

H₂arvest

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Each year, in the United States, Class 8 semi-trucks burn over 38.4 billion gallons of diesel fuel, at a current fuel cost of approximately \$195 billion, and emit over 55.3 million metric tons of CO₂e. This represents 7% of the yearly US greenhouse gas emissions. Hydrogen (H₂) fuel cell vehicles (FCEV) have zero emissions so they represent an impactful alternative to diesel trucks. Although battery electric vehicles (BEV) are also zero emissions, FCEV are advantaged in HD trucks due to their lighter weight, shorter fueling duration, longer vehicle range, and better driver comfort and decreased fatigue. Seven companies (Walmart, Amazon, Kroger, Costco, Walgreens, UPS, and FedEx) represent 80% of the class 8 delivery market. Currently each has a goal and strategy to get to zero emissions in their delivery operations. The federal government continues to apply pressure to corporate America to decrease emissions and is incentivizing adoption of zero emissions technologies. This project makes a business case for converting electrons to molecules by utilizing solar arrays on distribution warehouses to power PEM electrolysers, H₂ compressing, cooling and storage equipment, and filling equipment to fuel FCEV class 8 trucks delivering to/from the facility. A corresponding feasibility study found that a 640,000sf facility can produce enough solar power and H₂ to fuel 40 trucks and 106 forklifts per day. The economics of the project produced an internal rate of return of 15%. And, the amount of yearly emissions mitigated is approximately 6,334 metric tons per year of CO₂e.

