects is extremely difficult, particularly because the expected return on investment period coincided with the crisis years, which means that most positive impacts are still awaited, provided that future economic growth may take the best of modern operational infrastructure.

Unfortunately, while focusing on passenger transport, we did not address the development of goods traffic although these gained an increased interest over the last months with the energy crisis following the Ukrainian War. Things are starting to roll quickly in this area and major changes are expected in the years to come because of the new “world enclosure” and the creation of the novel “Iron Curtain.”

Similarly, we did not address the other major achievements in the area of logistics. Two major sectors of development emerged and were identified as priority objectives:

- (a) With maritime transport accounting for the vast majority of global trade by volume, and given the strategic place of Greece in the Eastern Mediterranean as an entry point to the Balkan area and Eastern Europe, the EU and Greek authorities target increased trade flows through major development projects. New logistics hubs and intermodal transport are expected to cater to international freight transport needs.
- (b) Greece is also deeply engaged in different energy projects such as TAP (Trans Adriatic Pipeline), IGB (Greece-Bulgaria Interconnector), the offshore floating LNG storage and regasification unit (FSRU) in Alexandroupolis, and the EastMed Gas Pipeline. These are part of a global warming and climate change agenda -phasing out the coal-based energy production- and gear towards creating an important regional energy hub in the south-eastern area of the EU (Androulaki & Psarras, 2016).

Not to repeat the mistakes of the past, limited government funding and the increased use of Public Private Partnership are expected to avoid the past financial derailments that were one of the root causes of the economic crisis. However, despite the activation of the Next Generation EU program in 2020 -the largest stimulus package ever financed by the EU-, the redistribution of cards following the war in Ukraine globally clouded the issue and introduced instability into the planned initiatives. The parties involved may be forced to abandon a number of projects that appear to be less of a priority and accelerate the achievement of other goals as an answer to emergency situations. Against uncertain times, progress in relation to resilience implies enhanced flexibility and adaptability.



## References

- Androulaki, S., & Psarras, J. (2016). Multicriteria decision support to evaluate potential long-term natural gas supply alternatives: The case of Greece. *European Journal of Operational Research*, 253(3), 791–810.
- Berechman, J., Ozmen, D., & Ozbay, K. (2006). Empirical analysis of transportation investment and economic development at state, county and municipality levels. *Transportation*, 33, 537–551.
- Chirot, D. (1989). *The origins of backwardness in Eastern Europe*. University of California Press.
- Dalakoglou, D., & Kallianos, Y. (2018). ‘Eating mountains’ and ‘eating each other’: Disjunctive modernization, infrastructural imaginaries and crisis in Greece. *Political Geography*, 67, 76–87.
- Darques, R. (2000). *Thessaloniki in the 20th century. From the Ottoman City to the Greek Metropolis* (in French). CNRS Editions, Paris.
- Köksal, Ö. Y. (2019). *The Ottoman Empire in the Tanzimat Era: Provincial perspectives from Ankara to Edirne*. Routledge.
- Kopsidas, A., Milioti, C., Kepaptsoglou, K., & Vlachogianni, E. (2021). How did the COVID-19 pandemic impact traveler behavior toward public transport? The case of Athens, Greece. *Transportation Letters*, 13, 344–352.
- Kostov, A. (2017). *Transport and Communications in the Balkans (1800–1914)* (in Bulgarian). University Publishing House “St. Kliment Ohridski”.
- Ministry of Public Works (1946). *The sacrifices of Greece in the second World War* (in Greek).
- Palairat, M. (1997). *The Balkan Economies c. 1800–1914. Evolution without development*. Cambridge University Press.
- Panagiotopoulos, G., & Kaliampakos, D. (2019). Accessibility and spatial inequalities in Greece. *Applied Spatial Analysis and Policy*, 12, 567–586.
- Park, J. S., Seo, Y.-J., & Ha, M.-H. (2019). The role of maritime, land, and air transportation in economic growth: Panel evidence from AECD and non-OECD countries. *Research in Transportation Economics*, 78, 100765.
- Short, J., & Kopp, A. (2005). Transport infrastructure: Investment and planning. Policy and research aspects. *Transport Policy*, 12(4), 360–367.
- Skayannis, P., & Kaparos, G. (2013). Infrastructure projects in Greece and the presence of Mega Transport Infrastructure Projects (MTIPs): Changing paradigms and priorities (in Greek). *Aeihoros*, 18, 12–65.
- Stanev, K., Alvarez-Palau, E. J., & Marti-Henneberg, J. (2017). Railway development and the economic and political integration of the Balkans, c. 1850–2000. *Europe-Asia Studies*, 69(10), 1601–1625.
- Zartaloudis, I., Karatolos, D., Koutelidis, D., Nathenas, G., Fasoulas, S., & Filippoupolis, A. (1997). *Greek Railways* (in Greek). Militos.

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