

Clean Midwest - Hydrogen at O'Hare Airport

This team evaluated the transition to hydrogen as a fuel source for baggage carts at O'Hare Airport.

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Chicago O'Hare Baggage Vehicles:

- Through partnership with United Airlines, United would transition baggage cart ground support vehicles from diesel to hydrogen fuel cell vehicles. The initial phase would require 66 new baggage carts (\$50,900 each).
- Utilize solar power from O'Hare rooftops. Initial demand is 1.25 MW. Assume \$1.75/kW (capex \$2.19M).
- Utilize a PEM electrolyzer to generate hydrogen. Utilize Nel hydrogen's MC250 which produces 531 kg hydrogen per day (capex \$5.1 million – includes compression, storage, and distribution systems).
- The benefit to United is in fuel costs. Assume hydrogen at \$7.53/kg and diesel at \$4.36/gallon. This generates savings of \$2.4 million/year, yielding an ROI between years 4 and 5. ROI could be further improved if credit is taken for Green H2 credit.



Expansion:

- Total hydrogen demand at O'Hare is estimated to be 28 MW = 11,294 kg hydrogen/day. Additional electrolyzers, compression/storage/distribution facilities, and solar capacity would be added incrementally.
 - There's potential to leverage energy harvested from plane movement via JetWind's technology.
 - Additional solar capacity may be available through the Double Black Diamond solar farm that is being constructed in central Illinois.
- Phase II expansion to various ground support vehicles (tugs, deicing vehicles, belt loaders, etc.) at the airport.
- Phase III expansion envisions O'Hare as H2 Hub – supporting public transport system, logistics transport, etc.

Why Chicago O'Hare?

- The Midwest was awarded a hydrogen hub through the DOE, announced in Fall 2023.
- Chicago O'Hare Airport is a hub for United Airlines with ample opportunity for renewable power.
- Illinois also offers favorable public policy such as the Climate and Equitable Jobs Act (2021), Solare Renewable Energy Credits, Illinois Energy Transition Act, and HB 2204 that creates a \$10M/year tax credit in 2026 and 2027 for users of clean hydrogen.

Challenges:

- Lack of existing hydrogen infrastructure today.
- Permitting/perceived hydrogen safety concerns.
- Unknown future regulatory guidance: timing and legislation.

Transitioning to hydrogen as a fuel at O'Hare Airport offers a range of benefits, encompassing environmental, economic, and operational aspects and opens the door to future growth opportunities in the net zero transition.