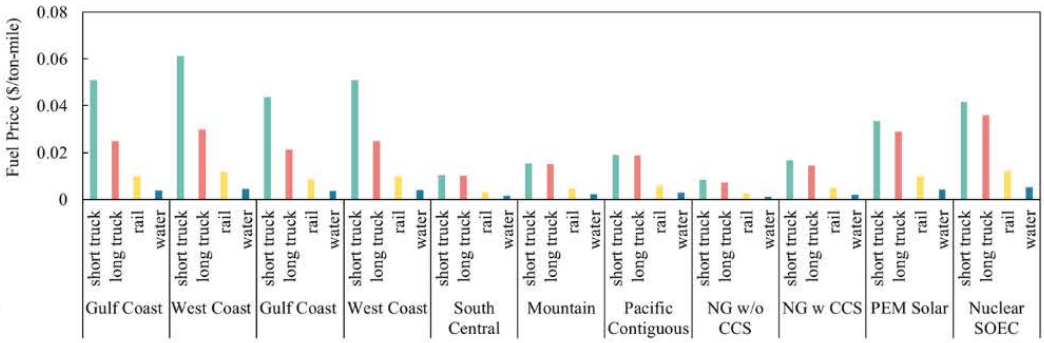
IMAGINED - MODULE C

TECHNO-ECONOMIC ANALYSIS

Northwestern University Inter Modal Analytics for Green Infrastructure Network Energy Decarbonization (IMAGINED) involves developing sophisticated network optimization and simulation methods embedded in an online, open-source platform to support the roll out of decarbonized infrastructure investments, including transloading hubs and energy infrastructure, vehicles, and equipment, as well as the implementation of advanced logistics strategies to improve operations.

ENERGY COST

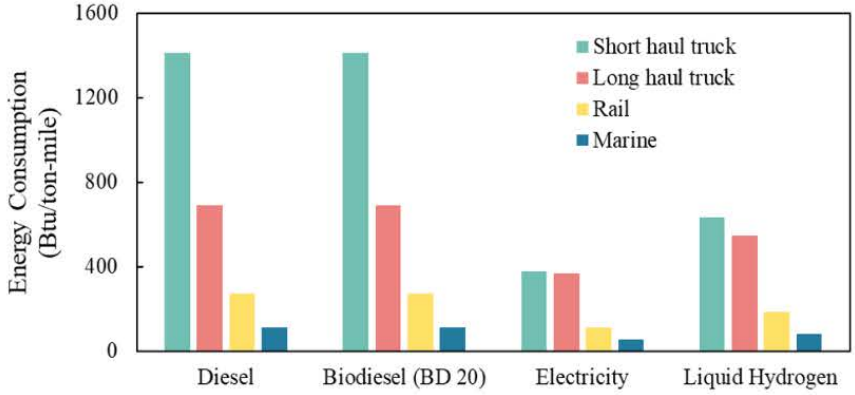
- Fuel prices vary significantly by region, Hydrogen prices variate across production pathways
- Electricity induce lower fuel costs compared to other fuels
- Ongoing work: incorporate refueling/charging facility capital and operating costs, and asset replacement costs across fuel-mode combinations



Distribution of energy cost per ton-mile across multiple modes and energy types in 2035

ENERGY CONSUMPTION

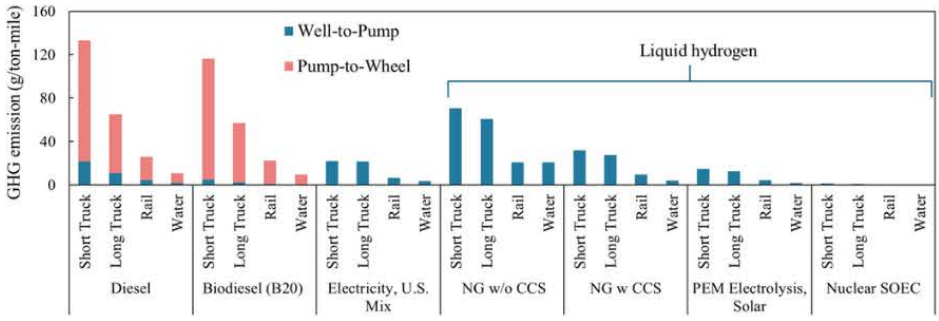
- Rail and maritime transport significantly reduce energy consumption
- Electricity and hydrogen outperforms Diesel in energy efficiency
- Liquid Hydrogen exhibits lower volumetric energy intensity (Btu/gal)



Distribution of energy consumption per ton-mile across multiple modes and energy types in 2035

GHG EMISSIONS

- GHG Emission (g/ton-mile) = Energy Consumption (Btu/ton-mile) * Emission Factor (g/Btu)
- GHG Emissions for hydrogen by production pathways show large variances
- Data also indicates that GHG emissions from electricity vary considerably across regions due to differences in well-to-pump emissions.



Distribution of GHG emissions per ton-mile across multiple modes and energy types in year 2035

Summary

- Fuel and hydrogen prices vary by region and production method.
- Electricity has lower fuel costs than other sources.
- GHG emissions vary for electricity and hydrogen based on production and regional factors.

Contact us

Do you have questions, concerns, or suggestions? We want to hear from you.

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SAVE VCARD

Visit transportation.northwestern.edu for more information on IMAGINED.

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