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**EVALUATING THE GREEK NATIONAL
ENERGY AND CLIMATE PLAN:
A WATER-ENERGY-EMISSIONS ASSESSMENT
FOR THE INDUSTRY SECTOR**

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Evaluating the Greek National Energy and Climate Plan: A Water-Energy-Emissions assessment for the industry sector

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Abstract

The global Agenda for energy transition and the imperative for climate adaptation mandate a comprehensive understanding of resource use and emissions in energy systems. Industries play a pivotal role in this transformation, both as major energy consumers and as key contributors to greenhouse gas (GHG) emissions. Building climate resilience requires the inclusion of interconnected natural resources such as water in industrial planning, highlighting the need for joint energy-water assessments to develop adaptive and holistic climate mitigation strategies. This consideration is an overlooked issue in southern European countries, given their lower industrialization levels than northern Europe. However, the analysis of resource use and emissions in industrial energy systems is a particularly critical issue for southern European countries because they face significant challenges due to their drier climate, naturally limited water resources, and their high vulnerability to climate change. At the same time, there are major emitting industries in those countries as well, and the sector's energy transition largely depends on their decarbonization as well. This research addresses this gap by analyzing Greece's industrial energy, water demands, and GHG emissions, from 2022 to 2050. It breaks the industrial sector into 17 subcategories, including food and tobacco, textiles and leather, wood products, paper pulp and printing, chemicals and chemical products, rubber and plastic, non-metallic minerals, basic metals, machinery, transport equipment, other manufacturing, coke and refined petroleum products, mining, cement and steel production. The annual energy and water consumption alongside GHG emissions were estimated, by coupling the Low Emissions Analysis Platform (LEAP) model with the WaterReqGCH model. Such integrated assessments are essential for informed policy evaluation and decision-making. Further, we evaluate the Greek National Energy and Climate Plan, showing its potential to shape a more sustainable industrial sector, considering its effects on the simulated water-energy-emissions system. Findings reveal critical synergies, trade-offs, and gaps, emphasizing the necessity of co-considering water resources into energy planning, developing thus more holistic pathways.

Keywords: Industry Decarbonization; LEAP Modeling; Water-Energy-Emissions Analysis; National Energy and Climate Plan (NECP); Greece.

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