UNIVERSITY OF THESSALY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING

CASE STUDY FOR THE ESTABLISHMENT OF AN INTERMODAL TERMINAL CENTER (DRY PORT TYPE) IN THE CITY OF LARISA

by

ANARGYROS CHRYSIKOS

University of Thessaly, 2025

Submitted in partial fulfillment of the requirements for the degree of Master of Science in Mechanical Engineering at the University of Thessaly

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Θέισ επίζεο λα αλαθεξζώ θαη λα επραξηζηήζσ εμίζνπ, πιένλ ησλ κειώλ ηεο εμεηαζηηθήο επηηξνπήο ηεο κεηαπηπρηαθήο εξγαζίαο κνπ ηνλ Γξ. θ. Κνπθνύκηδην Σηπιηαλό γηα ηελ ηηκή πνπ κνπ έθαλε λα κειεηήζεη ηελ δηπισκαηηθή κνπ εξγαζία θαη παξαιιήια ηηο γλσζεηο πνπ κνπ πξνζέθεξε αθεηδώο θαηά ηε δηάξθεηα ηνπ κεηαπηπρηαθνύ.

Σέινο, δε ζα κπνξνύζα λα θάλσ ηίπνηα ζηε δσή απηή, πόζν κάιινλ ηελ θνίηεζε ζην κεηαπηπρηαθό θαη ηελ εθπόλεζε ηεο παξνύζεο δηπισκαηηθήο εξγαζίαο ρσξίο ηε ζηήξημε, ηελ αγάπε θαη ηελ ζπλερή παξνπζία ηεο κεηέξαο κνπ Κσλζηαληίλαο, ηεο αδεξθήο κνπ Διέλεο – Άλλαο θαη ηνπ αδεξθνύ κνπ Νηθόιανπ – Νεθηάξηνπ ζηνπο νπνίνπο θαη νθείισ πξσηίζησο θαη δεπηεξεπόλησο αθηεξώλσ ηε δηπισκαηηθή κνπ.

CASE STUDY ON THE ESTABLISHMENT OF AN INTERMODAL TERMINAL CENTER IN THE REGION OF THESSALY

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Abstract

This thesis investigates the establishment of an intermodal terminal center in the Thessaly region, with particular focus on the redevelopment of the former sugar factory site located on the outskirts of Larisa. The work is structured across multiple chapters that collectively explore the historical, economic, technical, and strategic dimensions of intermodal transport, culminating in a detailed project proposal for a logistics hub that addresses regional and national transportation needs.

The initial chapters provide a comprehensive overview of the evolution of intermodal transport systems and the role of logistics in contemporary supply chains. Emphasis is placed on the global and European context, highlighting key milestones in containerization, multimodal integration, and efficiency gains from coordinated infrastructure. The thesis also outlines the current situation of freight transport in Greece, examining road, rail, maritime, and air cargo flows, and their implications for regional economic competitiveness. These sections establish the theoretical and operational framework required to assess the feasibility of a new intermodal hub.

Subsequent analysis turns to Thessaly as a focal region, presenting demographic, economic, and infrastructural data. Statistical indicators on population, economic activity, traffic flows, and accident rates are used to characterize both the challenges and opportunities of the area. The study then undertakes a comparative evaluation of several industrial sites within Thessaly, applying SWOT analyses, distance metrics to ports, airports, and rail nodes, and logistical accessibility assessments. Through this process, the old sugar factory emerges as the most advantageous location, primarily due to its extensive land availability, proximity to major transport corridors, and redevelopment potential.

The core of the thesis is dedicated to the design and operationalization of the proposed intermodal terminal at the Larisa sugar factory site. Detailed considerations include physical infrastructure requirements, specialized equipment (such as cranes, ITVs, and stacking systems), container flow projections, and vehicle integration between rail and road. Human resource needs, technological infrastructure, and

environmental factors are also addressed, alongside performance indicators that measure throughput, efficiency, and sustainability. Cost estimations for construction, equipment, and ongoing operations are presented, supported by scenarios for staffing, maintenance, and IT system integration. The proposal underscores the strategic value of integrating a rail line directly into the factory grounds to enhance container handling efficiency and reduce reliance on road-based transfer.

The concluding sections highlight the expected benefits and risks of the project. On the one hand, the terminal would significantly enhance Thessaly‘s role in the national logistics network, create employment, reduce transport costs, and support environmental objectives by shifting freight from road to rail. On the other hand, challenges such as high initial investment, regulatory coordination, and long-term maintenance requirements are acknowledged. The thesis argues that, with proper planning and phased implementation, the intermodal center can position Thessaly as a critical logistics hub within Greece and the broader European transport corridor.

Overall, this work contributes both a theoretical framework and a practical case study, demonstrating how the redevelopment of a deindustrialized site can serve as a catalyst for regional economic transformation through sustainable and integrated transport solutions.

Keywords: Intermodal transport, logistics, Thessaly, Larisa, sugar factory redevelopment, supply chain, infrastructure.

ΜΕΛΕΤΗ ΕΓΚΑΤΑΣΤΑΣΗΣ ΔΙΑΤΡΟΠΙΚΟΥ ΚΕΝΤΡΟΥ ΜΕΤΑΦΟΡΑΣ ΣΤΗ ΠΕΡΙΦΕΡΕΙΑ ΘΕΣΣΑΛΙΑΣ

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Περίληψη

Ζ παξνύζα κεηαπηπρηαθή εξγαζ ία εμεηάδεη ηελ ίδξπζε ελόο δηαηξνπηθνύ θέληξνπ κεηαθνξώλ ζηελ Πεξηθέξεηα Θεζζαιίαο, κε ζηόρν ηελ έκθαζε ζηελ αλαδηακόξθσζε ηνπ ρώξνπ ηνπ πξώελ εξγνζηαζίνπ ζάραξεο ηνπ βξίζθεηαη ζηα πεξίρσξα ηεο Λάξηζαο. Ζ κειέηε είλαη δνκεκέλε ζε επηκέξνπο θεθάιαηα πνπ αλαιύνπλ ηελ ηζηνξηθή, νηθνλνκηθή, ηερληθή θαη ζηξαηεγηθή δηάζηαζε ησλ δηαηξνπηθώλ κεηαθνξώλ, θαιιηεξγώληαο ζε κία ιεπηνκεξή πξόηαζε έξγνπ γηα ηε δεκηνπξγία ελόο θόκβνπ εθνδηαζηηθήο αιπζίδαο, ηθαλνύ λα θαιύςεη ηηο αλάγθεο ηεο πεξηθέξεηαο αιιά θαη ηεο ρώξαο ζπλνιηθά.

Στα πξώηα θεθάιαηα παξνπζηάδεηαη ε εμέιημε ησλ δηαηξνπηθώλ ζπζηεκάησλ κεηαθνξάο θαη ν ξόινο ηεο εθνδηαζηηθήο ζηε ζύγρξνλε νηθνλνκία. Δμεηάδνληαη ηα δηεζλή θαη επξσπαϊθά δεδνκέλα, νη ζηαζκνί ζηελ αλάπηπμε ηεο εκπνξεπκαηνθηβσηηνπνίεζεο θαη ηεο ηππνπνίεζεο θνξηίσλ, θαζώο θαη νη βειηηώζεηο ζηελ απνδνηηθόηεηα κέζσ ηεο ζπλδπαζκέλεο αλάπηπμεο ππνδνκώλ. Παξάιιεια, αλαιύεηαη ε πθηζηάκελε θαηάζηαζε ησλ εκπνξεπκαηηθώλ κεηαθνξώλ ζηελ Διιάδα —νδηθώλ, ζηδεξνδξνκηθώλ, ζαιάζζησλ θαη αεξνπνξηθώλ— θαη νη ζπλέπεηεο απηήο γηα ηελ αληαγσληζηηθόηεηα ηεο ειιεληθήο νηθνλνκίαο.

Στε ζπλέρεηα ε εξγαζία εζηηάδεη ζηε Θεζζαιία, παξνπζηάδνληαο πιεζπζκηαθά, νηθνλνκηθά θαη ζπγθνηλσληαθά δεδνκέλα, κε ζηαζκνύο ζηνλ δείθηεο πνπ αθνξνύλ ηελ αλάπηπμε, ηηο ξνέο εκπνξεπκάησλ θαη ηελ νδηθή αζθάιεηα. Αθνινπζεί ζπγθξηηηθή αμηνιόγεζε βηνκεραληθώλ ρώξσλ ζηελ πεξηνρή, κέζσ αλάιπζεο SWOT, κεηξήζεσλ απνζηάζεσλ από ιηκάληα, αεξνδξόκηα θαη ζηδεξνδξνκηθνύο ζηαζκνύο. Από απηή ηε δηεξεύλεζε, ην παιαηό εξγνζηάζην ζάραξεο πξνθύπηεη σο ε πιένλ θαηάιιειε ηνπνζεζία ιόγσ ηνπ κεγάινπ δηαζέζηκνπ ρώξνπ, ηεο εγγύηεηαο ζε θύξηνπο δηαδξόκνπο κεηαθνξάο θαη ηεο δπλαηόηεηαο αλαβίσζεο ελόο εγθαηαιειεηκκέλνπ βηνκεραληθνύ ρώξνπ.

Σν βαζηθό θεθάιαην ηεο εξγαζίαο αθηεξώλεηαη ζηελ ζρεδηαζκό θαη ηελ νξγάλσζε ηνπ λένπ δηαηξνπηθνύ θέληξνπ ζηνλ ρώξν ηνπ εξγνζηαζίνπ. Αλαιύνληαη νη απαηηήζεηο ζε θπζηθό ππνδνκέο, εμνπιηζκό (γεξαλνύο, νρήκαηα κεηαθνξάο, ζπζηήκαηα ζηνηβαζίαο), πξνβιέςεηο γηα εκπνξεπκαηνθηβώηηα θαη δηαζύλδεζε νδηθώλ θαη ζηδεξνδξνκηθώλ κεηαθνξώλ. Παξνπζηάδνληαη επίζεο νη αλάγθεο ζε αλζξώπηλν

δπλακηθό, πιε ξνθνξηαθά ζπζηήκαηα, ελεξγεηαθή απόδνζε θαη πεξηβαιινληηθέο επηπηώζεηο, καδί κε δείθηεο απόδνζεο πνπ αληηπξνζσπεύνπλ ηελ αληίιεςε ηνπ ηειηθνύ ρξήζηε. Κάζε δείθηεο απνηειεί ζπλάξηεζε ηνπ ζπζηήκαηνο, κε απνηέιεζκα ηε δπλαηόηεηα ζύλζεζεο νηθνλνκηθώλ θαη πεξηβαιινληηθώλ παξακέηξσλ.

Στα πιαίζηα ηεο αλαδεηεζεο βειηηζηνπνίεζεο ηεο αλαδηνξγάλσζεο ζε ζπζηήκαηα logistics, αλαπηύρζεθε έλα κνληέιν βαζηζκέλν ζηνλ πξνζδηνξηζκό ηεο βέιηηζηεο ζπρλόηεηαο δηαλνκήο θαη δξνκνιόγεζεο ηνπ ζηόινπ νρεκάησλ. Η πεξηνρή κειέηεο πεξηιακβάλεη ηελ Θεζζαιία θαη θπξίσο ηε Λάξηζα, ε νπνία απνηειεί θεληξηθό θόκβν δηαλνκήο. Παξάιιεια, εμεηάζηεθε ε ρξήζε ελαιιαθηηθώλ ηύπσλ νρεκάησλ, όπσο ειεθηξηθά θαη πβξηδηθά, σο κέζνδνο κείσζεο ησλ εθπνκπώλ. Τέινο, ππνινγίζηεθε όηη κε ζσζηό ζρεδηαζκό θαη ζπληνληζκό ηνπ ζηόινπ, κπνξεί λα επηηεπρζεί ζεκαληηθή κείσζε ηνπ θόζηνπο ζηε Λάξηζα θαη ζε όιε ηε Θεζζαιία.

Συλνιηθά, ε εξγαζία ζπλδπάδεη ζεσξεηηθή πξνζέγγηζε θαη πξαθηηθή κειέηε πεξίπησζεο, απνδεηθλύνληαο πώο ε εθαξκνγή κνληέισλ ελόο αλελεξγνύ βηνκεραληθνύ ρώξνπ κπνξεί λα απνηειέζεη κνριό νηθνλνκηθήο αλάπηπμεο θαη λα ζπκβάιεη ζηελ αλάπηπμε βηώζηκσλ θαη νηθνλνκηθά απνδνηηθώλ ιύζεσλ.

Λέξειρ-κλειδιά: Γηαρείξηζε κεηαθνξέο, εθνδηαζηηθή αιπζίδα, Θεζζαιία, Λάξηζα, αλαδηνξγάλσζε εξγνζηαζίνπ δάρηεο, πηνδνκέο, βηνκεραλία.

Chapter1. Introduction **20**
1.1 Definition and Scope of Logistics and Transportation 20
1.2 Evolution of Logistics and Transportation 20
1.3 The Critical Role of Logistics and Transportation Across Multiple Sectors 21
1.4 Strategic Importance of Integrated and Sustainable Logistics in Modern Supply Chains 22
1.5 The Importance of Transportation 22
1.6 Diversity of Transport Modes 23
1.7 Challenges Facing Logistics and Transportation Today 25
1.8 Thesis Focus and Research Questions 25
1.9 Concept and Role of Intermodal Transport 26
1.10 Importance of Intermodal Transport for Greece 27
1.11 Thessaly and Larissa as Strategic Intermodal Nodes 28
1.12 Policy and Strategic Framework Supporting Intermodal Transport 28
1.13 Problem Statement and Rationale 28
1.13.1 Challenges in Greece‘s Freight Logistics Infrastructure 28
1.13.2 Regional Logistics Deficiencies in Thessaly and Larissa 29
1.13.3 Rationale for Selecting the Old Sugar Factory Site 29
1.13.4 Summary and Foundation for Further Research 29
1.14 Project Overview 29
1.14.1 Project Vision and Strategic Location 29
1.14.2 Economic and Financial Assessment 30
1.14.3 Geopolitical and Trade Significance 30
1.14.4 Comprehensive Integration and Future Outlook 30
1.15 Thesis Structure 30
1.15.1 Introduction and Research Framework 30
1.15.2 Lessons from International Case Studies 30
1.15.3 Current State of Greece‘s Logistics Sector 31
1.15.4 Site Evaluation and Strategic Project Assessment 31
1.15.5 Synthesis, Policy Implications, and Future Research 31

Chapter 2. Case Studies and Lessons Learned **32**
2.1 Successful Intermodal Centers (Innovations, Operational Excellence, and Lessons for Future Development) 32
2.2 Examples of Intermodal Centers in Europe 32
2.2.1 Case Study: Port of Rotterdam (Netherlands) — Europe‘s Largest and Most Advanced Intermodal Hub 32
2.2.2 Duisburg Intermodal Terminal (Germany) — A Strategic Inland Port and Rail Hub on the China-Europe Corridor 33
2.2.3 Port of Trieste (Italy) — A Strategic Adriatic Gateway with Strong Rail Connectivity and Sustainability Focus 33
2.2.4 Budapest Intermodal Terminal (Hungary) — A Central European Distribution Hub with Digitalization Focus 34
2.3 Lessons Learned for the Larissa Sugar Factory Project 35
2.3.1 Port of Rotterdam : Strategic Integration of Automation and Sustainability 35
2.3.2 Duisburg Intermodal Terminal (DIT) : Pioneering Sustainability through Energy Transition and Digitalization 35
2.3.3 Port of Trieste : Leveraging Strategic Rail Connectivity and Multimodal Integration 36
2.3.4 Budapest Intermodal Terminal : Capacity Planning and Flexibility in a Growing Logistics Hub 36
2.4 Applications to the Larissa Sugar Factory Project 37
2.4.1 Port of Rotterdam: Tailored Automation and Sustainability Solutions for Larissa 37

2.4.2 Duisburg Intermodal Terminal: Implementing Sustainable Energy and Digital Infrastructure 37
2.4.3 Port of Trieste: Developing Rail-Enabled Multimodal Connectivity and Digital Systems 37
2.4.4 Budapest Intermodal Terminal: Designing for Flexibility and Operational Efficiency 38

Chapter 3. Greece, a Crossroad for Intermodal Logistics 39
3.1 Introduction to Greece‘s Demographics, Economy, and Logistics Landscape 39
3.2 Demographics of Greece 40
3.2.1 Demographic Trends and Their Impact on Greece‘s Logistics Sector 43
3.2.2 Educational Attainment and Labor Market Challenges Affecting Logistics 43
3.3 Greece's Economic Foundation and Recovery Trajectory 44
3.4 Greek Laws on Logistics and Intermodal Centers 45
3.4.1 N.4302/2014, Ρύζκηζε ζεκάησλ Δθνδηαζηήζην θαηάιιεο δηαηάμεσ (September 2015) 46
3.4.2 N.3333/2005, Ίδξπζε θαηιεηεπηξίαο ησλ Δκπνξεπκαηώλ Κέληξσλ θαηάιιεο δηαηάμεσ (April 2005) 46
3.5 Infrastructure Landscape in Greece: Airports, Roads, Railways, and Ports 46
3.6 Driving Rules and Regulations in Greece: Implications for Logistics and Transport Safety 47
3.7 The Significance and Usage of Road Infrastructure in Greece: Foundations for Logistics Development 48
3.8 Structure and Benefits of the Greek TEN-T (Trans-European Transport Network) and of the Orient/East-Med Corridor 50
3.9 Motorways of Greece : The road arteries in service of Logistics 53
3.9.1 The PATHE motorway 54
3.9.2 The Egnatia Odos motorway A2 55
3.9.3 The Ionia Odos motorway A5 56
3.9.4 The Kentriki Odos motorway 57
3.9.5 The Olympia Odos motorway A8 57
3.9.6 Aegean Motorway A1 58
3.9.7 The Moreas Motorway 59
3.9.8 Road Safety Deterioration and Infrastructure Investment Imperative 60
3.9.9 Weather-Related Risk Patterns and Modal Reliability Advantages 60
3.10 Rail Transport in Greece: Strategic Importance, Modernization, and Integration into European Networks 62
3.11 Sea Transport in Greece: Water as the prime factor of Logistics contribution 64
3.12 Ports in Greece: Strategic Gateways in Global Maritime Trade and National Logistics 65
3.12.1 Port of Piraeus 66
3.12.2 Port of Thessaloniki 68
3.12.3 Port of Alexandroupolis 69
3.12.4 Port of Igoumenitsa 70
3.12.5 Port of Patras 71
3.12.6 Port of Corfu 71
3.12.7 Port of Volos 72
3.13 Air Transport in Greece: Wings of Growth that elevate the Greek Intermodal Logistics 74
3.13.1 Athens International Airport (AIA) – Eleftherios Venizelos 75
3.13.2 Thessaloniki Airport – Makedonia (SKG) 75
3.13.3 Nea Anchialos National Airport (VOL) 76
3.14 Freightforwarding Management Options In Greece 77
3.15 Intermodal Projects – Pioneers in Greece 85

3.15.1 The Thriasio Pedio logistics center 85
3.15.2 Boeotia‘s logistics cluster 87
3.15.3 The Sindos logistics and industrial zone 88
3.15.4 The Kalochori logistics center 88
3.15.5 The Gonos logistics center 89
3.16 Major Global and European Intermodal Logistics Initiatives: Strategic Opportunities for Greece and the Larissa Intermodal Hub 91
3.16.1 China‘s Belt and Road Initiative (BRI) 91
3.16.2 European Union‘s ―Global Gateway” 91
3.16.3 India-Middle East-Europe Economic Corridor (IMEC) 92
3.16.4 Trans-European Transport Network (TEN-T) 92
3.16.5 Baltic Sea – Black Sea – Aegean Sea (BBA) European Transport Corridor (ETC) 93
3.16.6 Russia‘s ―Greater Eurasian Partnership” 93
3.16.7 Middle Corridor (Trans-Caspian International Transport Route - TITR) 93

Chapter 4. Thessaly, a Fertile Soil for Intermodalism 95
4.1 General overall assessment of Thessaly region 95
4.2 Geography 97
4.3 Population 98
4.3.1 Age Structure Analysis 99
4.3.2 Urbanization Patterns 99
4.4 Economy of Thessaly 100
4.4.1 Agricultural Sector Analysis 100
4.4.2 Intermodal Terminal Impact on Thessalian Agriculture 101
4.5 Infrastructure and Transportation on Thessaly 102
4.5.1 Intermodal Terminal Impact on Infrastructure 103
4.5.2 Intermodal Terminal Impact on Industrial Development 104
4.6 Environmental and Sustainability Considerations 104
4.6.1 Intermodal Terminal Environmental Impact 105
4.7 Greek companies and enterprises 105
4.8 Thessaly‘s 3PL Companies 107

Chapter 5. Larissa, an Upcoming Intermodal Node 110
5.1 Larissa at a glance 110
5.2 Climate 111
5.3 Population Size and Density Analysis 111
5.4 Economy 112
5.5 Strategic Geographic Position and Regional Significance 112
5.6 Road Infrastructure and Highway Connectivity 113
5.7 Railway Network and Rail Freight Potential 113
5.8 Port of Volos Maritime Connection 113
5.9 Air Transport 114
5.10 Agricultural Sector and Cargo Generation 114
5.11 International Freight and Logistics Potential 114
5.12 The role and positioning of an intermodal terminal center in Larissa 115

Chapter 6. Old Factories in the Region of Thessaly (Larissa and Volos) 116
6.1 Historical Context of Old Factories and Businesses in Greece: Impact of Economic Shifts and Their Potential for Intermodal Hubs 116
6.2 The Role of Industrial Transition: Turning Challenges Into Opportunities 116
6.3 Logistical Opportunities: Utilizing Existing Infrastructure for Efficiency 117
6.4 Environmental Benefits: Supporting Greece‘s Green Transition 117
6.5 Economic Revitalization and Regional Development 117

6.6 A Strategic Opportunity for Greece‘s Future 118
6.7 Old Factories located in Volos region 119
6.7.1 Daferrera Fish Processing & Packaging Industry – Chrysi Akti Panagias, Magnesia 119
6.7.2 Anagnostou Distillery Industrial Complex – Volos 122
6.7.3 MEFSOUT Tile & Mosaic Industrial Complex – Volos 125
6.7.4: G. Baglatzis & Son Foundry – Almyros, Magnesia 128
6.8 Old Factories located in Larissa region 130
6.8.1 KISSAVOS Tomato Processing Plant (Anavra, Larisa) 130
6.8.2 Former ELVEK Pulp & Paper Mill (Omorfokhori, Larisa) 134
6.8.3 Former Cold Storage Facility – Larisa (Demolished 2013) 137
6.8.4 Former Afoi Magrizou S.A. Textile Factory 140

Chapter 7. Founding of an Intermodal Terminal Center in the Establishment of Old Sugar Factory 143
7.1 The Larissa Intermodal Center Project 143
7.2 Project Rationale: Repurposing the Old Sugar Factory in Larissa 143
7.3 Foundational Indicators and Operational Framework for the Larissa Intermodal Terminal Project 144
7.4 Strategic Advantages and Multidimensional Benefits of the Larissa Intermodal Terminal 149
7.5 Implementation Timeline 150
7.6 Historical Background and Rise of EBZ 151
7.6.1 Decline and Closure 153
7.6.2 The Attempts at Restructuring of the Hellenic Sugar Industry (EBZ) 154
7.7 Geographical and Strategic Location with Connectivity Advantages 155
7.7.1 Topographical and Land Use Overview 156
7.7.2 Regional and Transport Connectivity 159
7.7.3 Environmental and Legal Considerations 160
7.8 SWOT Analysis and Strategic Fit 161
7.9 Technical Feasibility Assessment (Infrastructure and area allocation) 161
7.9.1 Infrastructure Design and Suitability 161
7.9.2 Spatial Allocation 162
7.9.3 Operational Flow and Connectivity 163
7.9.4 Sustainability Features 164
7.10 Economic - Industrial Environment and Cost Analysis 165
7.10.1 Direct Economic Impacts 165
7.10.1.1 Employment Creation 165
7.10.1.2 Urban Revitalization through Brownfield Site Redevelopment 166
7.10.1.3 Environmental Benefits through Modal Shift and Public Health Improvement 166
7.10.2 Indirect and Induced Economic Impacts 166
7.10.2.1 Enhancing Supply Chain Efficiency and Regional Competitiveness 166
7.10.2.2 Supporting Regional Development and Territorial Balance 167
7.10.3 Preliminary Cost Estimates 167
7.10.4 Business Revenue and Value Added 168
7.10.4.1 Cost Analysis for the deployment and installation of the intermodal terminal center in the base area of Old Sugar Factory 168
7.10.4.2 Projected Revenue and Economic Impact on Local Supply Chains 168
7.10.4.3 Strategic Importance and Alignment with Greek Market Realities 168

7.11 Environmental Sustainability and Compliance 170
7.11.1 Land Use and Visual Environmental Impact 171
7.11.2 Air Quality and Emissions 171
7.11.3 Noise and Vibration 171
7.11.4 Water Resources and Stormwater Management 172
7.11.5 Soil and Groundwater Contamination 172
7.11.6 Biodiversity and Habitat 172

References 175

LIST OF TABLES

Table 3.1 Surface area of Greece.

Table 3.2 Resident population by sex and age group for 2011 and 2021.

Table 3.3 Resident population by sex and region for 2011 and 2021.

Table 3.4 Ratio of Births and Deaths from 2019 to 2023.

Table 3.5 Life expectancy at birth in EU from 2021 to 2023.

Table 3.6 Greece's Economic Indicators and data from 2018 to 2024**.**

Table 3.7 Number of road traffic accidents and casualties for 2022 and 2023.

Table 3.8 Road traffic accidents and fatalities by type of weather conditions, 2023

Table 4.1 Logistics companies in Thessaly, their turnover and headquarters

Table 6.1 Distances and according travel times from significant infrastructure near Daferrera Fish Processing & Packaging Industry

Table 6.2 SWOT Analysis for Daferrera Fish Processing & Packaging Industry

Table 6.3 Comparative Evaluation of Factory Daferrera Fish Processing & Packaging Industry vs. Old Sugar Factory

Table 6.4 Distances and according travel times from significant infrastructure near Anagnostou Distillery Industrial Complex

Table 6.5 SWOT Analysis for Anagnostou Distillery Industrial Complex

Table 6.6 Comparative Evaluation of Anagnostou Distillery Industrial Complex vs. Old Sugar Factory

Table 6.7 Distances and according travel times from significant infrastructure near MEFSOUT Factory

Table 6.8 SWOT Analysis for MEFSOUT Factory

Table 6.9 Comparative Evaluation of MEFSOUT Factory vs. Old Sugar Factory

Table 6.10 Distances and according travel times from significant infrastructure near G. Baglatzis & Son Foundry

Table 6.11 SWOT Analysis for G. Baglatzis & Son Foundry

Table 6.12 Comparative Evaluation of G. Baglatzis & Son Foundry vs. Old Sugar Factory

Table 6.13 Distances and according travel times from significant infrastructure near KISSAVOS Tomato Processing Plant

Table 6.14 SWOT Analysis for KISSAVOS Tomato Processing Plant

Table 6.15 Comparative Evaluation of KISSAVOS Tomato Processing Plant vs. Old Sugar Factory

Table 6.16 Distances and according travel times from significant infrastructure near ELVEK Pulp & Paper Mill

Table 6.17 SWOT Analysis for ELVEK Pulp & Paper Mill

Table 6.18 Comparative Evaluation of ELVEK Pulp & Paper Mill vs. Old Sugar Factory

Table 6.19 Distances and according travel times from significant infrastructure near Former Cold Storage Facility

Table 6.20 SWOT Analysis for Former Cold Storage Facility

Table 6.21 Comparative Evaluation of Former Cold Storage Facility vs. Old Sugar Factory

Table 6.22 Distances and according travel times from significant infrastructure near Former Afoi Magrizou S.A. Textile Factory

Table 6.23 SWOT Analysis for Former Afoi Magrizou S.A. Textile Factory

Table 6.24 Comparative Evaluation of Former Afoi Magrizou S.A. Textile Factory vs Old Sugar Factory

Table 7.1 Physical Infrastructure Data

Table 7.2 Equipment Data

Table 7.3 Container Flow Data

Table 7.4 Vehicle Data (Trains)

Table 7.5 Vehicle Data (Trucks)

Table 7.6 Storage Data

Table 7.7 Human Resources Data

Table 7.8 Technological Infrastructure Data (IT & TOS)

Table 7.10 Environmental & Energy Data

Table 7.11 Operational Performance Data (KPIs)

Table 7.12 Data Collection Methods (Pre-Operational Phase)

Table 7.13 Summary Table of Benefits

Table 7.14 Timetable of Necessary Preparing Procedures and Actions for a Fully Operational Intermodal Terminal Center

Table 7.15 Number of existing operational utilities in the area of the Old Sugar Factory

Table 7.16 Distances and according travel times from significant infrastructure near Old Sugar Factory

Table 7.17 Calculation of Total costs needed for the foundation of the new intermodal terminal center

Table 7.18 Summary Table of Economic Impacts of the new intermodal terminal center

Table 7.19 Summary of Environmental Impact Assessment Process of the new intermodal terminal center

LIST OF FIGURES

Figure 3.1 Road Freight Transportation Economic profile of Greece

Figure 3.2 Greek TEN-T (Trans-European Transport Network) road infrastructure

Figure 3.3 The Orient/East-Med Corridor

Figure 3.4 Motorways of Greece

Figure 3.5 Piraeus as a corridor and the 1st largest commercial port in the Mediterranean

Figure 3.6 Overview of Piraeus Port

Figure 3.7 Rail freight terminal in the port of Piraeus

Figure 3.8 Locations of Logistics clusters near Attica

Figure 3.9 Locations of Logistics clusters near Thessaloniki region

Figure 3.10 Overview of Gonos Logistics center

Figure 4.1 Geographic position of Thessaly

Figure 4.2 Region of Thessaly geomorphological landscape

Figure 4.3 Demographic overview of Thessaly

Figure 5.1 Demographic overview of Larissa

Figure 5.2 Mountainous landscapes surrounding Larissa

Figure 5.3 Cultural restlessness imprinted on graffiti in a building in Larissa

Figure 6.1 Old abandoned factory in Thessaly

Figure 6.2 Location of Daferrera Fish Processing & Packaging Industry

Figure 6.3 Infrastructure of Daferrera Fish Processing & Packaging Industry

Figure 6.4 Location of Anagnostou Distillery Industrial Complex

Figure 6.5 First historical buildings of the distillery

Figure 6.6 Infrastructure of Anagnostou Distillery Industrial Complex

Figure 6.7 Location of MEFSOUT Factory

Figure 6.8 Historical photos and documents of MEFSOUT Factory

Figure 6.9 Infrastructure of MEFSOUT Factory

Figure 6.10 Location of G. Baglatzis & Son Foundry

Figure 6.11 Location of KISSAVOS Tomato Processing Plant

Figure 6.12 Infrastructure of KISSAVOS Tomato Processing Plant

Figure 6.13 Location of ELVEK Pulp & Paper Mill

Figure 6.14 Infrastructure of ELVEK Pulp & Paper Mill

Figure 6.15 Historical photos of ELVEK Pulp & Paper Mill

Figure 6.16 Location of Former Cold Storage Facility

Figure 6.17 Infrastructure of Former Cold Storage Facility

Figure 6.18 Location of Former Afoi Magrizou S.A. Textile Factory

Figure 6.19 Infrastructure of Former Afoi Magrizou S.A. Textile Factory

Figure 7.1 Historical photo of a worker outside the Old Sugar Factory

Figure 7.2 Current state of the Old Sugar Factory

Figure 7.3 Photo of a number of the working staff in front of the main building of the Old Sugar Factory

Figure 7.4 Overview of the Old Sugar Factory today

Figure 7.5 Space allocation of the proposed infrastructure that are essential for the fully operational new intermodal terminal center

Chapter 1. INTRODUCTION

1.1 Definition and Scope of Logistics and Transportation

Logistics is defined as the management of the flow of commodities, information, and resources from origin to consumption. Transportation, a core component of logistics, refers specifically to the physical movement of goods across different modes such as road, rail, sea, and air. Rodrigue et al. (2013) signifies that logistics coordinate and implement activities like inventory management, warehousing, and order fulfillment, with transportation serving as the critical link connecting these elements. The seamless coordination of logistics and transportation is essential for supply chain performance, influencing cost, speed, and reliability. In the context of freight movement, transportation modes vary in capacity, speed, and environmental impact, making multimodal initiatives and innovations increasingly important for optimally reshaping the logistics networks. According to NATO Logistics Handbook (1997) [2], logistics are engulfed into the following :

> Logistics is the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:
>
> a. design and development, acquisition, storage, transport, distribution, maintenance, evacuation and disposition of materiel.
> b. transport of personnel.
> c. acquisition or construction, maintenance, operation and disposition of facilities.
> d. acquisition or furnishing of services; and
> e. medical and health service support."

1.2 Evolution of Logistics and Transportation

It is essential and fruitful to mention quotes from great men throughout the ages that highlight and honor the role and importance of Logistics :

- ~~L~~eaders win through logistics. Vision, sure. Strategy, yes. But when you go to war, you need to have both toilet paper and bullets at the right place at the right time.” , **Tom Peters**, Business Author

- "Intermodal transportation is not just about shifting cargoes from one mode to another; it‘s about creating seamless connections that redefine how goods move across the world.", **Arthur Donovan** (Transportation Historian)

- "Supply lines win wars, not battles.", **General George S. Patton** (U.S. Army Commander)

- ~~"~~Amateurs talk about tactics, but professionals study logistics.", **General Robert H. Barrow**, USMC.

- ~~"~~Forget logistics, you lose.", **Lt. Gen. Frederick Franks**, USA, 7th Corps Commander, Desert Storm

- ~~"~~The line between disorder and order lies in logistics.", **Sun Tzu**

- ~~"~~My logisticians are a humorless lot... they know if my campaign fails, they are the first ones I will slay.", **Alexander the Great**

- "Intermodalism is the art of making different modes of transport work together as if they were one.", **John R. Meyer** (Economist)

The logistics and transportation sector has undergone significant transformation over the past decades, affected primarily by globalization, technological innovation, and sustainability. The rise of containerization in the mid-20th century revolutionized freight transport by standardizing cargo handling and enabling intermodal transfers between ship, rail, and truck, thereby reducing costs and transit times [3]. Digital technologies such as GPS tracking and terminal operating systems have enhanced even more the visibility and operational efficiency across supply chain [4]. The sector is also evolving towards greener solutions with emphasis on modal shifts from road to rail to reduce carbon emissions and congestion [5].

1.3 The Critical Role of Logistics and Transportation Across Multiple Sectors

Logistics and transportation form the backbone of modern economies, directly influencing economic growth, trade competitiveness, and regional development. Economic factors such as fluctuating fuel prices, trade volumes, and investment flows shape the demand and efficiency of freight transport systems. For instance, the Port of Rotterdam and the inland Port of Duisburg, Europe‘s largest maritime and inland terminals accordingly, prove how integrated logistics hubs can enhance economic activity by optimizing freight flows across multiple transport modes. These hubs support their geographic advantages to serve hinterlands, reducing transport costs and transit times. In Greece, the Larissa intermodal terminal project similarly aims to capitalize on Thessaly‘s central location and connectivity to major corridors, enhancing regional economic resilience and integration into European and global supply chains [6].

Technological innovation is another crucial sector overly shaping logistics and transportation. The adoption of automated terminal operations, digital tracking systems, and real- time data integration enhances operational efficiency, reduces human error, and improves safety. These technologies enable traffic management and maintenance, optimizing resource allocation and reducing delays. Market demand trends, such as the rise of e-commerce and just-in-time delivery provide new requirements for speed, flexibility, and reliability, compelling logistics providers to innovate and expand multimodal capabilities. Operational factors, including consolidation and deconsolidation processes, scheduling, and stakeholder coordination, are critical to managing complexity and cost-effectiveness in intermodal chains [7].

1.4 Strategic Importance of Integrated and Sustainable Logistics in Modern Supply Chains

The integration of multiple sectors is essential for building sustainable and resilient logistics systems that meet contemporary challenges. The deployment of digital platforms for real-time slot booking and cargo tracking enhances transparency and efficiency, minimizing idle times and empty runs, which are major indicators to inefficiency and emissions. The project‘s focus on repurposing old factory site further supports environmental objectives by preserving agricultural land, demonstrating how logistics development can be harmonized with sustainable urban planning [8].

Moreover, the strategic collaboration between ports, rail operators, and logistics providers is crucial to overcoming fragmented markets and regulatory barriers that often impede efficient freight movement. The successful partnerships between Duisburg, Rotterdam, Amsterdam, and Antwerp-Bruges illustrate how coordinated efforts can create supply chains that enhance Europe‘s competitiveness and support global trade flows [9]. These collaborations boost innovation in hydrogen infrastructure and zero-emission transport solutions, positioning logistics hubs as leaders in the energy transition [10]. In the Greek context, sychronising the Larissa terminal with such international networks and standards will not only improve operational efficiency but also elevate Greece‘s role as a logistics gateway between Europe and Asia, particularly within the framework of the Belt and Road Initiative [4].

1.5 The importance of transportation

Transport represents one of the most important human activities worldwide. It is an indispensable component of the economy and plays a major role in spatial relations between locations. Transport is a multidimensional activity whose importance is:

• Historical.

Transport modes have been fundamental in shaping civilizations since antiquity. In ancient Egypt, the Nile River served as a significant transport corridor enabling the movement of goods, people, and armies, which supported agricultural surplus and centralized power. The Roman Empire‘s vast road network over 400,000 km, was crucial for military control, trade, and administrative cohesion, facilitating rapid troop movements and communication across diverse territories. Similarly, in ancient China, the Grand Canal connected northern and southern regions, promoting economic integration and political unity.

• Social.

Transport systems gives access to essential social services such as healthcare, education, and cultural activities, thereby enhancing quality of life and social inclusion. Public transit, road networks, and railways enable mobility for vulnerable populations, including the elderly, disabled, and low-income groups, reducing social isolation.

Efficient transport fosters urbanization and the growth of metropolitan areas, influencing social stratification and neighborhood dynamics. Inadequate transport can reinforce social exclusion and limit opportunities.

• Political.

Governments are pivotal actors in the transport through investment, regulation, and policy making. Public funding supports infrastructure construction and maintenance, often subsidizing services to ensure universal access and affordability.

Political considerations influence transport priorities; for example, corridors may be developed to enhance national security, territorial integration, or international diplomacy. Infrastructure projects can dictate the state power and the modernization efforts. Transport policy also reflects broader political debates on sustainability, equity, and economic competitiveness.

• Environmental.

Emissions from road vehicles, ships, and aircraft significantly impact air quality, contributing to climate change and public health issues. Noise pollution affects urban and rural communities alike. Transport infrastructure can disrupt ecosystems, fragment habitats, and contribute to land degradation. Water pollution from ports and shipping is another concern.

Environmental costs need careful planning and investment in sustainable transport modes, such as electrified rail, clean fuels, and modal shifts from road to rail or waterways. Lifecycle assessments and green logistics practices are increasingly integrated into transport planning and further design.

• Economic.

Transport is a backbone of economic development, enabling the movement of goods and labor, supporting trade, and facilitating market access. Infrastructure investments stimulate related industries, including vehicle manufacturing, logistics services, and construction and many more fields. Efficient transport reduces costs, enhances productivity, and promotes economies of scale. It influences land values and regional specialization by improving accessibility.

1.6 Diversity of transport modes

Transport modes are the means by which people and freight achieve mobility. They fall into one of three basic types, depending on what surface they travel over: land (road, rail and pipelines), water (shipping), and air. Each mode is characterized by a set of technical, operational and commercial characteristics.

- **Road transportation**

This mode has become the dominant land transport system today. Automobiles, buses and trucks require a road bed. Such infrastructures are moderately expensive to provide, but there is a wide divergence of costs, from a gravel road to a multi lane urban expressway. Because vehicles have the means to climb moderate slopes, physical obstacles are less important than for some other land modes. This is due to the size constraints imposed by governments and also by the technical and economic limits of the power sources. In most jurisdictions, trucks and buses have specific weight and length restrictions which are imposed for safety reasons. In addition, there are serious limits on the traction capacities of cars, buses and trucks because of the considerable increases in energy consumption that accompany increases in the weight of the unit. For these reasons the carrying capacities of individual road vehicles are limited. Road transport, however, possesses significant advantages over other modes. The capital cost of vehicles is relatively

small. This produces several key characteristics of road transport. Low vehicle costs make it comparatively easy for new users to gain entry, which helps ensure that the trucking industry, for example, is highly competitive. Low capital costs also ensure that innovations and new technologies can diffuse quickly through the industry. Another advantage of road transport is the high relative speed of vehicles, the major constraint being government-imposed speed limits. One of its most important attributes is the flexibility of route choice, once a network of roads is provided. Road transport has the unique opportunity of providing door-to-door service for both passengers and freight.

- **Rail transportation**

Railways require tracks along which the locomotives and rail cars move. The initial capital costs are high because the construction of rail tracks and the provision of rolling stock are expensive. Historically, the investments have been made by the same source (either governments or the private sector). These expenditures have to be made before any revenues are realized and thus represent important entry barriers that tend to limit the number of operators. It also serves to delay innovation, compared with road transport, since rail rolling stock has a service life of at least twenty years. Railway routing is affected by topography because locomotives have limited capacities to mount gradients. Other factors that inhibit the movement of trains between different countries include signaling and electrification standards. These are particular problems for the European Union where the lack of ~~in~~teroperability" of the rail systems between the member states is a factor limiting the wider use of the rail mode. The ability of trains to haul large quantities of goods and significant numbers of people over long distances is the mode's primary asset. Freight traffic is dominated by bulk cargo shipments, agricultural and industrial raw materials in particular.

- **Pipelines**

Pipelines are an extremely important and extensive mode of land transport, although very rarely appreciated or recognized by the general public, mainly because they are buried underground (or under the sea as in the case of gas pipelines from North Africa to Europe). Pipelines are almost everywhere designed for a specific purpose only, to carry one commodity from one location to another. They are built largely with private capital and because the system has to be in place before any revenues are generated, represent a significant capital commitment. Geo political factors play a pivotal role in the routing of pipelines that cross international boundaries. Pipeline construction costs vary according to the diameter of the pipe and increase proportionally with the distance and with the viscosity of the fluid (need for pumping stations). Operating costs are very low, however, and as mentioned above, pipelines represent a very important mode for the transport of liquid and gaseous products. One major disadvantage of pipelines is the inflexibility of the mode.

- **Water transportation**

Shipping exploits the water routes that cross oceans as well as rivers and lakes. Many of the oceanic routes are in international waters and are provided at no cost to the users. In many coastal and inland waters too shipping lanes are ~~free~~", although national regulations may exclude foreign vessels from cabotage trade. Shipping enjoys rights of way that are at no cost to the users. Complementing this advantage are the relatively low operating costs of ships. Ships have the ability to carry large volumes with small energy consumption and limited manpower requirements. Shipping, therefore, is a mode that can offer very low rates compared with other modes. Even if maritime transportation has experienced improvements in safety and reliability the maritime routes are still facing dominant winds, currents and general weather patterns.

- **Air transportation**

Air transport, compared with other modes, has the obvious advantage of speed. This feature has served to offset many of its limitations, among which operating costs, fuel consumption and limited carrying capacities are the most significant.

1.7 Challenges Facing Logistics and Transportation Today

The logistics and transportation sector face challenges including infrastructure bottlenecks, environmental pressures, and regulatory complexities. Urban congestion and pollution, particularly from road freight, are major problems in many European regions, prompting policy shifts towards sustainable transport modes such as rail and inland waterways [11]. Greece‘s logistics sector also contends with fragmented infrastructure and limited intermodal terminal capacity outside major ports, constraining efficiency and modal shift potential.

1.8 Thesis Focus and Research Questions

In Europe, intermodal terminals are pivotal in facilitating modal shifts from road to rail and waterways, aligning with stringent environmental regulations and congestion mitigation policies. Greece‘s geographical position at the nexus of Europe, Asia, and Africa amplifies the strategic importance of developing efficient intermodal logistics to enhance its role as a regional transport hub.

Despite its strategic location, Greece‘s freight transport infrastructure has historically faced limitations, particularly in rail connectivity and intermodal terminal capacity [12]. The Thessaly region, and Larissa specifically, present unique opportunities for developing a modern intermodal terminal that can alleviate logistical bottlenecks and stimulate regional economic growth. Learning from internationally successful intermodal hubs such as Rotterdam and Duisburg, which combine advanced infrastructure, digital terminal operating systems, and sustainable practices, Greece can adapt these best practices to its local context [3] providing lessons crucial for the Larissa project.

This thesis aims to explore how an intermodal terminal in Larissa can be designed and implemented to maximize economic, environmental, and logistical benefits. It examines the geographic and economic context of Thessaly, evaluates the potential of repurposing former industrial sites such as the old sugar factory, and assesses the terminal‘s alignment with national and European transport policies, including the EU Green Deal and the Belt and Road Initiative. By integrating case study analysis, environmental assessment, and cost evaluation, the research seeks to provide a comprehensive roadmap for the project‘s development.

To guide this exploration, five key research questions are posed:

1. How has intermodal logistics evolved globally, and what lessons can be applied to the Greek context, particularly Thessaly and Larissa?

2. How do successful international intermodal terminal projects inform best practices and innovations for Larissa‘s terminal design and operation?

3. What are the demographic, economic, and logistical characteristics of Greece, Thessaly, and Larissa that impact the feasibility and strategic importance of the Larissa terminal?

4. What are the environmental, economic, and infrastructural considerations in repurposing former industrial sites, such as the old sugar factory, for intermodal logistics?

5. Are the infrastructure and benefits of the Larissa intermodal terminal make it cost effective rendering it progressively and successfully capable to contribute to broader initiatives like the China Belt and Road Initiative, enhancing Greece‘s role in regional and global supply chains?

By addressing these questions, this thesis contributes to the academic discourse on intermodal logistics while offering practical insights for policymakers and stakeholders in Greece‘s freight transport sector. The following chapters will elaborate on the geographic and economic context, lessons from international case studies, the current state of Greek logistics, and detailed project assessments.

1.9 Concept and Role of Intermodal Transport

Intermodal transport refers to the movement of goods using multiple modes of transportation in a single journey without handling the freight itself when changing modes. This approach enhances efficiency by leveraging the strengths of each transport mode: rail for long-distance bulk movement, road for flexible last-mile delivery, and sea for international trade.

Before progressing to the evolution of intermodal logistics it is necessary to mention to basic definitions that will significally support the comprehension and the overall assessment of this project:

1. Intermodal Terminal

Intermodal terminals are specialized infrastructure facilities where freight is transferred between different transportation modes without directly handling the cargo itself. These terminals are equipped with specialized handling equipment like gantry cranes, reach stackers and automated gate systems to optimize container and trailer transfers, minimize dwell times, and improve overall logistics efficiency. Modern terminals increasingly incorporate digital technologies such as terminal operating systems (TOS) and real time tracking to enhance operational transparency and reduce costs [13].

2. Standardized Containers (TEU)

Standardized containers, especially the 20-foot equivalent unit (TEU), are the fundamental units of modern intermodal transport, enabling seamless transfers across ships, trains, and trucks. Containers revolutionized freight logistics by enabling volume consolidation, protection of goods, and rapid transfers, with over 95% of global general cargo transported in containers by the late 20th century [14].

3. Transportation Modes in Intermodal Logistics

Intermodal transport involves a combination of maritime, rail, road, and air modes, each with unique characteristics: maritime for cost-effective long-distance bulk transport, rail for efficient inland long-haul freight, road for flexible last-mile delivery, and air for high-value, time-sensitive cargo [15]. The choice of mode depends on cost, speed, reliability, and environmental impact considerations.

4. Intermodal Chains

Intermodal chains refer to the integrated sequences of transport modes and terminals through which goods move from origin to destination. These chains require coordinated scheduling and handling to ensure seamless cargo flow, minimize delays, and optimize cost and environmental performance [1],[7].

5. Consolidation and Deconsolidation

Consolidation is the process of combining smaller shipments into larger units to achieve economies of scale and reduce transportation costs. Deconsolidation is the reverse process, where large shipments are broken down into smaller consignments for distribution to multiple destinations. These processes are crucial in intermodal logistics to manage capacity efficiently and reduce handling costs.

6. Modal Shift

Modal shift refers to the strategic transfer of freight transport from one mode to another, typically from road to rail or maritime, to achieve environmental, economic, or operational benefits. Modal shift is a central policy objective in the EU‘s transport strategy to reduce greenhouse gas emissions and road congestion.

7. Brownfield Redevelopment

Brownfield redevelopment involves the reuse of previously developed industrial or commercial sites that may be contaminated or underutilized. Such redevelopment is pivotal for sustainable urban planning and revitalizing local economies especially when repurposed for logistics infrastructure like intermodal terminals.

8. Circular Economy in Logistics

Circular economy principles in logistics focus on minimizing waste, maximizing resource efficiency, and promoting recycling and reuse throughout the supply chain and terminal operations.

The evolution of intermodal logistics has been shaped by the increasing demand for efficient, sustainable, and cost-effective freight transport systems worldwide. Globally, intermodal terminals have become critical nodes that facilitate the seamless transfer of goods between different transportation modes, optimizing supply chains and reducing environmental impacts. In Europe, the development of the Trans-European Transport Network (TEN-T) has prioritized multimodal connectivity to enhance trade flows and regional.

1.10 Importance of Intermodal Transport for Greece

Greece‘s geographic position as a gateway between Europe, Asia, and Africa places it at the crossroads of major trade routes, making intermodal transport vital for national economic competitiveness. The Greek Ministry of Infrastructure and Transport (2021) highlights the need to expand inland intermodal terminals to reduce road congestion, improve environmental performance, and implement with the Trans-European Transport Network (TEN-T). Developing terminals like Larissa can decentralize freight flows, enhance regional economies, and align with EU sustainability objectives.

In the Greek context, intermodal logistics remains an emerging sector with significant growth potential. The country‘s geography, characterized by mountainous terrain and dispersed urban centers, presents unique challenges for freight transport, making efficient multimodal solutions essential [12]. Thessaly and Larissa in particular, benefit from their central location on the main north-south transport axis linking Athens and Thessaloniki, as well as proximity to the port of Volos.

1.11 Thessaly and Larissa as Strategic Intermodal Nodes

Thessaly, with its central location and extensive transport infrastructure, is strategically positioned to serve as a logistics hub for Greece and the wider Balkan region. Larissa, the region‘s largest city, sits on the main Athens-Thessaloniki rail and road corridor (PATHE), providing critical connectivity for freight movement [16]. The city benefits from proximity to the port of Volos and the International Airport of Central Greece in Nea Anchialos, facilitating multimodal transport options. Despite these advantages, the lack of a modern intermodal terminal limits the region‘s logistics potential.

Historically, Larissa industrial heritage, including the presence of former sugar factories and manufacturing units, reflects its role in regional economic development. However, many of these industrial sites have become underutilized or abandoned, presenting opportunities for brownfield redevelopment into modern logistics facilities [17]. The repurposing of such sites aligns with sustainable urban development principles and can catalyze economic revitalization while preserving cultural heritage.

The Thessalian Plain, known for its fertile soils and agricultural productivity, generates substantial freight volumes, particularly in agricultural commodities. Efficient logistics infrastructure is vital to ensure timely and cost-effective transport from farms to markets and export terminals [18]. The region‘s climate and flat topography are conducive to rail and road transport, supporting the feasibility of an intermodal terminal that can handle diverse cargo types. Furthermore, the proximity to the Pineios River and the port of Volos enhances multimodal transport options, integrating inland and maritime logistics chains.

1.12 Policy and Strategic Framework Supporting Intermodal Transport

The European Union‘s transport policy framework strongly supports the development of intermodal transport as a means to achieve climate neutrality and sustainable mobility by 2050 (European Commission, 2020). The TEN-T network identifies core corridors passing through Greece, including the Mediterranean and Orient/East-Med corridors, emphasizing the importance of multimodal nodes like Larissa. Greece‘s National Strategy for Transport and Logistics (2021) echoes these priorities, committing to infrastructure upgrades, digitalization, and environmental sustainability. Furthermore, the Belt and Road Initiative‘s expansion into Europe highlights the strategic role of intermodal terminals in facilitating Eurasian trade, with Larissa positioned to capitalize on these emerging opportunities. Aligning local projects with EU and international frameworks ensures access to funding, technical expertise, and integration into global supply chains.

Internationally, intermodal terminals such as Rotterdam and Duisburg provide valuable models for Larissa. Rotterdam‘s success stems from its deep-water port facilities combined with extensive rail and inland waterway networks, supported by advanced digital systems and sustainable practices [3]. Duisburg, as the largest inland port globally, exemplifies how strategic location and multimodal integration can transform a logistics hub into a vital node for Eurasian trade, especially within the context of China‘s Belt and Road Initiative [4].

1.13 Problem Statement and Rationale

1.13.1. Challenges in Greece’s Freight Logistics Infrastructure

Greece‘s freight logistics infrastructure currently faces significant systemic challenges that hinder the development of efficient, sustainable, and competitive supply chains. Despite Greece‘s strategic geographic location at the crossroads of Europe, Asia, and Africa, its

transport networks remain fragmented and underdeveloped. Rail freight capacity is limited, and there is a notable scarcity of inland intermodal terminals outside of major maritime hubs such as Piraeus and Thessaloniki. This infrastructure gap forces an over reliance on road transport, which not only exacerbates congestion on highways but also contributes to greenhouse gas emissions and logistics costs.

1.13.2. Regional Logistics Deficiencies in Thessaly and Larissa

Larissa is strategically positioned on key north-south transport corridors and benefits from proximity to the port of Volos, yet it lacks a dedicated intermodal terminal capable of serving as a logistics hub for the region. The absence of such infrastructure results in inefficient freight flows, increased reliance on road haulage, and missed opportunities for economic growth and regional development. The region contains several underutilized former industrial sites, including the old sugar factory, which present both logistical challenges and redevelopment opportunities. These brownfield sites often require significant remediation efforts but offer prime locations for logistics facilities due to their proximity to existing transport networks and urban centers [17].

1.13.3. Concept for Selecting the Old Sugar Factory Site

The decision to select the old sugar factory site in Larissa as the location for the new intermodal terminal is grounded in multiple strategic and practical considerations. The site‘s adjacency to existing rail lines and major roadways facilitates multimodal connectivity, essential for efficient freight transfer between transport modes. Furthermore, the brownfield status of the site aligns with European Union and Greek policies that promote the regeneration of former industrial areas to mitigate environmental degradation. Redeveloping this site supports local economic revitalization by creating employment opportunities and attracting investment, thereby addressing socio-economic challenges faced by the region. The reuse of existing industrial land also reduces the need to develop greenfield sites, preserving agricultural land and natural habitats.

1.13.4. Summary and Foundation for Further Research

The problem statement underscores the urgent need to enhance Greece‘s inland intermodal logistics capacity to foster sustainable economic growth and environmental protection. The Larissa intermodal terminal project addresses this critical gap by proposing the redevelopment of a strategically located brownfield site, lessons learned from successful international intermodal terminals and aligning closely with national and EU policies. This concept introduces a strong foundation for the detailed technical, environmental, and economic assessments that follow in subsequent chapters of this thesis, aiming to provide a comprehensive roadmap for the project‘s successful implementation.

1.14 Project Overview

1.14.1. Project Vision and Strategic Location

The Larissa intermodal terminal project is envisioned as a state-of-the-art logistics hub aimed at enhancing freight transport efficiency and sustainability in central Greece. The project capitalizes on the strategic location of the former sugar factory site, which is advantageously positioned near major rail and road corridors, including the critical Athens-Thessaloniki axis and connections to the port of Volos. This location facilitates seamless integration of multiple transport modes enabling efficient modal transfers that contribute to reducing road congestion and environmental impacts.

1.14.2. Economic and Financial Assessment

A core objective of the Larissa terminal project is to conduct a comprehensive financial assessment encompassing construction, operational, and maintenance costs alongside the anticipated economic benefits. This includes job creation, stimulation of regional economic activity, and increased competitiveness of local industries through improved logistics services. National investment initiatives complement these funds, ensuring a robust financial framework that underpins the project‘s viability and long-term success.

1.14.3. Geopolitical and Trade Significance

Geographically, the Larissa intermodal terminal is strategically positioned to leverage Greece‘s role as a logistics gateway within the broader context of the Belt and Road Initiative (BRI). Greece‘s location at the crossroads of Eurasian trade routes enhances its capacity to handle increasing freight volumes moving from Asia to Europe [4]. The Larissa terminal is designed to complement existing logistics hubs such as Piraeus and Thessaloniki by providing inland connectivity that supports the efficient distribution of goods across the Balkans and Central Europe.

1.14.4. Comprehensive Integration and Future Outlook

Larissa intermodal terminal project represents a comprehensive initiative that integrates economic viability, environmental stewardship, and strategic positioning within global logistics networks. By transforming a former industrial brownfield into a modern logistics hub, the project supports Greece‘s transition toward sustainable freight transport and regional economic development. Its integration within national and European transport frameworks enhances connectivity with international trade corridors, positioning Larissa as a key player in the evolving landscape of global logistics.

1.15 Thesis Structure

1.15.1. Introduction and Research Framework

The thesis begins with an introductory chapter that establishes the foundation for the entire study. This chapter outlines the significance of the Larissa intermodal terminal project within the broader context of logistics and transport infrastructure development. It presents the key research questions that guide the investigation, framing the scope and objectives of the thesis. This approach ensures that readers understand the study‘s relevance and the specific issues it seeks to address [1].

1.15.2. Lessons from International Case Studies

Chapter 2 presents a detailed analysis of international case studies involving successful intermodal terminals. This comparative study highlights best practices, innovative technologies, and operational models that have contributed to the efficiency and sustainability of these terminals. With lessons from these global examples, the chapter provides valuable insights into how similar strategies can be adapted to the conditions of Larissa.

1.15.3. Current State of Greece’s Logistics Sector

The chapters 3,4 and 5 focus on the existing logistics landscape in Greece, with particular emphasis on Thessaly and Larissa. They assess demographic trends, economic conditions, geographic factors, and infrastructural assets that influence freight transport and logistics operations. The chapter also reviews regulatory frameworks and identifies logistical challenges that the Larissa intermodal terminal must overcome.

1.15.4. Site Evaluation and Strategic Project Assessment

Chapter 6 evaluates former industrial sites in Larissa and Volos to determine their suitability for redevelopment into intermodal logistics centers. It includes a thorough assessment of the old sugar factory site, considering factors such as cost, environmental impact, and strategic alignment with broader initiatives like the China Belt and Road Initiative. This chapter synthesizes technical, economic, and environmental analyses to justify the selection of the site and to outline the project‘s feasibility. The findings lay the groundwork for the final chapter‘s construct and recommendations.

1.15.5. Synthesis, Policy Implications, and Future Research

The final chapter synthesizes the research findings, discussing their implications for policy, planning, and practice. It offers recommendations for the successful development and operation of the Larissa intermodal terminal, emphasizing sustainable logistics and regional economic development. Additionally, the chapter identifies gaps and opportunities for future research, ensuring that the thesis contributes both to academic knowledge and practical applications in the field of intermodal logistics and infrastructure development.

Chapter 2. Case Studies and Lessons Learned

2.1 Successful Intermodal Centers (Innovations, Operational Excellence, and Lessons for Future Development)

This section presents a series of case studies of successful intermodal centers across Europe proving how innovations and strategic management translated into operational optimality. These examples provide valuable information about best practices, surpassing the logistic specific challenges and benefits of intermodal transport in the real environment.

By examining these case studies, we get a deeper understanding of how innovation is translated into practice and builds the bridge between concept and execution. This analysis also defines the base of the following part, which focuses on the Greek intermodal landscape, and offers a regional perspective on the adoption and adaptation of intermodal solutions.

2.2 Examples of intermodal facilities in Europe

2.2.1 Case Study: Port of Rotterdam (Netherlands) — Europe's Largest and Most Advanced Intermodal Hub

The port of Rotterdam is the most important sea port in Europe and a worldwide container control leader, and acts as a important intermodal middle that integrates sea, rail and road networks. In 2024, it handled approximately 13.82 million in spite of the boom in opposition from Antwerp-Brugge, which reached 98% of the Rotterdam throughput. The strategic place of Rotterdam in the North Sea and its numerous inland connections make it a crucial door to the products that are available in and out of Europe. Port‘s infrastructure includes direct railway ties with massive European towns, consisting of Duisburg, Basel and Milan, in addition to advanced logistics parks and interior terminals that facilitate best modal transfers, for that reason optimizing performance

.

Rotterdam has been at the forefront innovations to enhance operational performance and sustainability. The port‘s container terminals employ automation technologies such as Automated Stacking Cranes (ASCs) and Automated Guided Vehicles (AGVs), which enable 24/7 operations with increased safety and reduced labor costs [19]. Digitalization has a pivotal role along with blockchain technology deployed to improve supply chain transparency and traceability, fostering trust and efficiency among stakeholders. The Maasvlakte II terminal shows Rotterdam‘s commitment to sustainability, operating as a zero-emission terminal powered by renewable energy sources, which aligns with European Union climate goals.

Despite its strengths, the port has faced demanding situations in recent years. container throughput declined by way of 5.5% in 2022, in large part due to the disruption of change flows caused by the Russia-Ukraine struggle and related sanctions, which eliminated

over 8% of Rotterdam‘s box traffic associated with Russia. Additionally, global supply chain disruptions related to the COVID-19 pandemic and ability constraints brought about overcrowded terminals and uncertain shipping schedules. The port authority‘s strategic reaction includes sustained investments in infrastructure modernization and virtual systems to beautify resilience and put together for destiny monetary fluctuations [20].

Looking forward, Rotterdam maintains to put money into expanding its intermodal capabilities and sustainability projects to hold its competitive part. The port authority emphasizes the combination of AI and big data analytics to optimize terminal operations and hinterland logistics while fostering collaboration with rail and inland waterway operators to shift freight from avenue to greener modes. These efforts aim to secure Rotterdam‘s role as a essential logistics hub, providing valuable lessons for comparative evaluation with countrywide contexts along with Greece.

2.2.2 Duisburg Intermodal Terminal (Germany) — A Strategic Inland Port and Rail Hub on the China-Europe Corridor

Duisburg Intermodal Terminal, located at one of Europe's largest inland ports, acts as a critical logistics hub connecting maritime, railway and road delivery networks. Duisburg is strategically positioned on the Rhine River and incorporated with big railway corridors, and acts as a critical node on China - Europe Railway Express, which facilitates powerful movement of products among Asia and Europe. In 2023, the terminal dealt with an expected four million TEU, reflecting its growing significance in worldwide supply chains and its role as an entrance port for main and Eastern European markets [21].

The terminal has invested heavily in automation technologies, together with automatic cranes and digital shipbuilding systems, that have superior throughput potential and operational reliability. These technological advances are complemented by way of sustainability initiatives such as electrification of managing device and the implementation of renewable electricity resources, which aim to lessen the terminal's carbon footprint and suit European weather objectives.

The terminal's integration into the China-Europe Railway Express network exemplifies the growing importance of intermodal rail corridors in worldwide change. Duisburg acts as the maximum crucial European terminal for several railway offerings originating from China, permitting rapid transit times to traditional sea shipping. The terminal‘s capacity handling large volumes efficiently while maintaining flexibility to serve diverse cargo types has been pivotal to its success.

Despite its achievements, Duisburg faces challenges not unusual to fundamental intermodal hubs, inclusive of congestion control, coordination amongst multiple stakeholders, and the need for continuous technological improvements to keep competitiveness. The terminal‘s ongoing modernization applications aim to address those problems by way of increasing rail capacity, improving digital integration, and promoting sustainable logistics practices. Duisburg‘s example gives precious lessons at the significance of strategic location, multimodal connectivity, and innovation.

2.2.3 Port of Trieste (Italy) — A Strategic Adriatic Gateway with Strong Rail Connectivity and Sustainability Focus

The Port of Trieste is a critical maritime gateway link for Asia and Europe, especially through trade flows via the Adriatic Sea. In 2022, the port treated approximately 877,000 TEUs, marking a substantial boom as compared to preceding years and reflecting its ever growing position in containerized freight delivery in Southern Europe. Trieste‘s strategic

significance is underscored via its robust rail connections to Central European international locations allowing hinterland distribution and integration into the wider European logistics network. This connectivity is critical for the port‘s positioning as a key node at the China‘s Belt and Road Initiative (BRI), especially in the China-Europe collaboration with which ambitions to strengthen trade infrastructure and streamline transport hyperlinks between Asia and Europe.

Innovation and durability are crucial to the development strategy of the port soTrieste has invested in modernizing its infrastructure by focusing on sustainable logistics, including the integration of electric cranes and the integration of renewable energy sources in terminal operations. The port's system, the Trieste Marine Terminal (TMT) recorded a huge container traffic growth in the first quarter of 2025, with about 206,000 TEUs, which increases 39% of the year-by-year, which shows the effectiveness of its modernization and capacity. Despite a slight overall cargo throughput decrease in the early 2025 due to fluctuations in the liquid bulk volumes, strong growth has been shown by underlining the elasticity and adaptation of the port in containers and Ro-Ro traffic.

The integration of the port in the multimodal transport network has been further enhanced by its hub-and-spoke model that facilitates the efficient transfer of goods between the sea, rail and road. Trist's rail links are particularly noticeable, providing direct access to central European markets and enables faster transportation time compared to maritime options. This multimodal connectivity is supported by digitalization and supply chain transparency equipment investments, which improves operational efficiency and customer service. In collaboration with BRI, infrastructure funds and enhanced trade flow also brings opportunities for advanced trade flow, which positions Trieste as a competitive alternative to northern European ports for goods determined by South and Central Europe.

The port's ongoing infrastructure projects, such as terminal extensions and improved inland connections, intention to resolve problems and make it even more competitive in the logistics field of Southern Europe. Trieste's example emphasizes the significance of strategic location, investments in green technologies and worldwide collaborations to build successful intermodal centers which could adapt to developing global exchange dynamics.

2.2.4 Budapest Intermodal Terminal (Hungary) — A Central European Distribution Hub with Digitalization Focus

Budapest's Intermodal Terminal serves as an important distribution hub in Central and Eastern Europe taking advantage of the important geographical position of Hungary and considerable rail connectivity. In 2023, the terminal moved about 300,000 TEUs, reflecting its ability to consolidate freight flows and facilitate long-haul regional transport. Budapest's integration into the Trans - European Transport Network (TEN-T) further reinforces its strategic importance, providing continuous connections to essential European corridors and improving interoperability between certainly unique transport modes.

A defining feature of the Budapest Terminal is the consolidation of smaller shipments into cost-effective and larger freight movements. This hub-and-spoke technique optimizes load factors, reduces delivery costs, and improves carrier reliability for carriers operating in fragmented markets. The terminal has invested in digitalization initiatives, including real time tracking systems and advanced terminal operating systems (TOS).

Budapest terminal modernization also aligns with broader goals of European sustainability. Investments in energy -efficient handling equipment and digital tools contribute to reducing the terminal's environmental footprint. The role of the terminal in facilitating the modal change from road to rail supports reductions in greenhouse gas emissions and road traffic jams in central and eastern Europe. Terminal development demonstrates how medium

-sized intermodal centers can leverage technology and strategic location to serve as vital nodes in complex logistics environments simultaneously balancing operational efficiency with environmental responsibility.

Challenges remain in expanding capacity and further integrating inland transport networks, mainly due to diversified infrastructure and regulatory environments in central and eastern Europe. Budapest's paradigm offers valuable lessons on the significance of digital innovation, multimodal integration and regional collaboration in the gradual development of robust and competitive intermodal terminal center (Hungarian Logistics Association Report, 2023).

2.3 Lessons Learned for the Larissa Sugar Factory Project

2.3.1 Port of Rotterdam : Strategic Integration of Automation and Sustainability

Rotterdam port shows that integration of advanced automation technologies - for example, automated stacking cranes (ASC), automated guided vehicles (AGV) and digital terminal operating systems - can increase operating efficiency, transfer rate and safety in internal logistics functions significantly. This shows the importance of using scalable automation solutions that fit the size and scope of the site. In addition, Rotterdam's experience points out that automation must be balanced with social considerations, including workforce transition planning to maintain community support.

Sustainability is another critical Rotterdam lesson, where electrical equipment with energy efficiency and integration of renewable energy has reduced emissions and operating costs. Given Larissa's environmental goals and regional policy that favors green logistics, incorporation of the sustainability of the beginning of the project will be essential. This includes prioritization of electrical or hybrid handling machines, installment of solar panels on factory roofs and projected buildings with energy efficiency. The Rotterdam model also shows that sustainability can be a competitive advantage, attract environmentally conscious customers and provide access to EU green financing.

Rotterdam‘s success is largely attributed to its flawless integration of maritime, rail, and road transport modes, supported by extensive hinterland connections and digital tools like blockchain for supply chain transparency. For the Larissa intermodal center, this signifies the need to develop strong multimodal linkagesto forge efficient inbound raw material supply and outbound product distribution.

2.3.2 Duisburg Intermodal Terminal (DIT) : Pioneering Sustainability through Energy Transition and Digitalization

Duisburg Intermodal Terminal (DIT) sets the level on how sustainability goals can be integrated into large scale intermodal logistics operations. Duisburg shows that environmental responsibility and operational efficiency can exist together. This approach includes hydrogen powered locomotives, country power for barges and a smart local energy network that combines photovoltaic, battery storage and fuel cell systems. This highlights the critical importance of entering sustainability early in the design phase, especially given Greece climate targets and EU environmental sandals.

Duisburg's terminal hub and lightning model, with a revolutionary modal division target (40% rail, 40% barge, 20% truck), reduces road congestion and environmental impacts and maximizing transportation efficiency. This emphasizes the importance of strong multimodal connections, to integrate with regional and international supply chains.

The most pivotal and significant reuse and adaptability, similar to our intermodal project in Larissa, is that of Duisburg‘s ability to transform a former industrial site (a coal island) into a state-of-the-art logistics hub demonstrates the value of adaptive reuse and long-term planning in industrial regeneration. Duisburg‘s example suggests that site redevelopment, implemented with the conception of modern infrastructure and sustainable design, can revitalize underused industrial areas into competitive logistics centers.

2.3.3 Port of Trieste : Leveraging Strategic Rail Connectivity and Multimodal Integration

The Port of Trieste‘s success is strongly linked to its extensive and well-developed rail connectivity, with a dedicated rail park featuring five 600-meter tracks and three rail-mounted stacking cranes fully dedicated to train operations. This infrastructure enables the terminal to handle over 7,000 trains annually, facilitating efficient cargo flows between the Adriatic gateway and Central and Eastern European markets.

Trieste‘s ability to synchronize train with maritime schedules, supported by clear customs procedures and digital terminal operating systems (such as the Milos® TOS), highlights the value of operational coordination and digitalization in enhancing throughput and reducing dwell times. Trieste‘s example proves that combining physical infrastructure investments with advanced IT systems and process alignment can significantly boost terminal competitiveness and service quality.

2.3.4 Budapest Intermodal Terminal : Capacity Planning and Flexibility in a Growing Logistics Hub

The Budapest Intermodal Terminal (BILK) illustrates the critical importance of proactive capacity planning and operational flexibility in a dynamic logistics environment. With an annual throughput of around 230,000 TEUs and increasing demand for handling not only maritime containers but also trailers and swap bodies, BILK faces challenges related to limited expansion space and rising cargo diversity. Flexible yard layouts and modular infrastructure will be essential to accommodate future growth and diverse freight handling needs without costly redesigns or expansions.

BILK‘s experience with optimizing terminal processes—such as reducing dwell times, improving gate procedures through technologies like optical character recognition (OCR), and implementing pre-announcement systems—demonstrates how operational efficiency can be enhanced even when physical space is limited. The emphasis on safety at BILK shows the importance of integrating safety considerations into operational planning to protect workers and assets.

Budapest‘s strategic position at the heart of Europe, connecting transcontinental and maritime traffic flows is a key factor in BILK‘s success.

2.4 Applications to the Larissa Sugar Factory Project

2.4.1 Port of Rotterdam: Tailored Automation and Sustainability Solutions for Larissa

Applying Rotterdam‘s automation lessons to Larissa requires a realistic approach. Initial investments could focus on semi automated container handling equipment suitable for the site‘s scale, combined with digital yard management software to optimize space utilization. Given the existing factory infrastructure, renewal and rebuildind rather than full redevelopment may be preferred. Solar energy installations and electric vehicle charging stations can further embed sustainability while controlling operational costs. Moreover, Larissa can explore partnerships with local vocational schools to prepare the workforce for new technologies, easing social transitions and fostering local employment.

To replicate Rotterdam‘s multimodal connectivity, Larissa‘s project should improve rail access collaborating with the national rail operator to upgrade sidings or spur lines. Road infrastructure improvements will complement rail connections and facilitate efficient last mile deliveries. Engaging with regional transport planners early can help align these infrastructure upgrades with broader Thessaly logistics strategies. Additionally, Larissa can develop partnerships with regional freight forwarders and intermodal operators to integrate in existing supply chains, increasing cargo volumes.

2.4.2 Duisburg Intermodal Terminal: Implementing Sustainable Energy and Digital Infrastructure

Inspired by Duisburg‘s project, Larissa‘s old sugar factory redevelopment should prioritize a sustainable energy concept integrating renewable sources such as solar photovoltaics, energy storage, and electrification of cargo handling equipment. Larissa can also introduce hybrid electric vehicles and shore power connections for any barge operations or trucks to reduce emissions. Begin partnerships with local energy providers and applying for EU green funding is crucial and mandatory. Digital infrastructure should include terminal operating systems, RFID/barcode tracking, and real-time data analytics for optimal level performance yard operations, improve cargo visibility, and enhance client communication.

Focus on improving rail connectivity by upgrading or adding rail sidings and ensuring efficient last-mile road access is also significant goal. Coordination with Greek rail and road authorities will be necessary to align infrastructure investments with national and regional transport plans.

Optimizing land use, incorporating green spaces, and ensuring flexible layouts to accommodate diverse cargo types and future expansions should be done on the context of site redevelopment.

2.4.3 Port of Trieste: Developing Rail-Enabled Multimodal Connectivity and Digital Systems

Inspired by Trieste‘s rail park and terminal operating systems establishing or enhancing rail sidings with sufficient length and handling capacity to accommodate modern freight trains should be a top priority. Collaborating with Greek rail authorities to improve track quality and scheduling will be crucial to ensure reliable and frequent rail services. Complementing rail with efficient road access and parking/loading areas will enable smooth last-mile operations.

Phased expansions of storage, handling areas, and rail facilities as demand grows should be considered and forseen. Incorporating modular warehouses and adaptable yard layouts will enable the Larisa project to adapt to changing market conditions and cargo types.

2.4.4 Budapest Intermodal Terminal: Designing for Flexibility and Operational Efficiency

Of outmost significance is considered the flexible infrastructure capable of accommodating containers, trailers, and palletized goods. Modular storage areas, adaptable loading docks, and multi purpose handling equipment will support operations across different cargo flows. Implementing digital gate systems with OCR and pre announcement capabilities will reduce waiting times and improve throughput, critical for maximizing productivity on a constrained site.

Terminal Operating Systems (TOS) will facilitate better planning and communication with customers and transport partners, enhancing service reliability and viability. This is essential to be combined with the improve of rail sidings and road access, ensuring seamless integration with national and regional transport networks.

Engaging local industry, government, and logistics stakeholders and other assets early in the planning and designing process will help align infrastructure investments with regional economic development. Additional helpful partnerships with intermodal operators and freight forwarders to integrate the site into wider supply chains aim into increasing cargo volumes and operational viability.

Chapter 3. Greece, a crossroad for intermodal Logistics

3.1 Introduction to Greece's Demographics, Economy, and Logistics Landscape

Greece, situated at the crossroads of Europe, Asia, and Africa, presents a unique blend of demographic, economic, and infrastructural characteristics that shape its logistics and transportation sectors. The country's geopolitical position is decisive for the development of trade and related activities. At the same time, its rich (mountainous and maritime) geomorphology places constraints on the development of land transport, favoring the emergence of alternative, competitive modes of transport. With a population of approximately 10.5 million, Greece's demographic trends reflect an aging population alongside urban concentration in key metropolitan areas such as Athens and Thessaloniki. These demographic patterns influence demand for goods movement, urban logistics, and infrastructure development. Economically, Greece is classified as an advanced, high-income country with a service-oriented economy accounting for roughly 80% of GDP, complemented by industrial and agricultural sectors. Tourism and shipping stand out as pillars of the economy, with the Greek Merchant Navy being the largest globally by deadweight tonnage, underscoring Greece's maritime heritage and strategic importance in global trade routes. Recent years have seen steady economic recovery and growth, supported by investments in infrastructure and logistics, which are critical to sustaining competitiveness in the Mediterranean and broader European markets.

The logistics and transportation landscape in Greece is marked by significant developments and challenges across multiple modes of transport. The country boasts a network of ports, airports, roads, and railways that serve both domestic and international freight flows. The Port of Piraeus, under COSCO's management, has emerged as the Mediterranean's third-largest container port, driving regional logistics growth. Meanwhile, major logistics hubs like Thriasio Pedio are evolving into state-of-the-art distribution centers, supported by ongoing infrastructure projects such as highway upgrades and metro expansions in Athens and Thessaloniki. Despite these advances, Greece faces challenges including road safety concerns, aging rail infrastructure, and the need for greater multimodal integration. The rapid expansion of e-commerce is further reshaping logistics demand, emphasizing last-mile delivery capabilities and modern warehousing solutions. Greece's strategic engagement with international initiatives such as China's Belt and Road Initiative offers additional opportunities for enhancing connectivity and attracting investment, positioning the country as a vital logistics gateway between Europe and Asia. This section will explore these themes in detail, providing a comprehensive overview of Greece's demographics, economy, infrastructure, leading logistics players, and strategic initiatives shaping its transport and logistics future. Total area of Greece that can aid or conduct logistics operations is as following below:

Regions	Area (km²)
Greece, total	**132,049**
Anatoliki Makedonia, Thraki	14,179
Kentriki Makedonia	19,166
Dytiki Makedonia	9,471
Ipeiros	9,164
Thessalia	14,051
Sterea Ellada	15,561
Ionia Nisia	2,306
Dytiki Ellada	11,327
Peloponnisos	15,511
Attiki	3,814
Voreio Aigaio	3,854
Notio Aigaio	5,305
Kriti	8,340

Table 3.1 Surface area of Greece.

3.2 Demographics of Greece

As of early 2025, Greece's population is estimated at approximately 9.94 million, reflecting a continued decline due to low birth rates and an aging populace. The fertility rate stands at 1.41 children per woman, significantly below the replacement level of 2.1, contributing to a negative population growth rate of -1.08%. Life expectancy is relatively high, averaging 81.9 years, with males at 79.4 years and females at 84.6 years. The age distribution indicates that 13.8% of the population is aged 0–14 years, 62.6% are between 15–64 years, and 23.6% are 65 years and older, highlighting a significant aging demographic. According data analyzing the resident population by sex and region or age group, birth – death ratio and life expectancy are seen in the following tables:

Age group	2021			2011			Change (%) 2021/2011		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	**10,482,487**	**5,125,977**	**5,356,510**	**10,816,286**	**5,303,223**	**5,513,063**	**-3.1**	**-3.3**	**-2.8**
0 - 9	878,491	451,492	426,999	1,049,839	537,220	512,619	-16.3	-16.0	-16.7
10 - 19	1,068,216	551,148	517,068	1,072,705	552,173	520,532	-0.4	-0.2	-0.7
20 - 29	1,053,304	546,929	506,375	1,350,868	696,744	654,124	-22.0	-21.5	-22.6
30 - 39	1,256,393	633,913	622,480	1,635,304	827,542	807,762	-23.2	-23.4	-22.9
40 - 49	1,596,028	797,720	798,308	1,581,095	781,112	799,983	0.9	2.1	-0.2
50 - 59	1,543,340	753,596	789,744	1,391,854	677,018	714,836	10.9	11.3	10.5
60 - 69	1,324,635	630,150	694,485	1,134,045	543,421	590,624	16.8	16.0	17.6
70 - 79	996,037	455,938	540,099	1,017,242	456,247	560,995	-2.1	-0.1	-3.7
80 +	766,043	305,091	460,952	583,334	231,746	351,588	31.3	31.6	31.1

Table 3.2 Resident population by sex and age group for 2011 and 2021.

Region	2021			Percent over total region 2021		2011			Change (%) 2021/2011		
	Total	Male	Female	Male	Female	Total	Male	Female	Total	Male	Female
Greece, total	**10,482,487**	**5,125,977**	**5,356,510**	**48.9**	**51.1**	**10,816,286**	**5,303,223**	**5,513,063**	**-3.1**	**-3.3**	**-2.8**
Anatoliki Makedonia, Thraki	562,201	275,804	286,397	49.1	50.9	608,182	299,643	308,539	-7.6	-8.0	-7.2
Kentriki Makedonia	1,795,669	867,180	928,489	48.3	51.7	1,882,108	912,693	969,415	-4.6	-5.0	-4.2
Dytiki Makedonia	254,595	126,869	127,726	49.8	50.2	283,689	141,779	141,910	-10.3	-10.5	-10.0
Ipeiros	319,991	157,708	162,283	49.3	50.7	336,856	165,775	171,081	-5.0	-4.9	-5.1
Thessalia	688,255	338,586	349,669	49.2	50.8	732,762	362,194	370,568	-6.1	-6.5	-5.6
Sterea Ellada	508,254	254,511	253,743	50.1	49.9	547,390	277,475	269,915	-7.1	-8.3	-6.0
Ionia Nisia	204,532	101,125	103,407	49.4	50.6	207,855	102,400	105,455	-1.6	-1.2	-1.9
Dytiki Ellada	648,220	325,314	322,906	50.2	49.8	679,796	339,310	340,486	-4.6	-4.1	-5.2
Peloponnisos	539,535	270,495	269,040	50.1	49.9	577,903	291,777	286,126	-6.6	-7.3	-6.0
Attiki	3,814,064	1,837,343	1,976,721	48.2	51.8	3,828,434	1,845,663	1,982,771	-0.4	-0.5	-0.3
Voreio Aigaio	194,943	97,765	97,178	50.2	49.8	199,231	99,984	99,247	-2.2	-2.2	-2.1
Notio Aigaio	327,820	164,669	163,151	50.2	49.8	309,015	155,865	153,150	6.1	5.6	6.5
Kriti	624,408	308,608	315,800	49.4	50.6	623,065	308,665	314,400	0.2	0.0	0.4

Table 3.3 Resident population by sex and region for 2011 and 2021.

	2019	2020	2021	2022	2023
Births	83,756	84,764	85,346	76,095	71,455
Deaths	124,954	131,025	143,904	140,792	128,101
Difference	-41,198	-46,261	-58,558	-64,697	-56,646

Table 3.4 Ratio of Births and Deaths from 2019 to 2023.

Countries	Male			Female		
	2021	2022	2023*(3)	2021	2022	2023*(3)
EU 27	*(1)(2)77.2	*(1)(2)77.9	78.9	*(1)(2)82.9	*(1)(2)83.3	84.2
Euro area						
Austria (AT)	78.8	79.1	79.2	83.7	83.6	84.0
Belgium (BE)	79.4	79.7	80.3	84.3	83.9	84.6
France (FR)	*79.3	*79.3	80.1	*85.5	*85.1	85.9
Germany (DE)	78.4	78.3	…	83.3	83.0	…
Greece (EL)	77.4	78.3	79.0	82.9	83.4	84.2
Estonia (EE)	72.7	73.6	74.1	81.4	82.3	83.1
Ireland (IE)	80.4	80.9	…	84.2	84.2	…
Spain (ES)	80.3	80.5	81.2	86.2	85.9	86.7
Italy (IT)	80.5	80.7	81.7	84.9	84.8	85.8
Croatia (HR)	73.5	(1)74.6	75.4	79.7	(1)80.8	81.8
Cyprus (CY)	79.2	79.7	80.4	83.4	83.4	84.7
Latvia (LV)	68.2	69.4	70.8	78.0	79.4	80.8
Lithuania (LT)	69.5	71.4	72.5	78.8	80.1	81.7
Luxembourg (LU)	80.5	80.8	81.7	84.8	85.2	85.1
Malta (MT)	80.6	*80.4	81.8	84.0	*84.6	85.3
Netherlands (NE)	79.7	80.2	80.5	83.0	83.1	83.4
Portugal (PT)	78.5	*(1)78.9	79.5	84.4	*(1)84.5	85.2
Slovakia (SK)	71.2	73.6	74.7	78.2	80.5	81.5
Slovenia (SI)	77.7	78.6	79.1	83.8	84.1	85.0
Finland (FI)	79.3	78.7	79.1	84.6	83.8	84.4
Non-euro area						
Bulgaria (BG)	67.7	(1)70.6	72.0	74.9	(1)77.9	79.6
Denmark (DK)	79.6	79.5	80.0	83.3	83.2	83.8
Hungary (HU)	70.7	(1)72.6	73.6	77.6	(1)79.3	80.1
Poland (PL)	*(1)(2)71.4	(1)73.4	74.8	*(1)(2)79.5	(1)81.1	82.4
Romania (RO)	(2)69.2	(2)71.3	72.9	(2)76.6	(2)79.2	80.5
Sweden (SE)	81.3	81.4	81.7	84.9	84.8	85.0
Czechia (CZ)	(1)74.1	76.1	77.0	(1)80.5	81.9	82.9

Source: Eurostat.
* = Provisional data.
… = No data available.
(1) Break in time series.
(2) Estimates.
(3) Eurostat estimates.

Table 3.5 Life expectancy at birth in EU from 2021 to 2023.

3.2.1 Demographic Trends and Their Impact on Greece's Logistics Sector

Urbanization in Greece is highly pronounced, with approximately 81% to 89.5% of the population residing in urban areas as of 2025, predominantly concentrated in major metropolitan centers such as Athens and Thessaloniki. This intense urban concentration places significant demands on infrastructure, housing, and public services, creating both challenges and opportunities for logistics and supply chain management. The median age of the Greek population is notably high at 46.8 years, reflecting an aging demographic trend that is expected to continue. This aging population, coupled with a modest net migration rate of around 1.1 migrants per 1,000 inhabitants, partially offsets natural population decline but does not fully compensate for the shrinking workforce. These demographic dynamics influence consumption patterns, labor availability, and the spatial distribution of demand, necessitating more automated, efficient, and urban-centric logistics solutions to serve dense populations while maintaining connectivity with rural and island regions.

The demographic burden—manifested in labor shortages, especially in rural areas, and the emigration of young professionals—has accelerated the need for digitalization and automation within Greece's logistics sector. With over 23% of the population aged 65 and above and a shrinking working-age population, logistics operations must increasingly rely on intelligent transport systems, automated warehousing, and real-time cargo tracking to maintain throughput and service quality. Furthermore, Greece's high urbanization rate intensifies demand for integrated, multimodal logistics hubs strategically located near urban centers and transport corridors. Larissa, situated in Thessaly, exemplifies such a strategic location, offering geographic centrality that facilitates efficient distribution from northern ports like Thessaloniki and southern gateways such as Piraeus and Volos. The development of regional hubs closer to demand clusters is therefore both a demographic necessity and a logistical imperative, ensuring timely freight movement while alleviating congestion in urban cores.

3.2.2 Educational Attainment and Labor Market Challenges Affecting Logistics

Greece boasts a relatively high level of educational attainment, with a significant portion of the population pursuing higher education. English language education is compulsory from early schooling through secondary education, and university education is generally free for qualified students. Despite these educational opportunities, Greece faces persistent challenges related to youth unemployment and the emigration of skilled young professionals seeking better career prospects abroad—a phenomenon often referred to as ~~-b~~rain drain". Youth unemployment remains notably high, exceeding 19% as of early 2025, which is more than double the national average, and contributes to a shrinking pool of qualified labor available for sectors such as logistics and supply chain management.

The disconnect between educational output and labor market needs is a critical issue. While Greece produces many university graduates annually, the labor market struggles to absorb them effectively due to mismatches in skills and the limited demand for highly qualified workers in certain sectors. This has led to a rise in underemployment and overqualification, with many workers employed in jobs below their skill levels. For the logistics sector, this means that despite a well-educated workforce, there is a shortage of workers with practical skills in areas such as supply chain management, digital logistics technologies, and problem-solving abilities. Addressing this gap requires targeted skill-building initiatives and investment in vocational training aligned with modern logistics demands. For projects like the Larissa intermodal hub, this underscores the importance of

integrating workforce development strategies alongside infrastructure investments to ensure long-term operational success and competitiveness.

3.3 Greece's Economic Foundation and Recovery Trajectory

Greece's economy has undergone a remarkable transformation from the depths of the 2008-2018 financial crisis to emerge as one of Europe's standout performers, creating compelling conditions for strategic infrastructure investments such as the proposed intermodal terminal near Larissa. As the world's 50th largest economy with a nominal GDP of $267.348 billion and the 16th largest within the European Union, Greece has achieved consistent growth momentum that significantly outpaces regional averages. The economy recorded a government surplus of 1.3% of GDP in 2024, dramatically exceeding projections of a 0.6% deficit, while maintaining growth rates of 2.3% annually since 2022, compared to the eurozone's modest 0.8% average. This economic trajectory represents a fundamental shift from the catastrophic contractions of -9.9% in 2011 and -8.3% in 2012 to sustained expansion driven by controlled public expenditure, robust domestic demand (contributing 4.6% to growth in 2024), and strengthening exports. The detailed economic indicators reveal that domestic economy fundamentals have solidified, with unemployment declining from crisis peaks to 10.1% in 2024, inflation moderating from 12.6% in 2022 to 3.3% in 2024, and credit to the private sector expanding by 8.9% in 2024, indicating renewed business confidence and investment capacity. Greece's economy has been outpacing the euro area average since 2021, supported by Recovery and Resilience Fund disbursements, continuous employment gains, and recent structural reforms, positioning the country for sustained infrastructure development and modernization initiatives.

The structural composition of Greece's economy creates particularly favorable conditions for intermodal logistics development, with the service sector contributing 80% of GDP, industrial sectors 16%, and agriculture 4%, generating substantial freight movement demands across all economic segments. The Greek shipping industry stands as a global powerhouse, with Greek-owned vessels accounting for 20% of global deadweight tonnage and representing 59% of the total EU-controlled fleet, contributing approximately 7% to the nation's GDP and generating €9 billion in annual export revenues. This maritime dominance, combined with tourism's contribution of 18.2% to GDP through 32 million annual visitors in 2023, creates massive cargo flows requiring efficient inland distribution networks. The economic data demonstrates that Greece has become a significant regional investor and trading hub, serving as the largest foreign investor in Albania, third-largest in Bulgaria, and the most important trading partner for North Macedonia, while maintaining strong commercial ties with the EU, United States, China, and Gulf States. The country's strategic position as a gateway between Europe and Asia, combined with its recovering economic fundamentals, creates optimal conditions for intermodal infrastructure investments. The projected continuation of 2.3-2.9% annual growth rates through 2025, supported by EU Recovery and Resilience Facility funding and increased private sector credit expansion, provides the economic foundation necessary for major logistics infrastructure projects. Furthermore, Greece's transition from economic surveillance to investment-grade status by major credit rating agencies in 2023, coupled with stronger-than-anticipated direct tax revenues and subdued current expenditure growth, demonstrates the fiscal stability required to support and benefit from transformative infrastructure developments like the Larissa intermodal terminal, which can capitalize on the country's economic recovery while addressing the growing logistics demands of its key economic sectors.

	2018	2019	2020	2021	2022	2023	2024
(% change, unless otherwise indicated)							
Domestic economy							
GDP at constant prices of year 2020[1]	2.1	2.3	-9.2	8,7	5,7	2,3	2,3
Total domestic demand (contribution)	1.8	1.6	-3.7	7,7	8,2	1,9	4,6
Private consumption	2.3	2.6	-6.2	5,1	8,6	1,8	2,1
Public consumption	-3.3	2.0	3.0	1,8	0,1	2,6	-4,1
Gross fixed capital formation	-4.6	-0.8	1.7	21,7	16,4	6,6	4,5
Exports of goods and services	9.2	4.8	-21.5	24,4	6,6	1,9	1,0
Imports of goods and services	8.3	2.8	-7.3	17,4	11,0	0,9	5,5
GDP deflator[1]	-0.2	0.2	-0.4	1,4	6,5	5,9	3,2
GDP at current prices (billion €)[1]	180.6	185.2	167.5	184,6	207,9	225,2	237,6
GDP at current prices[1]	1.8	2.5	-9.5	10,2	12,6	8,3	5,5
CPI[2] (annual average)	0.6	0.3	-1.2	1,2	9,6	3,5	2,7
HICP[3] (annual average)	0.8	0.5	-1.3	0,6	9,3	4,2	3,0
Core Inflation[4] (annual average)	0.0	0.5	-0.7	-0,6	3,5	5,1	3,3
Unemployment (annual average rate)	19.3	17.3	16.3	14,7	12,4	11,1	10,1
(% of GDP)							
Public finance (General Government)							
Total revenues	49.5	48.5	49.7	49,8	50,4	48,2	
Total expenditures	48.6	47.7	59.3	56,7	52,9	49,5	
Primary expenditures	45.2	44.7	56.3	54,3	50,4	46,2	
Overall balance	0.9	0.8	-9.6	-6,9	-2,5	-1,3	
Primary balance	4.3	3.8	-6.6	-4,5	0,0	2,1	
Gross debt (Maastricht)[5]	189.0	183.2	209.4	197,3	177,0	163,9	
Balance of payments[6][7]							
Current account balance	-2.9	-1.5	-6.5	-6,6	-10,2	-6,2	
Trade and services balance	-1.8	-0.9	-6.7	-7,5	-9,7	-5,0	
Exports of goods and services	38.5	39.2	30.8	40,3	48,8	44,0	
Imports of goods and services	40.3	40.1	37.5	47,8	58,5	49,0	
Secondary income balance	-0.2	0.3	0.3	0,7	-0,1	0,6	
Primary income balance	-1.0	-0.9	-0.2	0,2	-0,4	-1,8	
Net international investment position	-147.8	-152.6	-171.6	-170,1	-143,4	-139,3	
(% change, unless otherwise indicated)							
Interest rates and credit[6]							
Lending rate[8]	4.8	4.5	4.1	3,8	5,1	6,8	5,7
Credit to private sector[9]	-1.1	-0.6	3.5	1,4	6,3	3,6	8,9
Exchange rates[6]							
Nominal effective exchange rate	2.1	-0.2	1.5	0,9	1,3	2,7	1,6
Real effective exchange rate (CPI - based)	0.6	-1.5	-0.8	-1,4	1,0	1,1	3,2

(1) GDP (and components) data have been compiled with 2020=100.0 as base year and 2021 as reference year. For the years 2022 - 2024 data are provisional.
(2) CPI: Consumer Price Index. Reference year: 2020=100.0
(3) HICP: Harmonised Index of Consumer Prices. Reference year: 2015=100.0
(4) Core Inflation: CPI excluding food, beverages, tobacco and energy. Reference year: 2020=100.0
(5) Debt as defined in the Maastricht Treaty.
(6) Source: Bank of Greece.
(7) Is based on the new compilation methodology of the Balance of Payments (BPM6).
(8) Loans to corporations, up to 1 year. Percentage at the end of December, excluding charges.
(9) Domestic credit growth to households and enterprises.

Table 3.6 Greece's Economic Indicators and data from 2018 to 2024**.**

3.4 Greek Laws on Logistics and Intermodal Centers

Greece, recognizing the strategic importance of logistics and intermodal transport for its economy and its ambition to become a regional and European logistics hub, has developed a comprehensive legal framework governing these sectors. The legislation aims to regulate logistics activities, promote sustainable and efficient supply chains, and support the development and operation of intermodal freight centers. The laws provide definitions, operational guidelines, and institutional structures to facilitate coordination, investment, and modernization of logistics infrastructure, including ports, rail, and road networks. They also address the digital transformation of logistics processes, environmental sustainability, and urban mobility challenges. Below are detailed descriptions of key Greek laws related to logistics and intermodal centers.

3.4.1 Ν.4302/2014, Ρύθμιση θεμάτων Εθνικής Οδικής Μεταφοράς και άλλες διατάξεις (September 2015)

Law 4302/2014 constitutes the foundational legal framework for logistics activities in Greece. It officially defines logistics operations to include the collection, loading, transport, transshipment, unloading, delivery, consolidation, deconsolidation, storage, and inventory management of goods. The law establishes the formulation, approval, and supervision of a National Strategy for the Supply Chain, along with a National Action Plan, aiming to enhance the efficiency and competitiveness of Greece's logistics sector. It empowers the Ministry of Infrastructure and Transport to coordinate investments, utilize funding sources (national, European, and private), and revise regulatory acts related to the supply chain. This law reflects Greece's strategic priority to transform into an international hub for transport services and logistics, leveraging its geographic location and infrastructure assets such as major ports (Piraeus, Thessaloniki), airports, and rail networks. The law also sets the institutional basis for governance and monitoring of logistics development, promoting transparency, sustainability, and innovation in supply chain management.

3.4.2 Ν.3333/2005, Ίδρυση και λειτουργία των Εμπορευματικών Κέντρων και άλλες διατάξεις (April 2005)

Law 3333/2005 regulates the establishment and operation of Freight Villages (Δικτυακή Κάλυψη) in Greece, which are key intermodal logistics hubs designed to facilitate the efficient handling, storage, and transfer of goods between different transport modes. The law defines the legal status, organizational structure, and operational requirements of these centers, aiming to promote multimodal transport and reduce road congestion and environmental impact. It encourages public-private partnerships for the development of infrastructure and services within these centers and sets conditions for licensing, safety, and environmental compliance. By fostering the creation of integrated logistics platforms, this law supports the consolidation of freight flows and the enhancement of supply chain connectivity, contributing to the modernization of Greece's transport and logistics system.

3.5 Infrastructure Landscape in Greece: Airports, Roads, Railways, and Ports

Greece's transport infrastructure encompasses a diverse and evolving network of airports, roads, railways, and ports that collectively underpin the country's logistics and freight movement capabilities. As of recent data, Greece operates 82 airports, with 67 featuring paved runways and six boasting runways longer than 3,047 meters, suitable for large aircraft operations. While only two airports are officially classified as international by the Hellenic Civil Aviation Authority, 15 airports provide international services, reflecting Greece's extensive connectivity despite its relatively small size. The country also maintains nine heliports, supporting specialized transport needs. The airline sector is dominated by Aegean Airlines and its subsidiary Olympic Air, following the privatization of the former national carrier Olympic Airlines in 2009. Both airlines have garnered multiple awards for service quality, enhancing Greece's air passenger and cargo transport reputation. In early 2025, passenger traffic across Greek airports increased significantly, with a 9.2% rise in passenger numbers and a 6.5% increase in aircraft movements compared to the previous year, signaling robust growth in air transport demand.

The Greek road network extends over 116,986 kilometers, including approximately 1,863 kilometers of highways, ranking 24th globally in highway length as of 2016. Since joining the European Union, Greece has benefited from substantial EU co-funding to upgrade critical road infrastructure, exemplified by flagship projects such as the Egnatia Odos and

Attiki Odos highways. These investments have enhanced connectivity across the country and facilitated the movement of nearly 500 million tons of goods by road in 2007, placing Greece eighth in the EU for road freight transport. The road network continues to expand, with major projects like the Central Greece Motorway (E65) and new highway sections scheduled for completion through 2030, which will further integrate regional economies and improve freight logistics.

Greece‘s rail network, totaling approximately 2,548 kilometers, remains a critical yet underutilized component of the national transport system. Operated primarily by TrainOSE, now a subsidiary of Italy‘s Ferrovie dello Stato Italiane, the network consists of 1,565 kilometers of standard gauge and 983 kilometers of narrow gauge track, with around 764 kilometers electrified. Rail connections link Greece with neighboring Bulgaria, North Macedonia, and Turkey, supporting both passenger and freight flows. Suburban rail systems operate in Athens, Thessaloniki, and Patras, with the Athens Metro fully operational and the Thessaloniki Metro under construction. Ongoing modernization efforts include electrification projects on key branches and upgrades to signaling and track infrastructure, although progress has been slower than initially planned. These initiatives aim to enhance rail‘s competitiveness and support modal shift objectives critical for sustainable freight transport.

Maritime infrastructure remains a cornerstone of Greece‘s logistics landscape. The Port of Piraeus, under the management of Chinese logistics giant COSCO, has transformed into the Mediterranean‘s third-largest container port, handling over 3.16 million TEUs in 2013 and continuing to grow. Other major ports include Thessaloniki, Eleusis, and Aghioi Theodoroi, which collectively handled over 58 million tons of cargo in 2010. While total cargo throughput experienced a decline from 164 million tons in 2007 to 124 million tons in 2010, recent investments and strategic partnerships have reversed this trend, with Piraeus notably achieving a 9.4% year-on-year increase in throughput in early 2024. Passenger traffic through Greek ports also remains significant, with millions of travelers passing through annually, underscoring Greece‘s dual role as a freight and passenger maritime hub.

3.6 Driving Rules and Regulations in Greece: Implications for Logistics and Transport Safety

Driving in Greece follows the standard European practice of right-hand traffic, with mandatory seat belt use for all vehicle occupants. Speed limits vary according to road type and location—urban areas typically enforce limits around 50 km/h, while highways allow speeds up to 130 km/h. Drivers must remain vigilant for aggressive driving behaviors and occasional traffic congestion, especially in metropolitan centers such as Athens and Thessaloniki, where chaotic traffic conditions can pose challenges for freight and logistics operations. For professional drivers and logistics companies, strict adherence to traffic regulations is essential to ensure safety, minimize delays, and maintain compliance with national and EU transport standards.

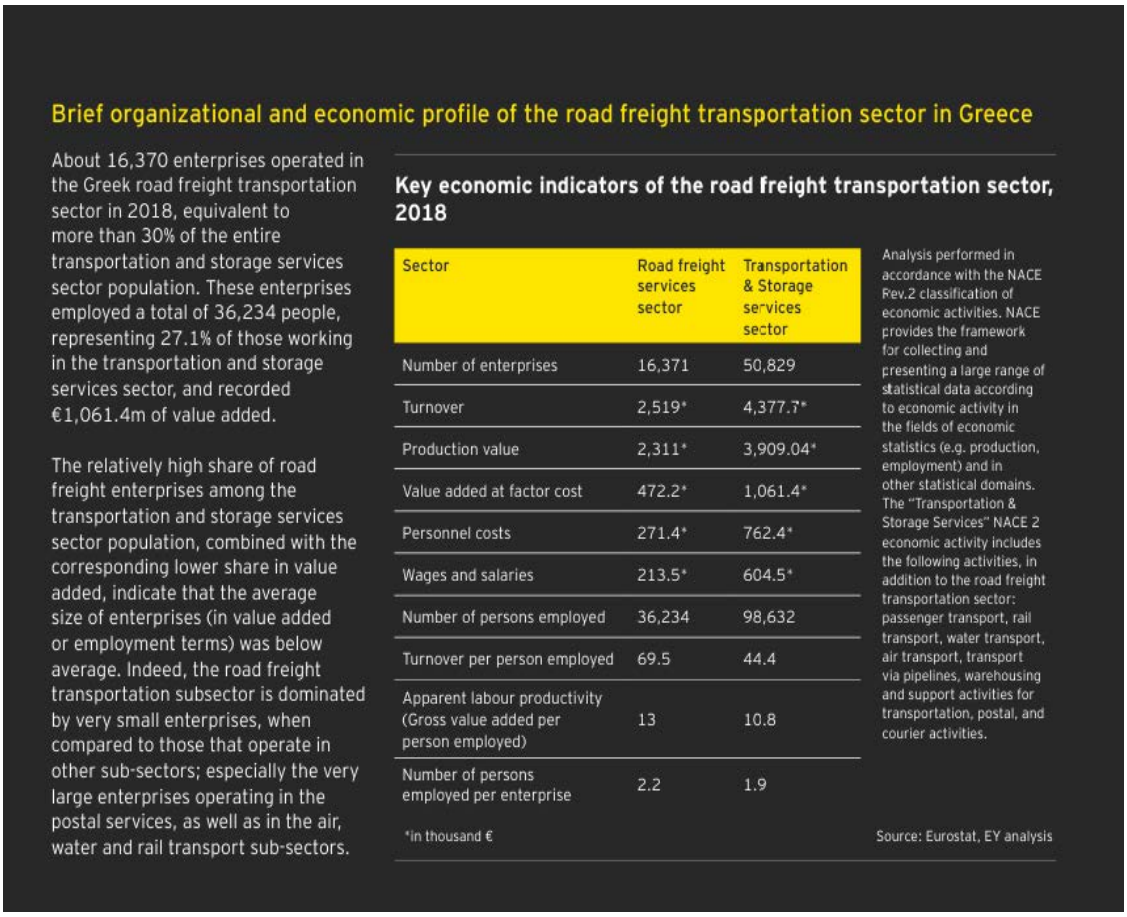
Greek authorities enforce stringent regulations on driving under the influence, with a legal blood alcohol concentration (BAC) limit set at 0.05%. This low threshold reflects Greece‘s commitment to road safety and aligns with broader European Union directives. Additionally, the use of mobile phones while driving is prohibited unless a hands-free system is employed, reducing distractions and accident risks. Drivers are legally required to carry valid documentation at all times, including a driver‘s license, vehicle registration, insurance papers, and personal identification. For logistics operators, ensuring that all drivers comply with these regulations is critical, as violations can result in fines, delays, and reputational damage. Understanding and integrating these rules into driver training and fleet management protocols is a key component of effective and safe transport operations in Greece.

3.7 The Significance and Usage of Road Infrastructure in Greece: Foundations for Logistics Development

Greece‘s road infrastructure has undergone a profound transformation over the last two decades, evolving into a modern, extensive network that connects virtually every part of the country. This development has been driven by major projects such as the Egnatia Odos, Ionian Highway, Olympia Odos, and the Attiki Odos ring road around Athens, which have significantly enhanced connectivity between key urban centers, ports, and border crossings. These highways not only facilitate domestic mobility but also serve as critical corridors for international trade, linking Greece with neighboring countries and broader European markets. The ongoing expansion and modernization of this infrastructure are supported by both national initiatives and substantial EU funding, reflecting the strategic priority placed on transport as a driver of economic growth and regional integration. The robustness and quality of Greece‘s road network are essential for ensuring the smooth flow of goods, reducing transit times, and improving road safety—factors that directly influence the competitiveness of Greek logistics companies and the efficiency of supply chains.

Logistics companies in Greece heavily rely on this upgraded road infrastructure to provide timely, reliable, and cost-effective freight services. The fragmented nature of the Greek road transport market, characterized by many small operators and owner-drivers, underscores the importance of efficient highways and motorways that can support frequent, high-volume long-haul movements. These companies use the main road arteries to connect maritime ports such as Piraeus, Thessaloniki, and Patras with inland distribution centers and industrial zones, enabling the export of agricultural products, manufactured goods, and imports essential for domestic consumption. The improved highways reduce operational risks associated with delays and accidents, while facilitating modal shifts and intermodal connectivity by linking road transport with rail and maritime modes. This infrastructure backbone is critical for logistics operators to maintain service quality, optimize fleet utilization, and manage costs in a highly competitive environment.

The evolution of Greece‘s road infrastructure is closely intertwined with the strategic objectives of the Larissa intermodal logistics project. Larissa‘s geographic position in Thessaly offers a unique opportunity to leverage the country‘s modern highways for efficient national and regional distribution. The project aims to capitalize on the improved road network to serve as a central node that connects northern ports like Thessaloniki and southern gateways such as Piraeus and Volos with inland markets. As urban centers become increasingly congested and demand for rapid freight movement grows, Larissa‘s intermodal hub will provide a critical solution by integrating road transport with rail and other modes, optimizing supply chains, and reducing environmental impacts. The continuous investment in road infrastructure not only supports the operational viability of such hubs but also aligns with Greece‘s broader economic development and sustainability goals, positioning Larissa as a future-proof logistics center that responds to demographic, economic, and technological trends shaping the country‘s transport landscape.



Brief organizational and economic profile of the road freight transportation sector in Greece

About 16,370 enterprises operated in the Greek road freight transportation sector in 2018, equivalent to more than 30% of the entire transportation and storage services sector population. These enterprises employed a total of 36,234 people, representing 27.1% of those working in the transportation and storage services sector, and recorded €1,061.4m of value added.

The relatively high share of road freight enterprises among the transportation and storage services sector population, combined with the corresponding lower share in value added, indicate that the average size of enterprises (in value added or employment terms) was below average. Indeed, the road freight transportation subsector is dominated by very small enterprises, when compared to those that operate in other sub-sectors; especially the very large enterprises operating in the postal services, as well as in the air, water and rail transport sub-sectors.

Key economic indicators of the road freight transportation sector, 2018

Sector	Road freight services sector	Transportation & Storage services sector
Number of enterprises	16,371	50,829
Turnover	2,519*	4,377.7*
Production value	2,311*	3,909.04*
Value added at factor cost	472.2*	1,061.4*
Personnel costs	271.4*	762.4*
Wages and salaries	213.5*	604.5*
Number of persons employed	36,234	98,632
Turnover per person employed	69.5	44.4
Apparent labour productivity (Gross value added per person employed)	13	10.8
Number of persons employed per enterprise	2.2	1.9

*in thousand €

Analysis performed in accordance with the NACE Rev.2 classification of economic activities. NACE provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment) and in other statistical domains. The "Transportation & Storage Services" NACE 2 economic activity includes the following activities, in addition to the road freight transportation sector: passenger transport, rail transport, water transport, air transport, transport via pipelines, warehousing and support activities for transportation, postal, and courier activities.

Source: Eurostat, EY analysis

Figure 3.1 Road Freight Transportation Economic profile of Greece

As shown above, the Greek road freight sector exhibits extreme fragmentation, with 16,371 enterprises employing only 36,234 people—an average of 2.2 persons per enterprise. This micro-enterprise structure (compared to 1.9 persons per enterprise in the broader transportation sector) indicates a market dominated by owner-operators and small family businesses. For a Larissa intermodal terminal, this suggests the need for simplified, standardized processes and potentially consolidated booking/documentation services, as these small operators lack the administrative infrastructure of larger logistics companies.

Economic Efficiency Indicators

The sector's productivity metrics reveal significant optimization opportunities. With turnover per person employed at €69,500 (versus €44,400 for the broader transport sector), road freight shows higher individual productivity, yet the apparent labor productivity of €13,000 gross value added per person employed (compared to €10,800 sector-wide) indicates substantial room for efficiency gains. An intermodal terminal in Larissa could capture value by offering consolidation services that improve load factors and reduce empty running—critical issues for small operators.

The road freight subsector generates €472.2 million in value added from €2,511 million in production value, representing an 18.8% value-added ratio. This relatively low margin indicates that the sector operates on thin profits, making cost efficiency crucial. A Larissa intermodal terminal should focus on reducing total logistics costs rather than competing on service premiums, emphasizing faster transit times, reduced fuel costs, and improved asset utilization for trucking companies.

Personnel costs of €271.4 million against wages and salaries of €213.5 million suggest a 27% burden rate for social contributions and benefits. This labor cost structure, combined with the small enterprise size, indicates that operators are highly sensitive to driver availability and costs. An intermodal solution in Larissa could address driver shortage issues by reducing long-haul driving requirements, allowing local drivers to focus on regional distribution while rail handles long-distance segments.

The dominance of small enterprises in road freight indicates limited intermodal awareness and potentially resistance to modal shift. However, this also represents an opportunity—these operators lack the scale to negotiate favorable rail rates independently but could benefit from collective access through a well-positioned intermodal terminal. Larissa's location on the Orient/East-Med Corridor positions it to offer these operators access to efficient rail connections to both Thessaloniki and Athens ports.

The fragmented market structure suggests the Larissa terminal should incorporate:

- Simplified technology interfaces suitable for small operators
- Flexible handling systems for diverse cargo types and sizes
- Consolidation services to improve rail load factors
- Extended gate hours to accommodate small operators' scheduling constraints
- Financial services or payment systems suited to cash-flow-sensitive micro-enterprises

3.8 Structure and Benefits of the Greek TEN-T (Trans-European Transport Network) and of the Orient/East-Med Corridor

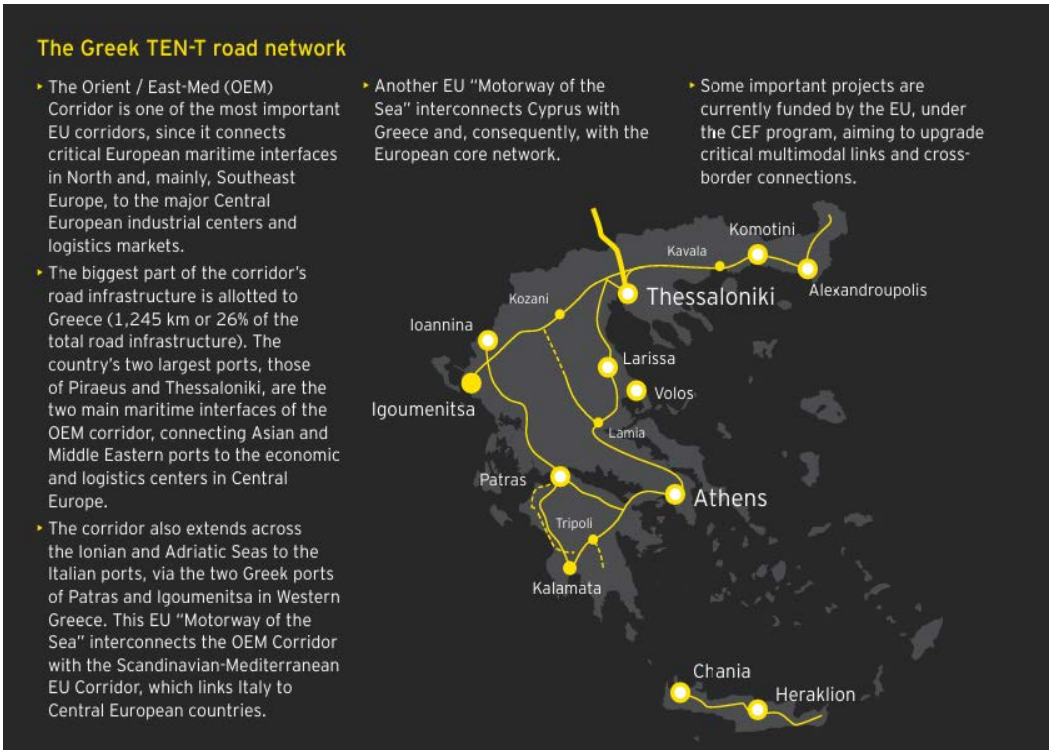


Figure 3.2 Greek TEN-T (Trans-European Transport Network) road infrastructure

This map illustrates the Greek TEN-T (Trans-European Transport Network) road infrastructure, which represents a strategically designed network that leverages Greece's unique geographical position as a bridge between Europe, Asia, and Africa. The network demonstrates several key analytical insights:

The Orient/East-Med (OEM) Corridor exploits Greece's position as the southeastern terminus of Europe, creating a critical land bridge that connects Asian and Middle Eastern trade flows with Central European markets. This positioning is particularly valuable given that maritime cargo from Asia can be offloaded at Greek ports and then transported overland, potentially offering faster transit times to Central Europe compared to longer sea routes through the Suez Canal to Northern European ports.

The allocation of 1,245 km of road infrastructure (26% of Greece's total) to this single corridor reveals a concentrated investment strategy. This suggests that Greece recognizes the economic multiplier effects of prioritizing connectivity infrastructure over dispersed spending. The focus on connecting the two major ports of Piraeus and Thessaloniki indicates an understanding that port-hinterland connectivity is crucial for capturing transit trade revenues.

The network's design reflects a sophisticated understanding of logistics chains. By connecting maritime interfaces (ports) with land corridors, Greece positions itself to capture value from cargo that might otherwise bypass the country entirely. The connection between Piraeus (near Athens) and Thessaloniki creates redundancy and flexibility in the system, allowing traffic to flow through either major port depending on operational conditions or capacity constraints.

The extension across the Ionian and Adriatic Seas to Italian ports (Patras-Igoumenitsa connections) demonstrates Greece's strategy to integrate with Western European logistics networks. This creates an alternative route that can compete with traditional Alpine crossings, particularly for trade flows destined for the Balkans and Eastern Europe.

The map reveals a hierarchical structure where major cities (Athens, Thessaloniki) serve as primary nodes, with secondary cities (Larissa, Volos, Patras) functioning as intermediate logistics hubs. This creates a distributed network that can handle cargo flows efficiently while also serving domestic connectivity needs. The integration of urban centers into the corridor design suggests consideration for both transit and domestic economic benefits.

By creating this "Motorway of the Sea" connection with the Scandinavian-Mediterranean Corridor, Greece effectively positions itself as a southern alternative to traditional Central European transit routes. This could prove particularly valuable during periods of congestion or disruption in more northern corridors, providing supply chain resilience for European trade networks.

The overall network design reflects a mature understanding of how infrastructure investment can transform a country's economic geography, shifting Greece from a peripheral location to a central node in European-Asian trade flows.

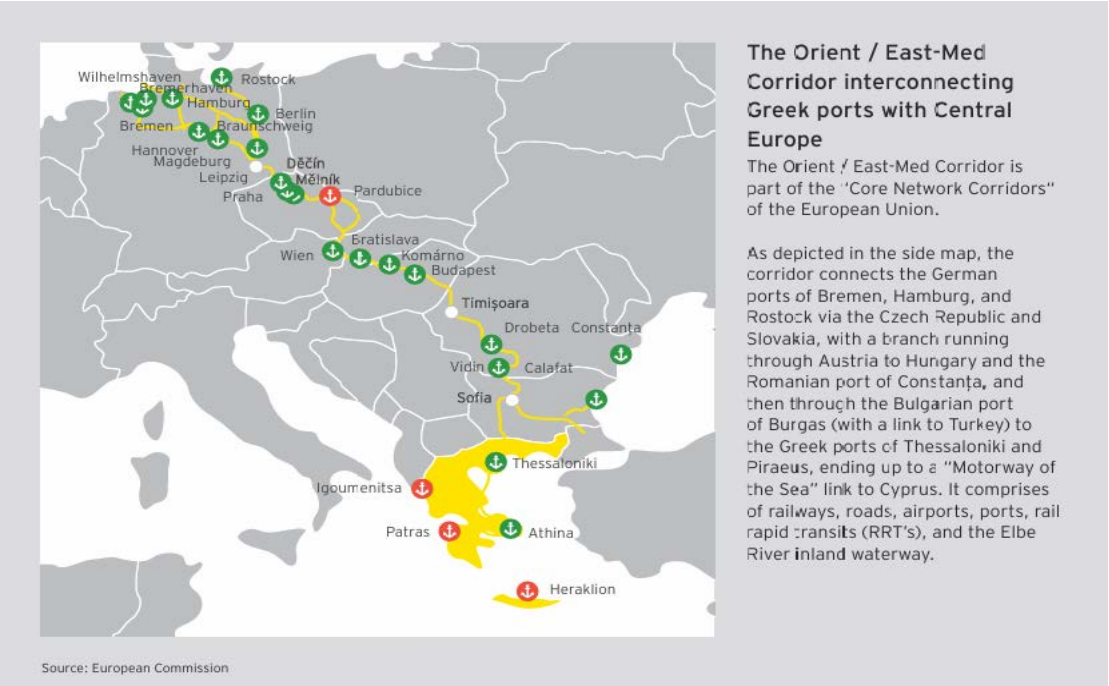


Figure 3.3 The Orient/East-Med Corridor

The Orient/East-Med Corridor map reveals Greece's transformation from a peripheral European location to a critical node in the EU's Core Network Corridors, fundamentally altering the strategic value proposition for intermodal infrastructure investment in locations like Larissa. The corridor's comprehensive multimodal design—encompassing railways, roads, airports, ports, rail rapid transits, and the Elbe River inland waterway—demonstrates the EU's commitment to creating seamless connectivity between Central European industrial centers and Mediterranean trade gateways. The corridor's routing through major German ports (Bremen, Hamburg, Rostock) via Czech Republic and Slovakia, with branches through Austria to Hungary and Romania, before reaching Greek ports (Thessaloniki and Piraeus) creates unprecedented market access for Greek-based logistics operations. This connectivity transforms the competitive landscape by enabling Greek intermodal terminals to serve not just domestic and regional Balkan markets, but to function as integral components of continental supply chains linking Asian trade flows through Greek ports to Central European manufacturing and consumption centers.

The corridor's extension to Cyprus through the "Motorway of the Sea" concept illustrates the strategic integration of maritime and land-based transport systems that creates new operational possibilities for intermodal terminals. For the proposed Larissa facility, positioning within this EU Core Network provides access to standardized infrastructure, coordinated regulations, and integrated funding mechanisms that significantly reduce operational barriers and investment risks. The corridor's comprehensive scope, including rail rapid transit systems and airport connections, indicates the EU's recognition that modern logistics requires seamless integration across all transport modes, validating the intermodal terminal concept as aligned with continental infrastructure development priorities. This strategic positioning enables the Larissa terminal to leverage EU infrastructure investments and regulatory harmonization efforts that create competitive advantages over purely national or bilateral transport solutions.

The corridor's comprehensive multimodal design validates the intermodal terminal investment approach by demonstrating that successful modern logistics infrastructure requires integration across transport modes rather than optimization of individual systems.

The inclusion of rail rapid transit, airports, and inland waterway connections indicates that competitive advantage derives from providing seamless modal transfers and integrated services rather than competing solely on single-mode efficiency metrics. For the Larissa terminal specifically, the corridor positioning enables the facility to serve as a consolidation point for cargo flows moving between multiple origins and destinations along the corridor, creating operational efficiencies and service frequency advantages that justify premium pricing. The EU's designation of this route as a Core Network Corridor also provides access to Connecting Europe Facility funding and regulatory priority status that reduces project development risks and improves financial returns through public sector support for infrastructure investments that serve strategic European connectivity objectives.

3.9 Motorways of Greece : The road arteries in service of Logistics

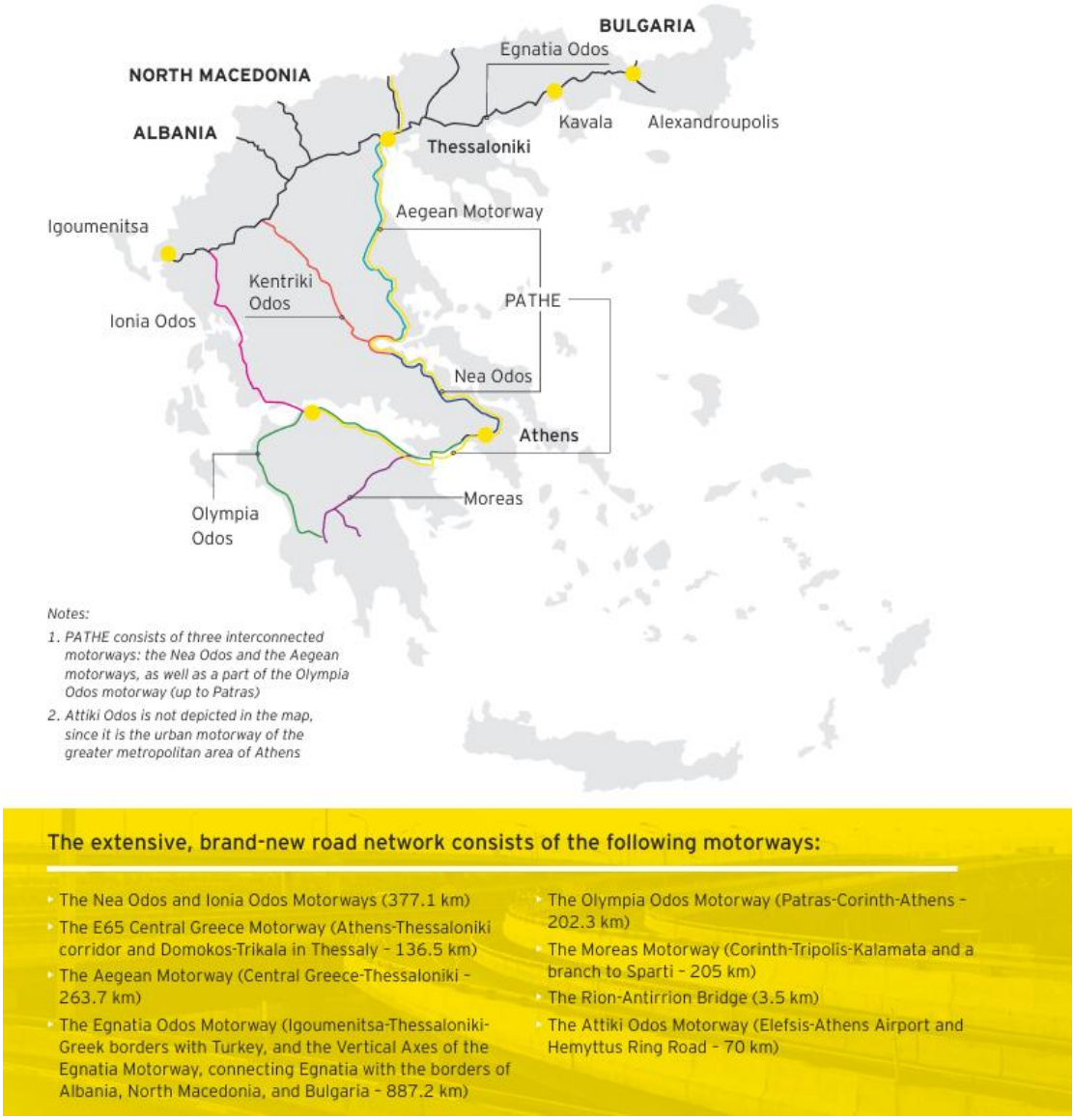


Figure 3.4 Motorways of Greece

This comprehensive motorway network represents a transformative infrastructure investment that fundamentally repositions Greece from a peripheral European location to a

central Balkan logistics hub, creating exceptional strategic advantages for the proposed Larissa intermodal terminal. The network's design demonstrates sophisticated understanding of modern logistics requirements, with over 1,500 kilometers of high-capacity motorways creating multiple redundant connections that eliminate traditional bottlenecks and provide operational resilience crucial for intermodal operations. The convergence of major corridors in the Thessaly region, where Larissa is positioned, validates the terminal's strategic location at the intersection of North-South movements connecting Greece's two largest economic centers and East-West flows linking the broader Balkan region. This positioning transforms the terminal from a regional facility into a national and international logistics hub capable of serving domestic Greek markets, transit cargo to neighboring countries, and serving as an alternative to traditional Central European corridors.

- **The E65 Central Greece Motorway (Athens-Thessaloniki corridor and Domokos-Trikala in Thessaly - 136.5 km)** provides direct high-capacity access to the Larissa region, positioning the intermodal terminal as a natural intermediate point between Greece's primary economic centers.
- **The Aegean Motorway (Central Greece-Thessaloniki - 263.7 km)** creates alternative routing capacity that reduces congestion risk and improves service reliability for intermodal operations.
- **The Egnatia Odos Motorway (Igoumenitsa-Thessaloniki-Greek borders with Turkey, and the Vertical Axes of the Egnatia Motorway, connecting Egnatia with the borders of Albania, North Macedonia, and Bulgaria - 887.2 km)** establishes Greece as the central Balkan transportation hub, connecting all neighboring countries through Greek territory.

The network's comprehensive coverage eliminates infrastructure barriers that traditionally limited intermodal competitiveness, creating market access capabilities that justify large-scale terminal investment and operations. The integration of port connectivity through western and eastern corridors, combined with urban distribution systems and cross-border connections, provides the Larissa terminal with unprecedented market reach spanning the entire Greek territory, the broader Balkans, and international trade flows. This infrastructure maturity means that road transport from the intermodal terminal becomes time-competitive with direct trucking while offering cost advantages through rail for long-haul segments, fundamentally changing the economics of modal choice for freight operators. The redundancy built into the system through multiple parallel routes and connection points creates the operational reliability essential for intermodal services, where schedule reliability directly impacts customer acceptance and modal shift potential.

- **The Nea Odos and Ionia Odos Motorways (377.1 km)** provide high-capacity connections to western ports, crucial for Mediterranean trade and connections to Italy.
- **The Olympia Odos Motorway (Patras-Corinth-Athens - 202.3 km)** and **The Moreas Motorway (Corinth-Tripolis-Kalamata and a branch to Sparti - 205 km)** ensure comprehensive Peloponnese coverage for southern Greek market access.
- **The Rion-Antirion Bridge (3.5 km)** eliminates ferry bottlenecks, creating seamless mainland-Peloponnese connectivity.
- **The Attiki Odos Motorway (Elefsis-Athens Airport and Hymettus Ring Road - 70 km)** provides congestion-free access to Athens' economic centers and airport connections for integrated logistics services.

3.9.1 The PATHE motorway

The Patras – Athens – Thessaloniki – Evzoni motorway, commonly known as the PATHE motorway or A1 motorway, is the oldest and most significant motorway in Greece, serving as the main north-south corridor that vertically connects the country‘s two largest

cities: Athens in the south and Thessaloniki in the north. Extending approximately 557 kilometers, this motorway forms the backbone of Greece‘s road network and is a critical segment of the Trans-European Transport Network (TEN-T). It runs along the eastern coast of the Greek mainland, linking the major ports of Piraeus and Thessaloniki to the northern border town of Evzoni, which connects Greece to North Macedonia. The PATHE motorway thus plays a vital role in facilitating both domestic mobility and international trade flows between Greece, the Balkans, and the rest of Europe.

Over the past 13 years, significant upgrades and new construction projects have brought large sections of the PATHE motorway up to modern motorway standards, improving safety, capacity, and travel times. The motorway begins at Neo Faliro in Attica, just north of Athens, and continues northward, passing through key urban centers such as Lamia, Larissa, and Katerini before reaching Thessaloniki. From there, it extends to the Evzoni border crossing. The motorway includes toll stations and is maintained and operated by private consortia under concession agreements, which have contributed to its modernization and ongoing maintenance. The route also intersects with other major highways, such as the Egnatia Odos (A2), enhancing connectivity across Greece and the wider region.

The PATHE motorway is part of the European route E75, a 4,380-kilometer international road stretching from Vardø in Norway to Sitia on the island of Crete, making it one of Europe‘s longest north-south corridors. This route connects diverse landscapes and cultures, passing through multiple countries including Finland, Poland, Hungary, Serbia, North Macedonia, and Greece. Within Greece, the E75 follows the PATHE motorway corridor, linking major cities and ports and serving as a key artery for freight and passenger transport. The E75‘s role extends beyond Greece, facilitating trade and tourism across Europe, and offering a continuous road connection from the Mediterranean to the Arctic. This strategic corridor supports Greece‘s ambitions to strengthen its position as a logistics hub in Southeast Europe and to enhance multimodal transport integration with ports, railways, and airports

3.9.2 The Egnatia Odos motorway A2 [Igoumenitsa – Ioannina – Metsovo – Grevena – Kozani – Veroia – Thessaloniki – Kavala – Xanthi – Komotini – Alexandroupoli – Kipi (Turkish border)]

The Egnatia Odos motorway (A2) is one of Greece‘s most significant infrastructure projects, spanning approximately 670 kilometers across Northern Greece from the western port of Igoumenitsa on the Adriatic Sea to the eastern Greek-Turkish border at Kipoi. Constructed between 1994 and 2009, with final works completed in 2014, the motorway follows a modern alignment that parallels, but does not exactly replicate, the ancient Roman Via Egnatia. The project was highly complex, requiring the construction of around 1,650 bridges and 76 tunnels to navigate the challenging terrain of the Pindos mountain range. Egnatia Odos is a fully controlled-access highway built to the latest European motorway standards, featuring dual carriageways with emergency lanes and a paved width of 24.5 meters for most of its length. This motorway is a vital east-west corridor that connects the ports of Igoumenitsa, Thessaloniki, Kavala, and Alexandroupolis, and serves key regions including Epirus, Macedonia, and Thrace.

Strategically, Egnatia Odos forms the backbone of Northern Greece‘s transport network and is a crucial segment of the Trans-European Transport Network (TEN-T). It links Greece with neighboring countries Albania, North Macedonia, Bulgaria, and Turkey through nine major vertical axes, facilitating trade and mobility across the Balkans and Southeastern Europe. The motorway serves approximately 36% of Greece‘s population and 33% of its GDP, while also supporting over half of the country‘s agricultural land and extractive industries. It integrates with key Pan-European corridors, including Corridors IV, IX, and X,

enhancing connectivity between Western and Eastern Europe. Auxiliary highways connect Egnatia Odos to important cities, ports, and airports such as Ioannina, Kastoria, Kozani, Thessaloniki, Kavala, and Alexandroupolis, further strengthening its role as a multimodal logistics corridor.

Beyond its economic and logistical importance, Egnatia Odos offers a scenic and culturally rich driving experience, passing through diverse landscapes from the Thracian plains to mountainous regions, and providing access to historic towns and natural attractions. The motorway has significantly reduced travel times, for example halving the journey between Thessaloniki and Ioannina, and has improved safety and traffic flow compared to older routes. Despite delays in the concession tender process for its operation and maintenance, Egnatia Odos remains a transformative infrastructure asset for Greece, underpinning regional development, trade facilitation, and integration into European transport networks. Its role complements other major corridors such as the PATHE motorway (E75), collectively enhancing Greece‘s position as a logistics hub in Southeast Europe

3.9.3 The Ionia Odos motorway A5 (Ioannina – Arta – Agrinio – Antirrio – Patras)

The Ionia Odos motorway (A5) is a critical infrastructure artery spanning approximately 196 kilometers across Western Greece, connecting the port city of Patras in the south to Ioannina near the Egnatia Odos motorway in the north. This motorway serves as a vital north-south corridor for Western Greece, linking major urban and rural centers such as Patras, Agrinio, Arta, and Ioannina. It also connects key ports including Patras, Astakos, and Igoumenitsa, thereby facilitating both passenger and freight transport to Western Europe and enhancing regional economic development. The motorway significantly reduces travel times, for example cutting the drive from Antirrio to Ioannina from 3.5 hours to approximately 1 hour and 40 minutes, while improving safety with an 80% reduction in accidents since its upgrade to modern motorway standards.

Technically, the Ionia Odos is designed for speeds up to 130 km/h with two lanes in each direction separated by a central median. The motorway includes four twin-tube tunnels totaling 11.2 km in length, 24 bridges spanning 7 km, and numerous overpasses and underpasses (133 in total), ensuring smooth traffic flow and safety. Among its engineering feats is the Panagopoula Tunnel, Greece‘s longest road tunnel at approximately 4 km. The motorway‘s construction was complex, requiring the old National Road 8A to remain operational during upgrades, necessitating careful traffic management and safety measures. The project was delivered by the Nea Odos consortium, a Greek-Spanish partnership responsible for financing, building, operating, and maintaining the motorway under a 30-year concession agreement, with a total investment of over €1.15 billion supplemented by EU and Greek government funds. Construction began in 2008, faced delays due to financial issues, but was ultimately completed in 2017 with ongoing extensions such as the Patras-Pyrgos section under development.

Strategically, the Ionia Odos motorway is part of the trans-Balkan Adriatic–Ionian corridor and European routes E55 and E951, linking Western Greece with the broader European transport network. It supports regional economic growth by improving access to major tourist and archaeological sites and by connecting remote areas with major urban centers and ports. The motorway also forms a key segment of the Kalamata–Kakavia axis, which will eventually stretch 460 km from the Peloponnese to the Albanian border, further enhancing Greece‘s connectivity with the Balkans. The motorway‘s integration with other major routes such as the Egnatia Odos and PATHE motorways creates a comprehensive network that supports multimodal logistics and freight transport, which is essential for

projects like the Larissa intermodal hub aiming to optimize supply chains across Greece and Southeast Europe

3.9.4 The Kentriki Odos motorway [Thermopylae (near Lamia) – Xyniada – Trikala – Grevena (connecting to Egnatia Odos)]

The Kentriki Odos (Central Greece Motorway), also designated as the E65 motorway, is a modern, strategically significant road corridor spanning approximately 238 kilometers. It connects the eastern and western parts of Greece, which are currently separated by the Pindos mountain range, thereby bridging the two main Greek motorway corridors: the PATHE (E75) and the Egnatia Odos (A2). The motorway comprises 174 km of newly constructed roads and 57 km of upgraded existing roads, featuring seven twin tunnels, 146 bridges, and 88 wildlife crossings, all built to the latest European motorway and safety standards. This infrastructure project is part of the Trans-European Transport Network (TEN-T) and is expected to significantly reduce travel times and improve freight and passenger transport across central Greece.

Upon completion, Kentriki Odos will dramatically reduce travel times; for example, the journey from Lamia to Egnatia Odos will decrease from 3 hours and 15 minutes to just 1 hour and 45 minutes, saving at least one hour for motorists. Other notable travel time reductions include Athens to Grevena and Metsovo (4 hours), Athens to Kastoria (4 hours 35 minutes), Athens to Kozani (4 hours 30 minutes), Athens to Karpenisi (3 hours), Athens to Trikala (under 3 hours), and Athens to Karditsa (2 hours 35 minutes). The motorway also enhances access to important tourist destinations such as Meteora and Lake Plastiras, promoting regional economic development. Safety improvements include installation of safety barriers, emergency telephones, traffic management centers, and constant patrols to ensure high-quality infrastructure and driver protection.

The E65 motorway is operated under a 30-year concession by Kentriki Odos S.A., a joint venture including ACS Group, Ferrovial, and GEK Terna. The concession covers the construction, operation, maintenance, and management of the motorway, including a 57 km section of the A1 motorway (PATHE) from Skarfia to Raches-Fthiotida. The middle section between Xyniada and Trikala opened in December 2017, the southern section from Xyniada to Lamia was completed in 2024, and the final northern section from Kalampaka to Egnatia Odos is under construction and expected to be completed soon. This motorway not only improves domestic connectivity but also strengthens Greece‘s integration into European transport corridors, facilitating efficient freight movement and supporting logistics projects such as the Larissa intermodal hub.

3.9.5 The Olympia Odos motorway A8 (Elefsina – Corinth – Patras – Pyrgos – Tsakona)

The Olympia Odos motorway (A8) is a strategic infrastructure project spanning approximately 202.3 kilometers, connecting Athens and the port of Piraeus with Western Greece and, critically, the port of Patras on the Ionian Sea. This motorway serves as the primary corridor facilitating international road freight movement from Greece to Central European countries, leveraging the Ro-Ro ferry services operating between the port of Patras and several Italian ports such as Brindisi, Bari, Ancona, Ravenna, and Venice. Over the past eight years, significant construction and upgrade works have modernized large sections of the motorway, enhancing safety, reducing travel times, and improving driver comfort. The motorway replaces the older National Road 8A and complies with contemporary

European motorway standards, featuring numerous tunnels and bridges to navigate the challenging terrain of the northern Peloponnese.

The motorway consists of two main sections: the Elefsina to Korinthos segment, which is fully operational since 2008 and features three lanes per direction plus emergency lanes, and the Korinthos to Patras section, which underwent extensive construction including 21 kilometers of tunnels, 64 bridges, and 18 interchanges. This latter section was completed under continuous traffic flow, reflecting the complexity of upgrading a heavily trafficked route. Notably, the Panagopoula Tunnel, approximately 4 kilometers long, is Greece‘s longest road tunnel and a key engineering achievement on this route. The motorway also includes five Motorist Service Stations, enhancing traveler convenience and safety. The ongoing extension of the Patras-Pyrgos motorway, expected to be fully operational by late 2025, will increase Olympia Odos‘ total length to 277 kilometers, further improving connectivity in the Western Peloponnese and boosting regional economic development.

Olympia Odos is operated under a 30-year concession by Olympia Odos S.A., a consortium comprising VINCI Concessions, HOCHTIEF PPP Solutions, J&P-AVAX, AKTOR Concessions, GEK TERNA, and Athena S.A. The concession covers design, construction, maintenance, and operation of the motorway, ensuring long-term infrastructure quality and service standards. The motorway‘s strategic importance lies in linking the economic heart of Greece—Athens and Piraeus—with the western ports and regions, facilitating export flows, tourism, and local development. Its integration with other major corridors such as PATHE (E75), Egnatia Odos (A2), and Ionia Odos (A5) supports Greece‘s multimodal logistics ecosystem, complementing projects like the Larissa intermodal hub by providing efficient road freight routes that connect ports, industrial centers, and inland logistics nodes.

3.9.6 Aegean Motorway A1

Aegean Motorway A1 Features significant structures like the Tempi Valley twin tunnels (2 km and 6 km) and the Platamonas tunnel (2.7 km); includes 22 bridges and 5 interchanges. The Project‘s objective is to remove the last, really dangerous and key point of the Athens-Thessaloniki road connection. It is a public work of immense national importance with social and financial benefits for the entire country in the medium and long run. PATHE Motorway, section Maliakos – Kleidi (i.e. the section of the motorway that , extends from Raches in the Prefecture of Fthiotida to Kleidi, Imathia, covering a total of 230 Km):

• the rehabilitation and upgrading of the existing motorway of 230 kms

• the construction of a new section of 26 km motorway which includes 2 twin tunnels at the Tempi Valley, 2 and 6 Km. long (the longest road tunnel in the Balkans), 1 twin tunnel at Platamonas 2.7 Km. long, 14 Kms of open road construction, 22 bridges, 5 interchanges, 5 new Motorist Service Stations per direction, etc.

• the operation and maintenance for a period of 30 years of both existing motorway and new section.

The Aegean Motorway (Maliakos-Kleidi section of the PATHE Motorway, E75) is a critical 230-kilometer stretch connecting Athens with Thessaloniki, forming a vital part of Greece‘s main north-south transport corridor. This motorway section includes a major upgrade and rehabilitation of the existing road network, alongside the construction of a new 26-kilometer segment featuring three twin tunnels: two in the Tempi Valley (2 km and 6 km long, the latter being the longest road tunnel in the Balkans) and one at Platamonas (2.7 km). The project also comprises 14 kilometers of new open road, 22 bridges, five interchanges,

and five new Motorist Service Stations per direction, significantly enhancing safety, capacity, and travel comfort along this busy route. The motorway concession covers design, construction, operation, and maintenance for 30 years, with toll collection managed by Aegean Motorway S.A. until 2038.

The Tempi Valley tunnels represent a landmark engineering achievement, removing one of the most dangerous bottlenecks on the Athens-Thessaloniki route and drastically improving road safety and travel times. The motorway upgrade has led to an 80% reduction in accidents in this section. The project also involved extensive geotechnical works such as slope stabilization, rockfall protection, and embankment construction to ensure long-term structural integrity in the mountainous terrain. The concession consortium includes major construction and infrastructure firms such as HOCHTIEF, AKTOR, J&P AVAX, VINCI, and GEK TERNA, reflecting the scale and complexity of the undertaking. The motorway forms part of the Trans-European Transport Network (TEN-T), reinforcing Greece‘s role as a logistics hub in Southeast Europe by connecting major urban centers, ports, and international borders.

This motorway segment is essential for freight and passenger transport, linking key economic regions and facilitating the flow of goods between the port of Piraeus, Athens, Thessaloniki, and northern borders. It integrates with other major corridors such as the Egnatia Odos and the Central Greece Motorway (Kentriki Odos), supporting multimodal logistics chains and projects like the Larissa intermodal hub. The Aegean Motorway‘s modern infrastructure, including advanced tunnels and bridges, enhances Greece‘s competitiveness by improving transit times, safety, and connectivity in the national and regional transport network.

3.9.7 The Moreas Motorway

The Moreas Motorway, comprising the A7 and A71 routes, is a key infrastructure corridor in the Peloponnese region of Greece, with a total length of approximately 205 kilometers. The A7 motorway runs from Corinth through Tripoli to Kalamata, while the A71 is a branch connecting Lefktro to Sparta. Operated by Moreas S.A., a consortium dominated by Ellaktor (71.67%) alongside AVAX (15%) and Intrakat (13.33%), the motorway is managed under a 30-year public-private partnership agreement effective from March 3, 2008, to March 3, 2038. Designed for speeds up to 130 km/h, the motorway features two lanes per direction separated by a central median, five twin tunnels totaling around 5 kilometers, 24 interchanges, six mainline toll plazas, three pairs of ramp toll plazas, and four pairs of service areas, reflecting a modern, high-standard motorway infrastructure.

Construction of the A7 began with the Corinth–Tripoli segment between 1984 and 1990, with the full A7 motorway becoming operational in late 2016. The A71 branch from Lefktro to Sparta opened on April 18, 2016, extending the network‘s reach deeper into the Peloponnese. The motorway has significantly enhanced regional connectivity by linking major urban centers and facilitating access to important cultural and archaeological sites, thereby promoting economic growth and tourism in the region. Safety improvements have been notable, with the upgrade to motorway standards leading to a substantial reduction in traffic accidents along the corridor. The infrastructure‘s tunnels and bridges enable efficient travel through the mountainous terrain, overcoming previous bottlenecks on older, less safe routes.

The Moreas Motorway integrates with Greece‘s broader transport network, connecting with the A8 Olympia Odos motorway near Corinth and supporting freight and passenger flows between Athens, the Peloponnese, and southern ports such as Patras and

Kalamata. Its role is complementary to other major corridors like the PATHE (A1) and Egnatia Odos (A2), forming part of the Trans-European Transport Network (TEN-T) and facilitating Greece‘s emergence as a logistics hub in Southeast Europe. The motorway‘s concession model ensures ongoing maintenance and modernization, aligning with national priorities to improve transport safety, efficiency, and regional economic development. For logistics projects such as the Larissa intermodal hub, the Moreas Motorway provides critical road connectivity that links inland logistics centers with maritime gateways and international freight corridors.

Table 1: Number of road traffic accidents and casualties, 2022 and 2023			
	2022	2023	Annual change 2023/2022(%)
Accidents	**10,487**	**10,553**	**0.6**
Thereof fatal	619	610	-1.5
% of fatal accidents	5.9	5.8	
Total of casualties	**13,279**	**13,461**	**1.4**
Fatalities	654	646	-1.2
Total of injuries	12,625	12,815	1.5
Serious injuries	664	659	-0.8
Slight injuries	11,961	12,156	1.6

Table 3.7 Number of road traffic accidents and casualties for 2022 and 2023.

3.9.8 Road Safety Deterioration and Infrastructure Investment Imperative

The Greek road traffic accident statistics reveal a concerning pattern that strengthens the economic and social case for intermodal terminal development as a strategic safety intervention. While total accidents increased modestly by 0.6% from 2022 to 2023 (10,487 to 10,553), the more significant concern lies in the 1.4% increase in total casualties (13,279 to 13,461) and the 1.5% rise in total injuries (12,625 to 12,815), indicating that accidents are becoming more severe despite a slight decrease in fatalities. This deterioration in road safety metrics occurs against a backdrop of intensive road freight activity, where the previously analyzed 16,371 micro-enterprises generate substantial truck traffic across Greek highways. The persistent high casualty rates, with over 13,000 people injured annually and 646 fatalities in 2023, represent not only human tragedy but also significant economic costs through healthcare expenses, productivity losses, and supply chain disruptions that directly impact the logistics sector's efficiency and competitiveness.

For logistics operators, the accident risk represents both direct costs through insurance premiums and indirect costs through schedule disruptions, driver availability issues, and reputation management, creating economic incentives for utilizing intermodal services that reduce highway exposure.

3.9.9 Weather-Related Risk Patterns and Modal Reliability Advantages

The weather-related accident data reveals critical insights into the operational vulnerabilities of Greece's road transport system that directly support the strategic value of

intermodal terminal development. While clear sky conditions account for the overwhelming majority of accidents (93.9% of incidents, 89.6% of fatalities), the disproportionate severity of weather-related incidents creates significant operational risks for road freight operations. Drizzle conditions, representing only 2.5% of accidents, account for 4.5% of fatalities, indicating an 80% higher fatality rate per incident compared to clear conditions. Similarly, rain conditions show elevated severity with 1.9% of accidents producing 3.4% of fatalities, representing a 79% higher fatality rate. These statistics demonstrate that adverse weather conditions create exponentially higher risks for road transport operations, particularly relevant for the fragmented Greek freight sector dominated by small operators with limited resources for advanced safety systems, driver training, or route optimization during challenging conditions.

Rail operations maintain more consistent schedules and safety records during weather events compared to road transport, as trains are less susceptible to wind, rain, and reduced visibility conditions that significantly impact truck safety and efficiency. For logistics operators serving time-sensitive supply chains, the weather-related reliability advantage of rail transport for long-haul segments represents measurable value through reduced schedule disruptions, lower insurance costs, and improved customer service levels. The concentration of weather-related accidents during drizzle and rain conditions—common in Greek winter months—indicates seasonal operational challenges that intermodal solutions can mitigate by shifting cargo to more weather-resistant rail transport during high-risk periods.

For the micro-enterprise dominated Greek freight sector, weather-related accidents create disproportionate impacts as small operators lack the financial reserves and operational flexibility to absorb major disruptions. The Larissa intermodal terminal can provide these operators with access to weather-resilient rail services during high-risk conditions, effectively offering risk diversification that individual small trucking companies cannot achieve independently.

For supply chain managers, this weather-responsive flexibility represents a competitive advantage in maintaining service reliability while managing risk exposure. The data supports positioning the Larissa terminal as a risk management tool for logistics operations, where the ability to switch between transport modes based on weather conditions provides operational resilience that pure road or rail solutions cannot match, justifying premium pricing for integrated intermodal services that deliver superior reliability through modal flexibility.

Weather conditions	Road accidents	%	Fatalities	%
Total	**10,553**	**100.0**	**646**	**100.0**
Clear sky	9,909	93.9	579	89.6
Strong wind	23	0.2	3	0.5
Frost	31	0.3	4	0.6
Fog / Mist	11	0.1	1	0.2
Drizzle	259	2.5	29	4.5
Rain	201	1.9	22	3.4
Tempest (Rain with strong wind)	7	0.1	0	0.0
Storm	3	0.0	0	0.0
Hail	0	0.0	0	0.0
Snow	3	0.0	0	0.0
Smoke	0	0.0	0	0.0
Dust	0	0.0	0	0.0
Other	106	1.0	8	1.2

Table 3.8 Road traffic accidents and fatalities by type of weather conditions, 2023

3.10 Rail Transport in Greece: Strategic Importance, Modernization, and Integration into European Networks

Rail transport in Greece plays a crucial and increasingly strategic role in the country‘s logistics landscape, particularly for medium- to long-distance freight and passenger services. As Greece positions itself as a gateway between Europe, Asia, and the Mediterranean, the development of a competitive, freight-friendly, and environmentally sustainable rail system is essential to enhancing national and regional connectivity. Rail offers a greener alternative to road haulage, aligning with European Union policies aimed at reducing emissions and congestion by shifting freight to rail and maritime modes. Greece‘s rail network, spanning approximately 2,548 km with 1,565 km of standard gauge and 961 km of narrow gauge lines, has historically suffered from underinvestment and aging infrastructure. However, recent years have seen a concerted effort to modernize and expand the network, with a focus on upgrading key corridors such as the Patras-Athens-Thessaloniki line, reducing travel times, and improving service reliability.

A landmark €760 million bilateral investment agreement between Greece and Italy, signed in May 2025, marks a new phase in the modernization of Greek railways. Italy‘s Ferrovie dello Stato (FS) Group, owner of Hellenic Train, is spearheading this initiative, which includes the procurement of 23 new state-of-the-art trains—eight high-speed intercity units and 15 suburban trains—alongside the development of modern maintenance depots. This investment aims to restore public confidence following the 2023 Tempe rail disaster and to bring Greece‘s rail system to the standards of leading European networks, particularly Italy‘s.

The modernization plan also encompasses infrastructure upgrades valued at €450 million, targeting critical sections such as the Domokos-Krannonas segment of the Athens-Thessaloniki line and the Paleofarsalos-Kalambaka branch, with completion deadlines aligned with EU Recovery and Resilience Facility funding requirements.

The strategic importance of rail freight is underscored by Greece‘s participation in key European rail initiatives and corridors. The Rail Freight Corridor Orient/East-Med (RFC OEM) connects Greece‘s ports, including Piraeus and Thessaloniki, with Central and Eastern Europe, facilitating seamless cross-border freight movement. Greece‘s membership in Rail Net Europe (RNE), PRIME, the Community of European Railways (CER), and the International Union of Railways (UIC) further integrates its rail infrastructure management and operations into European frameworks, promoting interoperability, safety, and harmonization of standards. These memberships enable Greece to actively participate in shaping the future of European rail transport and to attract technical and financial support for ongoing projects.

Domestic rail freight volumes are forecast to grow steadily, with projections estimating an increase from 3.25 million tonnes in 2023 to 3.70 million tonnes by 2027, driven by Greece‘s expanding role in European trade flows and the development of sea-rail intermodal services. Companies like Rail Cargo Group (RCG) and Ocean Rail Logistics exemplify the growing potential of rail freight in Greece, operating services that connect the port of Piraeus with inland Europe and the Balkans. RCG‘s TransFER network and Ocean Rail‘s Land Sea Express service facilitate containerized cargo movement between Greece, Central Europe, and the Far East, highlighting rail‘s capacity to support complex, multimodal supply chains. However, despite this growth, rail freight remains a smaller share of Greece‘s overall freight mix compared to road transport, reflecting the need for continued investment and policy support to shift modal balances in favor of rail.

Significant infrastructure projects complement these developments, including the construction of new rail links such as the 130 km mixed-traffic line connecting Florina in Greece with Pogradec in Albania, part of the CB Railway project with a budget of €845.7 million. This project aims to enhance regional connectivity by linking the Greek port of Thessaloniki with the Albanian port of Durres, Montenegro, and Serbia, thereby extending Greece‘s logistics reach into the Western Balkans. Additionally, ongoing upgrades to electrify and double-track key segments, along with the deployment of the European Train Control System (ETCS) signaling technology, are designed to improve capacity, safety, and interoperability. The European Investment Bank (EIB) is playing a pivotal advisory role in shaping Greece‘s rail investment strategy over the next two decades, ensuring alignment with the Trans-European Transport Network (TEN-T) objectives and EU sustainability goals.

For the Larissa intermodal logistics project, these rail sector advancements are directly relevant. Larissa‘s strategic location in Thessaly positions it as a natural inland hub that can leverage the expanding rail network to facilitate efficient distribution between northern ports like Thessaloniki and southern gateways such as Piraeus and Volos. The integration of Larissa into the TEN-T network and its connection to upgraded rail corridors will enable multimodal freight flows, reduce reliance on road transport, and support Greece‘s commitments to greener logistics. By capitalizing on the modernization of rail infrastructure and the growing rail freight market, Larissa can become a critical node in Greece‘s evolving logistics ecosystem, enhancing national competitiveness and regional economic development.

3.11 Sea Transport in Greece: Water as the prime factor of Logistics contribution

Sea transport is a cornerstone of Greece‘s transportation system, deeply rooted in the country‘s maritime heritage and its geographic configuration as a nation of numerous islands and extensive coastline. Over recent decades, Greece has significantly modernized its maritime fleet and ferry services, introducing super-fast ferries, high-speed catamarans, hydrofoils, and other advanced vessels that have drastically reduced travel times. For example, the journey from Piraeus to Crete now takes approximately six hours by fast ferry, while the Patras to Ancona route in Italy has been cut from 36 hours to around 19-20 hours. These improvements have enhanced the reliability and attractiveness of sea transport for both passengers and freight, supporting Greece‘s tourism industry and facilitating the movement of goods across the Aegean and Ionian Seas.

Greece‘s maritime infrastructure centers on several key ports, with the Port of Piraeus standing out as the most significant. Piraeus functions as the primary gateway to the Aegean Islands and serves as a major hub for both domestic ferry services and international shipping routes. The port has undergone extensive upgrades, particularly following substantial investments by COSCO, transforming it into one of the busiest container ports in Europe and a critical node in the Mediterranean logistics network. Other important ports include Rafina and Lavrion for Aegean island connections, Patras, Igoumenitsa, and Kyllini for the Ionian Islands, and Volos and Agios Konstantinos for the Sporades. Northern ports such as Thessaloniki, Kavala, and Alexandroupolis provide vital links to the North Aegean islands, supporting year-round passenger and freight traffic.

Internationally, Greek shipping is a dominant force, with the Greek merchant navy ranking among the largest globally by deadweight tonnage. Greek-owned fleets operate a wide variety of vessels, including oil tankers, bulk carriers, and container ships, playing a pivotal role in global maritime trade. The modernization of these fleets ensures compliance with stringent international and EU regulations on navigation safety, environmental protection, and health standards, including fire safety and non-smoking policies onboard. Greek shipowners have invested heavily in cleaner technologies and sustainable practices, responding to global pressures to reduce emissions and protect marine ecosystems. This commitment not only enhances Greece‘s maritime reputation but also supports the country‘s broader environmental and economic objectives.

The economic impact of sea transport extends beyond freight and passenger movement. The maritime sector stimulates local economies through tourism, shipbuilding, and repair industries. Shipyards in Elefsina and Skaramangas remain important centers for vessel maintenance and refurbishment, providing skilled employment and technological innovation. Environmental sustainability initiatives are increasingly integrated into maritime operations, including the adoption of cleaner fuels, waste management improvements, and emission reduction technologies. These efforts are critical for preserving the pristine marine environment that underpins Greece‘s tourism appeal and for aligning with EU Green Deal targets.

For logistics projects such as the Larissa intermodal hub, Greece‘s sea transport infrastructure offers vital opportunities for multimodal integration. Efficient ferry and shipping connections to major ports enable seamless transfer of goods between maritime and inland transport modes, reducing costs and transit times. The strategic location of Larissa, coupled with Greece‘s modernized ports and extensive ferry network, positions it as a potential inland logistics node that can enhance supply chain resilience and sustainability. Leveraging sea transport‘s strengths in volume and environmental performance, alongside road and rail modernization, will be essential for Greece to meet future logistics demands and strengthen its role as a Mediterranean trade hub.

3.12 Ports in Greece: Strategic Gateways in Global Maritime Trade and National Logistics

Greece‘s geographical position at the southernmost point of Europe, bridging three continents—Europe, Asia, and Africa—has historically established it as a pivotal maritime nation. This strategic location, combined with the longest coastline in Europe (approximately 13,676 km), positions Greece as a natural maritime gateway for West-East trade routes, particularly through the Suez Canal connecting Europe with the Far East. Greek ports are integral to both the national economy and the broader European Union‘s trade infrastructure, serving as critical nodes for international shipping and intra-EU commerce. Among over 140 ports serving passengers and cargo, 16 are classified as international, with Piraeus standing out as the largest and busiest, followed by Thessaloniki, Patras, Igoumenitsa, and others. These ports not only facilitate Greece‘s extensive domestic island connectivity but also anchor the country‘s role in global maritime logistics (Fitch Solutions, 2025; ELSTAT, 2023).

The Port of Piraeus exemplifies Greece‘s maritime transformation and ambition. Since China‘s COSCO Shipping acquired a majority stake in 2016, Piraeus has undergone significant expansion, becoming the Mediterranean‘s third-largest container port and a major transshipment hub connecting Asia with Europe. COSCO‘s investments have enhanced cargo capacity and operational efficiency, propelling Piraeus from outside the top 15 European ports in 2007 to 4th place by 2020, handling over 5.65 million TEUs annually. This growth has attracted a cluster of maritime-related activities, including ship management companies, freight forwarders, 3PL providers, and shipyards in the Attica region, reinforcing Greece‘s competitive maritime cluster. However, despite record revenues and increased stakes (COSCO now holds 67% ownership), concerns persist regarding insufficient investments in passenger infrastructure and local community impacts, with the Greek government urging COSCO to accelerate upgrades to passenger terminals, security, and urban integration.

Beyond Piraeus, Greece‘s other core ports—Thessaloniki, Patras, Igoumenitsa, and Heraklion—are designated as ―core ports” under the EU‘s Trans-European Transport Network (TEN-T) Orient/East-Med corridor, underscoring their strategic maritime interface role. These ports serve not only Greece but also neighboring EU countries, facilitating 75% of intra-EU vessel traffic calling at Greek harbors. The development of these ports is crucial for enhancing regional trade flows, supporting tourism, and integrating multimodal logistics chains. Investments in port infrastructure, digitalization, and environmental sustainability are ongoing priorities, aiming to improve cargo handling efficiency, reduce emissions, and comply with international maritime regulations. Greece‘s maritime cluster benefits from the strong presence of Greek shipowners, who manage a fleet accounting for 15.6% of global deadweight tonnage and 21% of global seaborne trade, maintaining Greece‘s status as a global shipping powerhouse despite increasing international competition.

The economic impact of Greece‘s ports extends beyond cargo throughput. Ports are vital for tourism, with millions of passengers traveling annually between the mainland and the islands. The extensive ferry networks operating from ports such as Piraeus, Rafina, Patras, and Volos support island economies and domestic cohesion. Additionally, the shipbuilding and repair industry, centered in shipyards like Elefsina and Skaramangas, contributes significantly to local employment and technological expertise. Environmental sustainability is increasingly emphasized, with initiatives to reduce maritime emissions, enhance waste management, and promote cleaner fuels, aligning with EU Green Deal objectives and preserving the marine environment critical to Greece‘s tourism and fisheries sectors.

3.12.1 Port of Piraeus

Piraeus is the largest Greek seaport and the country‘s main international commercial port.

• It is the natural gateway to Europe in the Eastern Mediterranean region and has emerged as a major maritime hub for Europe, linking Greece and the EU to Far Eastern and Middle Eastern markets.

• The Piraeus port is specialized in container traffic; having an annual handling capacity of over 7.5m TEUs, the port of Piraeus ranked fourth among all European ports in 2019 and 2020, in terms of total container throughput, and is first among the Mediterranean‘s commercial ports, surpassing Valencia and Algeciras, according to Lloyd‘s List Top 100 Global Ports.

• With the port‘s current capacity utilization exceeding 80%, and following its privatization in 2016, new investments in infrastructure are in place, with COSCO planning to expand pier 3 and build a fourth pier. Planned investments of €300m in the next two years are expected to increase port capacity to more than 10m TEUs

Piraeus has been one of the most rapidly growing ports in Europe and was the largest commercial port in the Mediterranean, and the fourth largest among all European ports in terms of total container throughput in 2019 and 2020, despite the pandemic‘s adverse effects on global trade. The vision of turning Piraeus into the south gate of Europe is backed by a series of planned investments within the next years, aiming at improving infrastructure and achieving better integration with the railway and road networks, transforming the port into a state-of-the-art logistics hub.

For example, it is estimated that a trip from Asia to the Czech Republic through Piraeus is 8-9 days shorter, in comparison to the same trip through Rotterdam or Hamburg. This is because freight rail transportation services from Piraeus to the major logistics centers in Central Europe are performed in approximately four days, by dedicated block trains, whereas the maritime trip from China to Piraeus is 8-9 days shorter when compared to the North European ports. Moreover, the Southeastern European intermodal corridor via the Piraeus port is not only a faster and a more lucrative alternative supply chain route for shippers and traders, but also a more reliable one.

More than 10 years ago, COSCO − China‘s shipping giant, the third largest container shipping and second largest port operator in the world– realized the benefits of Greece as a maritime and logistics center, by investing in the port of Piraeus.

The completion of the 21st Century Maritime Silk Road (MSR) initiative, (B&R) initiative, will highly influence the global containerized trade market. More than US$250b have been allocated to the B&R initiative, out of which, US$40b are for developing and securing maritime hubs, inter-oceanic channels, and trading links for the MSR initiative. Although the impact of the new Silk Road project cannot be thoroughly calculated, the scale of the initiative and the economic figures involved are expected to reshape the trade between Europe and Asia, thus creating new opportunities for Greece.

The port of Piraeus has been recognized early in the process as a major maritime link in the West East inter-oceanic corridor, and COSCO has already invested heavily in developing Piraeus as a major European transshipment port. Since Piraeus constitutes a key maritime interface on the MSR corridor, COSCO is increasing its investment in the port,

aiming to secure Piraeus‘s role as the south gate to Europe by enhancing port capacity, optimizing performance, and improving the port‘s links with railways, motorways, the Athens International Airport, and other regional ports.

Figure 3.5 Piraeus as a corridor and the 1st largest commercial port in the Mediterranean

Figure 3.6 Overview of Piraeus Port

Figure 3.7 Rail freight terminal in the port of Piraeus.

3.12.2 Port of Thessaloniki

The port of Thessaloniki is one of the strongest Greek ports. It is a transshipment container port, specializing mainly in dry cargo.

• Thessaloniki constitutes the primary entry port for Northern Greece and acts as an international logistics hub for all Balkan countries. The port attracts both grouped and conventional cargo traffic.

• The port‘s annual handling of container traffic is in the range of 0.5m TEUs. However, an expansion of the container terminal is planned, which will increase its capacity to 1.3m TEUs. Right now, there are seven companies and consortia interested in undertaking the extension of the Thessaloniki port‘s sixth pier, which will reportedly cost around €120m.

• The master plan, prepared in 2017 and approved by the European Commission, sets clear short and medium-term priorities for the development and upgrade of Thessaloniki to a middle category European port; the main developmental actions aim at raising the capacity of cargo terminals, as well as upgrading the sea cruise facilities and transit services capabilities to handle 150,000 passengers annually.

Significant investments are underway for the port of Thessaloniki, the primary entry port for Northern Greece and an international logistics hub for all Balkan countries, following its privatization in 2018.

An important node of the Trans-European Transport Network , The port of Thessaloniki is part of the Trans-European Transport Network (TEN-T) and is situated in proximity to the Trans Adriatic Pipeline (TAP). The master plan of the port, prepared in 2017 and approved by the European Commission, sets clear short- and medium-term priorities for the development and upgrade of Thessaloniki to a middle category European port; the main developmental actions aim at raising the capacity of the cargo terminals, as well as upgrading the sea cruise facilities and transit services capabilities.

In total, more than 25 important commercial seaports are currently operating in Greece, five of which have been identified by the EU as ports of strategic interest and key maritime interfaces of the Orient / East-Med (OEM) corridor.

The Port of Thessaloniki is the main trade seaport in Greece and is poised to see decent growth over the short-to-medium term. Both the ports of Thessaloniki and Piraeus are two of the biggest seaports in the Mediterranean. In line with a drive to privatise key infrastructure assets in Greece, partially a requirement of Greece‘s bailout deal with creditors, the government has advanced with the privatisation of two of the country's largest ports.

The privatization of the port of Thessaloniki finally concluded in March 2018, for a fee of €1.1b, with the Greek state handing 67% of the shares of the Thessaloniki Port Authority S.A. to the new owners of the port, South Europe Gateway Thessaloniki Ltd. Thessaloniki constitutes the primary entry port for Northern Greece and acts as an international logistics hub for all Southeastern European markets7. The port of Thessaloniki will substantially improve the international competitiveness of Greece. Thessaloniki is the second biggest container port in Greece and the biggest dry bulk and break bulk port of the country. It is an operating port with six piers, 6,200 meters of quay, 1.55m square meters of port land and several buildings and warehouses. Additionally, the port of Thessaloniki is part of the Trans-European Transport Network (TEN-T) and is situated in proximity to the Trans Adriatic Pipeline (TAP). Furthermore, the development of the Gonos Logistics Center in a plot of 672,000m2 near the port of Thessaloniki, will also enhance the Greek hinterland to the Balkan countries, at the Greek northern borders. The most used railway corridor from the Thessaloniki port to the Central European economic and logistics centers is PanEuropean Corridor X, which passes through North Macedonia, Serbia, Hungary, Slovakia, the Czech Republic, etc.

3.12.3 Port of Alexandroupolis

The port of Alexandroupolis, along with the port of Kavala, are high on the Hellenic Republic Asset Development Fund‘s (HRADF) agenda; in fact, after legislation proposed by the Ministry of Shipping and Island Policy was adopted by the Greek Parliament, the privatization of the port of Alexandroupolis is underway and, in October of 2020, the HRADF announced that four interested parties have submitted an expression of interest for the acquisition of a majority stake of at least 67% of the Alexandroupolis Port Authority.

The concession of the Port Authority of Alexandroupolis will cover the use and exploitation of the eastern part of the harbor, namely the container ships‘ berth, the container terminal and the large 400 acres area located in the eastern part of the harbor. It is worth noting that the container ships‘ berth has a draught of 12 meters.

The port of Alexandroupolis, which is linked to the national railway network, serves only conventional cargo to date, as it lacks container loading and handling equipment, and still does not feature a Free Zone.

Alexandroupolis has excellent potential to develop into a commercial cargo / bulk cargo logistics management center, while it is also fit for the construction of shipbuilding and ship-repairing shipyards and a marina.

3.12.4 Port of Igoumenitsa

The Port of Igoumenitsa, located in the Epirus region of Northwestern Greece, stands as one of the largest and most strategically important roll-on/roll-off (Ro-Ro) international transport ports in both Greece and the Eastern Mediterranean. Serving as a critical gateway for Northern Greece, the Southern Balkans—including Bulgaria and Turkey—and parts of the Middle East, it handles millions of tonnes of goods annually transported by international trucks. Its exceptional connectivity is bolstered by its location at the convergence of two major motorways, the Egnatia Odos and Ionia Odos, which facilitate efficient road freight flows between the port and inland markets. This positioning not only enhances the port‘s role as a logistics hub but also aligns with Greece‘s broader strategy to develop multimodal transport corridors that link maritime gateways with hinterland logistics centers, such as the proposed intermodal hub in Larissa. The port‘s natural protection, due to its westward-oriented gulf and absence of wave activity, reduces the need for extensive port protection infrastructure, allowing resources to be focused on capacity and service improvements.

Igoumenitsa‘s infrastructure includes a modern new port with 17 ramps dedicated to Ro-Ro ships and an older port with eight ramps for Ro-Ro and passenger ferries. The port handles exclusively passenger traffic through ferries, with limited cruise ship activity, and separates passenger flows between a new international ferry terminal and a domestic terminal at the old port. Despite the general good condition of passenger terminal buildings and effective port security procedures, some infrastructure elements, such as the port bumpers built during the initial construction phase, are outdated and require replacement due to corrosion. Ongoing expansion efforts, including the planned phase C of the port extension project, will add four additional ramps, significantly enhancing truck-level capacity and supporting increased freight throughput. These upgrades are critical for sustaining the port‘s growing role in regional trade and passenger transport, and they complement the development of a nearby logistics center in Grikas, approximately 17 km from the port. This logistics center, spanning nearly 890,300 m², is designed to add value to port operations by facilitating cargo consolidation, storage, and multimodal transfer, providing a direct synergy with inland logistics hubs like Larissa.

The strategic importance of Igoumenitsa port and its integration with Greece‘s road and rail infrastructure has direct implications for the Larissa intermodal project. As Larissa aims to become a central inland logistics node in Thessaly, its connectivity to major ports such as Igoumenitsa via the Egnatia Odos motorway is vital for efficient freight distribution across northern and central Greece and into the Balkans. The port‘s ongoing capacity enhancements and the development of adjacent logistics facilities support the creation of seamless supply chains that integrate maritime, road, and rail transport. This multimodal connectivity reduces transit times, lowers logistics costs, and contributes to Greece‘s objective of shifting freight from road to more sustainable transport modes. By leveraging the natural advantages and infrastructure improvements at Igoumenitsa, the Larissa hub can strengthen Greece‘s position as a logistics gateway in Southeastern Europe, fostering economic growth and regional integration.

3.12.5 Port of Patras

The Port of Patras holds a pivotal role in the economic vitality of Western Greece and serves as a critical maritime gateway linking Greece with Italy and the broader European market. Primarily a passenger port, Patras handles a significant share of the sea traffic between Greece and other countries, facilitating both tourism and commercial exchanges. The port‘s strategic importance is amplified by its role as a major Ro-Ro (roll-on/roll-off) hub, connecting Greece with Italian Adriatic ports such as Ancona, Bari, Brindisi, and Venice. These connections enable the seamless movement of goods and vehicles, supporting trade flows that extend from Greece through Italy and into Central Europe. The port‘s inclusion as a stopover on the Istanbul-Trieste route operated by U.N. RO-RO—now part of the Danish logistics giant DFDS—further underscores Patras‘ growing integration into Europe‘s combined transport networks, enhancing its transshipment capabilities and expanding its reach into Eastern Mediterranean and Balkan markets.

Patras‘ operational capacity is reflected in its handling of frequent ferry calls, with ships scheduled to call four times weekly—two in each direction—between Patras and Trieste, with plans to increase frequency. These intermediate stops facilitate the transshipment of cargo from Turkey destined for southern Italian ports and the domestic Greek market, as well as the reverse flow of goods from Italy and Greece back to Turkey and other eastern countries. This bidirectional cargo movement highlights the port‘s role as a multimodal logistics node that supports complex supply chains and regional trade integration. The Port Authority of Patras has developed a strategic plan aimed at strengthening Patras as a key intermodal transport hub within the Central Trans-European Network. This vision aligns with the port‘s positioning as a critical interconnection point between the East Mediterranean and Scandinavian corridors, reinforcing Greece‘s role in European freight corridors and supporting national economic growth.

The significance of Patras port extends beyond maritime operations to its connection with inland logistics infrastructure and transport networks, which is crucial for projects like the Larissa intermodal hub. Patras‘ accessibility via major highways and its integration with rail and road networks enable efficient hinterland distribution, facilitating the flow of goods between the port and central Greece, including Thessaly. The port‘s capacity to handle both passenger and freight traffic complements Larissa‘s ambition to become a central inland logistics node, leveraging multimodal transport solutions to optimize supply chains and reduce reliance on road haulage alone. As Greece continues to modernize its port infrastructure and expand intermodal capabilities, Patras stands out as a vital link that supports regional connectivity, economic diversification, and sustainable logistics development.

3.12.6 Port of Corfu

The Port of Corfu, situated on the east coast of the island of Corfu in the Ionian Islands group, plays a vital role in both domestic and international maritime transport. Managed by the Port Authority of Corfu under a concession agreement with the Greek State until 2042, the port primarily serves passenger traffic through a diverse fleet of Ro-Ro ferries, cruise ships, hydrofoils, high-speed boats, and day-trip vessels. Its strategic maritime connections link Corfu with domestic ports such as Igoumenitsa and Paxos Island, as well as key international ports in Italy, including Bari, Brindisi, Venice, and Ancona. This positioning makes Corfu a crucial gateway between Greece and Western Europe, facilitating both tourism and freight movement. The port‘s infrastructure has been developed in successive phases, including a significant 430-meter extension of the main harbor, enabling it to accommodate larger vessels and increasing its operational capacity.

Corfu‘s port facilities are well-equipped to handle growing passenger volumes and cruise ship traffic. The main pier, approximately 770 meters in length, allows mooring of up to four cruise ships simultaneously, with the capability to dock vessels up to 300 meters long. Passenger services are supported by modern terminal buildings, including an old terminal of 1,644 m², a new terminal of 3,762 m², a duty-free building, and a customs building, alongside a dedicated terminal for cruise passengers. The port‘s proximity to Corfu International Airport, just 3.5 km away, enhances its attractiveness as a cruise embarkation point, facilitating seamless intermodal passenger transfers. Recent years have seen a surge in cruise arrivals, with a 79% increase in passenger numbers in early 2025 alone, positioning Corfu as a leading cruise destination in the Eastern Mediterranean and Adriatic regions. To sustain this growth, the Corfu Port Authority is advancing infrastructure upgrades focused on expanding passenger terminal areas, improving boarding efficiency, and reducing congestion, ensuring the port can accommodate larger vessels and higher passenger throughput while maintaining high service standards.

Looking ahead, the Port of Corfu is undergoing ambitious development projects aimed at further enhancing its capacity and economic contribution. These include the construction of a new marina with berthing capacity for approximately 100 megayachts, located on the western side of the port near the cruise terminal, and the upgrade of the Lefkimmi Port in southern Corfu, which serves ferry connections to Igoumenitsa and is planned to include modern passenger terminals, new access roads, and parking facilities. Additional projects involve the development of marinas at Imerolia and Spilia, designed to boost recreational boating and tourism. These initiatives, supported by comprehensive master plans and concession agreements, align with Greece‘s broader strategy to diversify maritime activities, promote sustainable tourism, and strengthen the island‘s role in regional maritime networks. For logistics and intermodal projects like Larissa, Corfu‘s expanding port infrastructure offers enhanced maritime connectivity, supporting integrated supply chains that link island economies with mainland Greece and international markets.

3.12.7 Port of Volos

The Port of Volos, situated in the Pagasetic Gulf, is the principal maritime gateway of the Thessaly region and holds a strategic position at the heart of the Greek mainland. Located approximately 330 km north of Athens and 215 km south of Thessaloniki, the port‘s central location facilitates efficient access to major urban and industrial centers across Greece. Managed by the Port Authority of Volos under a concession agreement with the Greek State until 2042, the port supports a diverse range of activities including commercial bulk and general cargo handling, passenger ferry services, cruise tourism, and fishing. Its facilities are integrated within the urban fabric of Volos, with cargo operations concentrated at two main terminals across an area of roughly 676,695 m². While rail connectivity exists, it has been largely inactive for over a decade due to operational challenges related to urban traffic interruptions, underscoring the need for multimodal infrastructure upgrades to fully leverage the port‘s potential.

Volos port‘s cargo operations primarily focus on bulk commodities such as grain, fertilizer, steel, scrap metal, and liquid bulk, with container volumes remaining relatively low and currently managed without a dedicated container terminal. The port‘s general plan includes the creation of specialized terminals for scrap imports and multi-purpose dry bulk cargo, which are expected to enhance operational efficiency and environmental compliance. Cruise activity, which was significant prior to the regional economic downturn in Turkey, is anticipated to rebound, driven by the proximity of major tourist attractions such as the Meteora monasteries and Mount Pelion. To accommodate this growth, proposals include converting existing grain silo facilities into modern cruise terminals and developing marina infrastructure to support recreational boating, addressing a regional gap in marina services between Thessaloniki and Athens. Recent restoration and upgrade projects, valued at €9

million and funded through the Public Investment Program, aim to repair storm damage and improve operational resilience, positioning Volos as a key player in Thessaly‘s commercial and tourism sectors.

The Port of Volos is poised to become a critical node in Greece‘s evolving multimodal logistics network, particularly in connection with the Larissa intermodal hub. Its strategic location and expanding infrastructure capabilities enable it to serve as a maritime gateway that feeds the inland logistics and distribution systems of Thessaly and beyond. The port‘s accessibility via the PATHE (E75) motorway and national roads facilitates efficient road freight movements, while future rail reintegration could significantly enhance multimodal transport options. The cancellation of the recent privatization tender by Growthfund reflects a strategic reassessment aimed at optimizing the port‘s development in the public interest, ensuring alignment with national economic goals and regional growth strategies. By integrating port modernization with inland logistics development, Volos and Larissa together can strengthen Greece‘s position as a Mediterranean logistics hub, supporting sustainable trade, tourism, and economic resilience in the region.

Risks and challenges for the port of Volos

The Port of Volos faces several operational and environmental challenges due to its close proximity to the urban center, which has resulted in citizen complaints regarding dust, noise, and potential restrictions on port working hours. To address these concerns, a spatial reorganization has been proposed, concentrating passenger, cruise, and marina activities on the east side of the port, while dedicating the west side exclusively to freight management. This separation aims to minimize the environmental impact on the city and improve operational efficiency. However, even with this division, cargo handling at the future multipurpose terminal must incorporate robust mitigation measures to reduce dust, noise, and light pollution, ensuring sustainable coexistence between port activities and the urban environment. Implementing this reorganization will require modifications to the current port master plan to accommodate environmental and operational priorities effectively.

The port‘s cargo handling capabilities are also affected by equipment failures. Three cranes on platform 10 and one of the two cranes on platform 8 are out of order, limiting the port‘s operational capacity and efficiency. Additionally, the 15,000 m² silo installation, which has been out of use since 2012, represents underutilized infrastructure that could be revitalized to support bulk cargo operations, such as grain and fertilizer handling. Revitalizing this facility would contribute to the port‘s multifunctional cargo handling capabilities and support regional agricultural exports.

While the Port of Volos holds strategic importance for Thessaly and Greece‘s maritime network, addressing environmental impacts, upgrading aging infrastructure, and improving passenger and cargo facilities are essential steps to unlock its full potential. These improvements would not only enhance the port‘s operational efficiency and sustainability but also strengthen its integration with inland logistics hubs such as Larissa, fostering multimodal transport solutions and regional economic development.

3.13 Air Transport in Greece: Wings of Growth that elevate the Greek Intermodal Logistics

Greece‘s role as Southeast Europe‘s emerging air freight transportation logistics hub is underpinned by its strategic geographic location at the crossroads of Europe, Asia, and Africa, combined with significant recent investments in infrastructure and logistics capabilities. Although air freight accounts for only about 1% of Greece‘s total freight volume by weight, it represents approximately 35% of the value of international trade, reflecting its critical importance for transporting high-value, time-sensitive, and lightweight goods such as pharmaceuticals, perishables, and electronics. Between 2017 and 2018, Greece‘s international intra-EU and extra-EU air cargo transport grew by 10.1% and 5.9%, respectively, signaling rapid expansion and increasing competitiveness in the sector. The growth of passenger traffic through Greek airports, particularly Athens International Airport ―Eleftherios Venizelos” (AIA), and the establishment of new international air routes have created promising opportunities for air cargo services to flourish, positioning Greece as a viable alternative to congested European hubs.

Strategic initiatives such as the ―Seanairgy Project,” a cooperation between Athens International Airport and the port of Piraeus, exemplify Greece‘s efforts to integrate air and sea freight logistics, enhancing multimodal connectivity and efficiency. This project, alongside the development of major logistics centers like the Thriasio Freight Center near Athens and the Hull Logistics Center in Aspropyrgos, aims to transform Greece into a regional logistics hub that links Europe with the Middle East, Africa, and the Eastern Mediterranean. Thessaloniki‘s port and logistics infrastructure also play a crucial role in this network, serving as a gateway for the Balkans and Southeast Europe. These developments, supported by regulatory reforms and investments in digitalization and sustainability, are gradually elevating Greece‘s international ranking in trade facilitation and logistics performance, although further improvements are needed to match leading European competitors.

The country‘s extensive airport network—comprising 45 airports, including 15 international and 26 domestic airports—supports this growing air freight capability. Athens International Airport remains the dominant hub, handling over 88% of Greece‘s air cargo traffic. The privatization and modernization of regional airports by Fraport Greece have enhanced infrastructure and service quality, particularly on the islands, which are critical for tourism and regional connectivity. The expansion of long-haul routes, such as the Athens-Shanghai connection operated by Juneyao Air, further integrates Greece into global supply chains. For logistics projects like the Larissa intermodal hub, Greece‘s evolving air freight infrastructure complements road, rail, and maritime modes, enabling efficient multimodal transport solutions that reduce transit times and enhance supply chain resilience. As Greece continues to develop its air freight sector, it is poised to strengthen its position as Southeast Europe‘s premier air cargo logistics hub, supporting economic growth and regional integration.

Greece‘s air freight sector, though smaller in volume compared to road and sea freight, plays a vital role in handling time-sensitive and high-value goods such as pharmaceuticals, perishables, and electronics. In 2023, Greece transported approximately 100,900 tonnes of air cargo, ranking 63rd globally. Air freight accounts for about 35% of Greece‘s international trade value but only 1% by weight, reflecting the premium nature of air cargo. The sector has experienced growth rates exceeding 10% in intra-EU transport between 2017 and 2018, driven by increasing demand for rapid logistics solutions. However, challenges remain, including high operational costs, fragmented logistics networks, and infrastructure limitations in some regions. Efforts to modernize the sector include adopting electronic Air Waybills (eAWB), enhancing digitalization, and participating in European Defence Agency projects to improve operational harmonization and training. These initiatives

aim to position Greece as a competitive air cargo hub in Southeast Europe, complementing its maritime and road logistics capabilities.

The strategic location of Greece at the crossroads of Europe, Asia, and Africa offers significant potential for air transport to serve as a logistics hub connecting multiple continents. Athens International Airport‘s expanding long-haul connections, including recent route additions to China and the US, exemplify this potential. For instance, Juneyao Air‘s Athens-Shanghai route has seen rapid growth, with capacity increases planned for 2025. The airport‘s ongoing expansion and modernization projects, including advanced ground movement control systems and enhanced passenger services, are designed to support this international connectivity. These developments are crucial for integrating Greece into global supply chains and supporting the country‘s economic growth, tourism, and export sectors.

For the Larissa intermodal logistics project, Greece‘s air transport infrastructure provides complementary advantages. While the project primarily focuses on road, rail, and maritime connectivity, proximity to well-developed airports enhances multimodal options for high-value, time-sensitive cargo and passenger flows. The synergy between air freight and other transport modes can optimize supply chains, reduce transit times, and increase the resilience of logistics networks serving Thessaly and the broader region. Continued investment in airport infrastructure and digitalization will further strengthen Greece‘s position as a key logistics hub in Southeast Europe, supporting sustainable economic development and integration into international markets.

3.13.1 Athens International Airport (AIA) – Eleftherios Venizelos

Athens International Airport –Eleftherios Venizelos” (AIA) stands as Greece‘s premier aviation hub, serving not only the capital but the entire Attica region and emerging as a critical passenger and logistics gateway for Southeast Europe. Located about 20 kilometers east of central Athens, AIA recorded a historic passenger traffic milestone in 2024, handling 31.85 million passengers—a 13.1% increase over 2023 and surpassing pre-pandemic levels by over 10%. Domestic passenger numbers grew by 7.3%, while international traffic surged by 15.7%. Aircraft movements also rose by 11%, with both domestic and international flights increasing significantly. This robust growth reflects expanding tourism, improved airline connectivity, and rising demand for travel to and from Greece‘s numerous islands and international destinations.

On the cargo front, AIA remains Greece‘s leading air freight facility, managing approximately 100,900 tonnes of air cargo in 2023. The airport is equipped with advanced cargo terminals featuring cold storage and streamlined customs procedures, enabling efficient handling of perishables, pharmaceuticals, and high-value goods. Its strategic location at the crossroads of Europe, Asia, and Africa, combined with comprehensive logistics services, positions AIA as a pivotal node connecting diverse markets. To accommodate growing passenger and freight demand, AIA has launched a major expansion program aiming to increase capacity to 33 million passengers in the near term and 40 million by 2032. Planned upgrades include terminal expansions, new aircraft parking stands, runway improvements, and integration of cutting-edge technologies to enhance operational efficiency and passenger experience. Sustainability measures, such as electrification of ground vehicles and renewable energy use, are integral to this development.

3.13.2 Thessaloniki Airport – Makedonia (SKG)

Thessaloniki Airport, known as "Makedonia," serves as the primary aviation gateway to northern Greece. In 2023, the airport handled approximately 7.03 million passengers, reflecting an 18.7% increase from the previous year. This growth trajectory continued into

2024, with a 5% rise in passenger numbers, totaling 7.38 million. The airport's strategic location makes it a vital hub for both domestic and international flights, connecting the region to major European cities.

While specific cargo tonnage figures for Thessaloniki Airport are not publicly disclosed, the facility supports cargo operations that cater to the industrial and commercial needs of northern Greece. The airport's infrastructure includes cargo handling areas equipped to manage various freight types, facilitating the import and export of goods essential to the region's economy. Additionally, the airport's proximity to the Port of Thessaloniki enhances its role in multimodal transport, linking air cargo operations with maritime shipping routes.

Recent infrastructure improvements have focused on expanding terminal capacities, upgrading navigation systems, and enhancing passenger services. These developments aim to accommodate increasing traffic volumes and improve the overall efficiency of airport operations. Thessaloniki Airport's continued growth underscores its significance in Greece's transportation network and its potential as a regional logistics hub.

3.13.3 Nea Anchialos National Airport (VOL)

Nea Anchialos National Airport, located approximately 24 kilometers southwest of Volos in the Thessaly region, serves as a key regional aviation facility supporting both passenger and cargo operations. Since commencing operations in 1993, the airport has undergone significant upgrades, including the completion of a modern terminal in 2010, positioning it among Greece‘s most advanced regional airports. In 2018, the airport recorded 41,357 passengers and 452 aircraft movements, reflecting substantial growth of 36.1% and 22.2% respectively compared to the previous year. While more recent comprehensive data is limited, the airport continues to play an important role in connecting Central Greece with major domestic and European cities, supporting regional economic and tourism development.

The airport features a 2,759-meter asphalt runway capable of accommodating a wide range of aircraft types, facilitating both passenger and cargo flights. Its cargo operations, though modest relative to larger Greek airports, are vital for local industries, particularly agriculture and manufacturing, enabling efficient transport of goods within Central Greece and beyond. Connectivity is enhanced by the airport‘s proximity to the E75 motorway and its linkage to Volos via the Magnesia Intercity Bus service, which supports passenger accessibility and cargo movement. Ongoing modernization efforts, including terminal renovations and infrastructure upgrades, aim to improve operational capacity and passenger experience, reflecting broader national strategies to strengthen regional airports as integral components of Greece‘s transport and economic framework.

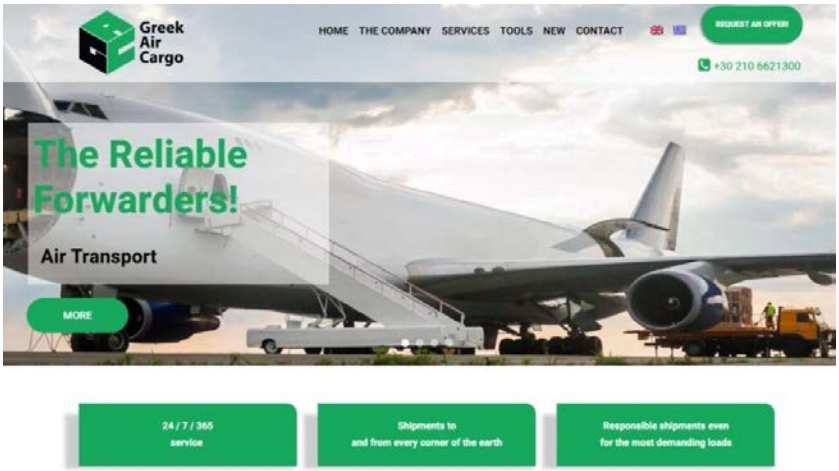
Nea Anchialos Airport‘s role is particularly significant within the context of Thessaly‘s logistics ecosystem, complementing the region‘s road and maritime infrastructure. Its capacity to handle both passenger and cargo flights supports multimodal transport solutions that enhance supply chain efficiency and regional connectivity. For the Larissa intermodal logistics project, the airport offers a strategic air transport node that can facilitate the rapid movement of high-value or time-sensitive goods, linking inland logistics hubs with international markets. As Greece continues to invest in upgrading its regional airports and integrating them with other transport modes, Nea Anchialos Airport is poised to contribute increasingly to the economic vitality and logistics competitiveness of Thessaly and Central Greece

3.14 Freightforwarding Management Options In Greece

Freight forwarding is a major sector within Greece‘s logistics industry, supported by the country‘s extensive and improving transport infrastructure. The presence of experienced and reliable freight forwarding companies ensures the safe and timely delivery of goods across domestic and international routes. These companies leverage Greece‘s multimodal transport options—road, rail, sea, and air—to optimize supply chains and meet the diverse needs of businesses. For regional projects such as the Larissa intermodal hub, the integration of freight forwarding services with modern logistics centers and transport networks is essential to maximize efficiency and connectivity. As Greece continues to develop its logistics ecosystem, including the eventual realization of projects like the Gonos logistics center, the country is well-positioned to strengthen its role as a key logistics hub in Southeast Europe

List Of The Top 10 Logistics solutions companies in Greece

Greek Air Cargo S.A.



Greek Air Cargo stands out from the competition in the global transportation market because its executives have the expertise needed to handle any transit issue for any kind of cargo and under any circumstances. Since their very first year of operation in 1973, they have gained a reputation as the "specialists" in the field of transportation.

About the Company

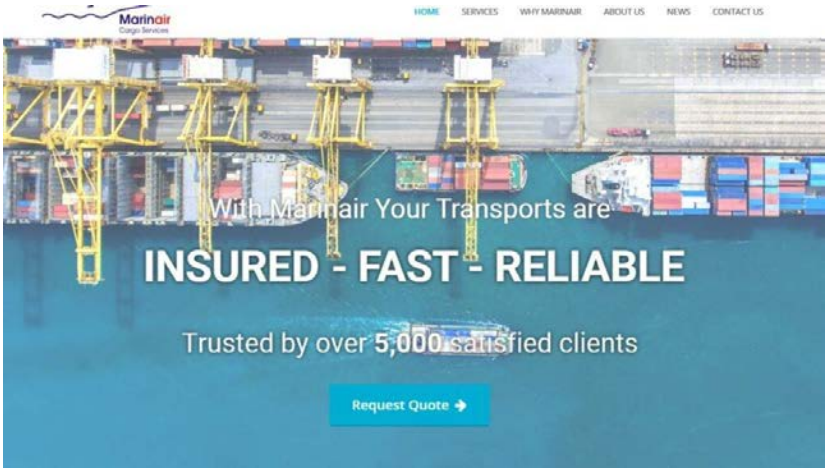
Founded: 1973

Headquarters: Athens, Greece

Key Services:

- Air Transport
- Shipping
- Road transport
- Railway transport
- Other transportation services
- supply chain manegement

Marinair Cargo Services Ltd



Marinair Cargo Services Ltd is among the fastest-growing forwarding agents with multimodal transportation worldwide in sea, air, logistics, and combined transport services. The company has shown remarkable growth in its local market followed by the opening of 4 branch offices across the Indian continent (Mumbai, Chennai, Tirupur, Tuticorin), Hong Kong, and one more European office in The Netherlands.

About the Company

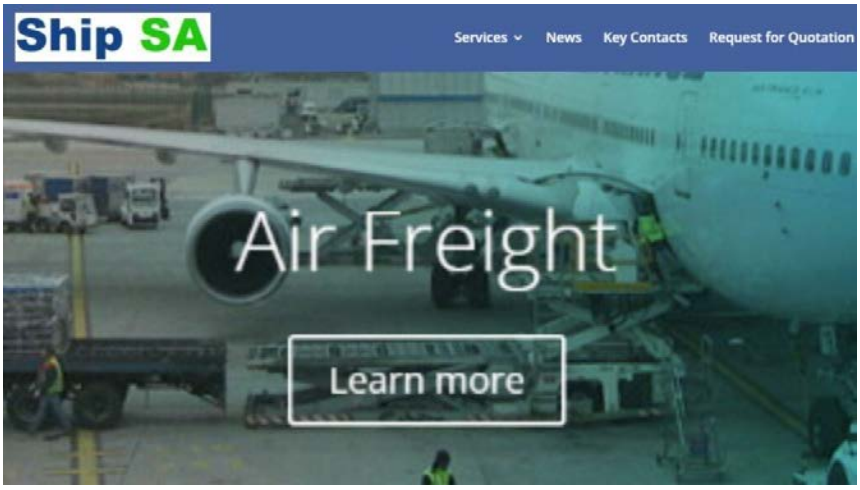
Founded: 2007

Headquarter: Piraeus, Greece

Key Services:

- Air Freight
- Sea Freight
- Road Freight
- Rail Freight
- Combine Freight
- supply chain manegement

SHIP SA (G.C. Lymberpa S.A.)



GC Lymberpa SA, Hellenic International Forwarders & General Enterprises Co., is the first and oldest transport company in Greece today. Since its establishment, the company is operating in Greece in the field of international transportation. The company specializes in Maritime Transport way back then. After the invention of the automobile, and the airplane, the company expanded to new transportation (road freight and air freight, respectively). GC Lymberpa SA is one of the largest privately owned in Europe.

About the Company

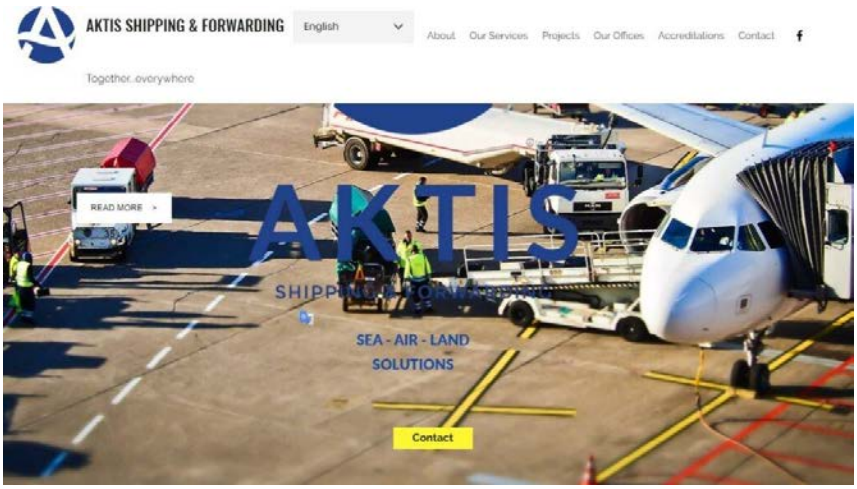
Founded: 1859

Headquarters: Koropi, Greece

Key Services:

- Air Cargo
- Sea Freight
- Road Transport
- Special Cargo
- Logistics & Distribution
- supply chain Manegement

Aktis Shipping & Forwarding Ltd



Aktis Shipping has been committed to providing service of the highest quality, paying particular attention to working efficiently while keeping the lines of communication with our clients clear and concise. AKTIS Shipping's mission is to provide high-quality services in a timely manner. The company's reputation and long presence in the forwarding field have led them to be considered one of the top greek forwarding companies.

About the Company

Founded: 1988

Headquarter: Piraeus, Greece

Key Services:

- Ocean Freight
- Air Freight
- Road Freight
- Customs Brokerage
- Warehousing & Distribution
- Project Cargo & Heavy Lift
- Transportation of ISO/Flexi Tanks
- Marble/Stone/Ceramics Transportation
- Other Special Services

United Freight Forwarder (UFF) Ltd.

United Freight is a Greek forwarding company dedicated that specializes in shipping and forwarding goods to and from Greece. Its years of experience and expertise make them the perfect choice for your shipping needs, whether you need to send a package to a friend or family member in Greece, or you are looking to import or export goods through Greece. They have been an IATA member since 1990.

About the Company

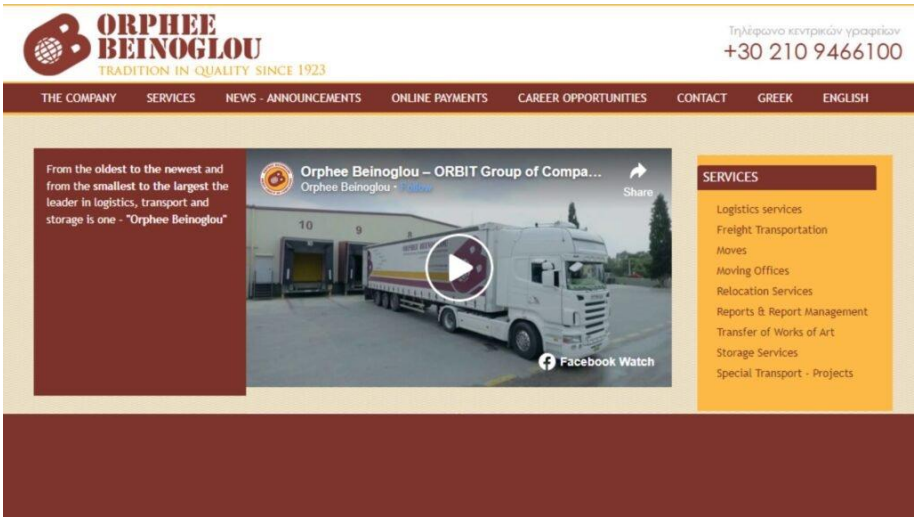
Founded: 1989

Headquarters: Athens Greece

Key Services:

- Air Freight
- Road Freight
- Sea Freight
- Value Added Services
- supply chain manegement

Orphee Beinoglou Logistics



ORFEAS BEINOGLOU has been active in the freight forwarding industry since 1923 located near athens international airport, providing services of high standards and quality, with full dedication to the needs of its customers. With a 90-year tradition of managing business moves and transport around the world, it offers the best possible service and expertise available today in all aspects of moving, transport, and logistics.

About the Company

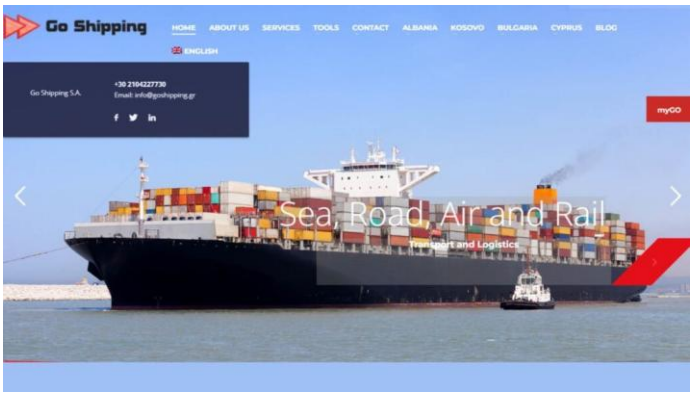
Founded: 1923

Headquarters: Athens Greece

Key Services:

- Logistics services
- Moves
- Transfer of Works of Art
- Storage Services
- Special Transport - Projects
- Freight Transportation
- Moving Offices
- Reports & Report Management
- Storage Services

Go Shipping S.A.



Go Shipping was established to serve the shipping, freight forwarding, and logistics industries. With its headquarters in Piraeus, the biggest port in the Mediterranean and the heart of the global maritime community, the company covers five continents with an extensive international network of freight forwarding offices in all the big ports and commercial centers of the world.

About the Company

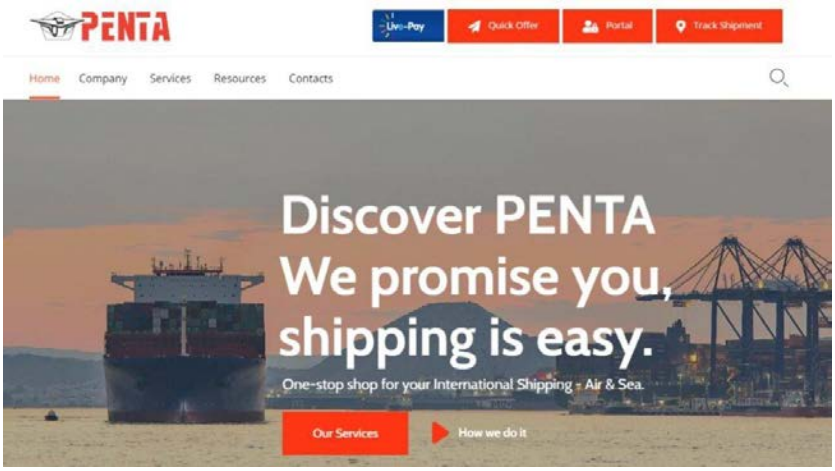
Founded: 2006

Headquarter: Piraeus, Greece

Key Services:

- Sea Service
- Road Transport
- Air Transport
- Rail Transport
- supply chain manegement

A.P PENTA Cargo Forwarder Greece



A.P Penta is a family-run greek forwarding company. The company can help you focus on growing your business by offering convenient and cost-effective shipping at every geographic position of Greece, Cyprus as well as our Balkan neighbors, North Macedonia, Bulgaria & Albania through the Greek gateway seaport of Thessaloniki.

About the Company

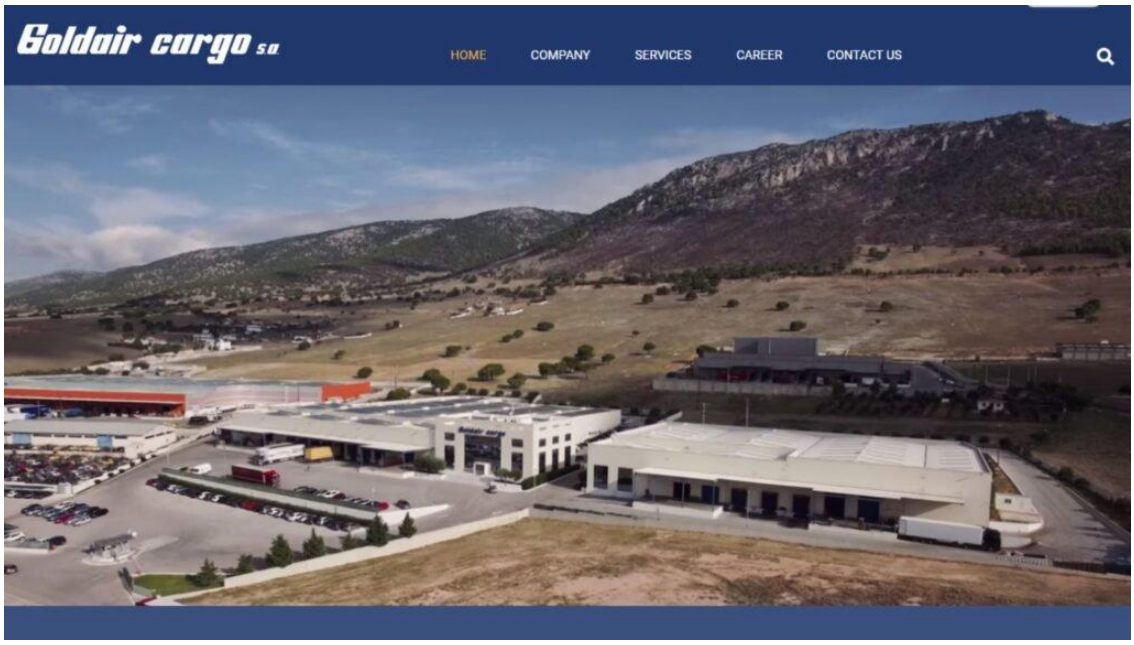
Founded: 1974

Headquarter: Piraeus, Greece

Key Services:

- Air Freight – IATA
- Sea Freight – Piraeus
- Land Transport
- Groupage
- Consultancy
- Value Added Services
- supply chain manegement

Goldair Cargo



Goldair Cargo operates in the field of international freight forwarding and logistics, offering high-level, value-added services due to its extensive network of partners that ensure the speed and high frequency of its shipments as well as its reliable response to its customers‘ needs.

About the Company

Founded: 1987

Headquarters: Aspropyrgos, Greece

Key Services:

- Third-Party Logistics
- Road Freight
- Air Freight
- Sea Freight

Multifreight Ltd

Multifreight specializes in the international shipping of goods to and from anywhere in the world. The chosen network, together with the agents they are affiliated with, works professionally and flexibly so that they can recognize each unique aspect of each shipment at any point during the transport process, all while keeping in mind the competitive pricing for the services being provided.

About the Company

Founded: 1994

Headquarter: Piraeus, Greece

Key Services:

- Sea Freight
- Air Freight
- Road Freight
- Rail Freight
- Intermodal Transportation

Top Freight forwarder China to Greece

DFH is a freight forwarding company that offers international freight shipping to customers. It was founded in 2009 and has provided services to customers worldwide since then.

Our staff is devoted to coming up with creative marketing tactics to assist our clients in achieving their business objectives.

If you are looking for a reliable and affordable freight forwarder from China to arrange your shipments from China to Greece, then DFH is the top choice for your business. Any shipping method from China to your nation can be handled by us.

DFH provides door-to-door delivery from China to the Amazon fulfillment.

3.15 Intermodal Projects – Pioneers in Greece

Altogether, the logistics network in Greece has been developed around five regional logistics clusters, each covering the supply chain requirements of a specific geographical area. The most important logistics markets have been developed around Athens and Thessaloniki, the country‘s two largest cities. At the same time, they are closely linked to the port of Piraeus and the port of Thessaloniki, the country‘s two main international maritime interfaces, and have direct access to the country‘s core international road and railway network. In Athens, the major logistics facilities are concentrated in either the Thriasio Pedio plain in West Attica, or Oinofyta, an industrial zone north of Attica, in the regional unit of Boeotia.

3.15.1 The Thriasio Pedio logistics center

Undeniably, the most important concentration of logistics facilities has been developed around the greater Athens metropolitan area, specifically in two distinct areas: the first one is the Thriasio Pedio plain in West Attica, and the second one is located at Attica‘s northern borders, in the industrial area of Oinofyta, in Boeotia. Both areas are located near the capital city of Athens and serve as the city‘s main supply centers for all types of goods. It is estimated that the existing logistics facilities in these two areas alone have an indoor

storage capacity of about 2m square meters, with the total indoor storage capacity in Attica being more than 2.3m square meters. All the major 3PL providers have developed and currently operate their warehouses and distribution centers in the greater area of Thriasio Pedio, due to its proximity to Athens and its suburbs, its connection to the Piraeus port container terminal, and the full access it provides to the core cross national road and railway network. A freight village of more than 145 acres is under construction at the Thriasio Pedio plain After more than a decade of unsuccessful efforts, the development of the Thriasio Logistics Center (–TLC" or –Thriasio I") is about to take off, pending final approvals from EU's DG Comp. TLC will be the first organized logistics park in Attica, Greece, and will be developed in two distinct phases: T1 comprising ca. 120,000m2 of storage facilities, and T2 comprising an additional 115,000m2. The project will be developed by THEK S.A., a special purpose vehicle set up by the joint project promoters, ETVA VIPE (the largest industrial parks developer and operator in Greece) and Goldair (one of the top Greek logistics services providers), holding 80% and 20% of THEK S.A. respectively. The 588,000m2 land, which is owned by the Greek State through its GAIAOSE subsidiary, will be developed under a 60-year PPP scheme. The construction works have been awarded to the Mytilineos Group. Per the developer's plans, the T1 phase will be developed in two years with a budget of ca. €70m62, while the T2 phase will be developed over the next 10 years with a budget of €60m63 – however, the T2 development period can be accelerated as required, subject to demand. In preparation for the commencement of the development, the TLC shareholders recently proceeded with a €35m capital increase. As TLC benefits from a direct rail connection to the port of Piraeus and to the Trans-European Transport Network, upon completion, it will become one of the most important modern intermodal freight and logistics parks in Southeast Europe. All in all, TLC is one of the most important infrastructure projects in Attica and is expected to provide a major boost to both the construction and the supply chain sectors.

Indeed, during the construction works, hundreds of people are expected to be employed, while TLC's operation is expected to create approximately 3,000 direct and indirect jobs. The launching of the TLC development was also expected to pave the way for a second PPP project in the same location, –Thriasio II", an intermodal terminal station to be developed on a 1,650,000m2 land plot adjacent to TLC and owned by OSE – the national railway infrastructure company.

The Thriasio Logistics Center headlines a series of major logistics projects in the country The most important logistics markets have developed around Athens and Thessaloniki and are closely linked to the country's main international maritime interfaces: the ports of Piraeus and Thessaloniki.

The construction of the new intermodal freight and logistics park in the Thriasio Pedio plain, near Piraeus, will significantly enhance the port's hinterland and will also facilitate the potential development of new operations and added-value logistics services. When fully developed, Thriasio will be one of the largest dry ports in Southeast Europe.

the Thriasio Logistics Center (TLC), is expected to be the core of intermodal transport in Greece in the near future, given its vicinity to the Piraeus port, as well as the fact that multiple modes of freight transport (railway, vehicles) can be employed. The size of the TLC plot is 588,000m2 and is expected to host about 240,000m2 of warehouses.

Besides having been established as the country's major logistics market, Thriasio Pedio is expected to soon accommodate the largest multi-modal logistics park (TLC I & II) and the most developed intermodal freight center in Southeast Europe. Having a direct railway connection to the Piraeus port (Ikonio), the Thriasio Pedio logistics park will become a physical expansion of the Piraeus container terminal. The park is also connected to the Greek core road network and the comprehensive TEN-T network, via the modern three-lane

Attiki Odos motorway, and has direct access to the city of Athens and the Athens International Airport. Additionally, the freight center will also be accessible via the East Aspropyrgos ring road, linking NATO Avenue with the Attiki Odos motorway.

In terms of freight traffic, 400 trucks and 50 wagons will be served daily. Last but not least, Thriasio will provide the below services:

- Product storage
- Car and truck parking spaces
- Customs
- Security
- Waste management and recycling
- Electricity production from renewable sources
- Servicing to motorists and vehicles

3.15.2 Boeotia's logistics cluster

The second largest concentration of logistics facilities can be traced at the northern borders of Attica, in the regional unit of Boeotia and, more specifically, around the town of Oinofyta, located 50 km north of Athens. The area also accommodates some of the largest and most important industrial installations in the country, while the main national motorway (PATHE) and railway line, which both connect Athens to Thessaloniki and to the Greek borders to the north, also cross it. This concentration of logistics facilities in Boeotia expands along the national motorway to the north, in two sub regions: around Schimatari and on the outskirts of Thebes. Besides serving the city of Athens, the abovementioned logistics centers have turned out to be all-important supply chain nodes for the national manufacturing industry, as they connect the industrial zone at the northern borders of Attica, in Boeotia, with the port of Piraeus, as well as with the rest of the country's main cross-border links and maritime multimodal interfaces, via the core national road and railway networks.

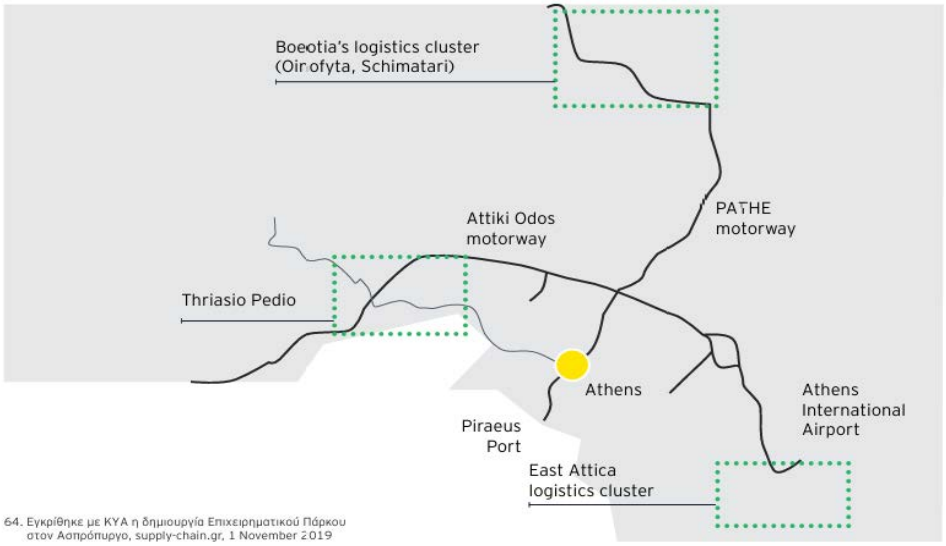


Figure 3.8 Locations of Logistics clusters near Athens region

3.15.3 The Sindos logistics and industrial zone

In addition to the logistics centers located in the greater Athens area, a majority of the Greek 3PL companies, particularly those with strong presence in international freight forwarding activities, also operate warehouse facilities in two main regions on the outskirts of Thessaloniki, namely Sindos and Kalochori. The strongest concentration of warehouses and distribution centers may be traced at Sindos, in West Thessaloniki. Sindos has been developed as an organized industrial zone covering an area of 2,470 acres, originally attracting the most important logistics facilities in Northern Greece.

Featuring two adjacent railway connections at its northern and southern borders, direct and immediate access to the core national road network, and sitting within a 15 km distance from the port of Thessaloniki, Sindos is considered an advantageous area and has, therefore, been the favorable location for the major 3PL companies, which, in the previous years, have invested in establishing modern warehouses there, each of which exceeds 18,000m2 of indoor storage capacity. Located at this unique and advantageous geographical position in Northern Greece, Sindos is widely considered as an important logistics gateway to the Balkan countries and is expected to soon strengthen and boost its international role, further extending its catchment area toward the southeast and central regions of Europe and Turkey.

3.15.4 The Kalochori logistics center

Kalochori constitutes the second largest concentration of logistics facilities in the greater Thessaloniki area. Since it is in very close proximity to the city‘s port, it functions mainly as the regional logistics center for several companies in the retail sector. The first results of the study on the rehabilitation of the informal industrial concentration in Kalochori, were presented to the local and business Kalochori logistics center stakeholders on 27 June 2018, during an event organized by the then Deputy Minister of Industry and the Thessaloniki Chamber of Commerce and Industry. During this event, a road map leading to the establishment of the Kalochori business park was presented. The then Ministry of Economy and Development, taking into consideration the serious environmental and operational problems of the region, undertook to promote all necessary actions for setting the foundations for the rehabilitation of the Kalochori industrial area. After a silent period, the rehabilitation process has recently started, with the connection of the Kalochori industrial area with the PATHE and the Egnatia Odos motorways being awarded to AKTOR in May 2020, following a bidding process.

Finally, the domestic market is also supported and served by a third, smaller concentration of logistics facilities in East Thessaloniki, near the city‘s international airport, named Kavallari.

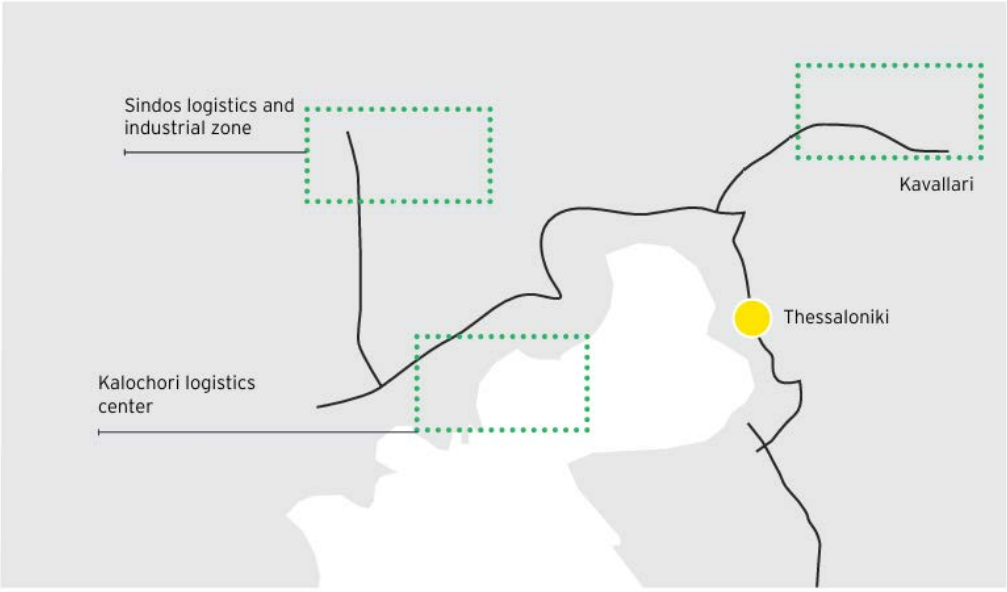


Figure 3.9 Locations of Logistics clusters near Thessaloniki region

3.15.5 The Gonos logistics center

One of the two most important freight centers in Greece, from a geostrategic perspective, is the one planned to be established in the Gonos former military camp in Thessaloniki, which is located in close proximity to the Port of Thessaloniki and the industrial parks of Sindos and Kalohori. The calculated 670,000m2 land plot is owned by the Greek State, through its GAIAOSE subsidiary, and the development potential is ca. 300,000m2.

The establishment of the Gonos logistics center is of supra-local and geostrategic importance, as it concerns not only the Greek market, but also the Balkans and Eastern Europe. The project is currently in the pre feasibility stage, which proposes its development in two distinct phases: the first phase (T1) may take up to two years, and concerns the processing of all technical studies and the completion of the relevant approval process, while the second phase (T2) may last four to eight years, and involves the construction and operation of the project. If developed as a logistics park, it is estimated that the Gonos logistics center will create approximately 3,000 jobs. If other, more complex activities, such as manufacturing, are to be hosted, then newly-created jobs may increase to approximately 5,000 - 6,000.

At present, the majority of cargo handled at Thessaloniki‘s port is bulk goods, raw materials, or general cargo designated for the Balkan countries. A large plot of land like the Gonos camp, which features a direct rail link to the port, will provide additional capacity to the port‘s terminal for the temporary storage or / and processing of these goods. During the last few years, container throughput in the port of Thessaloniki has shown a stable growing trend. The demand for container transport by the port‘s hinterland market is expected to decades, given the relatively low output of the neighboring economies, assuming the pace of their integration into the world trading system remains at today‘s standards.

The above are supported by the interest shown by a number of investors, given the strategic location of Thessaloniki in the Balkan Peninsula and the camp‘s close proximity to the city‘s port. Indeed, the Gonos camp is located 3 km away from the Egnatia Odos motorway, which ends at the Promachonas border station via the A1 and A2-E12 highways,

and connects the national road network to the rest of the TEN-T road network, through Bulgaria.

The Gonos camp also features a rudimentary rail connection, with the OSE rail network (part of the greater TEN-T railway network) extending within the land plot, and a container transit station at a distance of just 500 meters from the northern part of the camp. Due to the synergies that will occur through the use of the Gonos logistics center, and through its projected connection via rail with pier 6 of the Thessaloniki port, the city could further enhance its commercial profile and develop into one of the most significant transportation and logistics hubs in Southeast Europe.

Warehouse rents in Greece are among the most competitive ones in the region, since they have been significantly reduced compared to the previous decade, as a result of the f inancial crisis. The average rental cost for storage facilities in Thriasio Pedio in West Attica – which never ceased being the most attractive logistics market in Greece for over 15 years – ranges between €4-€4.5/ month per square meter, depending on the type and size of the facility.

Prior to the financial crisis, and in close alignment with the continuous growth of the Greek economy, warehouse rents in Thriasio Pedio had reached their peak value in 2008, exceeding €5.5/month per square meter. Rents of more than €6/m2 were also reported in some cases. However, as a result of the recession of the Greek economy, prices rapidly declined at the start of the previous decade and, since 2015 onward, remain relatively stable, in the range of €3/month per square meter, until 2018, when prices started rising again to upward of €3.5/month per square meter. In other regions, where availability of construction land is greater, or the distance from the city of Athens or / and the Piraeus port is longer, as in Boeotia, rent values are even more competitive, being 30% lower than the ones in Thriasio Pedio. Logistics facilities‘ rent prices in Thessaloniki are currently in the range of €4.5/m2 in Sindos and Kalochori.

Figure 3.10 Overview of Gonos Logistics center

3.16 Major Global and European Intermodal Logistics Initiatives: Strategic Opportunities for Greece and the Larissa Intermodal Hub

In today‘s interconnected world, large-scale trade and infrastructure initiatives play a pivotal role in shaping global supply chains and regional economic development. Europe and other continents are investing heavily in multimodal transport corridors, port modernization, and digital logistics platforms to enhance the efficiency, sustainability, and resilience of freight movement. For Greece, strategically located at the crossroads of Europe, Asia, and Africa, these initiatives represent unique opportunities to strengthen its position as a key logistics gateway. The Larissa intermodal terminal project stands to benefit significantly from alignment with such initiatives, leveraging Greece‘s geographic advantages and existing infrastructure to integrate seamlessly into major trade routes and transport networks. By connecting with initiatives like the EU‘s TEN-T, China‘s Belt and Road Initiative, and emerging corridors such as the India-Middle East-Europe Economic Corridor, Larissa can become a vital inland hub that supports diversified trade flows, attracts investment, and promotes regional economic growth. This subsection explores the most influential global and European intermodal logistics initiatives, analyzing their relevance to Greece and the Larissa project, and highlighting the potential privileges, challenges, and transformative outcomes that can arise from strategic engagement.

3.16.1 China’s Belt and Road Initiative (BRI)

The Belt and Road Initiative (BRI), launched by China in 2013, is a vast global infrastructure and economic development strategy aimed at enhancing connectivity across Asia, Europe, Africa, and beyond. It consists of the Silk Road Economic Belt (land routes) and the 21st Century Maritime Silk Road (sea routes), focusing on building roads, railways, ports, energy pipelines, and digital infrastructure to facilitate trade and investment flows. The BRI has invested heavily in port development, logistics hubs, and transport corridors, with Greece‘s Piraeus port being a flagship maritime gateway in Europe, operated largely by China‘s COSCO Shipping. The initiative aims to shorten transit times, reduce costs, and integrate global supply chains, but also raises geopolitical considerations due to China‘s growing influence in participating countries.

Greece is a key BRI partner, with Piraeus serving as the maritime entry point into Europe. The Larissa intermodal terminal can benefit from BRI‘s logistics flows by acting as an inland distribution hub, connecting maritime imports with rail and road transport to Central and Northern Europe. Privileges include increased freight volumes, foreign investment, and integration into global supply chains. Challenges involve managing geopolitical sensitivities, ensuring infrastructure compatibility, and balancing Chinese influence with European regulations. Outcomes could include enhanced regional economic development, job creation, and Greece‘s elevated role as a logistics gateway between Asia and Europe.

3.16.2 European Union’s —Global Gateway”

The EU‘s Global Gateway initiative, launched in 2021, is a strategic framework to boost sustainable and quality infrastructure investments worldwide, focusing on digital, transport, energy, and health sectors. It aims to promote democratic values, transparency, and environmental sustainability in global connectivity projects, serving as a counterpart to China‘s BRI. The Global Gateway mobilizes EU funds and private investments to support partner countries, emphasizing climate action, social inclusion, and good governance. It

targets strategic regions including Africa, Asia, Latin America, and the Western Balkans, fostering partnerships that enhance trade and economic development.

As an EU member, Greece can leverage Global Gateway funding and partnerships to upgrade its transport and logistics infrastructure, including the Larissa intermodal terminal. The initiative aligns with EU priorities of decarbonization and digitalization, supporting Greece‘s transition to greener logistics. Privileges include access to EU grants, technical assistance, and integration into broader European networks. Challenges may arise from stringent EU standards, competition for funding, and the need for coordinated regional planning. Outcomes could be improved infrastructure quality, enhanced EU connectivity, and strengthened Greece‘s position within the European logistics ecosystem.

3.16.3 India-Middle East-Europe Economic Corridor (IMEC)

IMEC, launched at the 2023 G20 Summit, is a planned transcontinental corridor linking India, the Middle East, and Europe through a multimodal network of ports, railways, roads, and digital infrastructure. It aims to diversify trade routes, reduce reliance on the Suez Canal, and foster economic integration among participating countries including India, UAE, Saudi Arabia, Israel, and European nations. The corridor includes maritime links from India‘s western coast to the Gulf, rail connections through the Arabian Peninsula to Israel‘s Haifa port, and maritime routes into Europe via Greece, Italy, or France. IMEC also incorporates green energy projects and undersea data cables, emphasizing sustainability and digital connectivity.

Greece is a candidate for IMEC‘s European terminal (Piraeus and Thessaloniki ports), positioning it as a critical gateway for goods entering Europe from Asia. The Larissa intermodal terminal can serve as a key inland hub distributing IMEC freight across Greece and Europe. Privileges include increased cargo volumes, strategic partnerships, and enhanced geopolitical relevance. Challenges include regional political instability, infrastructure security, and competition with other European ports. Successful integration could lead to economic growth, diversification of trade routes, and strengthened logistics capabilities in Thessaly and beyond.

3.16.4 Trans-European Transport Network (TEN-T)

TEN-T is the EU‘s flagship policy for developing a comprehensive, multimodal transport infrastructure network across Europe, including roads, railways, inland waterways, ports, and airports. It aims to remove bottlenecks, improve cross-border connections, and foster sustainable transport by 2050. The network includes core corridors linking major economic centers and gateways, with significant EU funding through the Connecting Europe Facility (CEF). TEN-T supports digitalization (e.g., ERTMS), green transport, and interoperability standards. Greece is integrated into TEN-T via corridors connecting its major ports (Piraeus, Thessaloniki, Igoumenitsa) with inland hubs like Larissa.

TEN-T provides the institutional and financial framework to develop Larissa as a modern intermodal terminal, connecting maritime, rail, and road freight. Privileges include access to EU funds, technical expertise, and integration into a pan-European logistics system. Challenges involve meeting EU technical and environmental standards, coordinating across multiple jurisdictions, and securing co-financing. Outcomes include improved infrastructure quality, reduced logistics costs, and enhanced competitiveness of Greek and Southeast European supply chains.

3.16.5 Baltic Sea – Black Sea – Aegean Sea (BBA) European Transport Corridor (ETC)

The BBA corridor is a proposed multimodal transport route linking the Baltic Sea in Northern Europe, the Black Sea region, and the Aegean Sea in Southern Europe. It aims to enhance connectivity between Northern and Southeastern Europe, facilitating trade flows through ports, railways, and road networks. The corridor would integrate key ports such as Thessaloniki and Varna, and improve inland transport links, supporting regional economic development and European cohesion policies. It complements TEN-T by providing additional north-south connectivity in Eastern Europe.

The BBA corridor strengthens Greece‘s role as a logistics gateway between Northern and Southeastern Europe. Larissa‘s intermodal terminal can serve as a critical inland hub within this corridor, optimizing freight flows between ports and hinterland markets. Privileges include increased transit traffic, regional development funds, and enhanced international trade. Challenges include infrastructure gaps in some corridor sections, cross-border coordination, and geopolitical risks in the Black Sea region. Successful implementation would boost Greece‘s logistics capacity and regional integration.

3.16.6 Russia’s —Greater Eurasian Partnership”

The Greater Eurasian Partnership is a Russian-led initiative aiming to deepen economic integration across Eurasia, including Russia, Central Asia, and parts of Eastern Europe. It focuses on developing transport corridors, energy cooperation, and trade facilitation to create a unified economic space. The initiative includes upgrading rail and road infrastructure and harmonizing customs procedures to enhance connectivity between Asia and Europe. It is seen as a counterbalance to Western-led initiatives and aims to leverage Russia‘s geographic position as a transit hub.

Greece‘s geographic position at Europe‘s southern edge offers potential as a maritime gateway complementing Eurasian land routes. However, political tensions and sanctions on Russia complicate direct engagement. Larissa‘s intermodal terminal could indirectly benefit if transit routes through Russia-Eurasia integrate with Mediterranean maritime flows. Privileges include potential new trade flows and diversification of logistics options. Challenges are significant geopolitical risks, regulatory uncertainties, and limited direct cooperation. Outcomes depend on broader geopolitical developments and Greece‘s ability to balance relations.

3.16.7 Middle Corridor (Trans-Caspian International Transport Route - TITR)

The Middle Corridor, or Trans-Caspian International Transport Route, connects China and Central Asia with Europe via the Caspian Sea, Azerbaijan, Georgia, Turkey, and the Black Sea, bypassing Russia. It combines rail, sea, and road transport to offer a shorter and politically stable alternative to northern routes. The corridor supports multimodal logistics, including container shipping, and aims to increase trade volumes and reduce transit times between Asia and Europe.

Greece‘s ports, especially Thessaloniki and Piraeus, are natural endpoints for Middle Corridor shipments entering Europe by sea. Larissa‘s intermodal terminal can act as an inland distribution center, linking maritime freight with rail and road networks across Southeast Europe. Privileges include diversification of supply chains, enhanced geopolitical stability, and increased freight volumes. Challenges involve infrastructure harmonization,

customs coordination, and competition with other corridors. Outcomes include improved logistics resilience and greater integration of Greece into Eurasian trade networks.

Chapter 4. Thessaly, a fertile soil for Intermodalism

4.1 General overall assessment of Thessaly region

The Region of Thessaly is one of the 13 regions of Greece. It covers a part of Central Greece and consists of four Regional Units, (Larissa, Karditsa, Magnesia, Sporades and Trikala). Apart from the long agricultural tradition of the Region, there also exist many protected areas, either due to their natural beauty, or due to the existence of protected species. Such areas are the National Park of Mount Olympus, the National Sea Park of Alonissos, the rock complex of Meteora, where many old Christian convicts exist, the island of Piperi in the heart of Marine Park in Alonissos and many other areas in the Region.

The Region is served by three (3) airports, two (2) heliports, one (1) major port and a satisfactory public road network, including a big part of the national highway connecting Athens to Thessaloniki (PATHE). Furthermore, there is one (1) main railway line passing through the Region, connecting Athens to Thessaloniki (double track electrified line) and two (2) secondary lines connecting the first Larissa to Volos and the second connecting Palaiofarsalos to Kalampaka (both single tracks non electrified).

The deindustrialization of the last decade has perceptibly shrunk the secondary sector, which is nowadays consisted mostly by units scattered along the axis formed by the cities of Volos and Larissa. Their activity concentrates in the medium to low technology sectors, such as the food and beverages, textiles and wearing apparel, manufacture of furniture, manufacture of wood and of products of wood, manufacture of basic metals and manufacture of fabricated metal products.

The Region of Thessaly has four main urban centers: the cities of Larissa, Volos, Trikala and Karditsa, capitals of Larissa, Magnesia, Trikala and Karditsa Regional Units respectively, with Volos and Larissa being the most developed ones. All four cities have urban buses that satisfy the needs of the inhabitants for urban transportation, within the center of the city and the suburbs. The Intercity Bus Companies (KTEL) is servicing the rest of the towns and villages. There is a different bus company servicing the inhabitants of each Regional Unit as regards their transportation, either within the Regional Unit or from one Regional Unit capital to another or even to destinations outside the Region of Thessaly (e.g. Athens, Thessaloniki, Patra). A strict legal framework is in effect until 2019, which does not allow bus drivers to pick up passengers from another Regional Unit, even if they do not need to deviate from their regular course to do so. However, the Greek government is working on a legislative and regulatory framework that will allow competition earlier than foreseen (2015).

This strict legal framework does not help the cooperation between the Intercity Bus Companies of different Regional Units. There is no supportive legal framework and that is the main obstacle for the cooperation between Bus Companies and the Rail Company in a form of a multimodal transportation service. The Region of Thessaly is in a privileged position concerning the rail services that can be provided to citizens, since the main rail axis of Greece is running through the Region.

The Region of Thessaly has a small military-civilian airport in New Anchialos, near the city of Volos and close to the highway connecting Athens with Thessaloniki. The airport services in the Region are active during spring, summer and autumn months, with domestic and European flights. In addition, the city of Volos has an important passenger-freight port connecting the islands of North Sporades with the mainland. The port is transporting a big number of passengers, especially during the summer months, since Sporades Islands, Skiathos, Skopelos and Alonissos, are international tourist destinations.

The role of the region in the transportation sector is vital since it is crossed by the main growth axis in Greece, also included in the wider European Network of Transports. Moreover, contact with the Western – European Area has been facilitated by the recent operation of the airport in Volos.

Due to the recent economic crisis, many people are moving towards the cities lowering even more the population of villages, causing the Bus Companies to respond with even lower frequencies to transportation demand on rural areas.

Figure 4.1 Geographic position of Thessaly

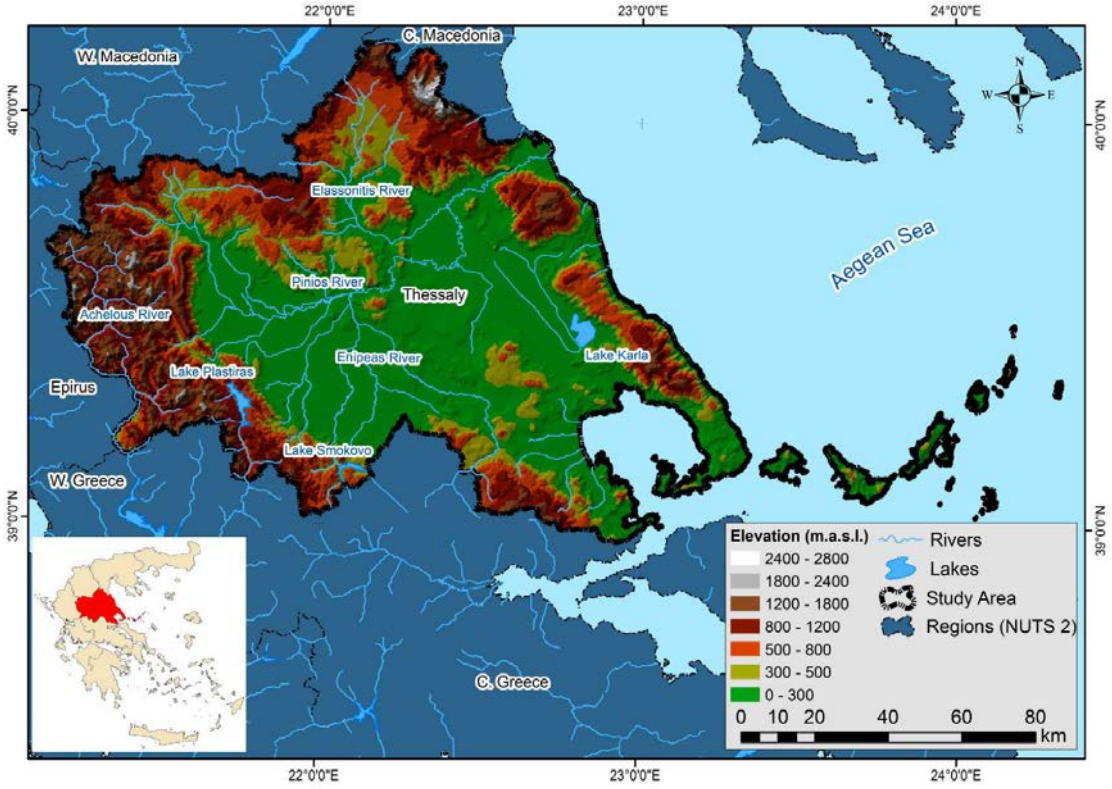


Figure 4.2 Region of Thessaly geomorphological landscape

4.2 Geography

Thessaly spans approximately **14,037 square kilometers** in central Greece, bordered by Macedonia to the north, Epirus to the west, Sterea Hellas to the south, and the Aegean Sea to the east. The region is characterized by the expansive Thessalian Plain, the largest in Greece, surrounded by prominent mountain ranges such as Mount Olympus to the north and the Pindus Mountains to the west. The Pinios River traverses the plain, flowing through the Tempi Valley into the Aegean Sea.

The Region of Thessaly occupies the central eastern part of continental Greece. It borders on the north with the regions of West and Central Macedonia, on the south with the region of Sterea Ellada, on the west with the Region of Epirus and on the east with the Aegean Sea. The total area is 14,037 km2 and represents about 11% of the total area of the Greek territory. The ground, in terms of its formation, is 50% mountainous and semi-mountainous and 50% flat, and within its borders is the plain of Thessaly, the largest plain and granary of the Greek territory, which flows through the east-west axis from the river Pinios, the third largest river in the country. The subsoil of the Thessaly region has mineral wealth, mainly chromate, sulphide ores, asbestos, ilmenite and lignite deposits. The Region consists of all kinds of terrain, mountainous areas, islands, valleys, and coastline areas as presented in **Figure 4.2**.

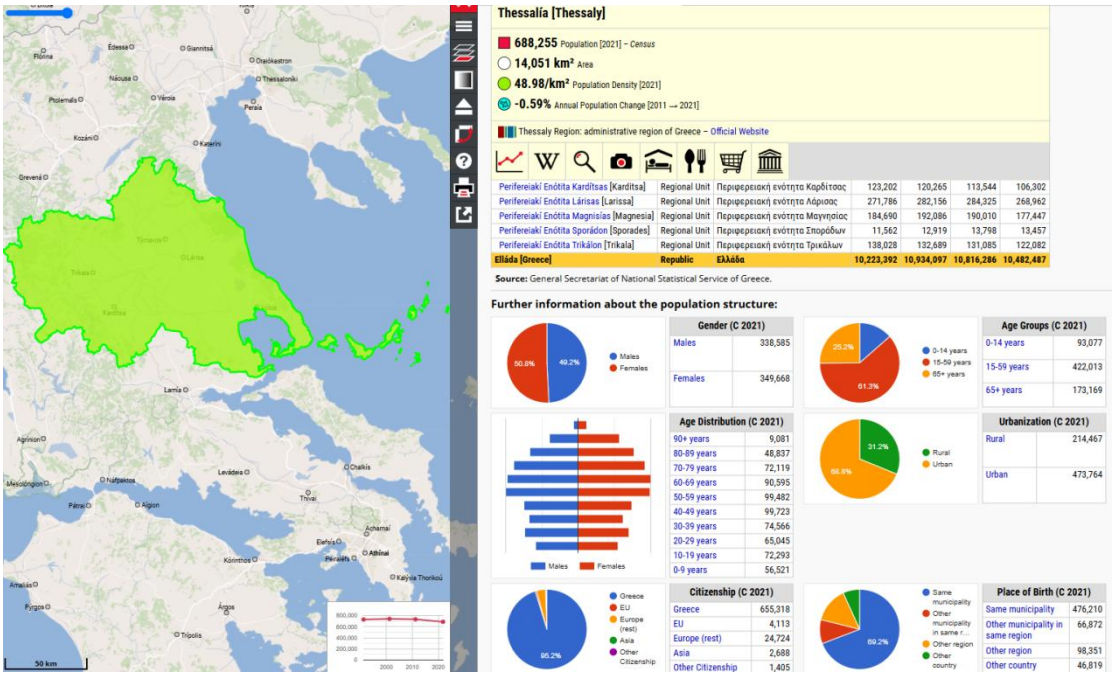


Figure 4.3 Demographic overview of Thessaly

4.3 Population

The region has a total population of 688,255 people according to the 2021 census data. This gives Thessaly a population density of 48.98 people per km², indicating a moderately populated region with significant rural and urban areas. The demographic trend shows a declining population with an annual population change of -0.59% between 2011 and 2021, reflecting the broader demographic challenges facing many Greek regions. The capital city, Larissa, is the largest urban center, followed by Volos, Trikala, and Karditsa.

The population break-down is 44% urban, 40% agrarian, and 16% semi-urban. A decrease in the agrarian population has been accompanied by an increase in the semi-urban population. The metropolitan area of Larissa, the capital of Thessaly, is home to more than 230,000 people, making it the biggest city of the region.

Thessaly is divided into five regional units, each functioning as administrative subdivisions:

Karditsa : The most populous regional unit with 123,202 inhabitants in 2021, showing a decline from 129,265 in previous counts. The area covers significant territory and represents a major administrative center.

Larissa : The second-largest unit with 271,786 people in 2021, down from 284,325 in earlier measurements. This appears to be the most densely populated area and likely contains the region's primary urban center.

Magnesia : Housing 184,690 residents in 2021, reduced from 190,010 previously. This coastal regional unit includes important port areas and maritime connections.

Sporades : The smallest regional unit with 11,562 inhabitants in 2021, slightly up from 13,798 in previous counts. This includes the Sporades island group, which are the islands visible in the blue sea area on the map.

Trikala : Contains 138,028 people as of 2021, showing a decrease from 131,085 in earlier census data.

The detailed demographic breakdown reveals a fairly balanced gender distribution with males comprising 49.2% (338,585 people) and females making up 50.8% (349,668 people) of the population. This slight female majority is typical of many European regions.

4.3.1 Age Structure Analysis

The age distribution shows a concerning demographic pattern common to many developed regions:

0-14 years: 93,077 children (13.5% of population)

15-59 years: 422,013 working-age adults (61.3% of population)

65+ years: 173,169 elderly residents (25.2% of population)

The age pyramid displayed in the chart clearly illustrates this demographic challenge, with a narrow base (fewer young people) and a wider top (more elderly residents), indicating an aging population structure that could impact future economic and social planning.

The population pyramid provides granular age data:

0-9 years: 56,521 people

10-19 years: 72,293 people

20-29 years: 65,045 people

30-39 years: 74,566 people

40-49 years: 99,723 people

50-59 years: 99,482 people

60-69 years: 90,955 people

70-79 years: 72,119 people

80-89 years: 48,837 people

90+ years: 9,081 people

4.3.2 Urbanization Patterns

The region shows a mixed urban-rural character with 31.2% of the population (214,467 people) living in rural areas and 68.8% (473,764 people) residing in urban centers. This indicates significant urbanization while maintaining substantial rural communities, likely engaged in agriculture and traditional economic activities.

4.4 Economy of Thessaly

Thessaly's economy represents a sophisticated multi-sectoral structure that has evolved significantly over recent decades, positioning the region as a critical component of Greece's broader economic recovery and modernization strategy. The region's economic foundation remains anchored in its exceptional agricultural capabilities, leveraging the fertile alluvial soils of the Thessalian Plain and the Pineios River basin to support extensive cultivation of strategic crops including cotton, cereals, tobacco, and an expanding portfolio of high-value products such as almonds, pistachios, and premium olive oil. This agricultural diversity and modernization have transformed Thessaly from a traditional farming region into a sophisticated agribusiness center that contributes substantially to Greece's agricultural export portfolio and food security objectives.

The economic scale and significance of Thessaly within the national framework cannot be understated. With a GDP of approximately 9.7 billion euros as of the most recent comprehensive data, representing 5.2% of Greece's total economic output, Thessaly maintains a position of substantial economic influence despite representing a relatively small geographic portion of the country. However, the region's GDP per capita of 16,100 euros, adjusted for purchasing power standards and representing only 53% of the EU27 average, indicates significant potential for economic convergence and development enhancement. This economic gap presents both challenges and opportunities, particularly in the context of Greece's broader economic recovery trajectory and the substantial EU funding programs currently being deployed to support regional development and modernization.

The productivity metrics reveal similar patterns of opportunity and challenge. With GDP per employee reaching approximately 65% of the EU average, Thessaly demonstrates considerable scope for efficiency improvements and value-added economic development. This productivity gap is particularly significant given the region's strategic advantages, including its central geographic position, transportation infrastructure, and natural resource endowments. The modernization of agricultural practices over recent decades has enhanced productivity and enabled diversification, though the region's vulnerability to natural disasters, as dramatically illustrated by the devastating 2023 floods, underscores the critical importance of resilient infrastructure development and climate adaptation strategies.

4.4.1 Agricultural Sector Analysis

Thessaly stands as Greece's agricultural powerhouse, earning its reputation as the "breadbasket of Greece." The region's fertile plains and favorable climate conditions have established it as the country's most extensive agricultural production area, fundamentally shaping both the regional economy and Greece's food security landscape.

The agricultural sector in Thessaly demonstrates remarkable productivity and scale:

- Production Share: Thessaly produces 14.2% of Greece's total agricultural output
- Cultivation Area: 410,000 hectares of active cultivation areas (450,000 hectares total agricultural use)
- Irrigated Area: 250,000 hectares under irrigation systems
- Average Farm Size: 4 hectares per farm
- Land Use Distribution: Agriculture accounts for 36% of total land use in the region

- Water Consumption: Agriculture represents 90-95% of annual water demand
- Mechanization: Fully mechanized production from sowing to harvesting

Crop-Specific Statistics

- Wheat/Barley: 180,850 hectares
- Cotton: 100,500 hectares
- Orchards: 43,200 hectares (including 4,200 hectares of apple cultivation, 3,900 hectares of vineyards, 3,000 hectares of peach and pear trees, 500 hectares of cherry trees)
- Maize: 20,000 hectares

Protected Designation of Origin (PDO) Products

Thessaly boasts 31 local products with EU quality scheme recognition, including:

- Cheeses: PDO Feta, Kasseri, Manouri, Galotyri, Batzos
- Meat Products: PDO Lamb and young goat from various regions
- Fruits: PDO Firiki apples of Pelion, Zagora mountain apples
- Wine: PDO Rapsani, Anchialos, Mesenicola varieties

4.4.2 Intermodal Terminal Impact on Thessalian Agriculture

The establishment of an intermodal terminal center at the old sugar factory site outside Larissa would provide transformative benefits for Thessaly's agricultural sector.

Direct Benefits:

- Enhanced Export Capabilities: Direct rail and road connections would reduce transportation costs for agricultural exports by an estimated 15-20%
- Reduced Post-Harvest Losses: Faster transportation to markets would decrease spoilage rates, currently estimated at 8-12% for perishable goods
- Value Chain Integration: The terminal would attract agro-processing industries, creating a hub for value-added agricultural products
- Market Access: Improved connectivity to European markets through TEN-T networks would increase competitiveness of Thessalian agricultural products

Strategic Advantages:

- Logistics Efficiency: Consolidation of agricultural shipments would reduce individual farmer transportation costs

- Cold Chain Integration: Modern refrigeration facilities could extend the shelf life of perishable products

- Quality Certification: Centralized processing could enhance quality control for PDO products

- Export Diversification: New markets in Eastern Europe and Mediterranean regions would become more accessible

4.5 Infrastructure and Transportation on Thessaly

Thessaly's strategic central location in Greece positions it as a crucial transportation hub connecting the country's northern and southern regions, as well as facilitating east-west connectivity. The region's infrastructure network forms an integral part of both national and European transportation systems.

Transportation Networks:

- Road Infrastructure: Connected by major highways including A1 Motorway (Athens-Thessaloniki) and E65 Motorway

- Rail Connectivity: Integrated into Greece's national railway network with connections to Athens and Thessaloniki

- Port Facilities: One seaport at Volos, part of TEN-T comprehensive network

- Aviation: Three airports (Larissa - military use, Volos and Skiathos - civilian operations)

- Public Transportation:

- KTEL Thessaly: Operates extensive bus network covering intercity and regional routes

- Modernization: Electronic ticketing systems and comfortable fleet upgrades

- Coverage: Comprehensive connections between towns, villages, and major cities

TEN-T Network Integration

Thessaly's transportation infrastructure is strategically integrated into the Trans-European Transport Network (TEN-T):

- Core Network: Primary national road and rail segments

- Comprehensive Network: Volos seaport inclusion

- European Connectivity: Direct links to broader European transportation corridors

4.5.1 Intermodal Terminal Impact on Infrastructure

The proposed intermodal terminal at the old sugar factory site would significantly enhance Thessaly's transportation capabilities:

Infrastructure Enhancement:

- Multimodal Integration: Seamless connection between road, rail, and potentially maritime transport modes
- Capacity Expansion: Increased handling capacity for both passenger and freight operations
- Network Optimization: Reduced congestion on existing transportation routes through efficient cargo consolidation
- Last-Mile Connectivity: Improved distribution efficiency to rural areas and smaller communities

Economic Infrastructure Impact:

- Investment Attraction: Expected to attract €50-100 million in private and public investment
- Employment Generation: Estimated 300-500 direct jobs and 1,000-1,500 indirect jobs
- Regional Development: Catalyst for industrial and commercial development in the broader Larissa area
- Digital Infrastructure: Integration of modern IT systems for logistics management and tracking

Industrial and Manufacturing Sector Breakdown

Thessaly's industrial sector has evolved significantly, particularly in food processing and manufacturing, building upon the region's strong agricultural foundation. The sector represents a critical component of the regional economy, transforming raw agricultural products into value-added goods.

- Manufacturing Businesses: Large number of food processing facilities established
- Agro-Industrial Integration: Strong linkage between agricultural production and food manufacturing
- Processing Capacity: Facilities for dairy, meat, grain, and fruit processing
- Value Addition: Significant contribution to regional GDP through agricultural product transformation

Sectoral Distribution

- Food Processing: Dominant industrial sector (approximately 60% of manufacturing)

- Textile Industry: Traditional cotton processing facilities
- Construction Materials: Cement and building materials production
- Small-Scale Manufacturing: Various light industries supporting regional needs

4.5.2 Intermodal Terminal Impact on Industrial Development

The intermodal terminal would serve as a catalyst for industrial expansion and modernization:

Industrial Clustering Benefits

- Logistics Hub Development: Attraction of logistics-intensive industries around the terminal
- Supply Chain Optimization: Reduced transportation costs would improve industrial competitiveness by 10-15%
- Just-in-Time Manufacturing: Enhanced connectivity would enable more efficient inventory management
- Export-Oriented Industries: Improved access to international markets would attract export-focused manufacturing

Innovation and Technology

- Smart Logistics: Integration of digital technologies for supply chain management
- Sustainable Practices: Promotion of environmentally friendly transportation modes
- Industry 4.0 Integration: Modern facilities would support advanced manufacturing technologies
- Research and Development: Potential for establishing logistics and transportation research centers

4.6 Environmental and Sustainability Considerations

Thessaly faces significant environmental challenges, particularly related to water management, climate variability, and sustainable agricultural practices. The region's environmental sustainability is crucial for long-term economic viability and resilience.

Environmental Challenges and Statistics

- Water Management
- Annual Rainfall: 400mm (relatively low)
- Evapotranspiration: 2.66mm/day
- Water Scarcity: Limited availability during summer growing season

- Over-exploitation: Excessive water use threatening aquifer sustainability
- Agricultural Environmental Issues
- Soil Quality: Low organic matter reducing fertility
- Clay Content: High clay content affecting crop yields
- Chemical Inputs: Excessive fertilizer and pesticide use
- Climate Stress: Very dry summer conditions impacting crop production

4.6.1 Intermodal Terminal Environmental Impact

The terminal project offers opportunities for environmental improvement and sustainable development

Sustainability Benefits

- Carbon Footprint Reduction: Shift from road to rail transport could reduce CO2 emissions by 30-40%
- Traffic Congestion Relief: Consolidated cargo handling would reduce truck traffic on regional roads
- Energy Efficiency: Modern terminal facilities with renewable energy integration
- Waste Management: Centralized waste processing and recycling facilities.

4.7 Greek companies and enterprises

At the forefront is Ellinika Galaktokomika A.E. (Olympus-Rodopi), headquartered in Larissa and controlled by the Sarantis brothers, which recorded sales of approximately €188.5 million in 2015, marking a 15% increase from the previous year. The company‘s EBITDA stood at €22.7 million, with net profits of nearly €12 million, underscoring its robust financial health and market leadership in dairy products. Its success illustrates the strength of Thessaly‘s dairy sector, which benefits from the region‘s rich livestock resources and advanced production techniques.

Following closely is Tyras S.A., part of the same corporate group, based in Trikala, with sales of €137 million and EBITDA of €12.2 million in 2015. Although net profits were more modest at €1.3 million, Tyras‘s position as the second-largest Thessalian company highlights the importance of vertically integrated dairy operations in the region, supporting local farmers and contributing to export potential.

In third place is Violar S.A., a textile and agricultural products company headquartered in Larissa, with two production facilities in Achilleio (Larissa) and Velestino (Magnesia). With sales of €129.7 million and EBITDA of €2.2 million, Violar exemplifies Thessaly‘s manufacturing diversity, linking agricultural raw materials to value-added textile production. Its presence reinforces the region‘s industrial base and employment.

The longstanding Loulis Mills S.A., based in Sourpi (Magnesia), ranks fourth with sales exceeding €101 million, EBITDA of €9 million, and net profits of €586,000. Established in 1782, Loulis Mills is one of Greece‘s oldest flour producers, symbolizing Thessaly‘s historical and ongoing role in grain processing and food production.

Intercomm Foods, headquartered in Sykourio (Larissa), is fifth on the list, with sales of €83.3 million and impressive EBITDA of nearly €13 million, alongside net profits of €7.4 million. Specializing in fruit preserves, olives, syrups, and related products, Intercomm Foods leverages Thessaly‘s rich agricultural output, supporting local farmers and contributing to export diversification.

In the aluminum sector, two companies stand out: Exalco S.A., based in Larissa, with sales of €71.7 million and EBITDA of €4.6 million, and Cosmos Profil A.E., also Larissa-based, with sales of €70.8 million and EBITDA of €6.9 million. Both companies contribute to Thessaly‘s industrial diversification and export capacity, with Exalco operating subsidiaries in Bulgaria and Romania, indicating regional integration.

Other notable companies include Biomar Hellenic, a Danish investment in Volos specializing in aquaculture feed with sales of €53.7 million, and Polisan Hellas, a PET resin and preform manufacturer in Volos, which despite recording losses in 2015, remains an important industrial presence.

Rounding out the top ten is Little Acre Milk Farm (La Farm), based in Trikala, with sales of €49.2 million and EBITDA of €3.3 million, reinforcing the strength of Thessaly‘s dairy sector.

While the region‘s manufacturing and agricultural sectors are well-established, Thessaly also hosts several logistics and freight forwarding companies that support these industries by facilitating domestic and international trade. These companies provide warehousing, transport, customs brokerage, and supply chain management services, vital for the efficient movement of goods. Their presence is crucial for projects like the Larissa intermodal terminal, which aims to integrate multimodal transport modes and enhance the region‘s logistics capabilities.

The strong industrial base of Thessaly, led by dairy, textiles, and manufacturing, creates a substantial demand for efficient logistics solutions. The Larissa intermodal terminal project is well-positioned to capitalize on this demand by providing a modern, multimodal freight hub that reduces transportation costs, improves delivery times, and enhances supply chain reliability. The terminal can facilitate exports of dairy products, textiles, aluminum, and processed foods, while supporting imports of raw materials and packaging. By improving connectivity to ports like Volos and airports such as Nea Anchialos, the project can boost Thessaly‘s competitiveness in national and international markets.

Moreover, the presence of successful companies with regional headquarters in Larissa and surrounding areas ensures a local customer base for logistics services, fostering economic growth and job creation. Challenges include aligning infrastructure development with industry needs, ensuring regulatory compliance, and training a skilled logistics workforce. However, the synergy between Thessaly‘s industrial sectors and the Larissa intermodal terminal offers significant advantages, including attracting investment, promoting regional development, and strengthening Greece‘s position as a logistics hub in Southeast Europe.

Rank	Company Name	Turnover (€)	Headquarters
1	Ellinika Galaktokomika S.A. (Olympus-Rodopi)	188,476,000	Larissa
2	Tyras S.A.	136,957,000	Trikala
3	Violar S.A.	129,670,000	Larissa
4	Loulis Mills S.A.	101,372,000	Volos
5	Intercomm Foods	83,298,000	Larissa
6	Exalco S.A.	71,718,000	Larissa
7	Cosmos Profil S.A.	70,769,000	Larissa
8	Biomar Hellenic S.A.	53,700,000	Volos
9	Polisan Hellas	51,095,000	Volos
10	Little Acre Milk Farm (La Farm)	49,225,000	Trikala

Table 4.1 Logistics companies in Thessaly, their turnover and headquarters

4.8 Thessaly's 3PL Companies

Thessaly hosts a vibrant and diverse logistics sector, with numerous companies providing a wide range of services including transportation, warehousing, customs clearance, and comprehensive supply chain management. These firms play a crucial role in supporting the region's strong agricultural, manufacturing, and industrial base by ensuring efficient movement and storage of goods domestically and internationally. Many of these companies are strategically headquartered in key urban centers such as Larissa, Volos, and Trikala, leveraging Thessaly's central location and transport infrastructure. Their expertise and capacity make them essential partners for multimodal logistics projects, including the Larissa intermodal terminal, which aims to enhance the region's freight handling capabilities and integrate road, rail, and air transport modes into a seamless logistics network.

Detailed Overview of Key 3PL Companies in Thessaly

1. Speedex (Volos)

Speedex focuses on express delivery and freight distribution services, catering primarily to time-sensitive shipments. Based in Volos, it benefits from proximity to the Port of Volos, facilitating quick last-mile delivery for maritime imports and exports. Speedex's express capabilities complement the broader logistics ecosystem in Thessaly.

2. Kuehne + Nagel (Larissa)

As part of a global logistics network, Kuehne + Nagel offers comprehensive supply chain solutions including freight forwarding, sea and air transport, and warehousing. Its presence in Larissa brings international logistics expertise to the region, supporting local companies in accessing global markets.

3. Transcom (Larissa)

Transcom provides specialized logistics services, including transportation and warehouse management. Its tailored solutions for different industries enhance supply chain efficiency and reliability, making it a valuable partner for complex logistics operations in Thessaly.

4. Ziegler Group (Larissa)

Ziegler Group offers multimodal transport services encompassing road, rail, air, and sea freight. Its integrated logistics solutions position it as a major logistics provider in Thessaly, capable of handling diverse cargo types and volumes.

5. DHL Express (Volos)

DHL Express is a global leader in courier and logistics services, with operations in Volos supporting express parcel delivery and supply chain management. Its extensive network facilitates rapid international connectivity for Thessaly‘s businesses.

6. Eurospeed (Volos)

Eurospeed specializes in transport management and logistics services, including warehousing and freight transport. Located in Volos, it leverages the port‘s facilities to optimize maritime freight flows.

7. Schenker Logistics (Larissa)

Schenker offers road, rail, and air freight services alongside supply chain management and warehousing. Its Larissa branch integrates global logistics standards with local market knowledge, supporting Thessaly‘s export-oriented industries.

8. TGH Logistics (Trikala)

TGH Logistics provides comprehensive logistics services including transportation, warehousing, and cargo management. Based in Trikala, it serves the northern part of Thessaly, facilitating regional distribution.

9. Palladium Logistics (Larissa)

Palladium offers transport, logistics, and storage services, focusing on customized solutions for clients in Thessaly. Its strategic location in Larissa supports efficient regional freight handling.

10. A.C.T. Group (Volos)

Advanced Cargo Transport (A.C.T.) specializes in freight transport, storage, and supply chain management. Its operations in Volos capitalize on the port‘s connectivity to facilitate import-export activities.

11. OnTime Logistics (Volos)

OnTime Logistics manages warehousing and freight transport services, supporting timely and reliable delivery solutions in the Thessaly region.

12. Wim Bosman Group (Larissa)

Wim Bosman provides integrated logistics services including transport, warehousing, and supply chain management. Its Larissa base enables it to serve Thessaly‘s diverse industrial sectors efficiently.

13. Oro Logistics (Volos)

Oro Logistics focuses on warehouse management, distribution, and transport services, leveraging Volos‘s port infrastructure for multimodal logistics.

14. Vlachakis Logistics (Trikala)

Vlachakis offers specialized logistics, warehousing, and transport services in Trikala, supporting local industries with tailored supply chain solutions.

The extensive network of logistics and 3PL companies in Thessaly forms a strong foundation for the success of the Larissa intermodal terminal project. These companies are natural collaborators and primary users of the terminal‘s multimodal capabilities, which promise to enhance freight efficiency by integrating rail, road, and potentially air transport. The terminal will enable faster, more cost-effective cargo handling and distribution, directly benefiting logistics providers by expanding their service offerings and improving transit times.

Moreover, the terminal‘s modern infrastructure will attract additional logistics firms and encourage existing companies to upgrade their operations, fostering innovation and competitiveness in the regional supply chain. The collaboration between the terminal and logistics companies can also stimulate job creation, skills development, and investment in Thessaly‘s logistics sector.

Challenges include ensuring seamless coordination among multiple stakeholders, upgrading last-mile connectivity, and aligning regulatory frameworks to facilitate smooth multimodal transfers. However, the synergy between the Larissa intermodal terminal and Thessaly‘s logistics companies is poised to transform the region into a key logistics hub in Greece and Southeast Europe, supporting economic growth and regional development.

Chapter 5. Larissa, an upcoming intermodal node

Cities are the most dynamic centres of economic transformations in a global level (Harris 1997).

5.1 Larissa at a glance

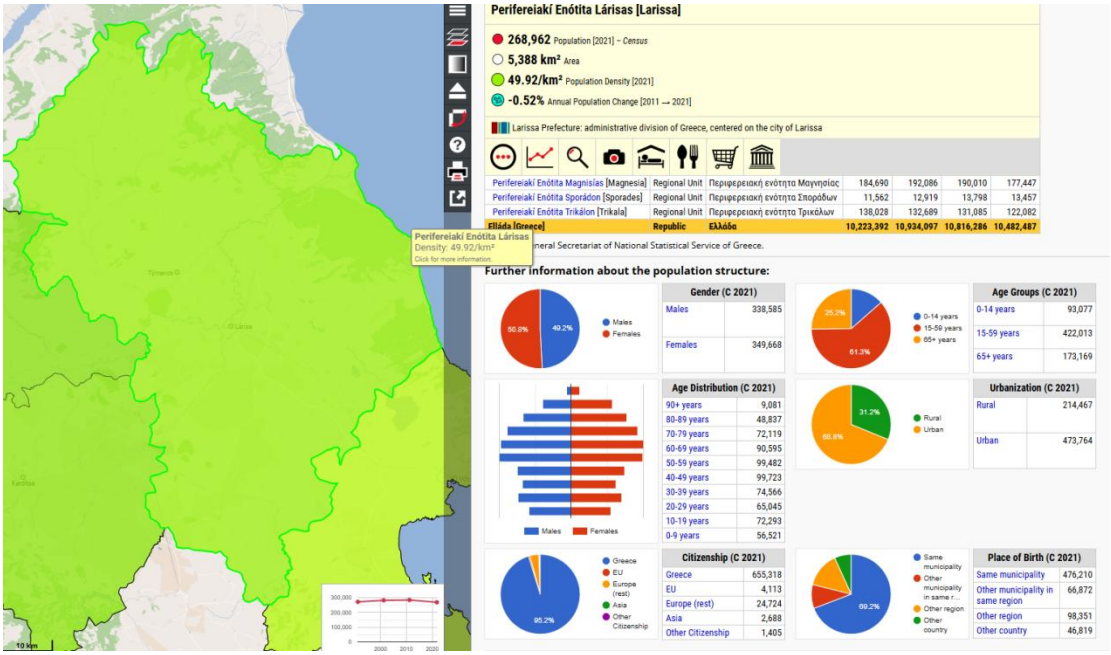


Figure 5.1 Demographic overview of Larissa

Larissa Prefecture (Perifereiaki Enotita Larisas) is a significant administrative division located in central Greece, as shown by the green-highlighted region on the map. The prefecture covers an area of 5,388 km², making it a substantial territorial unit within the Greek administrative system. The map clearly shows its central position in mainland Greece, with access to both mountainous terrain and coastal areas along what appears to be the Aegean Sea to the east. This strategic location has historically made Larissa an important crossroads for trade and cultural exchange in the region.

Larissa is the capital and largest city of the Thessaly region in Greece, located approximately 120 km southwest of Thessaloniki and 210 km northwest of Athens. Situated on the fertile plains of the Pineios River, Larissa covers a municipal area of roughly 336 km². The city lies near significant natural landmarks such as Mount Olympus and Mount Kissavos to the north and northeast, and it is in proximity to tourist destinations like Meteora and Lake Plastira.

Figure 5.2 Mountainous landscapes surrounding Larissa

The region‘s flat terrain, enriched by alluvial soils from the Pineios basin, makes it ideal for agriculture, which dominates the local economy. The fertile plain supports extensive cultivation and livestock farming. The region also includes mountainous areas such as Mount Ossa and Titanos, offering diverse ecological and recreational opportunities.

Larissa‘s geographic position on a fertile plain with excellent natural transport corridors makes it a prime location for an intermodal terminal. The proximity to mountains and tourist areas also opens opportunities for diversified freight and passenger logistics services.

5.2 Climate

Larissa experiences a cold semi-arid climate with Mediterranean characteristics, featuring hot, dry summers and cold winters with occasional snow. Average annual rainfall is low, about 413 mm, concentrated mostly in autumn and winter months. Summer temperatures often exceed 40°C, while winters can drop below freezing.

This climate is conducive to the cultivation of drought-resistant crops such as cotton and cereals but poses challenges such as summer heat stress and occasional flooding from thunderstorms.Climate considerations are crucial for infrastructure resilience. The intermodal terminal must incorporate flood protection and heat-resistant construction materials to ensure operational continuity, especially given recent regional flood events.

5.3 Population Size and Density Analysis

According to the 2021 census data, Larissa Prefecture has a total population of 268,962 inhabitants. With its area of 5,388 km², this translates to a population density of 49.92 people per square kilometer, indicating a relatively low population density typical of mixed urban-rural regions in Greece. This density suggests that while there are urban centers within the prefecture, much of the territory consists of rural areas, small towns, and possibly agricultural land. The population size makes Larissa a moderately populated prefecture within the Greek context. A concerning demographic trend is evident in the annual population change rate of -0.52% between 2011 and 2021. This negative growth rate indicates that Larissa Prefecture is experiencing population decline, losing approximately 1,400-1,500 residents per year during this decade. This trend reflects broader demographic challenges facing many regions in Greece, including urbanization toward major metropolitan areas, economic migration, and declining birth rates. The population decline could have

significant implications for local economic development, service provision, and community sustainability.

5.4 Economy

Larissa‘s economy is diversified, with strong sectors in agriculture, food processing, textiles, aluminum manufacturing, and logistics. Leading companies include Ellinika Galaktokomika (dairy), Violar (textiles), Exalco (aluminum), and Intercomm Foods (agro-food). The regional GDP was approximately €9.7 billion in 2018, about 5.2% of Greece‘s total, with GDP per capita at 53% of the EU average.

The terminal will serve these industries by improving supply chain efficiency, enabling faster market access, and attracting logistics investments. It will also create jobs and stimulate regional economic growth.

Figure 5.3 Cultural restlessness imprinted on graffiti in a building in Larissa

5.5 Strategic Geographic Position and Regional Significance

Larissa occupies a pivotal position in the Greek transportation network, serving as "a principal agricultural centre and a national transport hub, linked by road and rail with the port of Volos, the cities of Thessaloniki and Athens." Located "in the center of Greece, in the middle of the largest plain of the country, under the shadow of Mount Olympus and near the Tempi Valley," the city represents the fifth-most populous urban center in Greece with a population of 148,562 in the city proper according to 2021 census data, while the municipality reaches 164,095 inhabitants.

The strategic location positions the intermodal terminal as a critical node connecting northern Greece (Thessaloniki) with southern regions (Athens) and providing efficient access to the Volos port. This geographic advantage enables the facility to serve as a distribution hub for the entire Thessaly region and beyond, potentially capturing cargo flows between major Greek cities and international markets.

5.6 Road Infrastructure and Highway Connectivity

Larissa is well connected by major highways, including the E75 motorway, which links northern and southern Greece, passing near the city. The E65 (Central Greece Motorway) and E92 also provide access to neighboring regions and ports. However, recent infrastructure challenges have emerged, such as the collapse of the new coastal road at Rakopotamos connecting Larissa with Magnesia, highlighting the need for robust, well-planned road networks.

The E75 corridor is a critical freight artery, carrying a significant portion of Greece‘s road freight traffic. Thessaly‘s road network supports high volumes of agricultural and industrial transport.

The intermodal terminal‘s success depends on seamless road connectivity for last-mile delivery and regional distribution. Upgrading and maintaining road infrastructure will reduce bottlenecks and improve freight efficiency. Modern road infrastructure and bypass systems enable efficient truck access to your intermodal facility while avoiding city center congestion. This infrastructure investment directly supports the viability of road-to-rail transfer operations and ensures reliable first-mile and last-mile connectivity for cargo.

5.7 Railway Network and Rail Freight Potential

The main Athens-Thessaloniki railway line passes through Larissa, forming a double-track, electrified corridor essential for passenger and freight transport. Two branch lines connect Larissa to Volos (about 60 km, single track) and from Palaiofarsala to Kalampaka (about 80 km, single track). These lines support regional connectivity but face capacity and modernization challenges.

The Larissa-Thessaloniki section covers 160 km and is part of the core European rail network. Freight volumes on these lines have been growing steadily, with electrification improving speeds and reliability.

The Larissa intermodal terminal can leverage these rail links to facilitate multimodal freight transport, reducing road congestion and emissions. Investments in double-tracking and electrification of branch lines would enhance terminal throughput.The electrified Athens-Thessaloniki railway line passing through Larissa provides excellent rail connectivity for your intermodal terminal. The growing rail freight volumes indicate market demand for efficient rail services, while future high-speed connections to Central Europe will position your facility as a strategic gateway for international cargo flows.

5.8 Port of Volos Maritime Connection

Greece "serves as a trade bridge between Europe and Asia" with "the seaports of Thessaloniki and Piraeus playing a decisive role in the freight forwarding and rail industry in south-east Europe." The proximity to Volos port provides crucial maritime connectivity for inland transportation networks.

The Port of Volos is the main seaport serving Thessaly, handling approximately 3 million tonnes of cargo annually, including agricultural exports and industrial goods. It has container, bulk, and general cargo facilities and is undergoing expansion, including the LNG Floating Storage Regasification Unit (FSRU) project, which will enhance energy logistics.

The Sporades islands (Skiathos, Skopelos, Alonissos) have smaller ports primarily serving passenger ferries and local freight, connecting to Volos and mainland Greece.

The Larissa terminal‘s proximity to Volos port enables efficient maritime-rail-road intermodal transfers, boosting export competitiveness. The terminal can serve as a consolidation point for goods moving through Volos, enhancing supply chain integration. The direct rail and road connections to Volos port create significant opportunities for sea-to-land cargo transfers through your intermodal facility. This connectivity enables efficient movement of import/export cargo between the port and inland destinations, particularly for agricultural products and manufactured goods.

5.9 Air Transport

Nea Anchialos National Airport, about 60 km from Larissa, serves as the regional airport with domestic and limited international flights. It has a 2,759-meter runway suitable for cargo aircraft and is undergoing modernization with plans for expanded cargo handling. Larissa State Airport primarily serves general aviation but has potential for cargo operations. Air freight integration at Nea Anchialos can complement the intermodal terminal‘s services, especially for high-value or time-sensitive goods. The terminal can facilitate multimodal transfers between air, rail, and road.

The intermodal terminal center can provide truck-to-rail connections for time-sensitive cargo requiring air transport connectivity. This enables efficient movement of high-value goods to major airports while leveraging rail transport for the longer inland segments.

5.10 Agricultural Sector and Cargo Generation

Thessaly, and Larissa in particular, is a major agricultural hub in Greece. The fertile plains support cultivation of cotton, cereals, tobacco, dried nuts, and olives. Thessaly is Greece‘s leading cattle-raising area, with significant sheep and goat farming. Agricultural modernization has improved yields, but challenges remain from climate variability and market pressures. Thessaly accounts for a substantial share of Greece‘s agricultural output, with Larissa regional unit contributing significantly. The agricultural sector employs a large portion of the rural population.

The intermodal terminal will facilitate efficient export of agricultural products, reducing spoilage and transport costs. It can also support import of agricultural inputs, enhancing regional productivity. The concentration of agricultural production creates substantial cargo volumes requiring efficient transportation to domestic and international markets. Your intermodal terminal can serve as a consolidation point for agricultural products, enabling small-scale farmers to access larger markets through efficient rail connections. The seasonal nature of agricultural production requires flexible terminal operations to handle peak harvest periods.

5.11 International Freight and Logistics Potential

EY's report [22] "examines Greece's potential as an international freight center and logistics hub in 2021 and beyond," while "Greece is home to one of Europe's largest ports in terms of volume handling" with "an annual turnover of more than 6 million."

Greece's positioning as an international logistics hub creates opportunities for your Larissa terminal to participate in broader freight networks. The high port volumes indicate substantial cargo flows that could benefit from inland intermodal connections, particularly for containers requiring distribution to inland destinations.

5.12 The role and positioning of an intermodal terminal center in Larissa

Larissa possesses exceptional advantages for an intermodal terminal center, combining strategic geographic location, strong agricultural and industrial base, excellent transportation connectivity, rich cultural heritage, and supportive policy environment. The city's 10,000-year history, educational institutions, military significance, and cultural infrastructure create a unique foundation for sustainable economic development.

The intermodal terminal center would serve multiple functions:

1. **Agricultural Consolidation Hub**: Collecting and consolidating agricultural products from the Thessaly region for efficient rail transport to ports and urban markets.

2. **Import/Export Gateway**: Facilitating cargo flows between Volos port and inland destinations through efficient rail connections.

3. **Regional Distribution Center**: Serving as a break-bulk point for consumer goods and industrial products serving central Greece.

4. **International Logistics Node**: Connecting Greek production with European markets through future high-speed rail networks.

5. **Cultural and Educational Logistics Hub**: Supporting the transportation needs of universities, museums, cultural events, and military installations.

6. **Tourism Support Center**: Facilitating the logistics requirements of Larissa's growing tourism sector and cultural heritage activities.

The combination of growing rail freight volumes, strong agricultural base, strategic location, planned infrastructure improvements, rich cultural heritage, educational institutions, and military presence creates a compelling multi-dimensional business case for the proposed intermodal terminal center in Larissa.

Chapter 6. Old factories in the region of Thessaly (Larissa and Volos)

6.1 Historical Context of Old Factories and Businesses in Greece: Impact of Economic Shifts and Their Potential for Intermodal Hubs

In the past, numerous factories and industrial establishments in Greece were at the heart of local economic life, providing both employment and a sense of pride for many communities. These industries thrived during the Greek drachma era and the early years of the euro, making substantial contributions to the nation's GDP. These businesses were essential to regional growth, especially in industrial hubs like Larissa, Volos, and Thessaloniki. They offered a variety of products ranging from textiles, furniture, construction materials, and metal goods, to more specialized goods such as machinery and household items.

However, as the global and local economies began to shift over the last few decades, many of these factories found themselves struggling to stay afloat. The transition to a globalized economy, increased competition from lower-cost producers in countries such as China, and Greece‘s sovereign debt crisis in the early 2010s caused many businesses to either shrink or close down completely. Some companies relocated their operations to other countries offering more favorable tax policies or cheaper labor, while others downsized to smaller facilities. The financial constraints also brought about the shift in business models for many companies, changing from manufacturing-based to service-oriented operations.

The COVID-19 pandemic and its subsequent economic impact only accelerated these changes, resulting in widespread unemployment in regions heavily reliant on industrial production. The effects of these crises are particularly evident in the abandoned industrial buildings, many of which remain standing in prominent areas of Thessaly, like Sikourio, Platikambo, Falanos, and Ampelona, now symbols of a declining era in Greece's industrial history. These once-vibrant factories and warehouses are now empty, contributing to a feeling of stagnation in the local economy.

6.2 The Role of Industrial Transition: Turning Challenges Into Opportunities

Despite the decline of these traditional sectors, there lies a significant opportunity in transforming these derelict sites into modern intermodal hubs. Intermodal transportation, which utilizes multiple modes of transport (e.g., rail, road, sea) for the movement of goods without the need to handle the cargo itself when switching modes, is crucial for efficient logistics in the modern era.

Many of the old industrial sites in Thessaly are well-positioned to host intermodal logistics centers due to their proximity to key transportation corridors, including highways, rail lines, and ports. These locations offer both strategic advantages and untapped potential for the integration of freight transport networks, helping to optimize the flow of goods across the country.

6.3 Logistical Opportunities: Utilizing Existing Infrastructure for Efficiency

Thessaly's geographical position in central Greece makes it an ideal candidate for the establishment of an intermodal center. The region has existing transportation networks that could easily be adapted for a more integrated logistics system:

- **Road network**: Thessaly is well-connected to major highways, including the **E65** and **E92**, which link the region to Athens, Thessaloniki, and the western coast. These highways serve as major corridors for domestic transport, facilitating the movement of goods to and from the region.

- **Rail network**: The **Piraeus-Thessaloniki rail line** is an important link for freight, and with modern upgrades, this route can be further optimized to support an **intermodal hub**.

- **Port access**: The **Port of Volos** and **Port of Thessaloniki** are two critical access points for Greece's international trade, handling significant volumes of cargo. Linking these ports with improved **rail** and **road networks** can help to reduce congestion, enhance cargo handling, and reduce greenhouse gas emissions by shifting more freight from road to rail.

With advanced technology and digital systems, automated systems for handling freight, and improved connectivity between the road, rail, and sea transport modes, Thessaly can easily integrate into the broader European supply chain network. In doing so, the region can help address Greece's longstanding logistical challenges, such as the high dependency on road transport and inefficient port-to-warehouse connections.

6.4 Environmental Benefits: Supporting Greece’s Green Transition

Repurposing these old industrial sites for use as intermodal hubs could also be an essential part of Greece‘s efforts to reduce its carbon footprint and contribute to the European Green Deal. Shifting freight transportation from road to rail, for example, could help mitigate the country‘s high transport-related emissions.

Currently, road transport is the primary mode of cargo movement in Greece, accounting for over 80% of freight volume. This has significant environmental costs, particularly in terms of greenhouse gas emissions and traffic congestion. By promoting rail and maritime transport, especially for long-distance freight, the environmental impact could be significantly reduced.

- **Rail transport** is 4-5 times more energy-efficient than road transport per ton-kilometer, offering a substantial environmental benefit.

- **Multimodal hubs** in Thessaly can reduce the number of **trucks on the road**, easing congestion in urban centers like **Volos** and **Larissa**, and helping Greece meet its environmental targets.

6.5 Economic Revitalization and Regional Development

The transformation of these old factory sites into intermodal centers could serve as a major driver for **economic revitalization** in Thessaly. In particular:

- **Job creation**: New logistics operations would create jobs in areas such as warehousing, transportation, technology, and management.

- **Attracting investment**: The development of intermodal hubs could make Thessaly a regional logistics hub, attracting investment from both domestic and international companies.

- **Regional growth**: Intermodal centers will stimulate the growth of local economies by promoting trade, reducing transport costs, and encouraging the development of complementary industries such as packaging, supply chain management, and advanced manufacturing.

6.6 A Strategic Opportunity for Greece's Future

The decline of old industrial sectors in Greece, coupled with the economic crisis, has left behind a legacy of abandoned industrial buildings. However, these sites represent a unique opportunity to leverage Greece's existing infrastructure and address key logistical challenges. Intermodal transport hubs in Thessaly could be central to the country's efforts to modernize logistics infrastructure, enhance environmental sustainability, and revitalize local economies. By repurposing former industrial areas, Greece can create a more resilient, sustainable, and efficient logistics system that will drive economic growth and reduce its ecological footprint in the coming decades.

Figure 6.1 Old abandoned factory in Thessaly

6.7 Old Factories located in Volos region

6.7.1 Daferrera Fish Processing & Packaging Industry – Chrysi Akti Panagias, Magnesia

- **Coordinates**: 39.2926815 N, 22.8610211 E
- **Municipality**: Almyros, Regional Unit of Magnesia, Thessaly
- **Industrial Sector**: Packaging and processing of seafood (likely mollusks, small fish, shellfish)
- **Original Use**: Maritime food processing & vacuum/sealed-packaging
- **Current Status**: Unknown – listed in archival record, operational status requires confirmation
- **Land Category**: Coastal, peri-urban, adjacent to port infrastructure

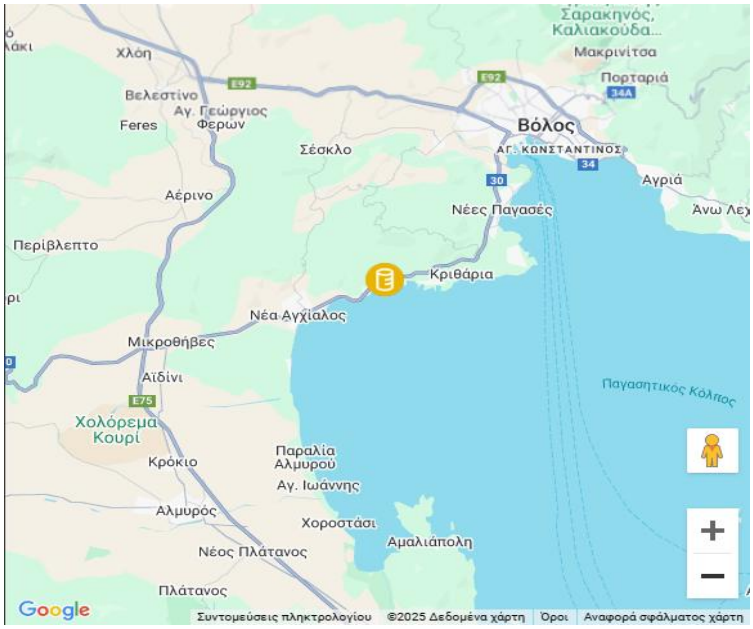


Figure 6.2 Location of Daferrera Fish Processing & Packaging Industry

Historical Background

This facility was part of Greece's **post-1980s expansion of the agri-food and fishery processing sectors**, as maritime aquaculture and coastal fish farming became increasingly standardized. The **Daferrera plant**, referenced in the 2017 *Industrial Survey Reports* edited by Vakalopoulou, Daniel, Lambropoulos & Fasourakis, appears to have been developed as a **cold-chain packaging plant** focused on **locally sourced seafood**, possibly supporting export-oriented supply chains from the Gulf of Pagasetic.
Greece's integration into the **EU Common Fisheries Policy (CFP)** and related funding mechanisms (e.g., European Maritime and Fisheries Fund – EMFF) allowed many such coastal installations to expand or modernize between 1990–2008. The facility likely operated with **refrigerated processing lines, vacuum sealing, and ISO-compliant packaging**, supplying both domestic and Balkan markets.

Its location in **Chrysi Akti Panagias** (a semi-industrial coastal zone near Almyros) suggests logistical intent — providing direct access to both **fishing vessels and road transport corridors**. However, due to regional economic shifts and consolidation of seafood processors in Central Macedonia and Attica, the site may have declined or been restructured in the 2010s [23].

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Almyros Town Center	~6.5 km	~10 minutes
Volos Port Terminal	~37 km	~35 minutes
Nea Anchialos Airport	~15 km	~18 minutes
Larisa City Center	~65 km	~1 hr
E75 Motorway Access	~9.5 km	~12 minutes

Table 6.1 Distances and according travel times from significant infrastructure near Daferrera Fish Processing & Packaging Industry

Infrastructure and Connectivity

- **Road Access**: Connected via secondary regional road network. Approx. 10 minutes from the E75 (Athens–Thessaloniki motorway).
- **Air**: Only 15 km from **Nea Anchialos National Airport**, making it one of the closest industrial facilities to a cargo-capable airstrip in Thessaly.
- **Port**: While not inside the Port of Volos, the facility is **directly adjacent to the sea**, likely with private pier or docking access for small-scale seafood loading. Export via Volos is feasible.
- **Rail**: No nearby access — nearest rail line lies >20 km away. Rail-sea intermodal options are not feasible unless containerized transport is first sent to Volos.

Very well suited for **coastal export logistics** and cold chain storage; **unsuitable as inland intermodal hub**, but ideal for **marine supply chain node**.

Figure 6.3 Infrastructure of Daferrera Fish Processing & Packaging Industry

Site and Land Use Characteristics

- **Zoning**: Likely maritime/food industry (requires confirmation); within **coastal industrial buffer zone** as defined in regional spatial plans.
- **Infrastructure**:
  - Cold storage
  - Vacuum packing or blast freezing

- Packaging and logistics line
- **Land Condition**: Proximity to sea demands **environmental risk assessments** for corrosion, sea level exposure, and effluent disposal
- **Ownership**: Presumed private (Daferrera S.A.) unless absorbed into another holding

SWOT Analysis – Logistics Use

Category	Description
Strengths	Sea access, seafood specialization, proximity to airport and E75, cold chain infrastructure
Weaknesses	Isolated from rail, limited scalability, subject to coastal environmental restrictions
Opportunities	Seafood exports, seafood re-export platform, fishery packaging support for local aquaculture cooperatives
Threats	Competition from northern seafood processors, regulatory burden from marine zone use, environmental compliance costs

Table 6.2 SWOT Analysis for Daferrera Fish Processing & Packaging Industry

Comparative Evaluation vs. Old Sugar Factory (Larisa)

Criteria	Old Sugar Factory (Larisa)	Daferrera Seafood Facility (Magnesia)
Transport Type	Inland intermodal (road–rail)	Coastal/semi-port (sea–road–air)
Access to Rail	Adjacent (planned siding)	No rail
Cold Chain Infrastructure	None currently	Yes (marine cold chain)
Redevelopment Readiness	High	Medium–High (if operational)
Specialization	General cargo/logistics	Fishery/aquatic processing
EU Fund Compatibility	High (NSRF, RRF)	High (EMFF, maritime cluster funding)

Table 6.3 Comparative Evaluation of Factory Daferrera Fish Processing & Packaging Industry vs. Old Sugar Factory

Suggested Redevelopment or Support Role

While not appropriate for a full intermodal container hub, the Daferrera facility could:

- Serve as a **marine-focused logistics node**, supporting chilled/frozen exports
- Be linked to **Larisa–Volos logistics chain**, acting as an ~~-~~end-of-line" sea transfer station
- Be used as a **pilot project for EU-funded blue economy cluster**, integrating aquaculture logistics, traceability systems, and circular economy models

6.7.2 Anagnostou Distillery Industrial Complex – Volos

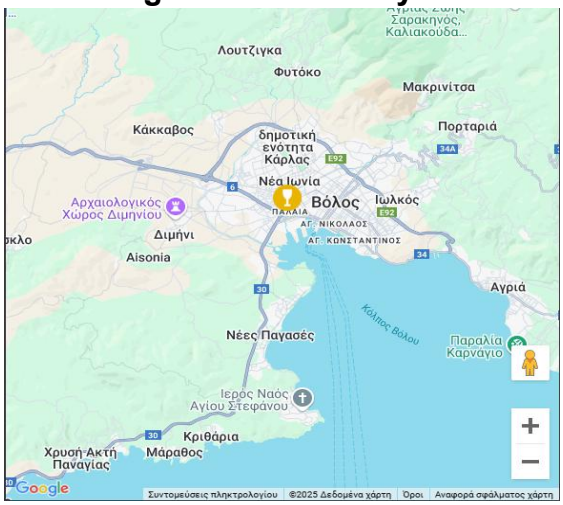


Figure 6.4 Location of Anagnostou Distillery Industrial Complex

- **Coordinates**: 39.3680800 N, 22.9316800 E
- **Municipality**: Volos, Regional Unit of Magnesia, Thessaly
- **Original Use**: Alcohol distillation, bottling, and storage
- **Year of Founding**: 1919 (establishment of the company), 1922 (start of operations)
- **Founders**: A cooperative of well-known distillers and oenologists from Volos, Trikala, Larisa, and Zagora — including the **Anagnostou family**, **Koutsikos**, **Nasiokas**, **Amoutsopoulos**, **Tsaggoulis**, **Tabasoulis**, and **Afentoulis**
- **Current Status**: Historical industrial building (unclear if operational; may be preserved or repurposed)

Figure 6.5 First historical buildings of the distillery

Historical Background

The Anagnostou Distillery Plant in Volos stands as one of the earliest industrial cooperatives in Thessaly‘s food and beverage sector. Officially founded in 1919, during the post-WWI reconstruction period, the distillery was the product of a pan-Thessalian initiative uniting distillers and entrepreneurs from several cities: Volos, Larisa, Trikala, and even mountain communities like Zagora.

By 1922, the building was completed and the factory became operational, producing traditional Greek spirits — such as tsipouro, ouzo, and brandy — as well as supporting activities like fermentation, bottling, and storage. Located near the city center and the port of Volos, the facility was strategically positioned for both domestic distribution and export.
Through the interwar and postwar decades, the distillery reflected the rise of regional industrial identity in Volos. Along with metalworking, ceramics, and textile factories, this site contributed to Volos‘ status as a port-industrial city. Its architecture also embodies early 20th-century industrial design influenced by neoclassical and Central European trends.
Though information on its present operational status is limited, the building is considered a heritage industrial structure and is included in regional architectural surveys. Its spatial footprint and port proximity make it a potential site for cultural reuse, logistics light use, or thematic heritage-commercial redevelopment [24].

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Volos Port Terminal	~600 meters	~2 minutes (or walkable)
Nea Anchialos Airport	~27 km	~25 minutes
Larisa City Center	~60 km	~1 hour
E75 Motorway Access	~9.5 km	~15 minutes
Volos Railway Station	~850 meters	~3 minutes

Table 6.4 Distances and according travel times from significant infrastructure near Anagnostou Distillery Industrial Complex

Figure 6.6 Infrastructure of Anagnostou Distillery Industrial Complex

Infrastructure and Intermodal Suitability

- **Road**: Directly integrated into Volos‘ urban street grid, with easy access to regional and national routes.
- **Rail**: Within walking distance of Volos Railway Station; connection exists but limited to **passenger and light freight** capacity — the port‘s freight rail line remains underutilized.
- **Port**: Outstanding proximity (within 600 m) to the **Port of Volos**, which handles bulk, general cargo, and containers (though not a Tier 1 container port).
- **Air**: Close to **Nea Anchialos Airport**, making this location attractive for **high-value air-sea cargo chains**.

This site has **high logistical value** from a port-city distribution perspective. While it is no longer a candidate for large-scale intermodal use, it could support **urban consolidation**, **heritage-linked logistics**, or **specialized warehousing**.

Land and Urban Use Profile

- **Zoning**: Likely classified as **protected industrial heritage** or mixed-use in urban redevelopment plans.
- **Building Condition**: Architectural and preservation status unknown; likely requires **structural rehabilitation** or re-adaptation.
- **Surrounding Area**: Dense urban fabric, including other legacy industries, residential zones, and commercial services.
- **Land Constraints**: Site area likely limited to under 1 ha; expansion is difficult in current city grid.

SWOT Analysis – Intermodal or Logistics Role

Category	Description
Strengths	Prime location near port and rail, historical significance, urban accessibility
Weaknesses	Space-constrained, not suited for large-scale freight handling, aging structure
Opportunities	Thematic logistics center (e.g., local beverage export), urban micro-distribution, adaptive reuse (e.g., museum/logistics hybrid)
Threats	Redevelopment restrictions, cost of preservation, ineligibility for industrial zoning

Table 6.5 SWOT Analysis for Anagnostou Distillery Industrial Complex

Comparative Table – Volos Distillery vs. Old Sugar Factory (Larisa)

Criteria	Old Sugar Factory (Larisa)	Anagnostou Distillery (Volos)
Year of Establishment	1960s	1919 (operational in 1922)
Distance to Port	55 km (Volos)	600 meters
Site Size	25–30 ha	<1 ha
Multimodal Suitability	Very High	Medium (excellent for port-sea-urban)
Redevelopment Use	Full-scale intermodal terminal	Cultural-logistics-commercial hybrid
Preservation Value	Low	High (historical architecture)

Table 6.6 Comparative Evaluation of Anagnostou Distillery Industrial Complex vs. Old Sugar Factory

Suggested Reuse Concepts

While not feasible for large-scale cargo handling, this site can be repurposed as:

- An **urban artisan logistics center** for local beverage/food product exports
- A **port-adjacent warehousing and cultural logistics hub** (e.g., specialty exports, packaging, branding, export prep)
- A **heritage-industrial museum**, incorporating interactive exhibits and possible commercial use (e.g., wine/tsipouro promotion center)
- A **last-mile logistics depot** for Volos (especially for urban e-commerce delivery under low-emission zones)

6.7.3 MEFSOUT Tile & Mosaic Industrial Complex – Volos

- **Coordinates**: 39.3544167 N, 22.9607500 E
- **Municipality**: Volos, Regional Unit of Magnesia, Thessaly
- **Original Use**: Manufacturing of mosaic tiles, terrazzo, and marble-based construction materials
- **Founding Year**: Factory began construction in 1904, production initiated in 1909
- **Current Status**: Inactive; partial preservation status under the Ministry of Culture
- **Ownership**: Private; reuse or redevelopment has not yet occurred
- **Heritage Status**: Façade on Polimeri Street and depth of 5m declared **preserved industrial heritage**

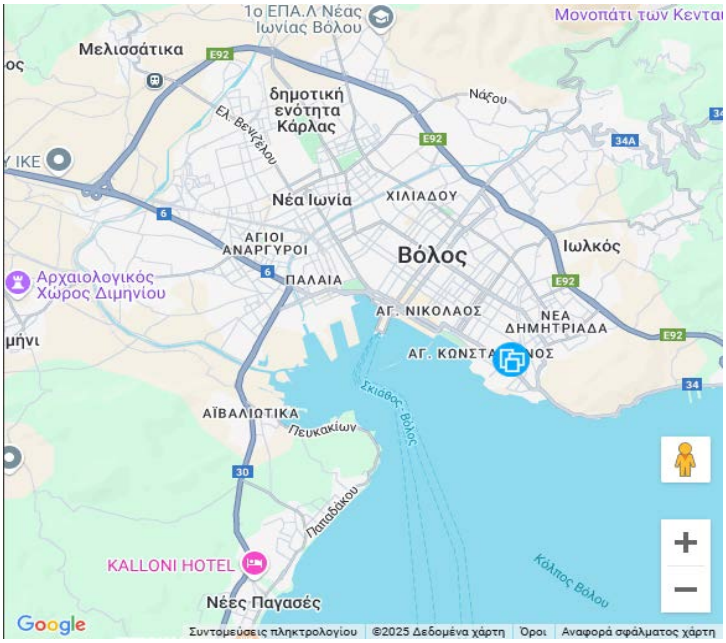


Figure 6.7 Location of MEFSOUT Factory

Historical Background

The **MEFSOUT Factory**, founded by a family of **Maltese origin**, stands as one of the **oldest known industrial tile and mosaic production facilities in Greece**. Its establishment reflects the early 20th-century wave of **construction material innovation** driven by urbanization and population expansion during the post-Ottoman era in Thessaly.

- **Construction began in 1904**, and by **1909**, the plant was producing **mosaic tiles, terrazzo flooring, and marble-based mortars**.
- The MEFSOUT complex **occupied an entire city block**, bordered by Polimeri, Dondolinon, Garefi, and Iatrou Tzanou streets.
- Expansion occurred in **two phases**:
  - First building: 1920–1925
  - Corner expansion: 1935–1940

The factory was exceptionally **technologically advanced** for its time. It featured:

- Grinders and crushers
- Vibrating sieves and stone-cutting machines
- Hydraulic press and mechanical hoists
- Industrial water pumps and dust absorbers with specialized **filters for air pollution control**

This made MEFSOUT **the only known facility in its class at the time to incorporate dedicated environmental safety mechanisms** — a remarkably forward-thinking feature in Greek industry.

Today, only the **façade and a 5-meter structural depth** facing Polimeri Street are officially preserved under the Ministry of Culture. The site remains **vacant and unused**, and no adaptive reuse project has been implemented despite architectural proposals being submitted (e.g., for conversion into a nursery and neighborhood culture center by Liarios in 2007) [25].

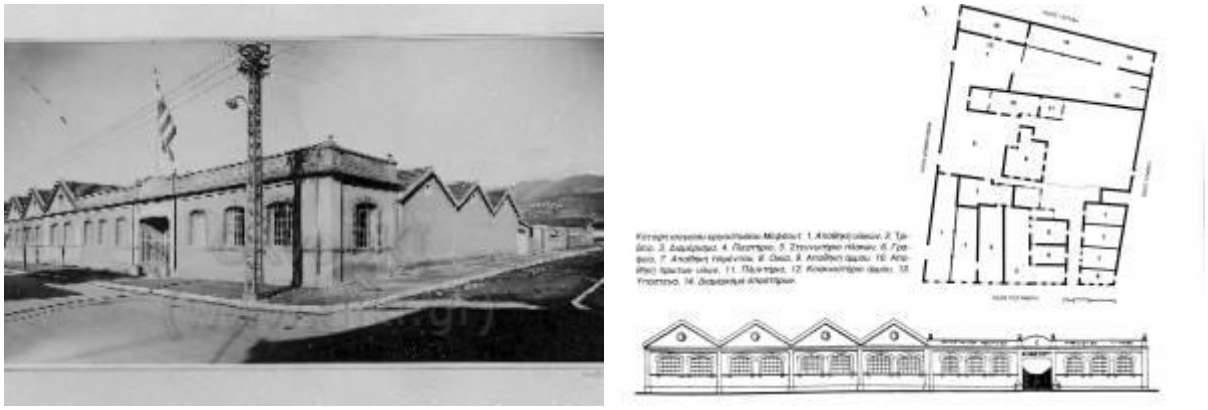


Figure 6.8 Historical photos and documents of MEFSOUT Factory

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Volos Port	~2.5 km	~5–6 minutes
Nea Anchialos Airport	~28 km	~25 minutes
Larisa City Center	~59 km	~1 hour
E75 Motorway Access	~10 km	~15 minutes
Volos Train Station	~2.2 km	~6 minutes

Table 6.7 Distances and according travel times from significant infrastructure near MEFSOUT Factory

Infrastructure and Intermodal Connectivity

- **Road**: Located within the **urban grid of Volos**, with direct access to regional roads and short access to the national highway.
- **Rail**: Close proximity to **Volos Rail Terminal**, but with limited current freight throughput.
- **Port**: Highly favorable port proximity (within 2.5 km), allowing potential use for **specialized freight or urban consolidation** logistics.
- **Air**: Reasonable access to **Nea Anchialos National Airport**, which may be further upgraded for freight.

While unsuitable for large intermodal terminals due to location and space constraints, the site offers **heritage-friendly logistics reuse potential**, such as urban delivery, circular economy activities, or smart logistics hubs.

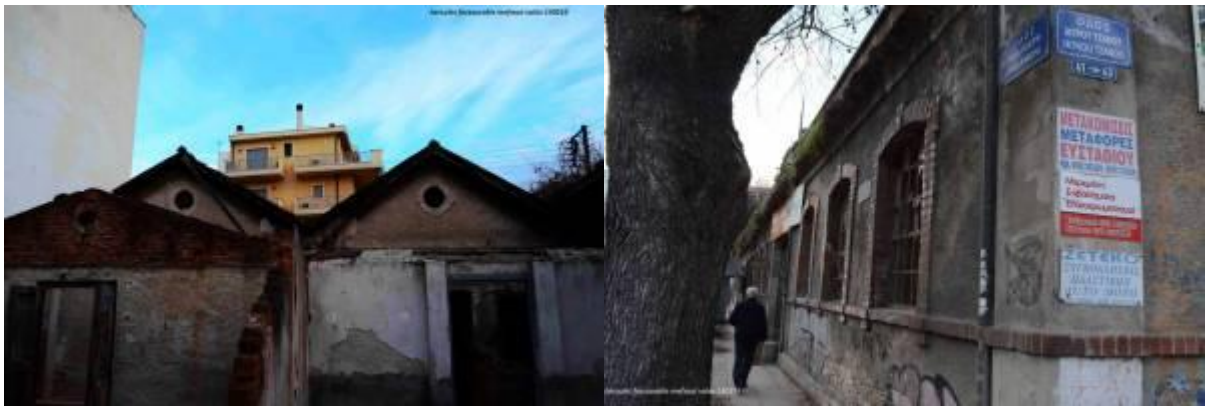


Figure 6.9 Infrastructure of MEFSOUT Factory

Site and Land Profile

- **Zoning**: Urban; likely classified as **mixed-use with heritage protection**
- **Site Size**: ~1 city block (~0.7–1.2 ha estimate)
- **Preservation Status**: Protected facade + 5 meters of structural depth
- **Constraints**: Cannot be demolished or significantly altered without Ministry of Culture approval
- **Ownership**: Private; requires consent or partnership for any reuse or development

SWOT Analysis – Logistics Use Potential

Category	Description
Strengths	Excellent location, strong architectural identity, near port and rail
Weaknesses	Small surface area, strict heritage constraints, not suited for heavy freight
Opportunities	Urban micro-distribution center, local crafts or specialty logistics, adaptive reuse in smart city context
Threats	Bureaucratic barriers to reuse, expensive restoration, limited scalability

Table 6.8 SWOT Analysis for MEFSOUT Factory

Comparative Table – MEFSOUT vs. Old Sugar Factory (Larisa)

Criteria	Old Sugar Factory (Larisa)	MEFSOUT Factory (Volos)
Year of Establishment	1960s	1904–1909
Rail and Port Access	Very High	Medium–High (within 2.5 km)
Cold Chain Infrastructure	None	None
Plot Size	25–30 ha	<1 ha
Legal/Heritage Restrictions	Low	High
Redevelopment Potential	High (logistics center)	Medium (cultural/logistics hybrid)

Table 6.9 Comparative Evaluation of MEFSOUT Factory vs. Old Sugar Factory

Suggested Reuse Concepts

Due to its architectural significance and central location, MEFSOUT could be repurposed as:

- A **heritage-based urban logistics micro-hub** (e.g., bike freight depot, last-mile center)

- A **circular economy lab or materials repackaging site** (connected with city construction supply chains)
- A **craft logistics and promotion space** for Volos-made artisanal goods or sustainable building materials
- A **community cultural space** with attached warehouse/packaging use for light logistics under smart city or EU cohesion funds

6.7.4 : G. Baglatzis & Son Foundry – Almyros, Magnesia

- **Coordinates**: 39.1758880 N, 22.7846010 E
- **Municipality**: Almyros, Magnesia Regional Unit, Thessaly
- **Original Use**: Metal casting and foundry (gray cast iron components)
- **Years of Operation**: ca. 1976 – late 1980s
- **Ownership**: Private (Giorgos Baglatzis & his son Anastasios Baglatzis)
- **Main Products**: Cast iron parts for heating appliances (e.g., stoves), subcontract work for the **Metallurgical Steelworks (Μεταλλουργική Χάλυψ)** in Tsiggeli, Almyros
- **Current Status**: Defunct; presumed abandoned or repurposed

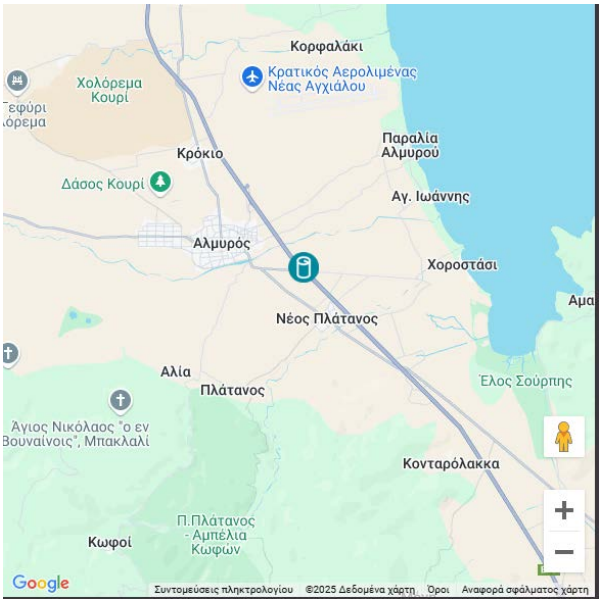


Figure 6.10 Location of G. Baglatzis & Son Foundry

Historical Background

The G. Baglatzis & Son Foundry, operating from approximately 1976 to the late 1980s, was part of a regional network of small to mid-scale metallurgical facilities in Central Greece that supplied components for both consumer appliances and industrial subcontracting [26].

Located in Almyros, a town with proximity to both the Volos industrial area and the Aegean corridor, the foundry specialized in:

- Cast iron components for solid-fuel stoves and household heating appliances
- Custom parts manufacturing for local and national clients, including work for the larger ~~"~~Metallurgical Halips" steelworks (Υάλυψ), which was located in nearby Tsiggeli, before it ceased operations

The Baglatzis foundry is representative of the post-dictatorship period of SME industrialization in Greece (1974–1985), particularly in light manufacturing and metals, often tied to regional supply chains.
The company‘s closure toward the end of the 1980s coincides with:

- The decline of traditional metal casting methods
- Market liberalization
- Increased Asian imports of mass-produced cast iron components
- The shutdown of nearby steel and heavy industry facilities, which removed key clients and disrupted supply-demand dynamics

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Almyros Town Center	~2.3 km	~5 minutes
Volos City Center	~41 km	~35 minutes
Port of Volos	~43 km	~40 minutes
Nea Anchialos Airport	~12.5 km	~15 minutes
Larisa City Center	~60 km	~55 minutes
E75 Motorway Access	~3.5 km	~5–6 minutes

Table 6.10 Distances and according travel times from significant infrastructure near G. Baglatzis & Son Foundry

Infrastructure and Intermodal Potential

- **Road Access**: Excellent proximity to the **E75 corridor**, enabling fast freight movement to both Volos and Larisa.
- **Rail Access**: No active rail connection to the site; nearest usable freight rail station is **Volos** (~40 km).
- **Port**: Moderate potential — access to **Volos port** available via E75.
- **Air**: **High air proximity** — only ~12.5 km from **Nea Anchialos National Airport**, useful for time-sensitive logistics.

Site has **good inland logistics value**, particularly for short-haul distribution and light manufacturing; unsuitable for full intermodal integration without added infrastructure.

Figure 6.11 Infrastructure of G. Baglatzis & Son Foundry

Site & Industrial Use Evaluation

- **Zoning**: Likely designated as **light industrial** or **SME zone** within Almyros municipality
- **Site Size**: Typical SME-scale foundry (estimated 1.0–1.5 ha)

- **Condition**: Presumed abandoned or underutilized; no evidence of current operations
- **Environmental Considerations**: As with all metalworking sites, potential for residual soil contamination (oils, particulates, heavy metals) — site assessments required prior to reuse

SWOT Analysis – Logistics and Redevelopment Potential

Category	Description
Strengths	Close to highway and airport, industrial legacy, light footprint for reactivation
Weaknesses	No rail access, unknown land condition, small site
Opportunities	Conversion into SME logistics depot, freight micro-terminal, or light agro-industrial facility
Threats	Redevelopment cost, limited scalability, land ownership or zoning changes required

Table 6.11 SWOT Analysis for G. Baglatzis & Son Foundry

Comparative Table – Baglatzis Foundry vs. Old Sugar Factory (Larisa)

Criteria	Old Sugar Factory (Larisa)	Baglatzis Foundry (Almyros)
Surface Area	~25–30 ha	~1–1.5 ha
Transport Integration	Excellent (rail + road)	Good (road + air)
Sea Access	Via Volos (55 km)	Via Volos (43 km)
Intermodal Suitability	Very High	Low–Medium
Redevelopment Potential	Full-scale hub	SME-oriented logistics/light use
Strategic Role in Region	Central hub for Thessaly	Peripheral light node

Table 6.12 Comparative Evaluation of G. Baglatzis & Son Foundry vs. Old Sugar Factory

Suggested Reuse Concepts

This site is best positioned for:

- **Logistics satellite station** supporting the main Larisa or Volos logistics hubs
- **Conversion into a rural freight consolidation center** or depot for local manufacturers
- **SME manufacturing or processing plant** for metalworking, agri-machinery parts, or niche casting
- A **training center for industrial heritage and light manufacturing skills** (linked with local vocational schools)

6.8 Old Factories located in Larissa region

6.8.1 KISSAVOS Tomato Processing Plant (Anavra, Larisa)

The KISSAVOS plant was originally developed in the mid-20th century by the company Afoi Gkountara S.A., operating under the brand „KISSAVOS." Its primary function was the processing and canning of tomatoes, a logical industrial activity given its location in the fertile Thessalian plain, one of Greece's leading tomato-producing regions. The facility specialized in tomato pulp, canned products, and potentially other forms of processed agricultural goods. Its establishment aligned with the national effort during the 1950s–1970s to decentralize agro-industrial production and enhance regional self-sufficiency. By leveraging the seasonal surpluses of Thessalian crops, the factory contributed to local employment and export activity, mainly to the Balkan and Middle Eastern markets.

The plant ceased operations in the late 20th century (exact closure date unclear), most likely due to competition from large-scale agro-food companies, outdated machinery, or reduced profitability after Greece‘s accession to the EU‘s Common Agricultural Policy.

Today, it stands as a symbol of Thessaly‘s declining agro-industrial sector, with partial infrastructure still present. It remains a candidate site for rural redevelopment under EU and national funding frameworks, but with major logistical shortcomings for an intermodal role.

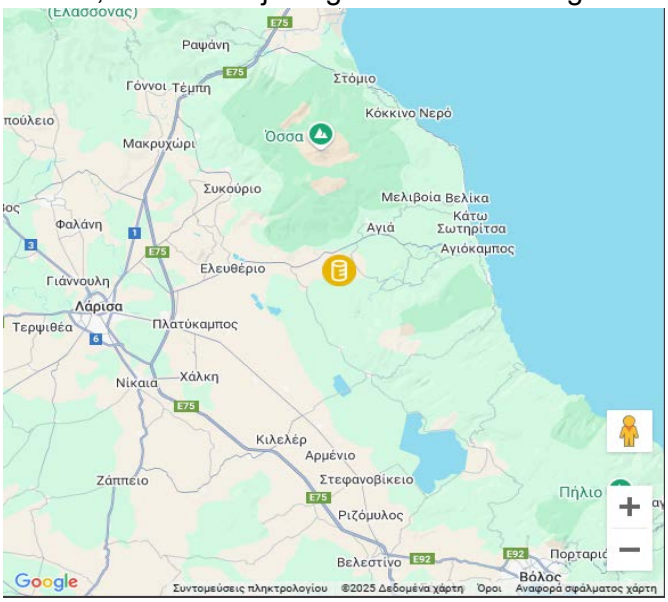


Figure 6.11 Location of KISSAVOS Tomato Processing Plant

General Information

- **Coordinates**: 39.6759970 N, 22.7017210 E
- **Municipality**: Sofades (adjacent to Farsala), Regional Unit of Larisa
- **Local Settlement**: Anavra
- **Site Type**: Former agro-industrial facility (tomato paste production)
- **Current Status**: Presumably inactive or minimally operational; ownership requires legal verification

Geographical Positioning and Distances

The facility is located in a rural area of southwestern Larisa Prefecture, adjacent to agricultural zones but **not in proximity to urban or multimodal infrastructure**:

Reference Point	Distance (by road)	Approx. Travel Time
Larisa City Center	~45 km	~50 minutes
Volos City Center	~60 km	~1 hr 10 minutes
Port of Volos	~62 km	~1 hr 15 minutes
Nea Anchialos Airport	~67 km	~1 hr 20 minutes
Nearest E75 Highway Access	~30 km (Farsala)	~30–35 minutes
Nearest Railway Station (Farsala)	~28 km	~30 minutes

Table 6.13 Distances and according travel times from significant infrastructure near KISSAVOS Tomato Processing Plant

Transport Accessibility Assessment

- **Road**: Located in a remote rural area; accessible via provincial roads. The closest main axis is the Farsala–Larisa route and E75 highway, which links Thessaloniki and Athens.
- **Rail**: No direct access to rail. The closest active station is in Farsala (~28 km away), but this branch line is of **secondary freight value** and not electrified or connected to major intermodal corridors.
- **Air**: Nearest airport is Nea Anchialos (LGVOL), with **minimal air freight capacity** and seasonal operation.
- **Sea**: Port of Volos is the nearest seaport; however, the location is not in proximity to regular container freight routes and would require significant road travel for cargo delivery.

The site does not meet **minimum intermodal standards** (i.e., direct or adjacent access to at least two modal systems), and lacks container-handling, rail spur, or highway interchange proximity.

Physical & Land Characteristics

- **Land Type**: Rural flatland; formerly zoned for agro-industrial use
- **Available Space**: Likely medium (estimated 10–15 hectares), sufficient for logistics retrofit
- **Topography**: Slightly undulating but generally flat; buildable with minimal earthwork
- **Zoning/Planning**:
    - Likely falls under **agricultural or rural economic zone**
    - Conversion to logistics platform or hub would require **Regional Spatial Plan (RSP) revision** and **Environmental Impact Assessment (EIA)**

Figure 6.12 Infrastructure of KISSAVOS Tomato Processing Plant

Potential Constraints:

- The site may lie within or near **protected hydro-agricultural zones**, regulated under **Law 1650/86** and recent updates (EU CAP 2023–2027).
- The reuse of industrial facilities in rural zones typically requires **Ministerial Decrees** for zone reclassification (per Greek Law 4447/2016).

Socioeconomic and Labor Considerations

- **Local Labor Market**: Low population density, mostly agricultural workforce — insufficient for large-scale 24/7 logistics operation

- **Employment Incentives**: Possible eligibility for **regional development subsidies (NSRF, Just Transition Fund)** due to rural depopulation
- **Regional Economic Fit**: May be suitable as a **specialized agricultural collection and storage point**, supporting cotton, cereals, tomato, and fruit logistics.

SWOT Analysis – Intermodal Suitability

Category	Description
Strengths	Existing agro-industrial footprint, flat terrain, potential for rural logistics use
Weaknesses	No highway or rail adjacency, distant from urban centers, no multimodal compatibility
Opportunities	Could be transformed into a **cold-chain consolidation point**, serve regional agri-export chain, leverage NSRF funds
Threats	High infrastructure retrofit cost, zoning/legal barriers, competitive disadvantage vs. urban hubs like Larisa

Table 6.14 SWOT Analysis for KISSAVOS Tomato Processing Plant

Comparative Matrix vs. Old Sugar Factory in Larisa

Factor	Old Sugar Factory (Larisa)	KISSAVOS Plant (Anavra)
Highway Proximity	2 km (E65–PATHE)	30 km
Rail Line Proximity	Adjacent (designated spur area)	28 km
Port Access	55 km (Volos)	62 km
Urban Accessibility	High (urban fringe)	Low (remote rural)
Land Zoning	Industrial (ready)	Agro-industrial (needs change)
Multimodal Integration Feasibility	High	Very low
Regional Role Potential	Central logistics/inland port	Agri-logistics satellite (secondary)

Table 6.15 Comparative Evaluation of KISSAVOS Tomato Processing Plant vs. Old Sugar Factory

Suggested Use for the Anavra Site (Realistic Potential)

While unsuitable for a full-scale intermodal freight hub, the site could be repurposed into:

- A **regional agri-logistics node**, focusing on bulk handling, temporary cold storage, and cooperative crop consolidation
- A **rural logistics service center** offering basic packaging, short-haul transportation, and export staging (to Volos or Larisa)
- A **dry aggregation point** integrated into a Thessaly-wide agro-logistics strategy, coordinated with larger hubs in Larisa or Volos

6.8.2 Former ELVEK Pulp & Paper Mill (Omorfokhori, Larisa)

The **ELVEK S.A.** (ΔΛΒΔΚ Α.Δ. – Διιελ ηθή Βηγκε ραληθή Δηαιξ είαΚτηηαξ ίλεο) pulp and paper factory represents one of the earliest and most ambitious efforts in Greece‘s post-war industrial strategy to capitalize on **domestic raw materials for industrial processing**. Founded in **1949**, during a period of state-driven economic recovery following World War II and the Greek Civil War, the company was established with the express purpose of producing **straw-based cellulose pulp**. This material was to be derived from the **wheat-rich agricultural plains of Thessaly**, especially Larisa, often referred to as the nation's "breadbasket".

The vision behind ELVEK was both economic and strategic: to substitute imports of wood-pulp-based paper with a **locally produced alternative**, by leveraging the abundance of wheat straw — an agricultural by-product. This strategy aligned with broader European trends in the mid-20th century to experiment with **non-wood fibers** in paper manufacturing, though such attempts were often limited in technological scalability.
In **1965**, ELVEK expanded to include a **fully operational paper production facility**, transitioning from raw pulp to finished paper goods. This marked the peak of its industrial capacity, and at its height, the plant supported **dozens of full-time workers** and contributed to Greece‘s domestic packaging and printing sectors.

The factory held symbolic significance as well: **Prime Minister Konstantinos Karamanlis**, accompanied by government officials, laid the cornerstone of the facility in a formal ceremony, emphasizing its national importance as a **flagship industrial project in Thessaly**. The event was widely publicized and intended to boost confidence in regional industrialization outside the Athens-Thessaloniki axis.

However, by the early 1980s, the company began to struggle with **financial mismanagement, operational inefficiencies, and increasing competition** from global paper producers. The lack of modernization in machinery, low product quality compared to imported alternatives, and the burden of outdated production processes led to a **declaration of bankruptcy in 1983**. The facility continued minimal operations for a few more years but was officially closed in **1991**.

Today, the ELVEK site stands as a **remnant of Greece’s mid-century industrial policy**, symbolizing both the ambitions and limitations of rural industrialization in a globalizing economy. Its large footprint, flat terrain, and historic use make it a candidate for **adaptive reuse**, especially within logistics and light industrial frameworks — provided its legacy environmental impact is properly assessed.

- **Coordinates**: 39.6867920 N, 22.4689440 E
- **Location**: Omorfokhori, Larisa Regional Unit, Thessaly
- **Original Use**: Straw pulp and paper production plant (1949–1991)
- **Operational Timeline**:
    - 1949: ELVEK S.A. established
    - 1965: Paper plant operational
    - 1983: Declared bankruptcy
    - 1991: Final closure
- **Historical Significance**: Inaugurated with ceremonial laying of cornerstone by Prime Minister Konstantinos Karamanlis.

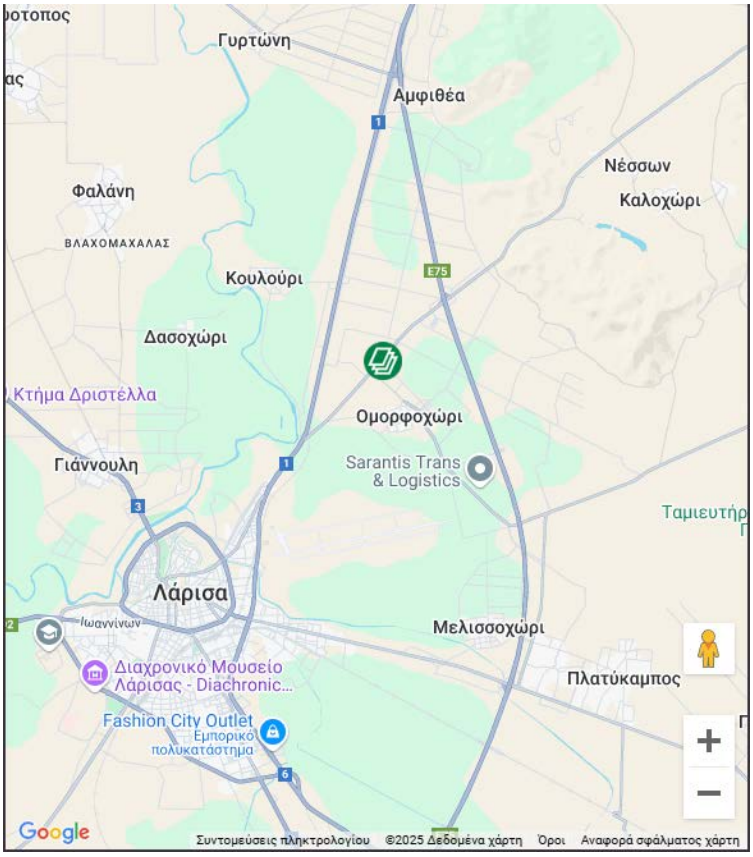


Figure 6.13 Location of ELVEK Pulp & Paper Mill

Geographical Context and Distances

Reference Point	Distance (by road)	Approx. Travel Time
Larisa City Center	~8.5 km	~12 minutes
Volos City Center	~65 km	~1 hr 10 minutes
Port of Volos	~67 km	~1 hr 15 minutes
Nea Anchialos Airport	~75 km	~1 hr 20 minutes
E75 Motorway Access	~5.2 km (Interchange)	~6 minutes
Larisa Train Station	~8.4 km	~10–12 minutes

Table 6.16 Distances and according travel times from significant infrastructure near ELVEK Pulp & Paper Mill

Infrastructure and Intermodal Potential

- **Road**: Immediate access to Larisa‘s urban road network and close proximity to E75 (PATHE) — optimal for long-haul trucking and national freight distribution.
- **Rail**: Though the site is not adjacent to a rail line, it lies ~8 km from the central Larisa rail hub, which is integrated into the **PATHEP rail corridor** (TEN-T core network). This provides potential for truck-to-rail transfers via nearby logistics terminals.
- **Sea**: Within reasonable trucking distance of the **Port of Volos**, which provides mixed cargo services, though limited container handling.
- **Air**: Nearest cargo-compatible airport is Nea Anchialos. Limited current freight volume, but part of Thessaly‘s future logistics strategy.

This location is **highly accessible by road**, moderately positioned for rail connection, and within strategic reach of sea and air routes — giving it **strong multimodal logistics potential**.

Figure 6.14 Infrastructure of ELVEK Pulp & Paper Mill

Site & Land Characteristics

- **Land Use**: Industrial (legacy); likely zoned for general industrial use (ΒΗΠΔ.) under current spatial plans.
- **Plot Size**: Estimated ~10–20 hectares (exact surface area needs verification).
- **Surrounding Area**: Semi-rural, agricultural and light-industrial blend; compatible with low-noise logistics activities.
- **Topography**: Flat and buildable — minimal grading or leveling required.
- **Structural Legacy**: Possible remaining buildings may need demolition or environmental remediation, depending on contamination status from historic operations.

Legal & Environmental Considerations

- **Land Ownership & Status**: Unconfirmed — further research required in the Larisa land registry (Κηξκα ηγι όγηγ).
- **Zoning**: Likely already within a general industrial use zone, simplifying approval of logistics redevelopment.
- **Environmental Risk**:
  - Past use of chemical pulping (e.g., sodium hydroxide, sulfur compounds) may have left soil contamination.
  - May require Environmental Baseline Assessment (EBA) under Directive 2010/75/EU for industrial reuse.

SWOT Analysis – Intermodal Suitability

Category	Description
Strengths	Close to Larisa city, road network, existing industrial footprint, symbolic historical legacy
Weaknesses	No on-site rail spur, unknown environmental liabilities
Opportunities	Logistics retrofitting, dry port support hub, NSRF or RRF-funded redevelopment
Threats	Potential soil contamination, legal ownership/heritage listing complications

Table 6.17 SWOT Analysis for ELVEK Pulp & Paper Mill

Comparative Matrix vs. Old Sugar Factory (Larisa)

Factor	Old Sugar Factory (Larisa)	Former ELVEK Plant (Omorfokhori)
Distance to City Center	~6 km	~8.5 km
Highway Proximity	~2 km	~5 km
Rail Access	Planned direct access (on-site)	8 km to rail hub (shuttle required)
Port Access (Volos)	55 km	67 km
Site Zoning	Industrial	Presumably industrial (verify)
Multimodal Score	Very High	High
Reuse Readiness	High	Medium–High

Table 6.18 Comparative Evaluation of ELVEK Pulp & Paper Mill vs. Old Sugar Factory

Suggested Future Use for ELVEK Site

Given its location, infrastructure links, and existing industrial identity, the ELVEK site is a **realistic alternative** for:

- A **secondary intermodal satellite hub**, supporting Larisa's main logistics center
- A **freight consolidation and distribution depot** (short-distance trucking + regional rail)
- A **reverse logistics center** (returns, reprocessing, circular economy activities)
- A **hub for low-intensity urban freight (city logistics)** if connected to urban delivery zones

Historical & Symbolic Significance

- One of the **earliest pulp industry efforts in postwar Greece**, signifying industrial decentralization during the Karamanlis era
- Strong local memory and historical visibility — potential for adaptive reuse to combine logistics and cultural/heritage functions
- Formerly promoted as a **flagship agro-industrial innovation** exploiting Thessaly's wheat plains

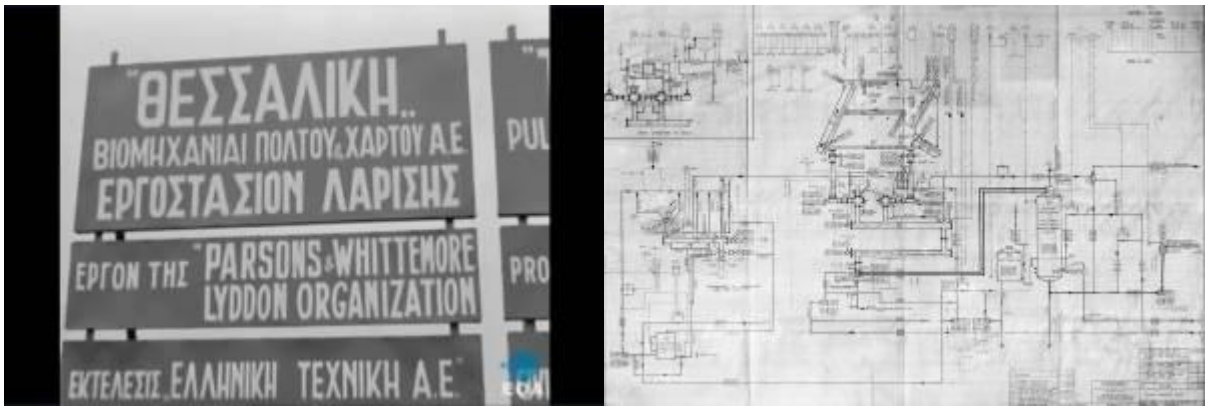


Figure 6.15 Historical photos of ELVEK Pulp & Paper Mill

6.8.3 Former Cold Storage Facility – Larisa (Demolished 2013)

- **Coordinates**: 39.6306600 N, 22.4263810 E
- **Municipality**: Larisa, Thessaly Region

- **Land Use**: Former industrial/cold chain logistics use
- **Current Status**: Demolished (March 29, 2013) — lot presumed vacant or redeveloped

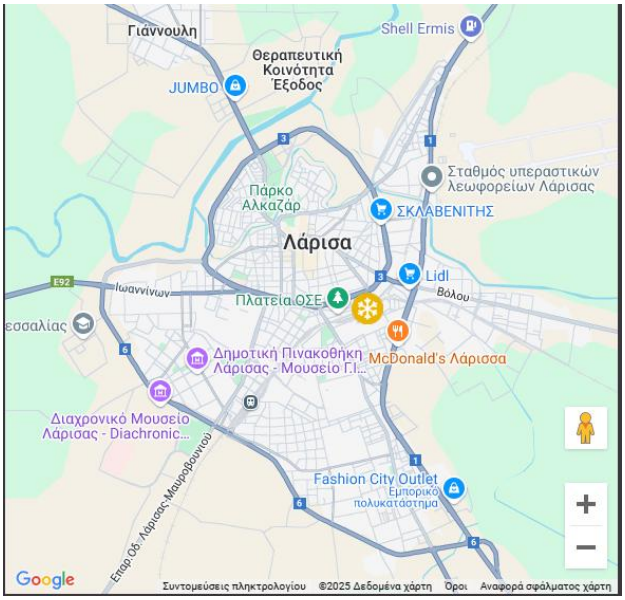


Figure 6.16 Location of Former Cold Storage Facility

Historical Background

This cold storage facility in Larisa was part of the region‘s mid-20th century infrastructure to support agricultural supply chain logistics, particularly perishables such as fruits, vegetables, and dairy products. Given Thessaly‘s dominant role in primary production, the facility played a key role in post-harvest storage, processing, and urban distribution.

Although documentation on its ownership or founding entity is scarce, visual and locational evidence indicates it operated during the 1970s–early 2000s, aligning with the era when Greece expanded its food distribution infrastructure through state and semi-private partnerships.

The facility appears to have been decommissioned by the late 2000s and was ultimately demolished on March 29, 2013, according to photographic evidence. It likely succumbed to obsolescence due to changes in cold-chain standards (e.g., EU regulation), energy inefficiency, or urban redevelopment plans.

Its removal reflects a broader transition in Greek logistics from centralized urban cold storage to decentralized, regional or mobile refrigerated logistics systems, especially after EU CAP (Common Agricultural Policy) reforms and food trade liberalization.

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Larisa City Center	~2.5 km	~6 minutes
E75 Motorway (PATHE)	~3.2 km	~7 minutes
Larisa Railway Station	~2.1 km	~5 minutes
Port of Volos	~55 km	~1 hr
Nea Anchialos Airport	~65 km	~1 hr 10 min

Table 6.19 Distances and according travel times from significant infrastructure near Former Cold Storage Facility

Infrastructure Evaluation

- **Road Access**: Located within the Larisa urban grid, with direct road links to the National Road and short access to the PATHE highway.
- **Rail Access**: Only ~2.1 km from the Larisa central rail station, connected to the Athens–Thessaloniki main line (electrified, TEN-T corridor).
- **Multimodal Potential**: High if the land were reused — ideal proximity to all transport modes except sea.
- **Land Connectivity**: The area is already part of Larisa‘s urban fabric and could easily be connected to a regional freight or intermodal logistics corridor.

Figure 6.17 Infrastructure of Former Cold Storage Facility

Land and Redevelopment Characteristics

- **Zoning**: The site is presumed to be within **urban/industrial/commercial zoning**. Since demolition occurred post-2010, it may already be integrated into Larisa's updated **General Urban Plan (GUP)**.
- **Plot Condition**: As of 2023 satellite imagery, the area shows signs of either reuse or continued vacancy.
- **Surrounding Use**: Mixed — includes residential, light industrial, and commercial zones. Ideal for low-noise logistics or value-added services.

SWOT Analysis – Intermodal Logistics Use

Category	Description
Strengths	Excellent proximity to road and rail, previous logistics use, central urban location, proven cold-chain history
Weaknesses	Facility no longer exists (new construction or clearance required), small surface area limits scalability
Opportunities	Reuse as an urban consolidation center, cold-chain distribution node, or final-mile logistics hub
Threats	Land may have been re-zoned for residential/commercial use, competition from larger sites with direct rail links

Table 6.20 SWOT Analysis for Former Cold Storage Facility

Comparison with Old Sugar Factory (Larisa)

Factor	Old Sugar Factory Site	Cold Storage Site (Demolished)
Rail Access	Adjacent, planned siding	2.1 km from main station

Road Access	Direct to highway	Urban street grid to highway
Redevelopment Complexity	Medium	High (already demolished)
Urban Integration	Periphery	Central
Multimodal Integration	Very High	High (except seaport)
Site Size	Large (25+ ha)	Small (approx. 1–3 ha)

Table 6.21 Comparative Evaluation of Former Cold Storage Facility vs. Old Sugar Factory

Redevelopment Potential (Strategic View)
While the original building no longer exists, this plot retains strong redevelopment value for:

- An urban freight consolidation hub (suitable for last-mile or same-day delivery operations)
- A cold-chain distribution node, especially for pharma, food & beverage sectors
- A pilot urban logistics micro-hub as part of an EU „green delivery" or smart city initiative (e.g., EIT Urban Mobility, Horizon Europe funding)
- A commercial logistics co-working facility supporting local SMEs (reverse logistics, parcel handling, etc.)

6.8.4 Former Afoi Magrizou S.A. Textile Factory

- **Coordinates**: 39.6671667 N, 22.3960000 E
- **Municipality**: Larisa, District of Giannouli, Thessaly
- **Original Use**: Textile manufacturing (family-owned company: David, Moisis & Nina Magrizos)
- **Current Status**: Inactive; plant shut down in the 1990s after stock market and accounting scandal

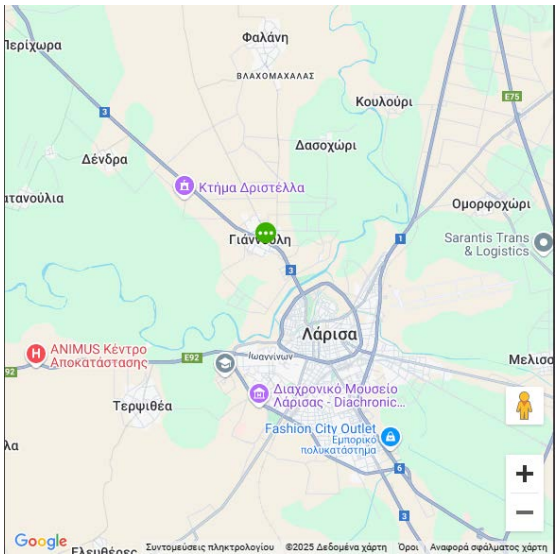


Figure 6.18 Location of Former Afoi Magrizou S.A. Textile Factory

Historical Background – Translated and Summarized
The company **"Afoi Magrizou S.A."** (Magrizos Brothers) was a **small textile enterprise based in Larisa**, founded and managed by members of the **Magrizos family**. The factory came into public scrutiny during a notorious **1996–1998 Greek stock market manipulation scandal**.

- Between 1995–1996, the firm's shares rose from **200 drachmas to almost 1,000**, due to speculative trading and a falsified business plan involving the founding of a bank in Albania and a capital increase of 2.5 billion drachmas.

- The stock market activity was driven by interlinked individuals and entities: stockbroker **Dimitris Argyriadis**, businessman **Panagiotis Tryfon**, and financial firm **Delta**.
- **Massive daily trading volumes** (involving "rolling four-day packet swaps") deceived retail investors, causing widespread losses.
- In 1998, Tryfon and Argyriadis were **provisionally detained**, and a total of **180 people were tried** in relation to the financial misconduct.

The scandal had **reputational and financial consequences**, both for investors and for Larisa's industrial base, which was already declining by the late 1990s.

Geographical Context and Distances

Reference Point	Distance (by road)	Travel Time
Larisa City Center	~4.5 km	~10 minutes
Volos City Center	~60 km	~1 hr
Port of Volos	~62 km	~1 hr 5 min
Nea Anchialos Airport	~70 km	~1 hr 10 min
National Road E75	~3.5 km	~5 minutes
Larisa Train Station	~5 km	~8 minutes

Table 6.22 Distances and according travel times from significant infrastructure near Former Afoi Magrizou S.A. Textile Factory

Infrastructure and Intermodal Evaluation

- **Road Access**: Excellent. The site is within 3.5 km of the E75 Motorway (PATHE), enabling fast freight access to Athens, Thessaloniki, and Volos.
- **Rail**: ~5 km from Larisa Train Station, a key node on Greece‘s PATHEP corridor (part of the **TEN-T core rail network**). Offers potential for **rail-road logistics integration**.
- **Sea Access**: Accessible by road to the Port of Volos (~62 km), allowing container or bulk shipping operations.
- **Air**: Nearest airport is Nea Anchialos, providing limited seasonal cargo capacity.

The site's multimodal potential is **medium-high**, especially if integrated into a rail-linked logistics chain via Larisa.

Figure 6.19 Infrastructure of Former Afoi Magrizou S.A. Textile Factory

Land, Legal, and Environmental Conditions

- **Zoning**: Located within the urban-industrial perimeter of Giannouli. Presumably zoned for **light or medium industry**, compatible with logistics or warehousing uses.

- **Land Type**: Flat and buildable. Urban-fringe location suitable for last-mile operations or central distribution.
- **Size**: Estimated ~5–8 hectares. May require plot expansion or adjacent land acquisition for full intermodal use.
- **Environmental Concerns**:
  - Possible residual waste from textile production (chemical dyes, solvents)
  - Legal records from the 1990s suggest financial malfeasance but no known environmental violations
- **Legal Status**: Unknown — ownership and land registry (Κτηματολόγιο) must be verified for potential acquisition or development.

SWOT Analysis – Intermodal Suitability

Category	Description
Strengths	Excellent road proximity, urban access, prior industrial use, relatively short distance to Larisa's rail and labor market
Weaknesses	Legacy from financial scandal, potential regulatory burdens, limited available surface area
Opportunities	Urban freight, last-mile hub, regional 3PL platform, NSRF/EU funding for brownfield reuse
Threats	Legal complications in land transfer, site contamination unknown, overshadowed by better-located facilities

Table 6.23 SWOT Analysis for Former Afoi Magrizou S.A. Textile Factory

Comparison vs. Old Sugar Factory (Larisa)

Factor	Old Sugar Factory (Larisa)	Afoi Magrizou Factory (Giannouli)
Distance to City Center	~6 km	~4.5 km
Highway Proximity	~2 km	~3.5 km
Rail Access	Adjacent (planned siding)	5 km (requires truck transfer)
Site Size	25–30 ha	~5–8 ha
Multimodal Integration	Very High	Medium–High
Zoning Status	Industrial	Likely industrial
Redevelopment Complexity	Low	Medium

Table 6.24 Comparative Evaluation of Former Afoi Magrizou S.A. Textile Factory vs Old Sugar Factory

Strategic Redevelopment Potential

The Afoi Magrizou site could be realistically reused as:

- An **urban distribution node** for logistics companies operating in Larisa‘s growing delivery economy (city logistics)
- A **cross-dock platform** for regional movement of light and high-value cargo
- A **reverse logistics depot** or **freight consolidation site** (if warehousing or cold storage added)
- A potential **“green logistics” demonstration zone** under an EU-funded brownfield regeneration scheme

Chapter 7. Founding of an Intermodal Terminal Center in the establishment of Old Sugar Factory

7.1 The Larissa Intermodal Center Project

The evolution of logistics hubs worldwide has led to a variety of facility types, each serving a unique role in the modern supply chain. Understanding these categories is essential when considering the proposed development of an intermodal logistics hub in the area of the old sugar factory outside Larissa reflects a strategic reuse of a historically significant industrial site that once symbolized Thessaly's industrial might. In the context of national infrastructure, Larissa occupies a pivotal position in Greece‘s logistics network. It‘s strategic position along with the existing infrastructure matrix enhances the connectivity of the region, making it suitable for a hub that integrates road, rail, and potentially air transport. Greece‘s participation in the EU‘s TEN-T network and the Mediterranean Corridor further increases the geostrategic value of such a logistics platform in Larissa, allowing the site to serve as a transshipment point not only for domestic distribution but also for Balkan, Central European, and Middle Eastern trade flows.

From an economic development standpoint, the repurposing of the sugar factory site aligns with broader goals of revitalizing Thessaly‘s industrial landscape while diversifying regional employment opportunities. This development is forecasted to create direct and indirect employment, reduce logistics costs for agri-food and manufacturing firms in the region, and stimulate local service sectors (transportation, maintenance, ICT).

Lastly, the intermodal center is designed not only with operational efficiency in mind but also with environmental and legislative compliance. The project is expected to meet EU Green Deal targets with integrated PV systems, energy-efficient equipment, and sustainable waste/recycling plans. Compliance with Greek zoning, logistics, and transportation legislation ensures institutional stability, while environmental impact assessments (EIAs) and safety frameworks are being modeled based on existing Greek intermodal hubs, including the Thriasio Logistics Center. Through an innovative and sustainable approach, the transformation of the former sugar factory into a state-of-the-art logistics gateway for Central Greece aims to become a flagship project of regional regeneration and national logistics competitiveness. In order to support this thesis let‘s break down the foretold pillars of this intermodal project.

7.2 Project Rationale: Repurposing the Old Sugar Factory in Larissa

After a detailed examination and operational and cost effective assessment of the given locations in order to establish an intermodal center in Thessaly region the most fruitful and resourceful location that ~~-sa~~tisfies” all the indicators of a successful logistics pillar in Greece is the positioning of the intermodal project in the area of the Old Sugar Factory that is located

a few kilometers outside the city of Larissa. The proposed Larissa Intermodal Center, situated on the site of the former Hellenic Sugar Industry (EBZ) factory, presents an opportunity to transform a historically significant industrial asset into a modern logistics hub that aligns with both EU and Greek strategic priorities. The conversion of the EBZ site into an intermodal facility would not only revitalize a brownfield area but also contribute to the integration of regional and national logistics networks, thereby enhancing trade competitiveness and sustainability.

The strategic location of the EBZ site, coupled with the existing infrastructure and potential for rail connectivity, positions the Intermodal Center to serve as a pivotal node within the TEN-T (Trans-European Transport Network) corridors . This alignment with the EU‘s broader vision for seamless, multimodal freight transport networks underscores the project‘s significance for regional and European logistics integration.

7.3 Foundational Indicators and Operational Framework for the Larissa Intermodal Terminal Project

The Larissa intermodal terminal project has been shaped and formed within a well-defined framework of pivotal indicators and parameters that establish the operational boundaries and developmental trajectory of the facility, especially considering its location on the site of the old sugar factory. These critical factors encompass physical infrastructure specifications, equipment capabilities, container flow characteristics, vehicle logistics, storage strategies, human resource planning, technological infrastructure, environmental and energy considerations, as well as operational performance metrics. Drawing from extensive European experience—particularly from successful hubs like the Duisburg Gateway Terminal—and adapting these insights to the Greek market and regulatory environment, the Larissa terminal's design and implementation respond to the complex requirements of modern intermodal freight transport. This includes ensuring adequate rail track capacity, efficient stacking and reefer zones, optimized handling equipment, and integration with regional transport corridors, all while balancing sustainability goals and labor market realities. The European Court of Auditors‘ recent assessments emphasize the necessity of interoperable infrastructure, reliable modal connections, and digital information accessibility, which have been incorporated into Larissa‘s planning to avoid common pitfalls such as delays and fragmented ownership structures that have hindered other projects.

Within these boundaries, the Larissa intermodal terminal must function as a competitive and efficient node in Greece‘s logistics network, contributing meaningfully to the national economy. The parameters guiding its development—such as import/export ratios, dwell time assumptions, rehandling rates, and customs clearance needs—reflect both the operational realities and market demands specific to the Greek context. The project also recognizes the importance of phased development and diversified service offerings to mitigate risks and adapt to evolving freight patterns, as highlighted in European best practices. Moreover, the terminal‘s alignment with TEN-T corridor objectives and Greece‘s strategic push for modal shift from road to rail ensures that it supports broader EU and national goals for greener, more sustainable freight transport. This strategic positioning, combined with active stakeholder engagement and adherence to Greek environmental and labor regulations, sets the foundation for Larissa to develop successfully and sustainably.

Ultimately, the Larissa intermodal terminal‘s contribution to the vast Greek economy hinges on its ability to integrate these multifaceted parameters into a coherent operational framework that maximizes throughput, minimizes environmental impact, and fosters regional economic development. By leveraging lessons from European intermodal centers and tailoring them to local conditions—such as infrastructure limitations, labor market characteristics, and regional trade flows—the project aims to become a vital logistics hub that enhances Greece‘s competitiveness in global supply chains. Its successful realization will not only improve freight efficiency and modal connectivity but also stimulate investment, job creation, and technological advancement in Thessaly and beyond, thereby reinforcing Greece‘s role in the evolving European freight transport landscape

Those significant indicators mentioned above are given accordingly below:

Data Item	Description
Terminal Area	Total surface area (m²), layout design
Rail Tracks	Number of tracks, length, capacity, access
Truck Bays & Gates	Number of entry/exit gates, loading/unloading bays
Stacking Area	Storage positions, tiers, capacity (TEU)
Reefer Zone	Space for refrigerated containers, power outlets, power needs
Empty Container Area	Zone for empty container storage
Maintenance Yard	Area for repairs and servicing

Table 7.1 Physical Infrastructure Data

Data Item	Description
Reach Stackers	Number, lifting capacity, speed
Forklifts	Type, capacity, fuel type
Rail Gantry Cranes	Type, lifting rate, automation level
RTGs (if used)	Lifting capacity, movement speed
Fuel/Energy Consumption	kWh/hour or diesel consumption per TEU
Uptime/Downtime Projections	Forecast data from suppliers
Preventive Maintenance Plan	Frequency of checks, MTBF/MTR estimates

Table 7.2 Equipment Data

Data Item	Description
Import/Export Ratio	Percentage of import/export containers
Container Types	20‘ dry, 40‘ dry, reefer, high cube, open top
Origin-Destination Matrix	Origin (e.g., Germany, Italy) – Destination (e.g., Balkans, Turkey)
Handling Time per Container	Average unloading/loading time
Dwell Time Assumptions	Average container dwell time (e.g., 1–2 days)
Rehandling Rate Estimation	Hypothetical rate (e.g., 5%–8%)
Customs Clearance Needs	Percentage of containers requiring customs check

Table 7.3 Container Flow Data

Data Item	Description
Number of trains/day	Expected frequency
Wagons per train	E.g., 25 wagons per train
Average dwell time	Hours of stay on track
Scheduled vs Actual Arrival	Planned entry/exit timing
Cooperation with Rail Operators	HUPAC, Ferrovie dello Stato, EV Cargo Rail

Table 7.4 Vehicle Data (Trains)

Data Item	Description
Number of trucks/day	Forecast based on local demand
Booking system usage	Appointment-based entries
Turnaround time forecast	Expected service time (e.g., 20–30 minutes)
Truck types	Chassis, trailers, local hauliers
Truck arrival patterns	Peak hours, daily distribution
Gate Capacity Planning	Number of entry/exit gates required

Table 7.5 Vehicle Data (Trucks)

Data Item	Description
Yard Layout	Design of stacks, rows, tiers
Stacking Strategy	FIFO, LIFO, priority-based stacking
Storage Density	TEU per m²
Block Allocation Rules	Container placement rules
Container Retrieval Logic	Rules for locating containers
Buffer Zones	Temporary storage for peak times

Table 7.6 Storage Data

Data Item	Description
Shift Patterns	24/7 operation or single shift
Staff Roles	Operators, supervisors, IT, security, administration
Productivity Estimates	TEU/hour per operator
Training Requirements	Safety training, crane license, ISO certifications
Overtime Predictions	Estimation of possible overtime hours
Labor Cost Estimates	Monthly budget for labor costs

Table 7.7 Human Resources Data

Data Item	Description
TOS Selection	Navis N4, SAP EWM, custom-built
EDI & API Integrations	Support for integration with external systems
OCR / RFID Equipment	Expected use for tracking
CCTV & Security Systems	Security protocol design
Real-Time Monitoring Tools	Dashboard design, reporting modules
Data Storage Infrastructure	Cloud or on-premise server capacity planning

Table 7.8 Technological Infrastructure Data (IT & TOS)

Data Item	Description
Customer Portfolio (hypothetical)	Forwarders, shipping lines, rail operators
Volume per Customer	TEU/month per customer
Service Level Agreements	Expected performance (on-time delivery, turnaround)
Booking Preferences	Preferred slots, appointment rules
Customer Satisfaction Metrics	NPS, expected complaints, feedback loop design

Table 7.9 Customers & Partnerships Data

Data Item	Description
CO2 Emissions per TEU	Emissions calculation per TEU
Energy Consumption	kWh/day, peak load estimation
Electric Equipment Share	Percentage of electric equipment
Renewable Energy Plans	PV panels, green energy contracts
Noise Pollution Estimate	dB levels during peak hours
Waste Management Design	Recycling plan, incineration, waste treatment

Table 7.10 Environmental & Energy Data

Data Item	Description
Throughput Forecast	TEU/hour, TEU/day
Utilization Rates	Equipment uptime, gate usage, stack occupancy
Efficiency Indicators	Rehandling rate, dwell time
Financial Metrics	Cost per TEU, revenue projections, ROI
Sustainability KPIs	CO_2 per TEU, renewable energy percentage
Customer Satisfaction Goals	On-time departure rate, SLA compliance

Table 7.11 Operational Performance Data (KPIs)

Method	Description
Simulation Models	AnyLogic, FlexSim, DES (Discrete Event Simulation)
Benchmarking	Comparative analysis with other terminals
Expert Interviews	Logistics managers, rail operators, port consultants
Market Research	Freight flow analysis, regional trade patterns
Supplier Inputs	Specifications from equipment manufacturers
Government Reports	Statistics from ELSTAT, Greek Ministry of Transport
Rail Corridor Studies	Mediterranean Corridor, TEN-T, Pan-European networks
Digital Twins	Virtual operation simulations

Table 7.12 Data Collection Methods (Pre-Operational Phase)

7.4 Strategic Advantages and Multidimensional Benefits of the Larissa Intermodal Terminal

The Larissa Intermodal Terminal project is designed to deliver a comprehensive suite of strategic advantages that align with regional, national, and European priorities. By leveraging cost-efficient rail and maritime transport modes, the terminal reduces freight expenses for regional producers in Thessaly, enhancing the competitiveness of agricultural and industrial exports in global markets. Enhanced security protocols, including sealed container handling, safeguard high-value goods such as pharmaceuticals and electronics, while reduced road congestion and noise pollution improve urban livability for Larissa‘s residents. The terminal‘s operational flexibility ensures adaptability to supply chain disruptions, enabling agile rerouting and optimized transit times, which is critical for maintaining resilience in volatile markets. Capacity optimization through balanced truck-rail integration allows efficient handling of growing freight volumes, accommodating projected increases in Balkan and Mediterranean trade flows. Advanced supply chain visibility tools, such as real-time tracking, empower stakeholders with actionable data, improving decision-making and customer satisfaction. Most significantly, the terminal‘s regional economic impact—supporting Thessaly‘s agricultural modernization and industrial growth—stimulates job creation, skills development, and economic diversification, positioning Larissa as a pivotal logistics hub in Greece‘s broader economic strategy. Collectively, these benefits underscore the terminal‘s transformative potential, fostering sustainable development while reinforcing Greece‘s role in European supply chains.

Benefit	Description	Relevance to Larissa Project
Cost Efficiency	Lower freight costs via rail and sea modes	Enhances competitiveness of regional exporters

Environmental Sustainability	Up to 60% reduction in carbon emissions compared to trucking	Aligns with EU/Greek climate goals
Security	Sealed containers reduce theft and damage	Protects high-value goods
Reduced Congestion/Noise	Less highway traffic and noise pollution	Improves local quality of life
Operational Flexibility	Ability to adapt to disruptions and optimize transit	Increases supply chain resilience
Capacity Optimization	Efficient handling of large volumes with balanced truck-rail operations	Supports growing freight demand
Supply Chain Visibility	Real-time tracking and monitoring	Enhances operational control and customer service
Regional Economic Impact	Supports agriculture and industry growth	Drives local employment and economic diversification

Table 7.13 Summary Table of Benefits

7.5 Implementation Timeline

The successful delivery of the Larissa intermodal center requires a phased, well-coordinated approach spanning approximately 4 to 5 years from project initiation to full operational status. The timeline below reflects typical durations for complex intermodal projects, adapted to the Greek context and your site specifics.

Phase	Key Activities	Duration	Timeline Example (Months)
1. Project Initiation & Planning	Feasibility studies, environmental assessments, stakeholder consultations, funding applications	6–9 months	0–9
2. Design & Permitting	Detailed engineering design, master planning, regulatory approvals, tendering for contractors	9–12 months	6–18
3. Site Preparation & Remediation	Environmental remediation, demolition of obsolete structures, site grading and utilities upgrade	9–12 months	12–30
4. Construction & Infrastructure Development	Construction of container yards, gate complexes, warehouses, roadworks, rail siding installation	12–18 months	24–42

5. Equipment Procurement & Installation	Acquisition and commissioning of handling equipment, IT systems, security installations	6–9 months	36–48
6. Testing, Training & Commissioning	Operational trials, staff training, safety audits, phased ramp-up of operations	3–6 months	42–54
7. Full Operational Launch	Commercial operations commence, continuous performance monitoring and optimization	Ongoing	54+

Table 7.14 Timetable of Necessary Preparing Procedures and Actions for a Fully Operational Intermodal Terminal Center

Figure 7.1 Historical photo of a worker outside the Old Sugar Factory

7.6 Historical Background and Rise of EBZ

The proposed intermodal center is strategically located on the site of the former sugar factory near Larissa, an area with a rich industrial heritage deeply intertwined with the economic development of Thessaly. The sugar factory, once a pivotal agro-industrial establishment, contributed significantly to the regional economy by supporting agricultural production and processing for over a century. Although operations ceased due to structural and economic shifts—including the EU‘s sugar sector reforms and evolving market conditions—the site remains a valuable asset due to its extensive land area and proximity to key transport corridors. This industrial legacy offers a unique opportunity to revitalize the area by transforming it into a modern logistics hub, leveraging existing infrastructure while aligning with urban redevelopment policies and the Greek institutional framework governing the reuse of ~~d~~angerous” or abandoned buildings, as outlined by local and national legislation.

The former Hellenic Sugar Industry (ΔΒΕ) factory in Larissa stands as a symbol of Greece‘s mid-20th-century industrial aspirations. Established in 1961, the plant was among the first in a network of sugar production facilities designed to make Greece self-sufficient in this essential commodity. The Larissa factory was the flagship facility, constructed by a German company, and played a central role in the regional economy, employing hundreds and sourcing beets from thousands of hectares in Thessaly. With a capacity of 2,000 tons of sugar beet per day, the Larissa factory contributed to a thriving national industry that, at its peak, processed over 32,400 tons across five Greek factories. However, due to mismanagement, international competition, and changing EU agricultural policy, the factory ceased operations, ultimately representing the broader decline of state-supported industrial production. Repurposing this historically significant site offers a unique opportunity to bridge Greece‘s industrial past with its logistics-driven economic future, giving new life to infrastructure that once employed thousands across the region.

Figure 7.2 Current state of the Old Sugar Factory

Figure 7.3 Photo of a number of the working staff in front of the main building of the Old Sugar Factory

7.6.1 Decline and Closure

The decline of what was once one of Greece‘s most historic industries resulted from persistent mismanagement and financial malpractices that rapidly accumulated enormous debts.

The decline of ΔΒΕ began in 2006, coinciding with EU sugar market reforms that halved Greece‘s production quota. This forced the closure of the Larissa and Xanthi factories and led to a dramatic reduction in domestic sugar production. Mismanagement, political interference, and financial missteps further exacerbated the company‘s problems, resulting in mounting debts (over €52 million in losses between 2007–2015) and the mortgaging of assets—including the Larissa site. Multiple attempts to sell the company and its assets failed, and the company‘s production costs far exceeded those of imported sugar, making operations unsustainable.

A preliminary investigation by the Economic Police (2007–2015) revealed that former executives sold goods on credit to other companies without adequate guarantees, sold products below cost, and made donations of sugar at the company‘s expense. The total damage to EBZ during this period amounted to €52 million.

Behind-the-scenes maneuvers pushed EBZ to the brink of bankruptcy. For example, despite orders to halt sugar sales to control inventory, 7,000 tons were suddenly sold. Reports also highlighted sugar purchases from multinationals at prices well below market rates and problematic borrowing from the Agricultural Bank of Greece (ATE), despite EBZ being its subsidiary.

7.6.2 The Attempts at Restructuring of the Hellenic Sugar Industry (EBZ)

The Hellenic Sugar Industry (EBZ) entered a critical phase as the government developed a restructuring plan involving the separation of its assets into special purpose companies. Among these assets is the inactive Larissa factory, valued commercially at approximately €6.78 million.

The plan envisages transferring EBZ‘s most valuable assets—shares of Serbian subsidiaries, factories in Platy and Larissa, prime real estate, and part of the liabilities—to three SPVs created by Piraeus Bank, while residual assets and liabilities remain with EBZ (OldCo). The bank will reduce its claims by €96.3 million, and other creditors face a ~~h~~aircut” of up to 90%, receiving only 10% of their claims from the new companies, with the rest to be settled through liquidation of OldCo assets.

As of October 31, 2018, EBZ‘s total liabilities stood at nearly €249 million, with €177 million owed to Piraeus Bank and nearly €2 million to the Cooperative Bank of Serres. Other privileged creditors include social security funds, employees, the public sector, and sugar beet producers.

The rehabilitation plan prioritizes maintaining EBZ‘s business operations and securing the jobs of its 292 employees. A legislative provision (Law 4587/2018) supports special unemployment benefits and transfers of older workers to public sector roles.

The special purpose companies will receive assets valued over €105 million, including Serbian subsidiaries, operational factories, equipment, licenses, and commercial rights. The OldCo will retain assets worth nearly €94 million, including customer receivables, unencumbered agricultural land, sugar stock, and other claims.

The restructuring of the former sugar factory site, previously operated by EBZ, represents a critical backdrop for the Larissa intermodal terminal project, shaping both the challenges and opportunities for successful development. EBZ‘s temporary court protection under Article 106A of the Greek Bankruptcy Code initiated a comprehensive restructuring plan aimed at stabilizing the company‘s financial position and operational viability. Innovation Brain, a reputable European restructuring consultancy, is spearheading this turnaround effort with the support of Elements Capital, an investment firm committed to injecting approximately €100 million over five years. This capital infusion is intended to revitalize operations, reduce debt exposure, and safeguard employment for the remaining workforce, thereby preserving social stability in the region. However, despite these concerted efforts, EBZ‘s recovery remains vulnerable to ongoing political, financial, and market uncertainties, which underscore the importance of careful risk management and adaptive planning in the Larissa terminal project. The intermodal terminal‘s development must therefore be closely aligned with the restructuring dynamics, leveraging the renewed focus on asset optimization and financial restructuring to ensure that the project not only revitalizes the brownfield site but also contributes sustainably to the regional economy and logistics infrastructure. This synergy between the terminal‘s operational goals and EBZ‘s restructuring framework is pivotal for unlocking the full economic potential of the site and fostering long-term growth in Thessaly.

Figure 7.4 Overview of the Old Sugar Factory today

7.7 Geographical and Strategic Location with Connectivity Advantages

Larissa‘s geographical position as the capital of Thessaly and a major transport nexus in Central Greece enhances the viability of the intermodal center. The site‘s proximity to major ports such as Thessaloniki and Volos, as well as regional airports, facilitates multimodal connectivity essential for efficient freight movement. The intermodal center will capitalize on these linkages to serve as a critical node in Greece‘s logistics network, supporting the country‘s ambitions to strengthen hinterland connections and optimize supply chains. This aligns with national and EU transport policies emphasizing the integration of maritime, rail, and road freight to reduce costs and environmental impact.

The Larissa site is ideally positioned to serve as an intermodal logistics hub due to its exceptional connectivity across transportation modes. Furthermore, the location benefits from inclusion in the EU‘s Trans-European Transport Network (TEN-T), specifically the Orient/East-Med and Mediterranean Corridors, enhancing its potential as a transshipment point for goods moving between the Balkans, Central Europe, and the Middle East. Also its strategic location in Greece and its role in improving multimodal freight connectivity position it as a potentially important node within broader Eurasian and European transport networks. Given Greece‘s role as a key entry point for Chinese goods into Europe, Larissa‘s terminal could be considered a fundamental cornerstone for Chinese Belt Initiative (CBI) for Europe‘s logistics infrastructure. This strategic position ensures high throughput potential while supporting multimodal synergies.

The **Government Gazette (ΦΕΚ)** (April 1975) further validates the expropriation and zoning of the area for industrial use, specifically for the establishment and operation of the sugar factory. This legal clarity is crucial for any future redevelopment, as it establishes a clear

chain of title and industrial land use, streamlining the permitting process for transformation into an intermodal center.

7.7.1 Topographical and Land Use Overview

The location of the old sugar factory site near Larissa offers several comparative opportunities relative to other potential sites and also engulfs some challenges for an intermodal center in the Larissa region:

Opportunities

1. Strategic Multimodal Connectivity

The old sugar factory site benefits from its proximity to major transport corridors, including key regional roads and rail links. This facilitates seamless integration of road and rail freight, a core advantage for intermodal centers aiming to optimize container flows and reduce drayage costs. As highlighted in logistics studies, sites near superior infrastructure and rail accessibility significantly enhance operational efficiency and attract higher container volumes. The site‘s location near Larissa—a regional hub with connections to ports like Thessaloniki and Volos—enables efficient multimodal transfers, reducing transit times and improving supply chain reliability.

2. Access to Ports and Airports

The site benefits from reasonable distances to major Greek ports such as Thessaloniki and Volos, as well as airports in Thessaloniki and Volos, enabling multimodal freight flows involving maritime and air transport. This accessibility is comparable or superior to other Larissa-area sites that may be less connected or further from these pivotal logistics nodes. The ability to efficiently link road, rail, sea, and air transport modes is a critical factor in intermodal center success, and the old sugar factory‘s location supports this multimodal connectivity.

3. Reuse of Existing Industrial Infrastructure and Land

Repurposing the old sugar factory area leverages existing industrial land and some remaining infrastructure, which can reduce initial capital expenditures compared to greenfield developments. This approach aligns with sustainable redevelopment principles and urban renewal policies common in Greece, turning a historically significant but underutilized site into a modern logistics asset. Similar cases internationally demonstrate that industrial heritage sites, when strategically redeveloped, can provide cost-effective and logistically advantageous locations for intermodal terminals.

4. Economic Revitalization and Regional Development Synergies

The site‘s historical role as a major agro-industrial facility ties it closely to the regional economy of Thessaly, known for its agricultural production and growing industrial base. Establishing an intermodal center here supports local producers by improving access to national and international markets, fostering economic diversification, and creating

employment opportunities. This synergy between logistics infrastructure and regional economic strengths is crucial for sustainable growth and aligns with Greek regional development strategies and EU cohesion policies.

5. Operational and Cost Efficiency Benefits

Locating the intermodal center at this site reduces drayage distances to nearby ports and airports, a critical factor in controlling logistics costs. Industry analyses show that proximity to intermodal facilities can dramatically lower drayage expenses, improve supply chain control, and enhance service reliability for shippers. Additionally, the site‘s accessibility and integration with existing road and rail networks minimize operational disruptions and support scalable growth, making it a competitive choice compared to alternative locations farther from key transport nodes.

Challenges

1. Site Remediation and Environmental Concerns

Like many former industrial sites, the old sugar factory area may have soil contamination, residual industrial waste, or structural degradation requiring extensive remediation before redevelopment. Experiences from similar projects, such as the British Sugar site in York and Kidderminster, highlight that environmental assessments, cleanup, and reclamation can be costly and time-consuming. Compliance with Greek environmental laws and EU directives on contaminated land remediation will be mandatory, potentially impacting project timelines and budgets.

2. Planning and Regulatory Approvals

Redeveloping a large industrial site involves navigating complex planning processes, including securing permits, adhering to zoning regulations, and conducting public consultations. The York sugar factory redevelopment case illustrates the importance of early and ongoing engagement with local authorities and communities to address objections and ensure the project aligns with regional planning frameworks. In Greece, coordination with municipal, regional, and national authorities will be essential, particularly given the site‘s industrial heritage and proximity to residential areas.

3. Infrastructure Modernization and Adaptation

The existing infrastructure at the old sugar factory site may be outdated or unsuitable for modern intermodal logistics needs, necessitating significant upgrades or complete replacement. This includes roads, rail sidings, utilities, and buildings. Balancing the reuse of existing structures with the need for state-of-the-art facilities can pose technical and financial challenges. Additionally, integrating the site with current transport networks to achieve efficient multimodal connectivity requires careful engineering and investment.

4. Community and Social Acceptance

Large redevelopment projects can face resistance from local communities concerned about increased traffic, noise, environmental impacts, and changes to the area‘s character. The York redevelopment process involved extensive community forums and public exhibitions to incorporate stakeholder input and mitigate concerns. Similarly, in Larissa, proactive engagement with residents, businesses, and local authorities will be critical to foster support and ensure the project delivers social as well as economic benefits.

Taking into consideration all the above given significant information and regarding also the fact that the old sugar factory site (ΔΒΕ) in Larissa is a historically significant industrial property, with detailed topographical documentation dating back to its original expropriation and establishment in 1960 combined with the site‘s strategic location northeast of Larissa we can clearly conceive that has a significant geographical placement so to serve Greece‘s primary north-south axis. More specifically:

Sugar Factory in Sykourio, Larissa:

- **Total land area** at approximately 318,772 m² (31.9 hectares), with 27,021.15 m² (12,113.58 m² production units; 14,907.57 m² administration, staff, and storage buildings).
- Minimum sale price: €8,000,000
- Location: 2nd kilometer of the Larissa–Sykourio provincial road and old National Road Larissa–Thessaloniki
- The terrain is predominantly flat, which is ideal for logistics operations, container stacking, and large-scale industrial redevelopment.
- The property is bordered by agricultural land and is adjacent to the Peneios River basin, which may influence both drainage planning and environmental considerations.
- Currently inactive, last operated as a sugar factory in 2006 (following the withdrawal of 50.01% of the production quota per EU Regulation 320/2006). Now used for sugar storage and packaging.
- The original factory layout included production halls, warehouses, administrative buildings, auxiliary structures, and electromechanical equipment most of which remain idle but require assessment for structural integrity and suitability for reuse.
- The property is fully fenced, with established internal roadways and utility connections (water, electricity, natural gas), though all systems will require assessment and likely upgrading to meet modern standards.
- Redevelopment as an intermodal center will require zoning confirmation, classified for industrial use, simplifying conversion to a logistics or intermodal function. However, environmental impact assessments (EIA) and compliance with Law 3982/2011 and EU brownfield redevelopment directives will be

required, particularly due to possible soil or groundwater contamination from past industrial activities.

- Existing Utilities :

Utility	Status at Site	Capacity/Condition	Upgrade Needs
Water	Connected to municipal supply	Adequate for current industrial use	Increased capacity for terminal operations; fire suppression systems
Electricity	Connected to regional grid	Stable supply; aging infrastructure	Upgrade transformers and distribution for heavy equipment and lighting
Natural Gas	Available	Limited usage historically	Expansion for heating, maintenance workshops, and potential energy generation
Telecommunications	Basic telecom and internet	Limited bandwidth	High-speed fiber optic installation for terminal operating systems and communications

Table 7.15 Number of existing operational utilities in the area of the Old Sugar Factory

7.7.2 Regional and Transport Connectivity

Strategic Location:

- The site is situated northeast of the Larissa urban core, offering direct access to the city while remaining outside dense residential zones, minimizing potential conflicts with urban land uses.
- The Larissa–Sykourio provincial road, which connects to the regional road network and facilitates local freight movements.
- The old National Road Larissa–Thessaloniki provides a direct route to the northern Greek motorway network (A1/E75), facilitating road freight movements to Thessaloniki (approx. 150 km) and Volos (approx. 60 km).
- Larissa is a major rail hub on the Athens–Thessaloniki mainline, which is undergoing modernization efforts, including electrification and signaling upgrades, although progress has been slow and faces challenges. The proximity of the site to Larissa railway station presents a strategic opportunity to develop a dedicated rail siding or spur, enabling direct rail access to the intermodal terminal. This rail connection is

essential to facilitate modal shifts from road to rail, reduce carbon emissions, and improve freight efficiency.

- Port of Volos: ~60 km by road, suitable for short-sea shipping and regional exports.
- Port of Thessaloniki: ~150 km by road/rail, Greece‘s second-largest container and bulk port, with extensive international connections.
- Larissa Airport (Nea Anchialos): ~70 km, offering potential for air freight links.
- The site is well-placed to serve the agricultural heartland of Thessaly, supporting both inbound (fertilizer, machinery) and outbound (agricultural products, processed foods) logistics.

Transport Mode	Infrastructure	Distance from Site	Approximate Travel Time
Road	Larissa–Sykourio provincial road	Adjacent (0 km)	Immediate access
	Old National Road Larissa–Thessaloniki	~1 km	2 minutes
	A1/E75 Motorway (Athens–Thessaloniki)	~6 km	10 minutes
Rail	Larissa Railway Station (Athens–Thessaloniki mainline)	~3 km	5 minutes
Port	Port of Volos	~60 km	~1 hour by truck
	Port of Thessaloniki	~150 km	~2 hours by truck
Airport	Nea Anchialos Airport	~70 km	~1 hour by truck

Table 7.16 Distances and according travel times from significant infrastructure near Old Sugar Factory

7.7.3 Environmental and Legal Considerations

Given its industrial past, the site may present soil and groundwater contamination risks (e.g., from fuel storage, chemical use in sugar processing). A full environmental audit and remediation plan will be necessary, in line with Greek and EU brownfield redevelopment directives. In addition to that the property is free of major encumbrances but has been used as collateral in past EBZ financial restructurings; clear title and legal due diligence are prerequisites for investment.

7.8 SWOT Analysis and Strategic Fit

Alongside all the topographical benefits and infrastructural advantage an extent analysis must take place in order to assess the founding of an establishment with the role of an intermodal center in the wider area of Larissa. Given these considerations the strengths, weaknesses, opportunities and threats of this intermodal conception are presented below :

Strengths:

- Large, contiguous land parcel with existing industrial infrastructure.
- Excellent road and potential rail connectivity.
- Proximity to major agricultural and industrial production zones.
- Potential for rapid redevelopment with lower land acquisition costs compared to greenfield sites.

Weaknesses:

- Need for environmental remediation and infrastructure modernization.
- Outdated building stock may limit immediate reuse.
- Potential legal complexities due to past financial encumbrances.

Opportunities:

- Positioning as a regional logistics hub for Central Greece and Thessaly.
- Integration with national and EU transport corridors (TEN-T).
- Eligibility for EU and Greek redevelopment and green transition funding.
- Creation of new jobs and economic revitalization in a historically industrial area.

Threats:

- Competition from other logistics hubs (e.g., Volos, Thessaloniki).
- Regulatory delays in permitting and environmental approvals.
- Potential community concerns regarding increased traffic and industrial activity.

7.9 Technical Feasibility Assessment (Infrastructure and area allocation)

The redevelopment of the former ΔΒΕ sugar factory site into a modern intermodal logistics center requires a thorough technical feasibility assessment to ensure the project‘s viability and sustainability. The existing flat terrain and large contiguous land parcel (~318,772 m²) provide an excellent foundation for the construction of container stacking yards, gate complexes, storage facilities, and access roads.

7.9.1 Infrastructure Design and Suitability

Key technical feasibility criteria regarding the infrastructure include:

- **Infrastructure adequacy:** The site‘s existing road access to the Larissa–Sykourio provincial road and proximity to the old National Road Larissa–Thessaloniki meet the

necessary connectivity requirements for efficient truck movements. The potential for rail siding extension to the nearby Larissa railway station enhances multimodal capabilities.

- **Engineering and architectural requirements:** The existing industrial buildings, while requiring modernization, offer a structural base that can be adapted for administrative offices, warehousing, and maintenance facilities. New constructions for container stacking and handling areas will be designed to meet current industry standards for load-bearing capacity, drainage, and safety.

- **Technology integration:** The project will incorporate proven container handling technologies such as reach stackers, terminal tractors, and automated gate systems. The selection of equipment will balance operational efficiency with cost-effectiveness and compatibility with Greek infrastructure standards.

- **Geotechnical and environmental considerations:** Preliminary site investigations indicate stable soil conditions suitable for heavy container stacking and equipment operation. Environmental assessments will address legacy contamination from sugar processing activities, with remediation plans aligned with Greek and EU environmental regulations to mitigate risks.

7.9.2 Spatial Allocation

The layout of the Larissa intermodal center is thoughtfully designed to optimize operational efficiency and environmental integration. At its core, the container stacking yard occupies the largest central portion of the site, featuring multiple parallel stacking lanes separated by wide aisles that facilitate the smooth maneuvering of reach stackers and terminal tractors. Along the eastern boundary, dedicated rail tracks run continuously, comprising arrival, departure, and storage lines interconnected by internal switches to enable flexible train movements and efficient railcar handling. The gate complex is strategically positioned at the southern entrance, adjacent to ample truck parking and inspection lanes, ensuring streamlined security and customs processing for inbound and outbound freight. Warehouses and administrative buildings are conveniently located near the gate complex, providing easy access for personnel and supporting seamless coordination of logistics activities. Surrounding the entire site, buffer zones and landscaped areas serve to mitigate noise pollution and reduce visual impact on neighboring communities, enhancing the facility‘s environmental compatibility and social acceptance. This integrated site plan balances operational demands with sustainability and community considerations, establishing a robust foundation for the center‘s role as a key multimodal logistics hub. According to the risks, challenges and the existing infrastructure an initial conceptual plan for the design and development of the intermodal center divides the site into functional zones optimized for operational efficiency and safety. Thus said in the existing establishment and space of the Old Sugar Factory, the proposed geolocation and the according space allocation of crucial infrastructure needed for the optimal and fully operational performance of the new intermodal terminal center is depicted in the following picture :

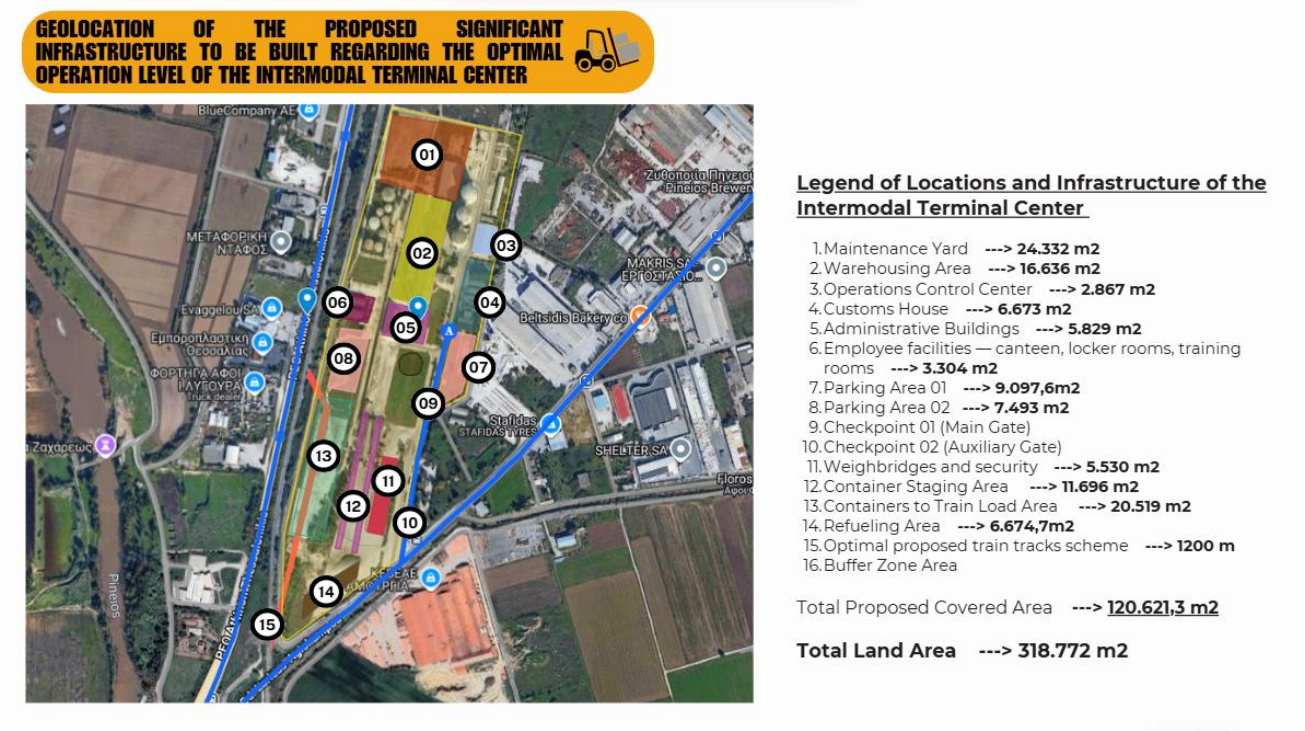


Figure 7.5 Space allocation of the proposed infrastructure that are essential for the fully operational new intermodal terminal center

7.9.3 Operational Flow and Connectivity

The inbound freight operations at the Larissa intermodal center represent a critical juncture in the logistics flow, where trucks and railcars converge at the gate complex, initiating a series of coordinated processes that ensure security, regulatory compliance, and efficient cargo handling. Upon arrival, all inbound vehicles undergo stringent security and customs inspections, which serve not only to safeguard the facility and national borders but also to streamline the clearance process, minimizing delays and bottlenecks. This gate complex functions as a controlled access point equipped with advanced scanning technologies and staffed by trained personnel, enabling rapid verification of cargo manifests and compliance with international trade regulations. Efficient management of this checkpoint is essential to maintaining throughput capacity, as any congestion here can cascade into operational delays throughout the terminal. Once cleared, freight proceeds to designated unloading or stacking areas, where the physical transfer of containers from transport vehicles to the terminal‘s storage infrastructure occurs. The layout and design of these areas are optimized for smooth traffic flow, allowing simultaneous handling of multiple shipments and reducing dwell times. This inbound phase is foundational to the terminal‘s overall performance, as it directly impacts the velocity of cargo movement and the ability to meet service level agreements with shippers and carriers.

Container handling within the stacking yard is a complex, technology-driven operation that involves the coordinated use of reach stackers, terminal tractors, and other specialized equipment to move containers efficiently between storage locations, loading docks, and outbound transport modes. Reach stackers, with their high maneuverability and lifting capacity, enable rapid stacking and retrieval of containers, optimizing yard space utilization

and facilitating quick access to high-priority shipments. Terminal tractors complement this by towing containers between the stacking yard and gate complexes or rail sidings, ensuring seamless intermodal transfers. The integration of terminal operating systems (TOS) with real-time tracking and scheduling software enhances operational precision, allowing for dynamic allocation of equipment and labor resources based on fluctuating demand patterns. Outbound freight operations mirror the inbound process, with containers loaded onto trucks or railcars destined for regional distribution centers or major ports such as Thessaloniki and Volos. This phase demands meticulous coordination to synchronize with shipping schedules and minimize turnaround times. Supporting these core activities are warehousing and maintenance zones that underpin operational continuity and enable value-added logistics services, including inventory management, packaging, and equipment upkeep. These support functions not only enhance the terminal‘s service portfolio but also contribute to its competitive advantage by offering integrated solutions that reduce total supply chain costs for customers. Together, these interconnected processes form a robust logistics ecosystem that maximizes throughput, minimizes costs, and supports the sustainable growth of the Larissa intermodal center as a strategic freight hub in the region.

7.9.4 Sustainability Features

Building upon the operational efficiency of inbound and outbound freight handling, the Larissa intermodal center integrates a comprehensive sustainability framework designed to minimize environmental impact while enhancing operational resilience. Energy efficiency is a cornerstone of this approach, achieved through the incorporation of LED lighting systems that significantly reduce electricity consumption compared to traditional lighting. Complementing this are solar panels strategically installed on warehouse roofs, harnessing renewable solar energy to power facility operations and reduce reliance on grid electricity. Additionally, energy-efficient HVAC (heating, ventilation, and air conditioning) systems ensure optimal climate control within warehouses and administrative buildings, balancing occupant comfort with minimized energy use. These measures collectively contribute to lowering the terminal‘s carbon footprint and operational costs, aligning with broader European Union directives on sustainable infrastructure development. The integration of such green technologies not only supports environmental stewardship but also enhances the terminal‘s appeal to eco-conscious clients and stakeholders, positioning Larissa as a forward-thinking logistics hub.

Green buffer zones comprising vegetated areas are strategically placed around the site to serve multiple functions: they act as natural sound barriers reducing noise pollution from freight activities, improve air quality by filtering airborne particulates, and enhance the aesthetic appeal of the terminal, fostering positive community relations. These ecological features contribute to a healthier working environment and demonstrate the project‘s commitment to harmonizing industrial activity with natural surroundings. Complementing these sustainability initiatives is the digitalization of terminal operations through the implementation of advanced Terminal Operating Systems (TOS). These systems provide real-time tracking of cargo, precise inventory management, and process optimization, enabling data-driven decision-making that enhances throughput and reduces waste. The synergy between digital technologies and sustainable infrastructure creates a smart, efficient, and environmentally responsible logistics ecosystem, reinforcing the Larissa intermodal center‘s role as a modern, integrated freight hub that meets the demands of today‘s supply chains while safeguarding resources for the future.

7.10 Economic - Industrial Environment and Cost Analysis

The economic backdrop of Thessaly, with a GDP exceeding €9 billion and a diversified industrial base including agriculture, manufacturing, and services, provides a fertile environment for the intermodal center‘s success. The region‘s economic indicators reflect steady growth and increasing demand for advanced logistics solutions, driven by both domestic production and international trade flows. The transformation of the old sugar factory site into an intermodal hub aligns with regional development strategies aimed at enhancing industrial competitiveness and employment. Moreover, the project supports Greece‘s broader logistics sector evolution, which has seen significant growth in third-party logistics (3PL) services and infrastructure investments, particularly in port modernization and hinterland connectivity. This synergy between local economic conditions and sectoral trends underpins the project‘s potential to generate substantial economic value and catalyze further regional development.

Transforming the abandoned sugar factory into a logistics hub aligns with regional economic revitalization strategies in Thessaly and national objectives to boost supply chain efficiency. The project integrates GIS-based spatial planning, real-time simulation of freight flows, and robust cost forecasting tools indexed to 2025 Greek construction and labor rates. It is expected to generate significant direct employment in warehousing, transportation, and ICT, while also creating secondary opportunities in services such as truck maintenance, customs brokerage, and regional agri-food exports. This diversification is critical given the decline of traditional sectors like furniture manufacturing in Larissa and the region‘s above-average unemployment (21%) and GDP per capita (83% of the national average). As such, the hub becomes a catalyst for economic modernization and convergence within the broader EU framework for cohesion and competitiveness.

The proposed intermodal hub in Larissa will include container stacking zones (with a modeled capacity of 10,528 TEU in 5-tier configurations), reefer power zones, maintenance yards, gated truck access with advanced appointment systems, and at least four rail tracks with 750 m capacity for trains of up to 40 wagons. The infrastructure design is based on GIS spatial planning and benchmarks from Thriasio Freight Center and the Bettembourg terminal in Luxembourg. The economic benefits include enhanced logistics flows for agri-food, industrial, and manufacturing goods produced in Thessaly, cost reductions for truck and rail logistics, as well as job creation in areas such as operations, maintenance, security, and IT. The facility is expected to process 100,000–150,000 TEU/year in its first phase, with planned expansion based on demand and throughput projections.

7.10.1 Direct Economic Impacts

7.10.1.1 Employment Creation

The development of the Larissa intermodal terminal is projected to generate significant employment opportunities during its construction phase, spanning approximately 2 to 3 years. It is estimated that between 300 and 500 temporary jobs will be created, encompassing a wide range of skilled and semi-skilled positions. These roles will include site

remediation experts responsible for preparing the land, civil engineers and construction workers engaged in foundational and structural works, specialists in infrastructure installation such as rail tracks, electrical systems, and terminal buildings, as well as professionals involved in equipment procurement and assembly. This influx of employment will not only provide a substantial boost to the local labor market but also stimulate related sectors such as materials supply, transportation, and local services. The project‘s emphasis on sustainable construction practices and adherence to Greek environmental regulations will further enhance job quality and promote workforce development in modern construction techniques.

7.10.1.2 Urban Revitalization through Brownfield Site Redevelopment

The Larissa intermodal terminal project involves the revitalization of a brownfield site, transforming previously underutilized or contaminated land into a productive logistics hub. This redevelopment improves urban aesthetics by replacing derelict or industrial wasteland with modern infrastructure and landscaped areas, contributing to a cleaner and more attractive urban environment. Efficient land use is a critical concern in regional planning, and the project exemplifies sustainable urban development by maximizing the value of existing land resources rather than expanding into greenfield areas. Academic urban studies highlight that brownfield redevelopment projects like Larissa‘s not only enhance land use efficiency but also stimulate local economic activity and community pride. By integrating environmental remediation with infrastructure development, the terminal supports the sustainable growth of Larissa city and its surroundings, promoting long-term urban resilience and quality of life.

7.10.1.3 Environmental Benefits through Modal Shift and Public Health Improvement

The Larissa terminal‘s emphasis on intermodal transport, particularly the modal shift from road to rail, offers substantial environmental and public health benefits. Shifting freight from trucks to trains reduces road congestion, lowers greenhouse gas emissions, and decreases air pollutants such as nitrogen oxides and particulate matter—key contributors to respiratory and cardiovascular diseases. Studies from European intermodal terminals, including Duisburg, demonstrate that rail-based logistics can cut CO_2 emissions by up to 70% compared to road transport. In the context of Larissa and the wider Thessaly region, this modal shift aligns with Greece‘s commitments under the EU Green Deal and national environmental policies, contributing to improved air quality and healthier living conditions for local communities. Moreover, reduced traffic congestion enhances road safety and decreases noise pollution, further benefiting public well-being.

7.10.2 Indirect and Induced Economic Impacts

7.10.2.1 Enhancing Supply Chain Efficiency and Regional Competitiveness

The establishment of the Larissa intermodal terminal is poised to significantly improve logistics efficiency for producers across the Thessaly region. By providing streamlined container handling, integrated customs clearance, and multimodal transport options, the terminal reduces transit times and lowers freight costs for regional manufacturers and agricultural exporters. Academic studies on intermodal logistics highlight that improved supply chain efficiency directly translates to enhanced competitiveness by enabling businesses to respond faster to market demands and reduce inventory holding costs. For Larissa‘s producers, this means greater access to both domestic and international markets, fostering an environment conducive to scaling production volumes. This efficiency gain is particularly crucial for Thessaly‘s agricultural sector, where timely delivery of perishable

goods is essential. The terminal thus acts as a catalyst for modernizing supply chains, supporting local enterprises in achieving higher productivity and profitability within the increasingly competitive European market.

7.10.2.2 Supporting Regional Development and Territorial Balance

The Larissa intermodal terminal project aligns strategically with Greece‘s national and regional development goals, particularly those targeting the industrial modernization of Thessaly and the expansion of agricultural exports. By enhancing the region‘s logistics infrastructure, the terminal facilitates balanced territorial development, reducing disparities between urban centers and peripheral areas . Thessaly, with its strong agricultural base and emerging industrial activities, benefits from improved connectivity to major ports and European transport corridors, enabling local producers to compete more effectively in global markets. Furthermore, the terminal supports sustainable development objectives by promoting intermodal transport solutions that reduce road congestion and environmental impact. This infrastructure investment thus not only boosts economic output but also enhances the quality of life and long-term competitiveness of the Thessaly region, contributing to Greece‘s broader ambitions for inclusive and sustainable growth.

7.10.3 Preliminary Cost Estimates

Based on benchmarking with similar European intermodal terminals and adjusting for Greek market conditions, preliminary capital expenditure (CapEx) estimates are:

Cost Component	Estimated Cost (€ million)	Notes
Land Acquisition	6.38	Total Land Cost = €6,375,440.
Environmental Remediation	2.5 – 4.0	Phased soil and groundwater cleanup.
Infrastructure (all works: site prep, yard, warehouses, admin, gates, security)	255.02	Total Infrastructure Cost (covers all civil works and buildings).
Equipment Procurement	17.44	Total Equipment Cost incl. spare parts.
Contingency	17.0	~5% of total CAPEX to cover uncertainties
Total Project Cost – First Year	296.12	

Table 7.17 Calculation of Total costs needed for the foundation of the new intermodal terminal center

7.10.4 Business Revenue and Value Added

7.10.4.1 Cost Analysis for the deployment and installation of the intermodal terminal center in the base area of Old Sugar Factory

The cost analysis for the deployment and installation of the Intermodal Terminal Center in Larissa, located on the site of the old Sugar Factory, is based on detailed calculations and operational models. According to the Excel-based estimates, the **Final Project Cost – First Year amounts to €296.12 million**, including land acquisition, infrastructure, equipment procurement, energy requirements, and contingency reserves.From an operational perspective, the **Final Operating Cost per Year is €16.80 million**, while the **Final Annual Profit is projected at €19.33 million**, reflecting the terminal‘s capability to efficiently handle freight volumes and provide value-added logistics services. These figures align with comparable European intermodal centers, proving both economic viability and long-term sustainability.The analysis highlights that the **largest expenditure lies in infrastructure (€255.02 million)**, which covers civil works, container yard, warehouses, and facilities modernization. Equipment costs are estimated at **€17.44 million**, including reach stackers, terminal tractors, and IT systems. Land acquisition contributes **€6.38 million**, while yearly operational costs such as fuel (€0.37 million), labor (€0.64 million), and downtime (€7.30 million) constitute the backbone of ongoing expenditure.

Overall, the financial model demonstrates that despite the significant upfront investment, the Larissa Intermodal Terminal is expected to generate positive net returns within the first year of operation, while creating substantial economic spillovers for Thessaly and Greece. A sensitivity analysis further shows that a ±20% fluctuation in freight throughput would proportionally impact profit levels, yet the project remains viable under both conservative and optimistic scenarios.

7.10.4.2 Projected Revenue and Economic Impact on Local Supply Chains
According to the financial projections developed for the Larissa intermodal terminal, the facility is expected to generate **annual revenues of approximately €36.1 million** once fully operational. This figure is derived directly from the operational cost base of **€16.8 million** and the projected net annual profit of **€19.3 million**, as established in the cost model. These values position the terminal well within the revenue range of comparable European inland hubs, demonstrating both competitiveness and long-term viability. In operational terms, the capacity assumptions correspond to an estimated throughput of **around 240 TEUs per day**, supported by investments in modern handling equipment and value-added logistics services, including warehousing, customs clearance, and container processing. The economic benefits of the project extend far beyond the terminal boundaries. As shown in the **2022 Report on Combined Transport in Europe** and supported by European case studies analyzed in this thesis, intermodal facilities generate strong multiplier effects by stimulating demand for ancillary services such as equipment maintenance, road haulage, and information technology support. For Thessaly, this translates into tangible gains: the terminal will not only reduce logistics costs and improve supply chain efficiency but also enhance the competitiveness of regional producers and exporters, particularly in the agri-food sector. By providing reliable access to both national and international markets, the Larissa hub is positioned to catalyze **regional economic development, job creation, and enhanced connectivity**, thereby reinforcing Greece‘s integration into the broader European transport network.

7.10.4.3 Strategic Importance and Alignment with Greek Market Realities
The Larissa intermodal terminal project fits strategically within Greece‘s broader logistics and transport development plans, which emphasize improving hinterland connectivity and expanding intermodal capacity to support the country‘s role as a regional freight hub.

Greece‘s ongoing investments in rail and road infrastructure, combined with initiatives to streamline customs and enhance third-party logistics services, create a favorable environment for Larissa‘s growth. However, compared to highly automated European terminals like Duisburg, Larissa must account for local market conditions such as lower automation levels, regulatory frameworks, and labor market characteristics. The economic evaluation of terminal typologies suggests that smaller-scale, less automated terminals can remain competitive by focusing on cost efficiency and tailored services. Larissa‘s revenue model and service offerings should therefore be adapted to these realities, ensuring sustainable growth while gradually integrating technological advancements.

Impact Type	Description	Estimated Magnitude
Jobs Created	Construction + Operations	~300–500 temporary (construction phase) + ~400–600 permanent .
Annual Revenue	Terminal operations	≈ €36.1 million/year (Operating Costs €16.8M + Profit €19.3M).
GDP Contribution	Direct and multiplier effects	≈ €50–70 million/year (using 1.5–2.0 multiplier on revenues).
Tax Revenue	Corporate, VAT, income taxes	≈ €7–9 million/year (assuming ~25% corporate tax on profit + VAT/employee taxes).
Social Benefits	Employment, social inclusion	Strong regional impact: up to 600 families supported + indirect job creation in supply chains.
Environmental Benefits	Emissions reduction, congestion relief	CO_2 reduction up to 50–60% (based on modal shift rail/sea vs. road + 1.65M kWh electrified ops).

Table 7.18 Summary Table of Economic Impacts of the new intermodal terminal center

7.11 Environmental Sustainability and Compliance

The redevelopment of the former sugar factory site into an intermodal center is fully consistent with Greece‘s evolving regulatory and sustainability frameworks. The project incorporates environmental considerations such as site remediation, reforestation of buffer zones, and compliance with EU directives on sustainable transport and urban planning. It addresses the challenges of abandoned industrial sites by adhering to Greek laws on building safety, urban renewal, and environmental protection, ensuring the site‘s transformation contributes positively to the local community and ecosystem. Furthermore, the center supports Greece‘s commitment to green logistics through energy-efficient infrastructure, multimodal transport integration, and reduced carbon emissions. By embedding these principles into the project design and operation, the intermodal center not only fulfills legal obligations but also positions itself as a model for sustainable industrial redevelopment in the region.

Beyond economic gains, the proposed logistics hub emphasizes sustainability and legislative compliance. Environmental planning includes on-site PV panel installations for renewable energy supply, noise and emission mitigation strategies, and a high-efficiency waste recycling system targeting EU Green Deal compliance thresholds. The project is designed in alignment with Greek environmental legislation and urban planning regulations, while incorporating best practices from established hubs such as the Thriasio Logistics Center. Furthermore, environmental impact assessments (EIAs) have been planned using data from national infrastructure planning documents and feasibility studies. Through these design choices, the hub not only reduces the carbon footprint of regional logistics but also positions itself as a flagship example of green transition in Greek industrial infrastructure .

Sustainability is a cornerstone of the development, with integration of solar PV systems on warehouse rooftops (expected output: 0.7–1 MWp), LED-based smart lighting, and fully electric RMG gantry cranes to reduce energy intensity per container move. The use of green procurement principles in construction, ISO 14001 certification goals, and a waste management plan based on Greek regulations (FEK3350B/2012) are essential for both environmental impact mitigation and eligibility for EU co-financing under the Just Transition Mechanism. Furthermore, operational compliance with the Greek freight and customs code, labor legislation (N. 4808/2021), and zoning frameworks ensures the long-term viability and legal conformity of the project. Through this layered approach—combining operational excellence, environmental foresight, and infrastructural reactivation—the project aspires to establish itself as a central logistics gateway in Greece‘s inland freight network.

7.11.1 Land Use and Visual Environmental Impact

The transition from a disused industrial area to a modern logistics hub will inevitably alter the visual and environmental character of the locality, introducing increased industrial activity, infrastructure, and traffic flows. Recognizing the potential impacts on the landscape and local quality of life, the project incorporates comprehensive mitigation strategies aimed at harmonizing the terminal with its surroundings. These include the implementation of extensive landscaping programs that utilize native vegetation to create green buffer zones, effectively softening the visual impact and providing ecological benefits such as habitat connectivity and air quality improvement. Architectural design principles are carefully applied to ensure that new facilities feature aesthetically pleasing facades, scale, and materials that complement the existing semi-urban and rural context. Additionally, noise barriers and strategic placement of operational zones minimize disturbances to neighboring communities.

7.11.2 Air Quality and Emissions

During the construction phase, dust generation and emissions from heavy machinery and transport vehicles pose potential risks to local air quality and public health. To mitigate these effects, the project will implement comprehensive dust control measures such as regular watering of exposed surfaces, use of dust suppressants, and strict maintenance schedules for construction equipment to minimize exhaust emissions. In the operational phase, the anticipated increase in truck and train movements could elevate local pollutant concentrations, including nitrogen oxides (NOx), particulate matter (PM), and greenhouse gases. To address this, the terminal‘s design prioritizes a modal shift from road to rail, capitalizing on rail transport‘s lower emissions per ton-kilometer, thereby significantly reducing truck traffic and associated pollution levels. Additionally, the deployment of low-emission equipment and vehicles, including electric or hybrid terminal tractors and trucks, will further curtail operational emissions. A robust air quality monitoring program will be established to track pollutant levels continuously, ensuring compliance with national and EU environmental standards and enabling timely interventions if necessary.

7.11.3 Noise and Vibration

The noise emissions (potential noise impacts arising from various sources, including construction equipment, increased truck traffic, and rail operations) may cause disturbances to nearby residents and local wildlife, particularly given the terminal‘s proximity to semi-urban and agricultural areas. To mitigate these impacts, construction activities will be scheduled primarily during daytime hours, thereby minimizing noise disruptions during nighttime when

sensitivity is higher. The project will also incorporate the installation of noise barriers strategically placed around high-noise zones to absorb and reduce sound propagation toward residential and natural habitats. Furthermore, the use of quiet technology and modern low-noise equipment during both construction and operational phases will be prioritized to limit noise generation at the source. Maintaining buffer zones with vegetation and open spaces between the terminal and adjacent communities will provide additional noise attenuation and help preserve local biodiversity.

7.11.4 Water Resources and Stormwater Management

Potential risks include contamination from industrial runoff, which could introduce pollutants into local waterways, and the increase of impervious surfaces due to terminal infrastructure, potentially exacerbating stormwater runoff and flooding. To mitigate these risks, the project incorporates advanced stormwater management systems designed with retention basins that temporarily hold runoff, reducing peak flow rates and allowing sedimentation. Additionally, biofiltration areas using vegetation and soil media will naturally treat runoff by filtering contaminants before water is discharged into the environment. Spill prevention plans are a key component of the environmental management strategy, focusing on minimizing accidental releases of hazardous substances through proper handling, storage, and emergency response protocols. Continuous water quality monitoring will be implemented to detect any deviations promptly, ensuring compliance with environmental regulations and protecting local ecosystems.

7.11.5 Soil and Groundwater Contamination

The legacy environmental challenges, notably residual contamination stemming from past sugar processing activities pose potential risks to soil and groundwater quality, necessitating thorough investigation and remediation to ensure the site‘s safe and sustainable redevelopment. To address these concerns, a comprehensive Phase II Environmental Site Assessment (ESA) will be conducted to characterize the extent and nature of contamination, including sampling and analysis of soils and groundwater. Based on the assessment findings, targeted remediation strategies will be implemented to clean up contaminated soils, employing techniques such as soil excavation, bioremediation, or stabilization as appropriate. Continuous groundwater monitoring will be established to track any residual contamination and prevent off-site migration, ensuring long-term environmental protection. Throughout this process, strict compliance with Greek national environmental laws and EU directives will be maintained, aligning with best practices for brownfield redevelopment.

7.11.6 Biodiversity and Habitat

Construction activities in such sensitive environments (Peneios River floodplain and adjacent agricultural lands, areas of significant ecological and economic importance) carry the risk of habitat disruption, which could adversely affect local flora and fauna as well as the productivity of surrounding agricultural zones. To mitigate these potential impacts, the project design strategically avoids encroachment on the most sensitive ecological areas, preserving critical habitats and maintaining natural buffers along the floodplain. Where vegetation removal is unavoidable, a comprehensive restoration plan will be implemented post-construction, focusing on replanting native species to rehabilitate disturbed areas and enhance biodiversity. Additionally, proactive invasive species control measures will be

enforced to prevent the introduction or spread of non-native plants that could threaten local ecosystems.

Impact Area	Potential Effect	Mitigation Strategy
Land Use	Visual change	Green buffers, architectural design
Air Quality	Dust, emissions	Dust control, modal shift, low-emission equipment
Noise & Vibration	Disturbance	Noise barriers, scheduling, quiet tech
Water Resources	Runoff, contamination	Stormwater management, spill prevention
Soil & Groundwater	Contamination risk	Site assessment, remediation
Biodiversity	Habitat disruption	Avoidance, restoration, invasive control

Table 7.19 Summary of Environmental Impact Assessment Process of the new intermodal terminal center

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