



Hydrogen in the U.S. energy system: Webcast Forum on Modeling Challenges

EPA

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Office of Atmospheric Programs (OAP)

H2 Production – Emissions Accounting and Boundary Setting

Sec 40315 (EPACT Sec. 822): Clean Hydrogen Production Qualifications

(b.1.B) define the term 'clean hydrogen' to mean *hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced*

Policy: Decisions regarding the scope and other metrics needed to realize full potential benefits of hydrogen and minimize potential negative impacts, including the extent to which programs/policies account for upstream emissions and incentivize mitigation

Modeling: Where and how do we account for direct and upstream emissions, including those from biogenic fuels and CH₄? (e.g., sequestration, electricity generation, fugitive emissions)

Regulatory Approaches

Policy: Discussion of H₂ potential for GHG mitigation from combustion turbines as part of new source GHG white paper, feedback from which could potentially feed into proposed rule
whitepaper coming soon [article1](#) [article2](#)

Modeling: Potential of H₂ use in combustion turbines and emissions effects (direct and upstream)

Office of Transportation and Air Quality (OTAQ)

Technology neutral priorities, but has a vested interest in making sure that H2 is considered as a potential fuel for all GHG mitigation strategies, including rulemaking efforts

Modeling and Policy:

- Understanding infrastructure costs, fuel supply logistical constraints, etc... to estimate potential adoption rates for fuel cells
 - Adoption rates used for ongoing transportation rules (e.g., heavy-duty and NOx rules)
- Decarbonization pathways for transportation end uses
 - Focus on on-road transportation end-uses, though OTAQ understands that there is growing interest in H2 for the marine and other off-road end uses

Office of Research and Development

Model development and utilization

Modeling:

- **TIMES** (The Integrated MARKAL-EFOM System) – linear-programming bottom-up model to produce a least-cost energy system, optimized according to user constraints, over medium to long-term time horizons
 - Implemented H2 production, transmission, distribution, and transportation end uses (light, medium, and heavy-duty, on-road, shipping, rail, and aviation)
 - Participation in EMF 37 with a focus on carbon management
- **GCAM-USA** - multi-sector human-Earth systems model with state-level details in the United States along with an electric sector module embedded within a global multi-sector framework
 - Representation of H2 production pathways and cars, trucks, planes, and marine end uses

Questions?

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