

## 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*

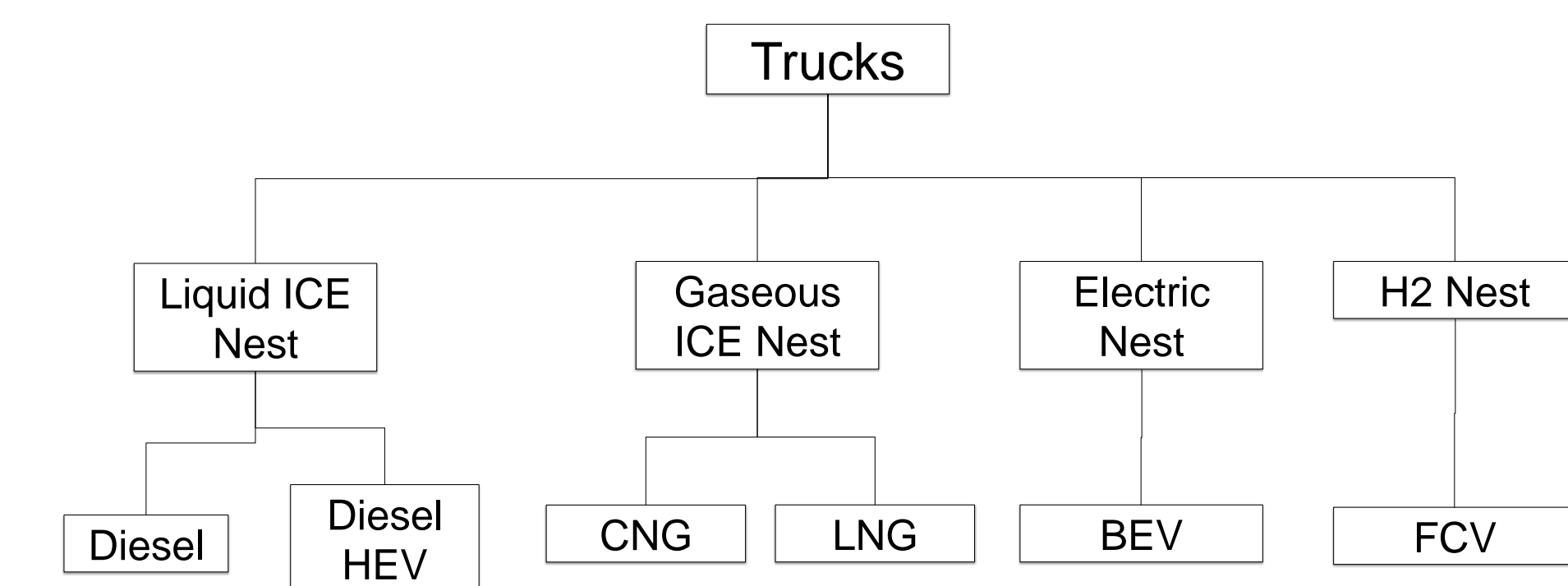
## Sustainability

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

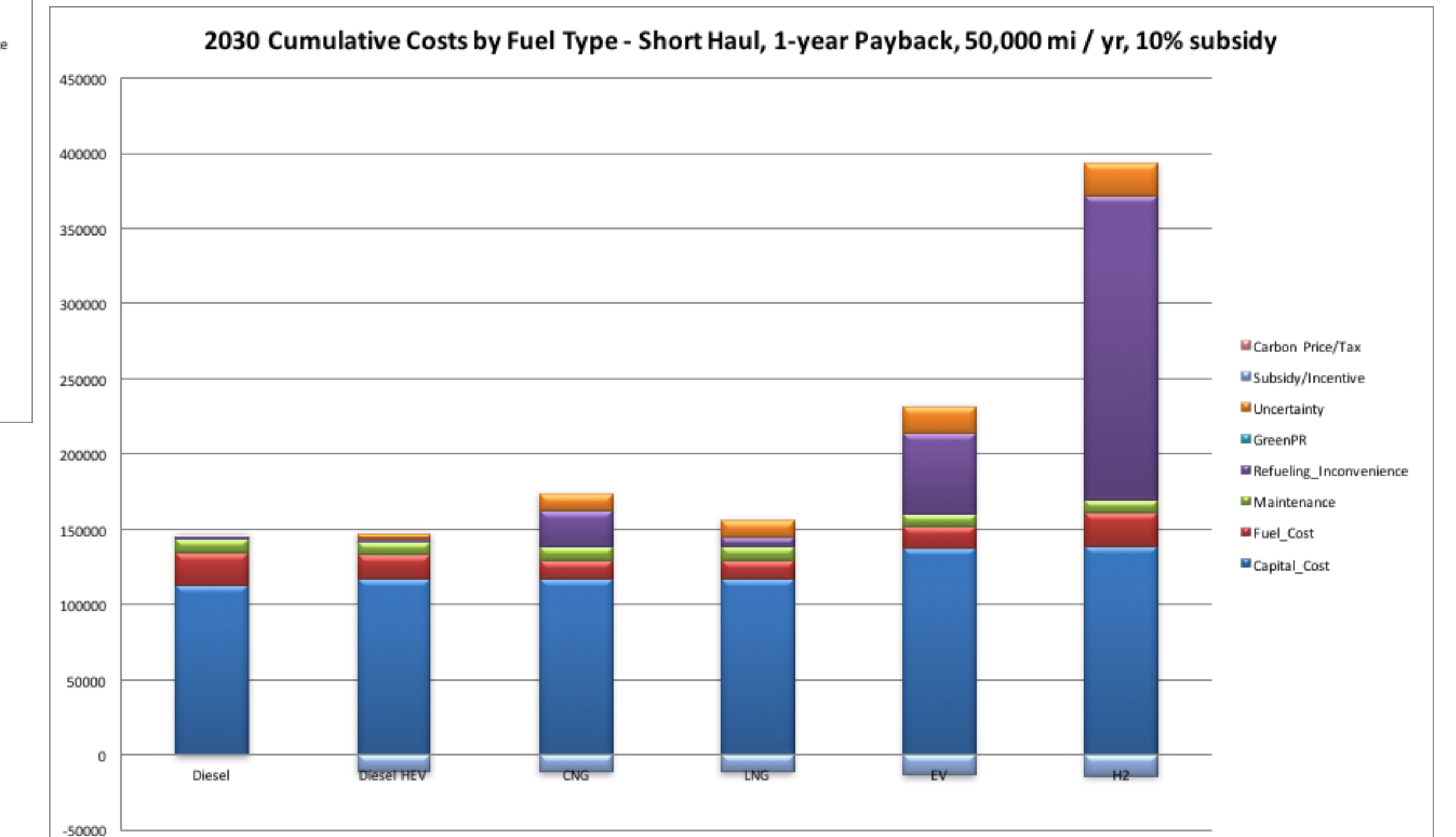
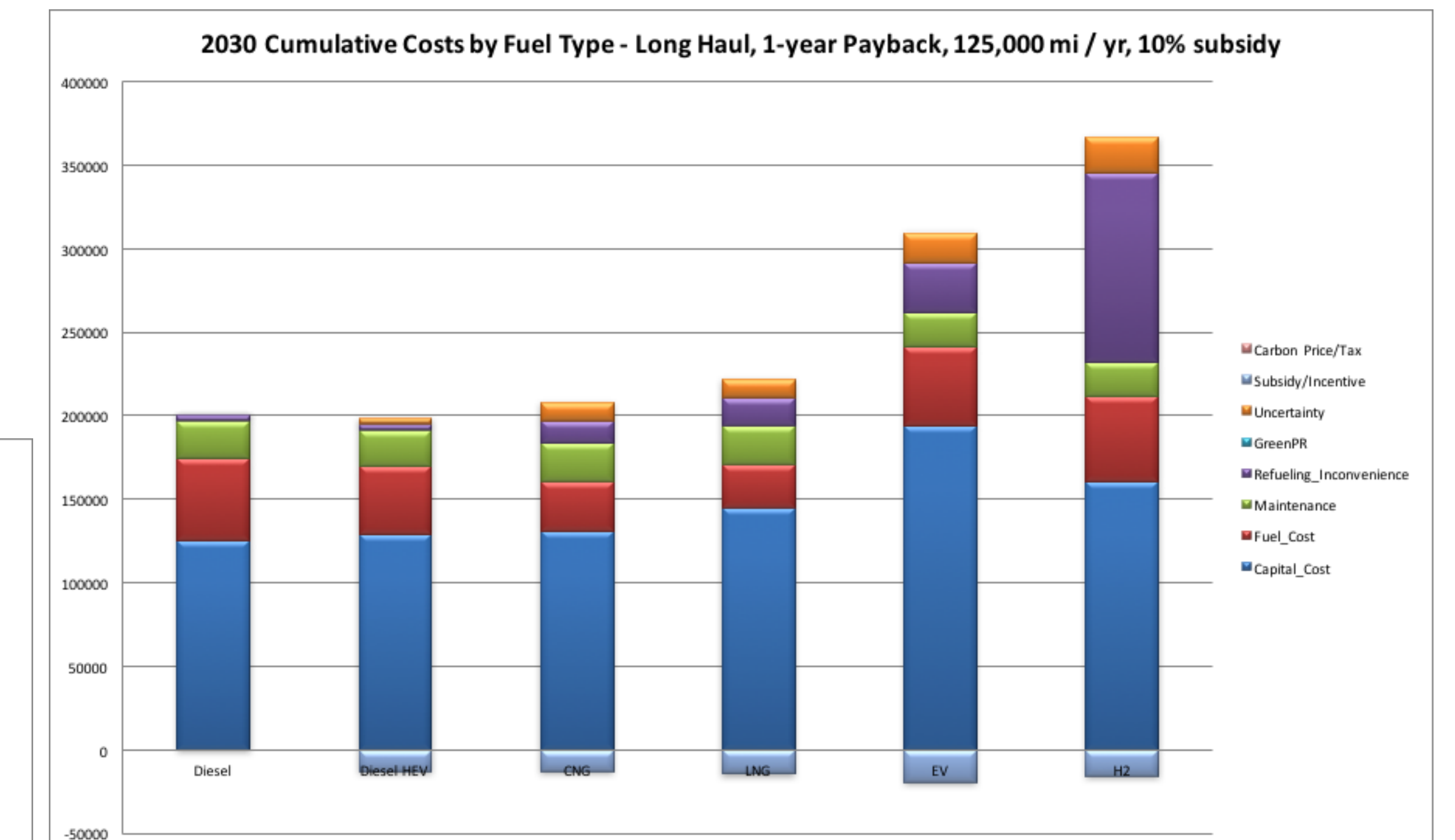
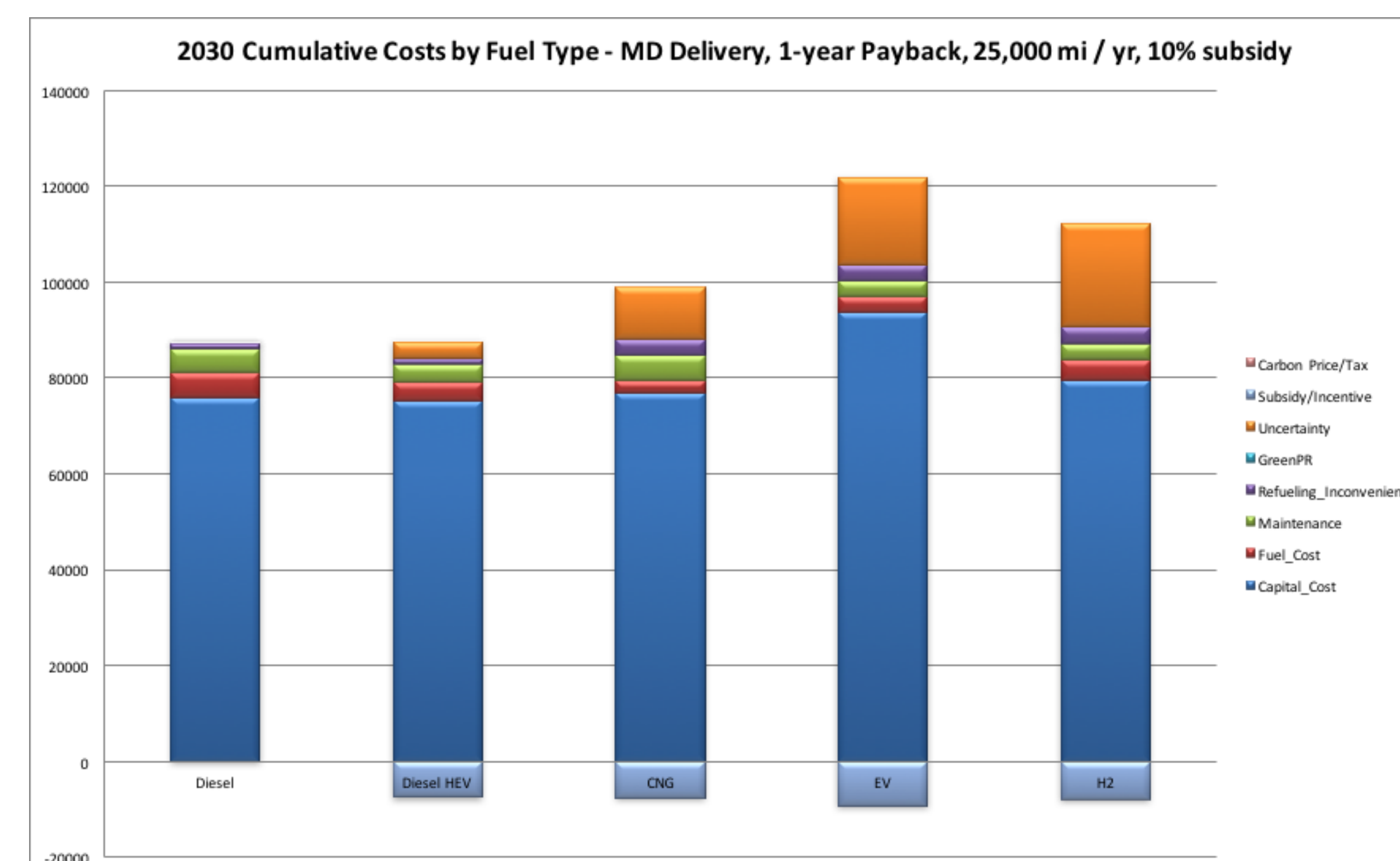
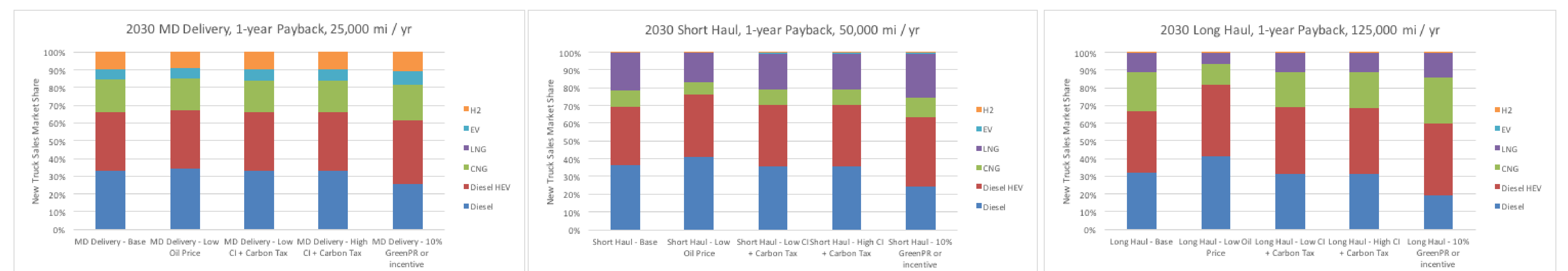
Used in many vehicle choice approaches based on work by Greene

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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