

Project description/goals:

This research project focuses on understanding the critical elements of a transition to alternative-fueled medium- and heavy-duty trucks for the purposes of greenhouse gas and criteria emissions reduction. This work will focus on vehicle/technology performance and costs, and important purchase decision factors in determining the adoption of alternative fuel truck technologies in various truck segments.

Key factors we are working to quantify: *Capital Cost; Operating costs (fuel use, maintenance); Environmental perception; Uncertainty (Risk); Incentives; Vehicle Range; Refueling Time; Station Availability; and Carbon Tax*

Qualitative Findings

We have spoken with:

Fleets: *Swift, UPS, RediMix, Fritolay/PepsiCo, Walmart, TTSI*

OEMs: *Penske, BYD/Supreme, Hino, Ford, Kenworth*

Truck Leasing: *Penske*

Infrastructure: *Love's / Trillium, NexGen*

Risk

Bigger truck fleets typically are the first to test and adopt new technologies

- *One fleet noted that even with higher natural gas prices, natural gas trucks allowed the company to mitigate exposure to fuel cost risk*

Showstopper – Operational Capability

If a company has to deploy many more trucks or faces hours of downtime for refueling, this would exclude the technology from consideration

Residual Value

Most natural gas truck fleets either keep their truck for its useful life or have a limited target secondary market, like the ports of Long Beach & LA

- *The vocational sector has more precedence with natural gas truck use, and one OEM noted that while finance systems will typically assume 0 residual value, fleets that better understand the value of NGVs will buy these vehicles*

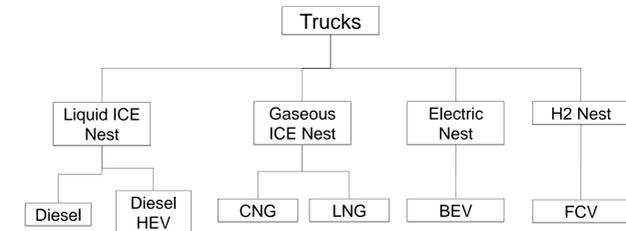
Sustainability

Sustainability has value to a varying degree, but is a secondary consideration. One fleet noted that if their project has the same ROI as another and it has sustainability, it will easily win; otherwise, if it has a poor ROI it may only win with sustainability in limited use cases such as testing out new electric trucks

The Truck Choice Model is based upon a Nested Multinomial Logit (NMNL) framework

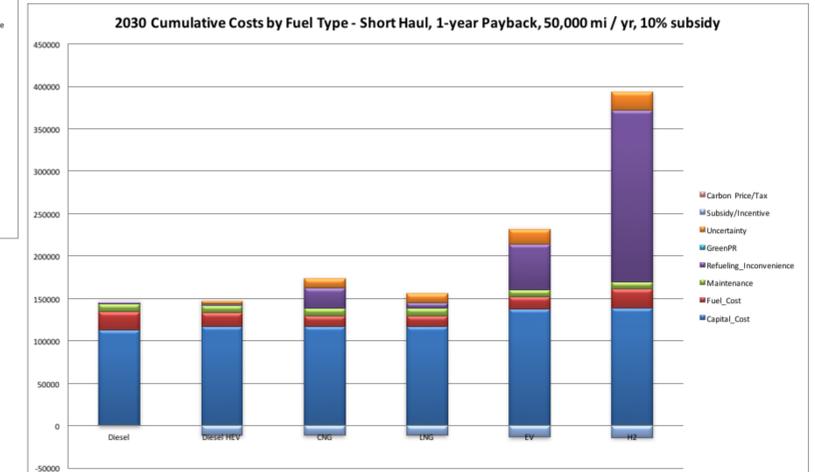
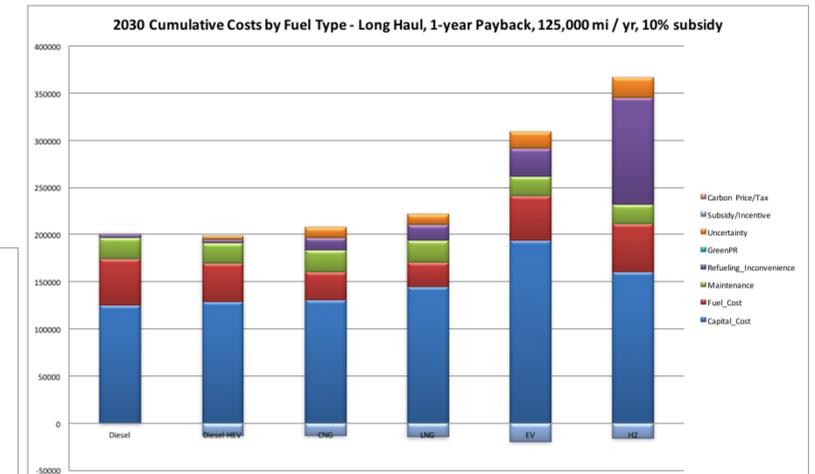
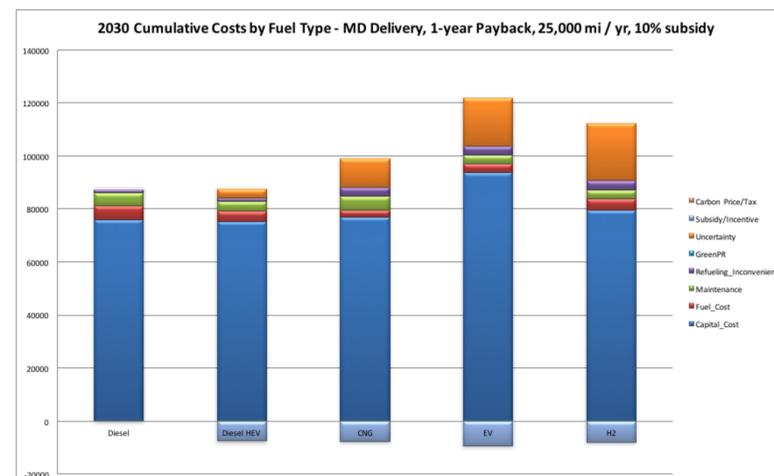
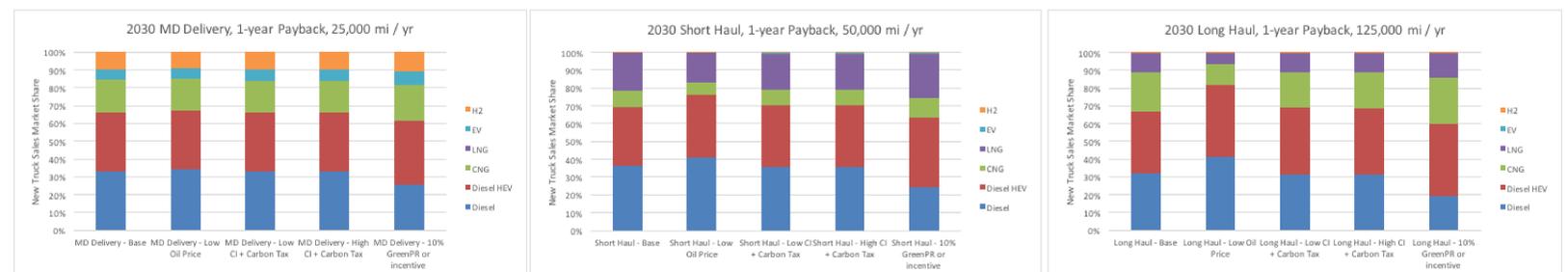
Used in many vehicle choice approaches based on work by Greene

Nests represent groupings of similar technologies that consumers consider close substitutes



(Preliminary)

Quantitative results



Next Steps

- Additional outreach to private truck fleets
- Workshop with public fleets at July 12 NorCal MEMA event
- Modify quantitative valuations and add key components to the model (e.g. gasoline option)
- Optimize policy levers like incentives and infrastructure funding to meet clean truck goals

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