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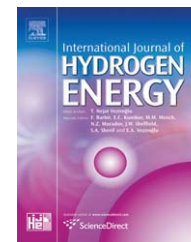


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Challenges for renewable hydrogen production from biomass

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ABSTRACT

The increasing demand for H₂ for heavy oil upgrading, desulfurization and upgrading of conventional petroleum, and for production of ammonium, in addition to the projected demand for H₂ as a transportation fuel and portable power, will require H₂ production on a massive scale. Increased production of H₂ by current technologies will consume greater amounts of conventional hydrocarbons (primarily natural gas), which in turn will generate greater greenhouse gas emissions. Production of H₂ from renewable sources derived from agricultural or other waste streams offers the possibility to contribute to the production capacity with lower or no net greenhouse gas emissions (without carbon sequestration technologies), increasing the flexibility and improving the economics of distributed and semi-centralized reforming. Electrolysis, thermocatalytic, and biological production can be easily adapted to on-site decentralized production of H₂, circumventing the need to establish a large and costly distribution infrastructure. Each of these H₂ production technologies, however, faces technical challenges, including conversion efficiencies, feedstock type, and the need to safely integrate H₂ production systems with H₂ purification and storage technologies.

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