Navigating the Road to Trucking Decarbonization
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Introduction

Driving Factors
- Road freight transportation accounts for over 7% of global CO₂ emissions.
- Transitioning the industry to alternative carriers will require significant investment and infrastructure build-out.

Our Proposal
- Develop a geospatial mapping tool that enables the regional identification and assessment of fleet decarbonization opportunities.
- Leveraging this mapping tool, implement a methodology to rigorously compare a range of factors that can impact fleet decarbonization decisions at the corridor level.

Methods

1. Literature Review: Understand existing methods that identify and quantify fleet transition assessment factors.
2. Data Gathering: Collect relevant publicly available data.
3. Model Development: Synthesize data and leverage path planning algorithms to identify corridors of interest.
4. Visualization: Represent the resulting corridors geospatially.

Highlights
- There are many ways to decarbonize trucking, how do we choose the ‘best’ one?

Impact
- Developed a methodology to systematically identify corridors of interest based upon freight flow and distance.
- Our methodology is applied to geospatial datasets to enable quantitative corridor comparison.

Preliminary Results

Findings & Future Work

Fig 1. U.S. Road Network from FAF5
Fig 2. Corridor Identification Proof of Concept

Fig 3. CO₂ Emission Rates (lb/MWh)
Fig 4. U.S. BET Lifecycle Costs/Mile ($/mi)

Findings
- Based on CO₂ emissions, corridors in the Southeastern/Midwestern US are ideal for fleet electrification.
- Vehicle lifecycle cost (for BETs) is higher in the Western/Southwestern US.

Future work
- Continue to expand the range of data sources that input to the model for corridor level comparisons.
- Further refine how geospatial data along identified corridors is quantified to assess fleet transition opportunities.

References
- eGRID: US EPA, “Emissions & generation resource integrated database (eGRID).”
- Link to Extended Abstract: qrco.de/bewtjB