

An Integrated Hydrogen Scenario Analysis: Impacts on Transportation, Energy, and Air Emissions

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We present an analysis of the potential energy and environmental implications of hydrogen fuel cell vehicle (H₂-FCV) penetration into the U.S. light duty vehicle fleet by 2030. Sensitivity analysis is used to identify the inputs with the greatest influence on H₂-FCV adoption and carbon dioxide (CO₂) emissions. Sectoral and system-wide energy use under different baseline assumptions are compared. Uncertainty analysis methods are used to characterize output uncertainty. Our results suggest that whether H₂-FCV penetration leads to reductions in system-wide energy use and carbon emissions is dependent on the technological pathway and baseline to which the pathway is compared.

Keywords:

integrated analysis, Monte Carlo, endogenous technological learning, probabilistic sensitivity and uncertainty analysis