

An Economic and Technological Analysis of Green Hydrogen Production for the Toulouse-Blagnac Airport

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Abstract : Since the Paris Climate Agreement, numerous countries, including France, have committed to achieving carbon neutrality by 2050 by enhancing renewable energy capacity and decarbonizing various sectors, including aviation. In this way, the Occitanie region aspires to become a renewable energy pioneer and has focused on Toulouse's Blagnac airport—a prominent hub characterized by high-energy demands. As part of a holistic strategy to reduce the airport's energy dependency, green hydrogen has emerged as a promising alternative fuel, offering the potential to significantly enhance aviation's environmental sustainability. This study assesses the technical and economic aspects of green hydrogen production, particularly its potential to replace fossil kerosene in aviation at Toulouse-Blagnac airport. It analyzes future liquid hydrogen fuel demand, calculates energy requirements for electrolysis and liquefaction, considers diverse renewable energy scenarios, and assesses the Levelized Cost of Hydrogen (LCOH) for economic viability. The research also projects LCOH evolution from 2023 to 2050, offering a comprehensive view of green hydrogen's feasibility as a sustainable aviation fuel, aligning with the region's renewable energy and sustainable aviation objectives.

Keywords : Toulouse-Blagnac Airport, green hydrogen, aviation decarbonization, electrolysis, renewable energy, technical-economic feasibility

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