

An Evaluation of Regulatory Frameworks for the Development of Interstate Hydrogen Infrastructure in the United States

Author:

Drake D. Hernandez

Master's Candidate, Technology and Policy Program (TPP), Massachusetts Institute of Technology (MIT)

Graduate Research Assistant, MIT Energy Initiative

www.linkedin.com/in/drakehernandez

Markets for natural gas, electric power, and oil, and associated regulatory frameworks for the development of infrastructure to move said commodities in the United States, are mature – having developed over the last century and a half. In this study, one frames hydrogen as a fundamentally different energy commodity than those currently under the purview of Federal regulators and assesses potential regulatory frameworks for the development of interstate hydrogen transmission infrastructure. This study combines qualitative and quantitative methods to assess the use of regulatory frameworks to enable the development of such an interstate hydrogen transmission network. One conducts a historical analysis of commodity market, and infrastructure, development in the United States for the oil, natural gas, and electric power sectors. One then conducts a cross-sectional analysis of other countries' stated hydrogen strategies to assess why the United States might consider using hydrogen in their energy sector. In order to justify an investigation into regulatory frameworks for the development of interstate hydrogen network development, one develops a linear program to evaluate the hydrogen transmission network which serves to minimize total expenditures on hydrogen based on power price and hydrogen demand assumptions. One finds there are many cases in which the construction of a substantial hydrogen transmission network minimizes total expenditure on hydrogen within the United States. The study concludes with an evaluation of regulatory frameworks for the development of hydrogen transmission infrastructure. Across all frameworks assessed, one finds an act of Congress is likely necessary if hydrogen is to play a substantive role in the United States' future energy sector.