THE POTENTIAL FOR HYDROGEN IN LOUISIANA

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Overview

We estimate the potential of clean hydrogen for industrial uses in Louisiana from several sources. For current usage, we consider hydrogen consumption in crude oil refining, ammonia production – for fertilizers, and methanol production. For potential future uses, we consider hydrogen for energy exports (as liquefied natural gas, LNG), electricity generation, and manufacturing energy consumption in Louisiana. These results are considered in light of the Carbon Border Adjustment Mechanism (CBAM), which includes hydrogen.

Methods

A combination of data sources, including datasets from the US Energy Information Administration (EIA) and the US Geological Survey (USGS) are used to calculate the amount of hydrogen consumed in each industrial usage using stoichiometry (for ammonia and methanol production), hydrogen demand intensity (for crude oil refining), matching the energy content (for LNG exports, electricity generation, and manufacturing energy consumption).

Results

Our analysis estimates that current hydrogen consumption from industrial uses in Louisiana amounts to 2.5 million metric tons per year (MMT/yr). These are: ammonia production (0.98 MMT/yr), crude oil refining (0.89 MMT/yr), and methanol production (0.56 MMT/yr). Potential future consumotion of hydrogen in Louisiana can amount to an additional 30.8 MMT/yr. These are: energy exports in the form of LNG (22.7 MMT/yr), electricity generation (4.55 MMT/yr), and manufacturing energy consumption (3.5 MMT/yr).

Conclusions

Potential future consumption of hydrogen in Louisiana is approximately 13 times greater than current consumption. For context, current US hydrogen consumption is approximately 10 MMT/yr. The implications of our analysis are that a potential buildout of hydrogen based on future uses will require multi-billion dollar investments on a decadal timescale. Other applications such as using hydrogen for electricity generation and industrial applications could also drive higher demand. In terms of chemical manufacturing, blue or green hydrogen could be used in place of natural gas as an energy source and holds the potential to reduce the carbon intensity of many common products made in Louisiana. This is likely to be of significance when considered in the context of the implementation of CBAM. According to leading chemical manufactures, products with lower carbon intensities are more competitive globally. While the estimates provided here give some perspective of potential demand, global markets are highly dependent on policies and consumer willingness pay premiums for low carbon intensity fuels and products.

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