

Battery-electric trucks: The most affordable path to decarbonizing tractor-trailers

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Hussein Basma and Ray Minjares

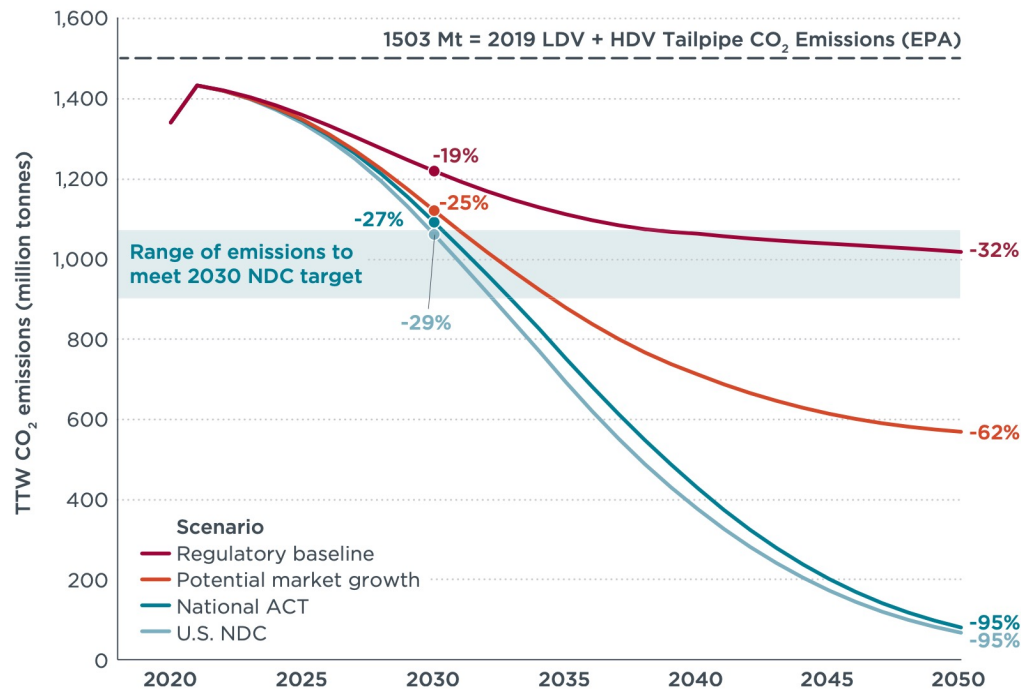
Why long-haul tractor-trucks?

Tractors represent **30%** of the total population of class 4-8 regulated vehicles.

The share of long-haul trucks is around 62% of the tractor population.

Under the Regulatory baseline scenario:

- **Tractors** will produce **67%** of the GHG emissions of class 4-8 vehicles through 2050.
- **49%** of Class 4-8 emissions originate from **combination long-haul trucks**.



Use case and assumptions

- Four powertrain technologies:



Diesel



Battery-electric



Hydrogen fuel-cell



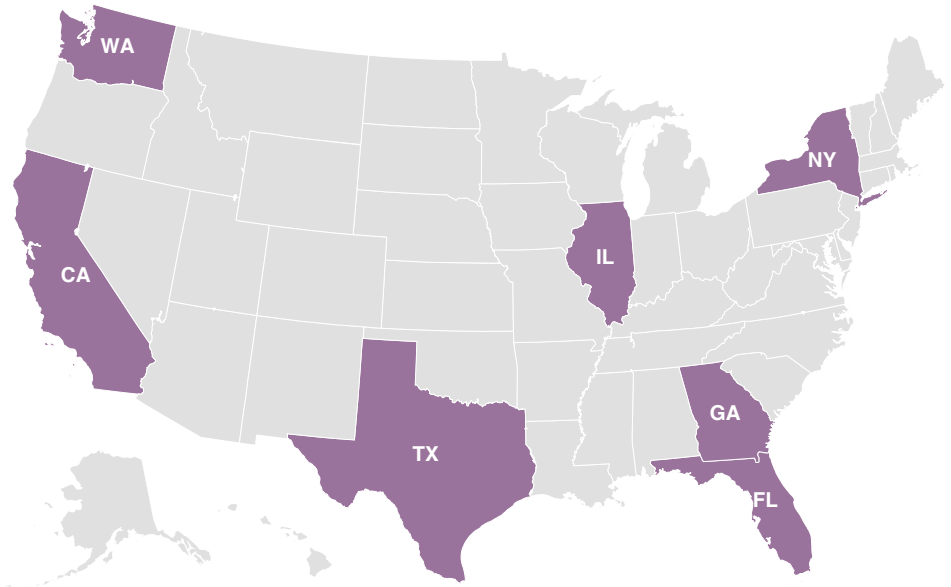
Hydrogen
combustion engine

- Daily mileage: **500 miles**
- On-route charging: **350 kW** until **2027** – **1 MW** afterward.
- Renewable electrolysis green hydrogen
- Holding period: 5 years



Georgraphic scope

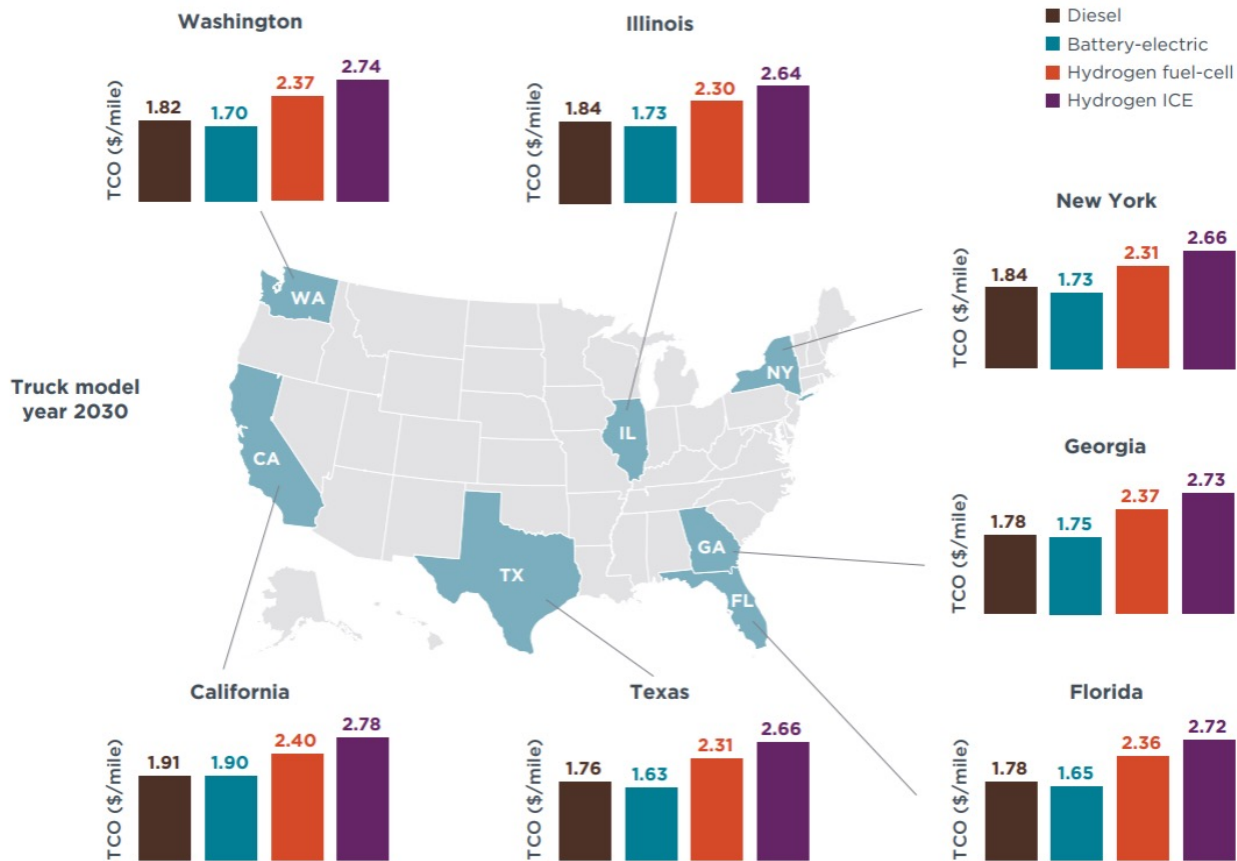
- Ensuring comprehensive geographic coverage over the United States mainland.
- Focusing on states with the highest long-haul trucking activity in every region.
- Ensuring a comprehensive coverage of commercial electricity rates in the United States.



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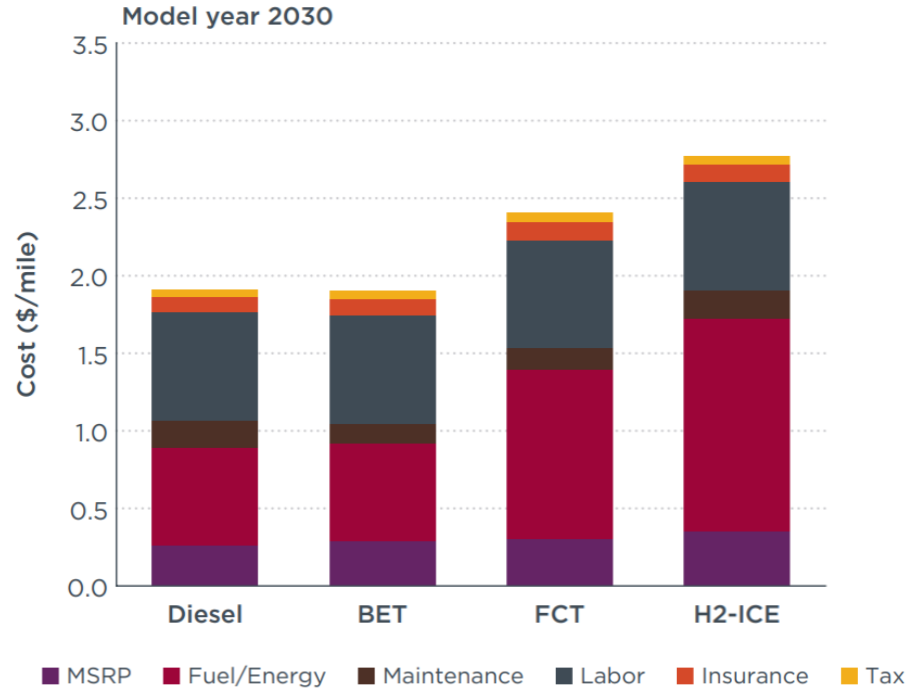
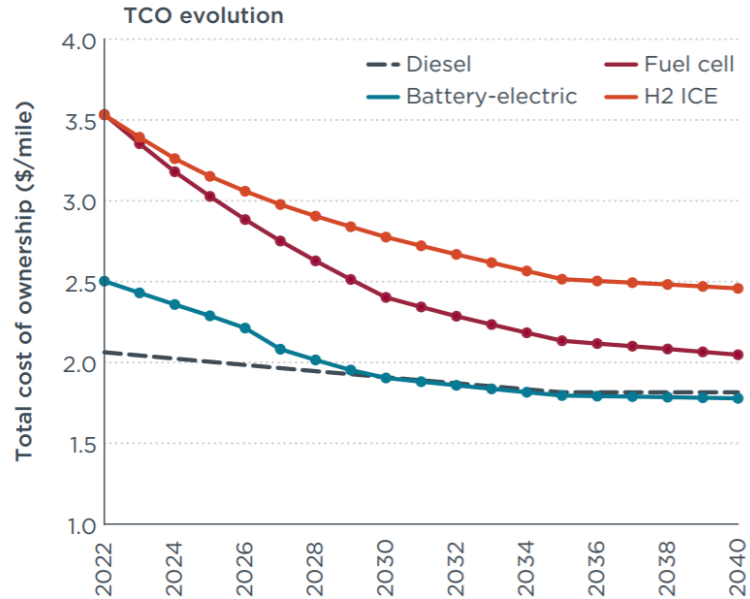
Key findings

Battery-electric long-haul trucks are expected to record the lowest TCO by 2030 in most states

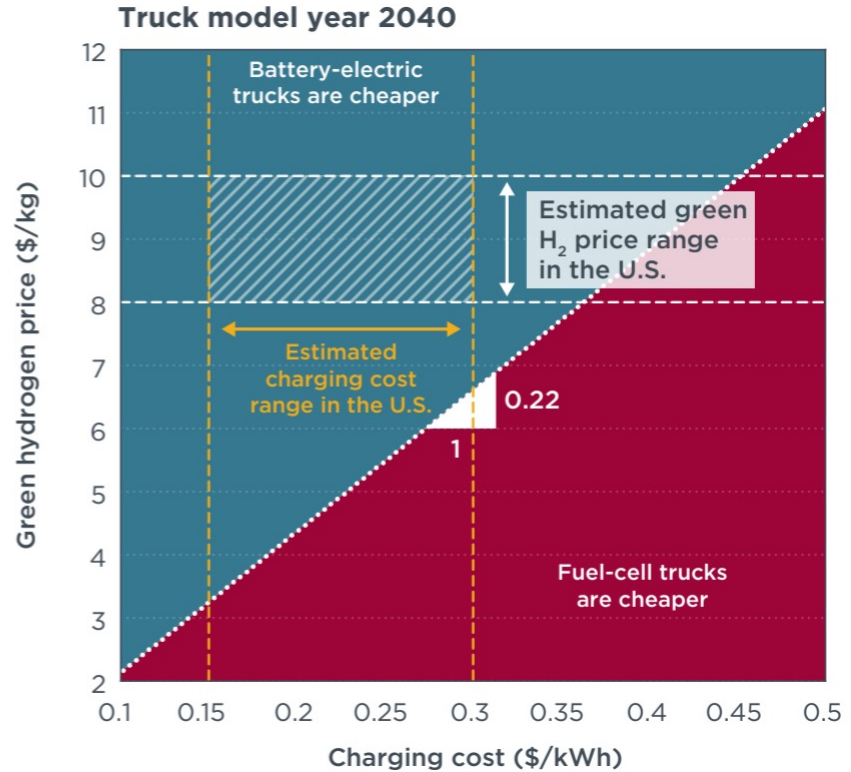
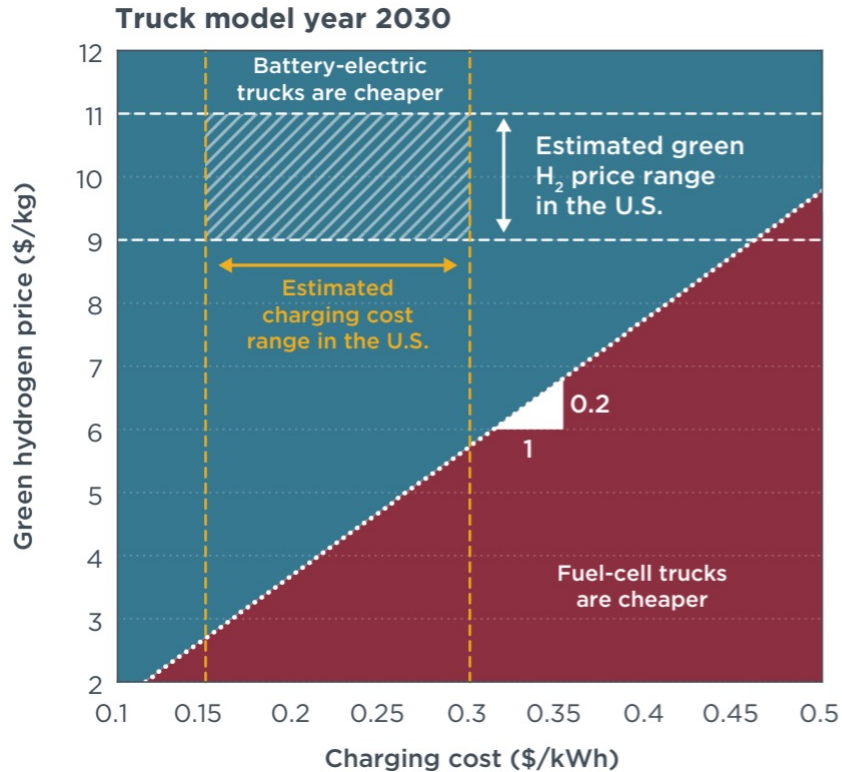


TCO breakdown for trucks operating in California

California



Battery-electric trucks are expected to achieve a lower TCO than fuel-cell trucks

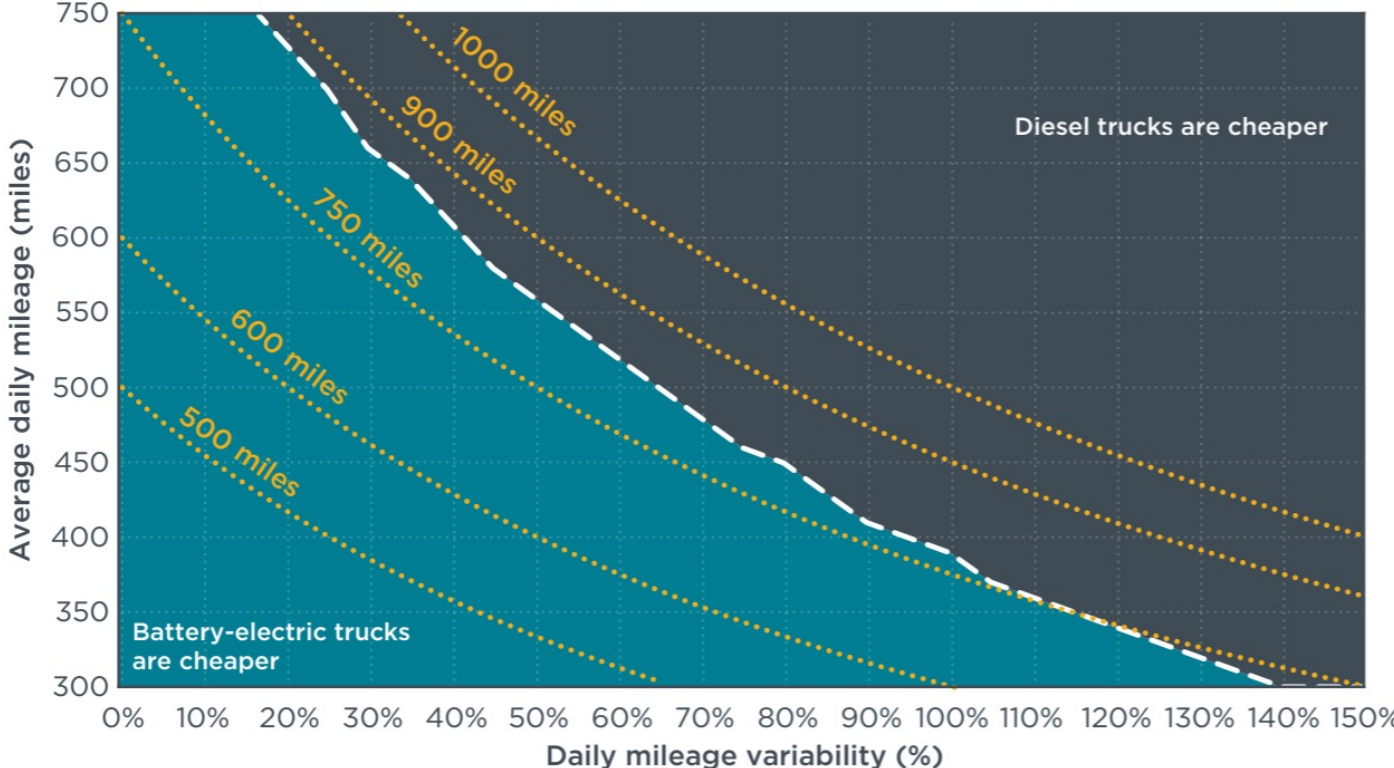


Battery-electric trucks can still achieve a better TCO at high daily mileages, given that their day-to-day mileage variability is low

Model year 2040

Average daily mileage
VS
mileage variability

- High average daily mileage:
 - Bigger battery (-)
 - More miles (+)
- High daily mileage variability:
 - Bigger battery (-)



Q&A

ray@theicct.org

h.basma@theicct.org