



**DEPARTMENT OF INTERNATIONAL AND
EUROPEAN ECONOMIC STUDIES**

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

ASSESSING THE FUTURE ENERGY DEMAND OF GREECE'S TRANSPORTATION SECTOR

STATHIS DEVVES

ANGELOS ALAMANOS

PHOEBE KOUNDOURI

Working Paper Series

25-15

January 2025

Assessing the future energy demand of Greece's transportation sector

Stathis Devves ^{1*}, **Angelos Alamanos** ², **Phoebe Koundouri** ^{1,3,4}

1 Athens University of Economics and Business, 10434 Athens, Greece

2 Independent Researcher, Berlin 10243, Germany

3 ATHENA RC; UN SDSN Europe, 10434 Athina, Greece

4 Department of Technology, Management and Economics, Denmark Technical University (DTU), Kongens Lyngby 2800, Denmark.

*Correspondence: devves@aueb.gr

Abstract

The terrestrial transportation sector, including passengers, buses, and trains, is becoming an increasingly complex field in terms of decarbonization, requiring science-driven, data-based solutions to address its energy and emissions challenges effectively. Greece exemplifies these challenges, as its transportation sector has been slow in transitioning towards decarbonization, despite the country's commitments. Factors such as dependence on conventional fuels, infrastructure inefficiencies, and policy gaps exacerbate the situation, highlighting the urgent need for comprehensive modeling and assessment tools. This research presents a detailed assessment of Greece's transportation sector, focusing on energy demand and associated greenhouse gas (GHG) emissions, per use and per fuel type. Leveraging the Low-Emission-Analysis Platform (LEAP) model, we analyze the sector's fuel mix across various uses at a national scale, marking, to the best of our knowledge, the first such effort for Greece. The model is tested under Shared Socioeconomic Pathways (SSPs) scenarios: SSP1 (sustainability-focused), SSP2 (moderate progress), and SSP5 (fossil-fueled development), projected to 2050. Our findings reveal critical insights into how different decarbonization pathways could reshape Greece's transportation sector. The key outcomes discussed include variations in energy consumption, emission trajectories, and the feasibility of achieving national and EU decarbonization targets under diverse socio-economic conditions. This work aims to support policymakers in designing robust, forward-looking transportation strategies aligned with sustainability objectives.

Keywords: Transportation Decarbonization; LEAP Modeling; Energy Demand Analysis; Greenhouse Gas Emissions; Shared Socioeconomic Pathways (SSPs); Greece.

References

- Koundouri, P., Alamanos, A., Devves, S., Landis, C. & Dellis, K. (2025). Innovations for Holistic and Sustainable Transitions. *Energies* 2024, 17(20): 5184. <https://doi.org/10.3390/en17205184>
- Koundouri, P., Alamanos, A. & Devves, S. (2025). Challenges and solutions for the energy sector. *Energia.gr* (solicited paper – in Greek). <https://www.energia.gr/article/225303/proklhseis-kai-lyseis-ston-tomea-ths-energeias>