Truck Decision Choice Project

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STEPS Workshop
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ITS UCDAVIS
INSTITUTE OF TRANSPORTATION STUDIES

Truck Decision Choice Project

- The trucking sector has historically been poorly represented in long-term energy/technology models
- Many of these energy and scenario models only deal with highly aggregated heavy-duty and medium-duty trucks.
- We are developing a better set of cost and performance projections for trucks of different types and technologies
  - Breaking out categories (long haul, short haul, delivery, vocational, etc.) with different duty cycles, different average travel per year, and different fuel use and refueling profiles.
  - Interviewing and surveying logistics and trucking firms to better understand their purchase criteria, truck use patterns, resale strategies, etc.
  - Developing a logit model of choice, with future scenarios for alt-fuel truck sales consistent with ARB Vision framework
- At this time all input values are preliminary – we're still calibrating and updating parameter values

Decision Choice Model Input Parameters

- Capital Cost
- Operating costs (fuel use, maintenance)
- Environmental perception
- Uncertainty (Risk)
- Incentives/Subsidies
- Vehicle Range
- Refueling Time
- Station Availability
- Carbon Tax

Truck HD Fleet Categories

- Fleet categories can strongly affect decision factors
- Long haul, short haul, drayage (port)
  - Range, station availability
- Fleet size (large, medium, owner operator)
  - Risk
  - Payback period

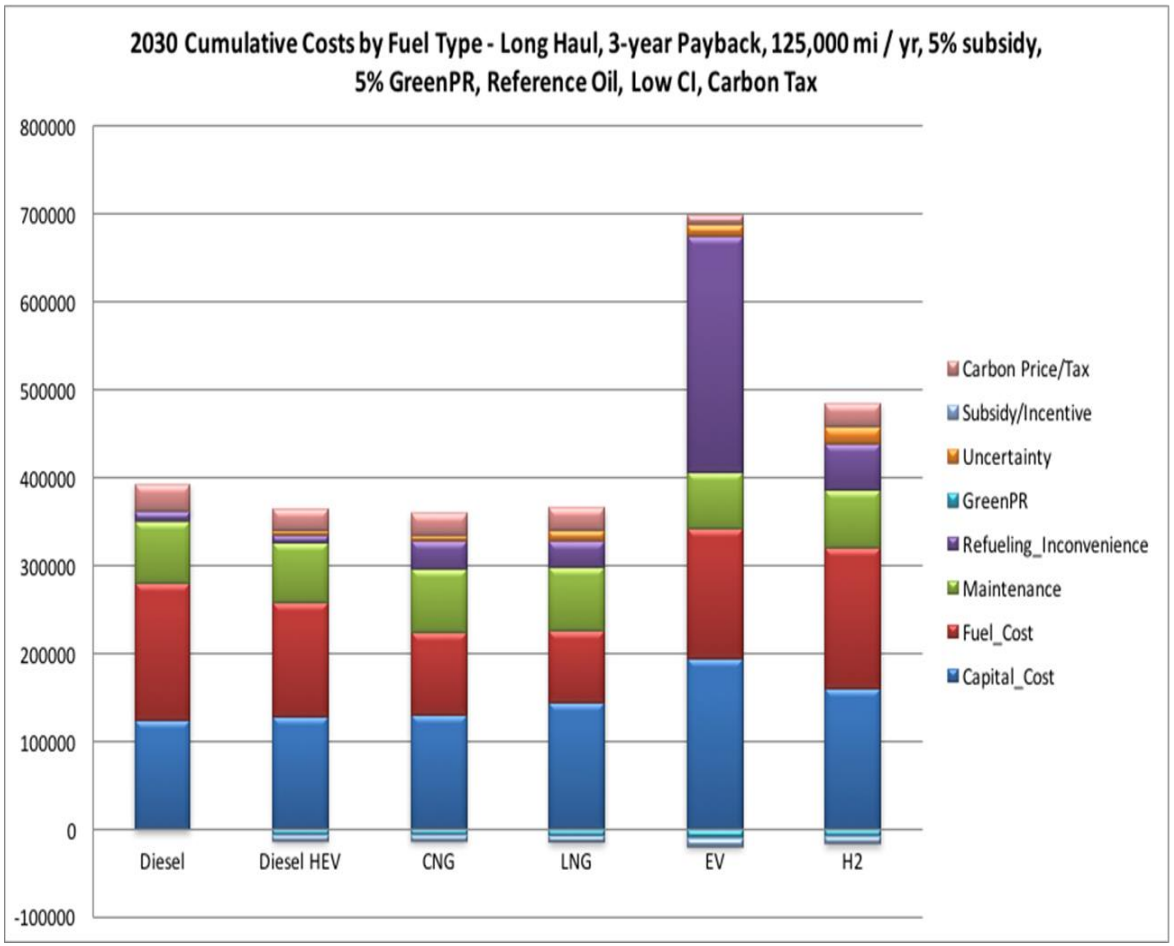
Trucking Shareholders Contacted

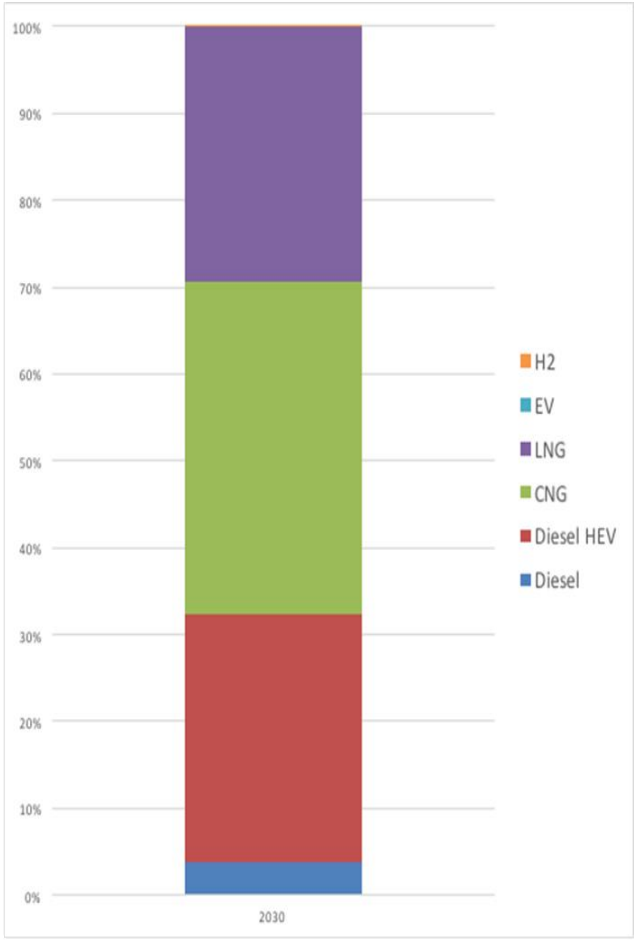
- Fleets
  - Swift, UPS, RediMix, Fritolay/PepsiCO, Walmart, Total Transportation Services Inc.
- OEMS
  - Penske, BYD/Supreme, Hino, Ford, Kenworth
- Infrastructure
  - Love's / Trillium, NexGen
- Planned Work
  - More interviews
  - NorCal MEMA public fleets workshop
  - Fleet decision choice questionnaire

Interview Takeaways

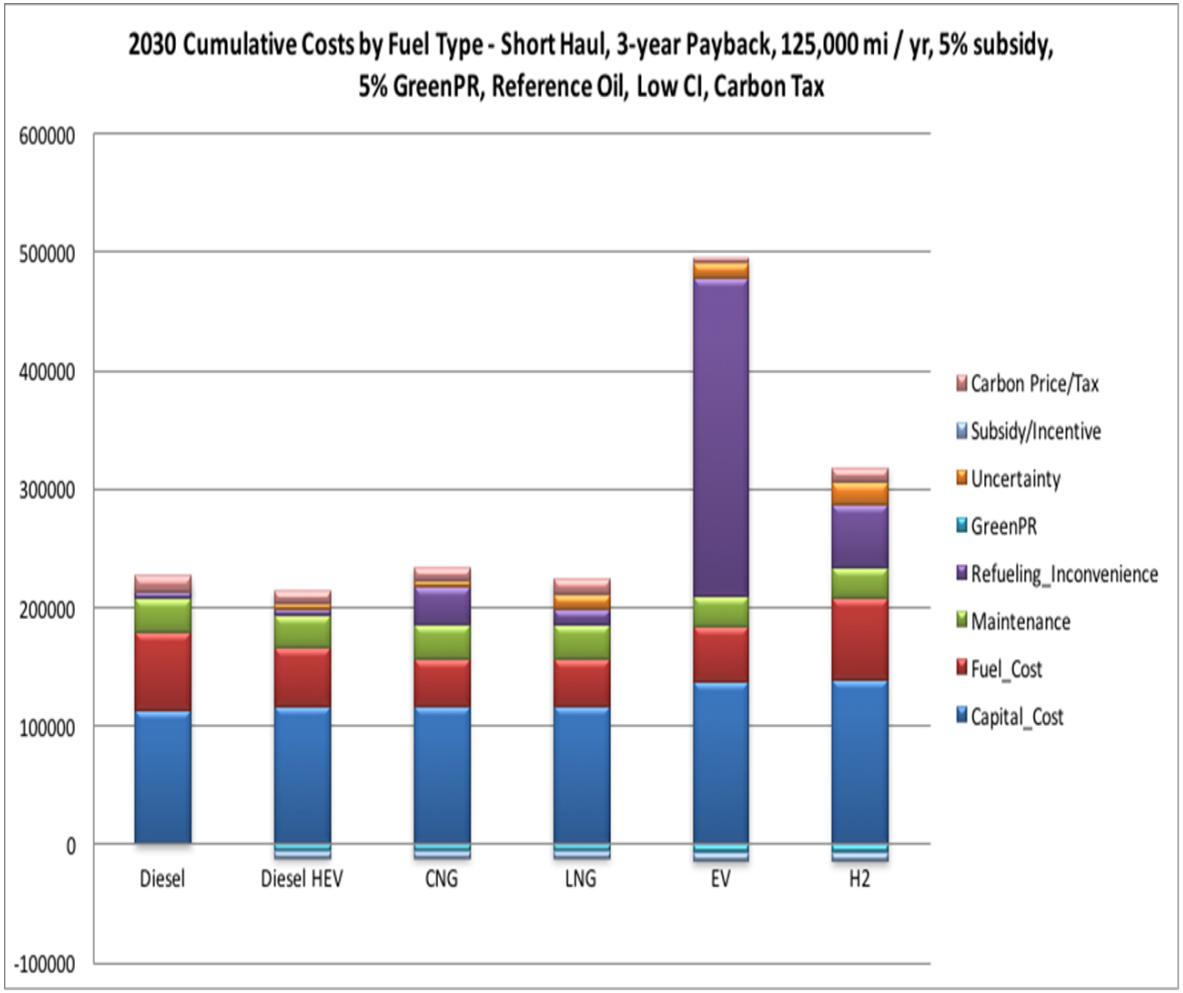
- Cost is paramount
- Payback period (1.5 to 3 years but prefer < 2)
- Secondary Markets (trade back to OEM, keep for salvage)
- Must meet performance requirements (range, power)
- Fuel availability (Own stations, return to “home”)
- Driver retention
- Environmental PR (outside mandatory regulations)
- Test fleets for large fleets (10-100 new technology vehicles)

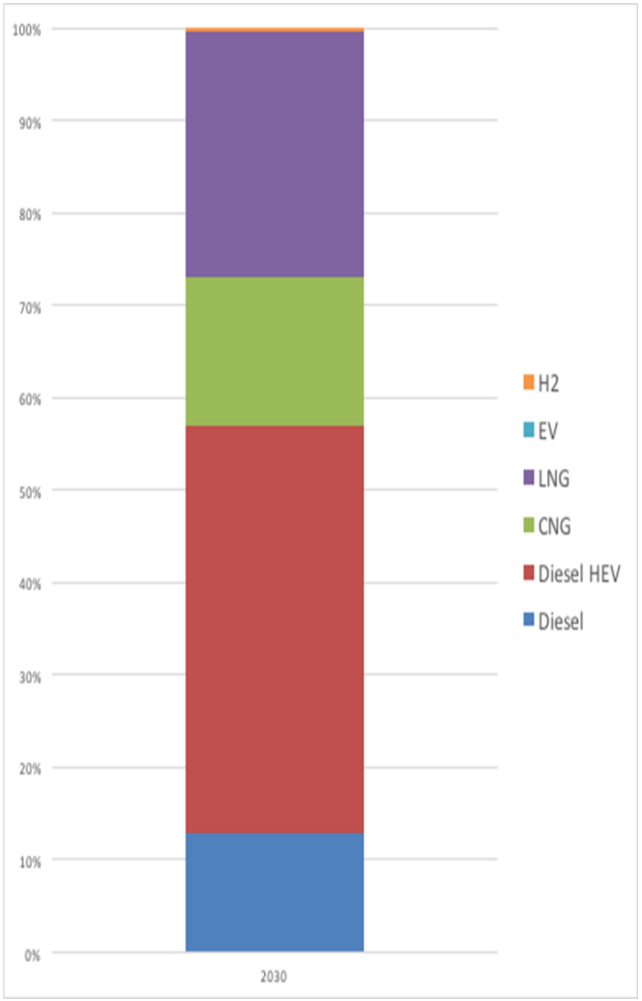
2030 Long Haul Market Shares – Various Conditions



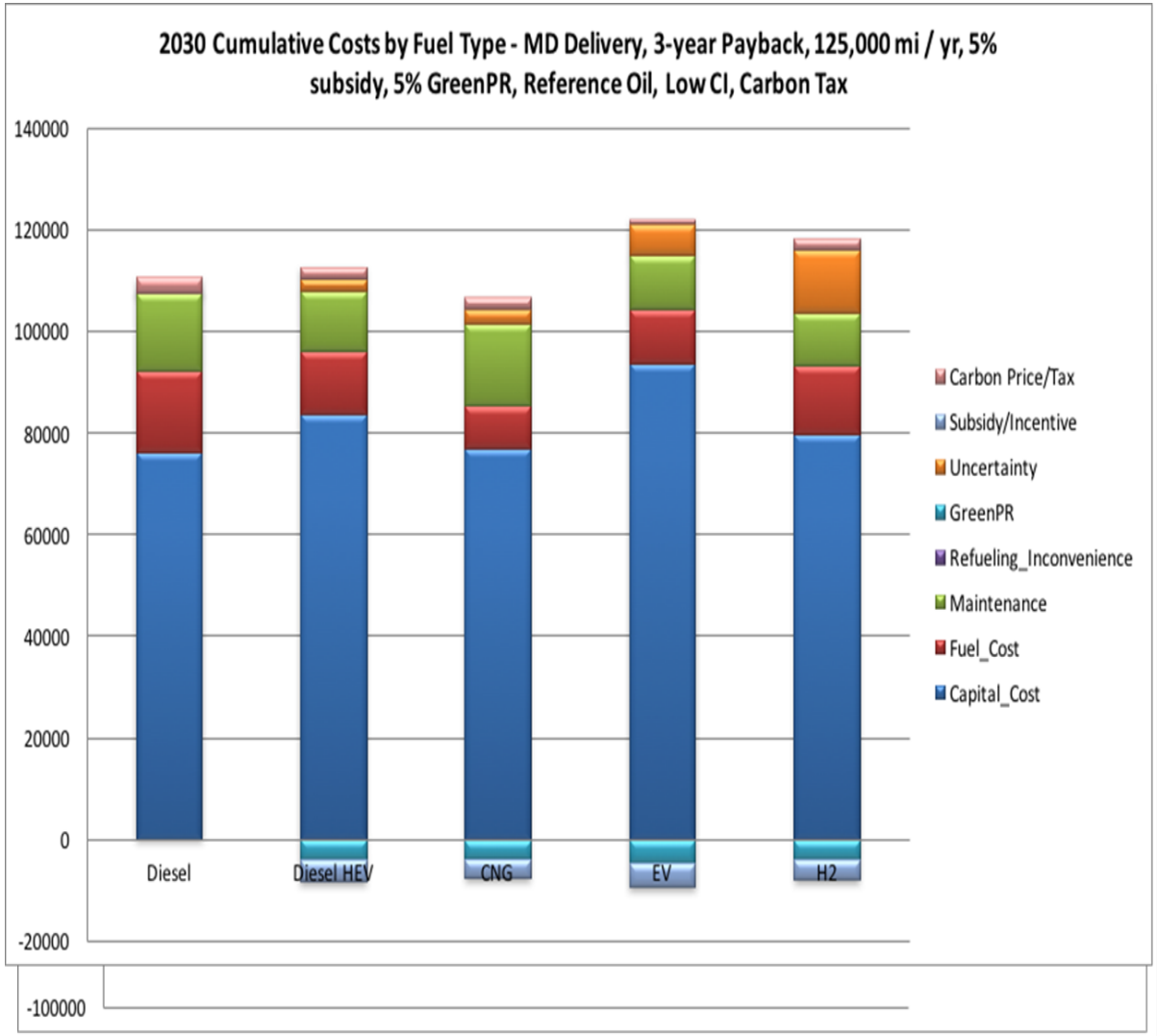


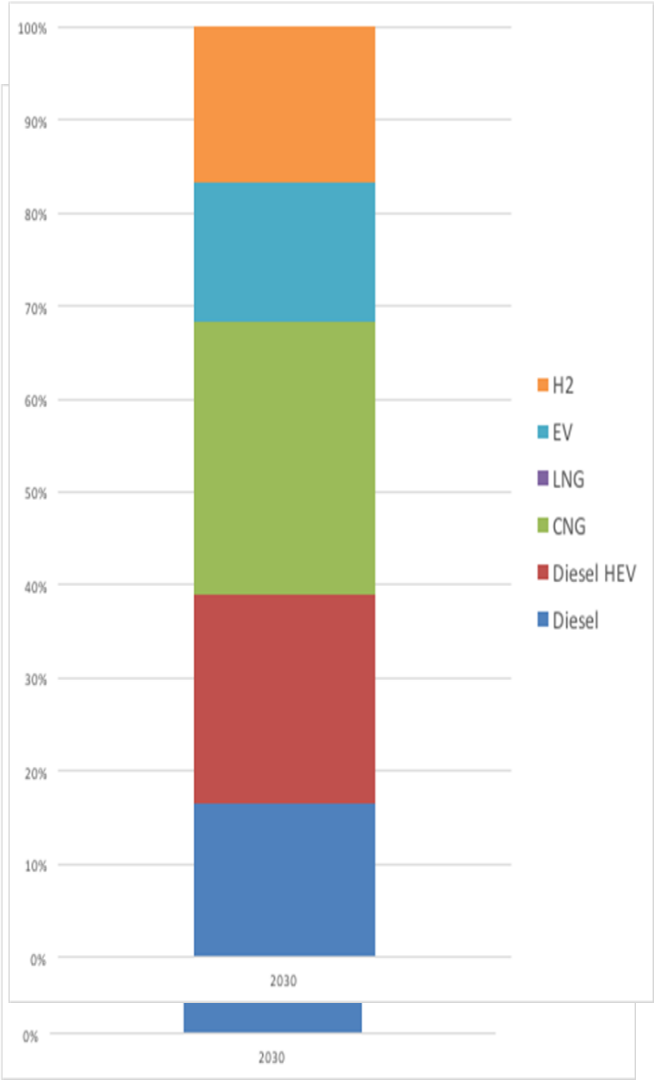
2030 Short Haul Market Shares – Similar Conditions

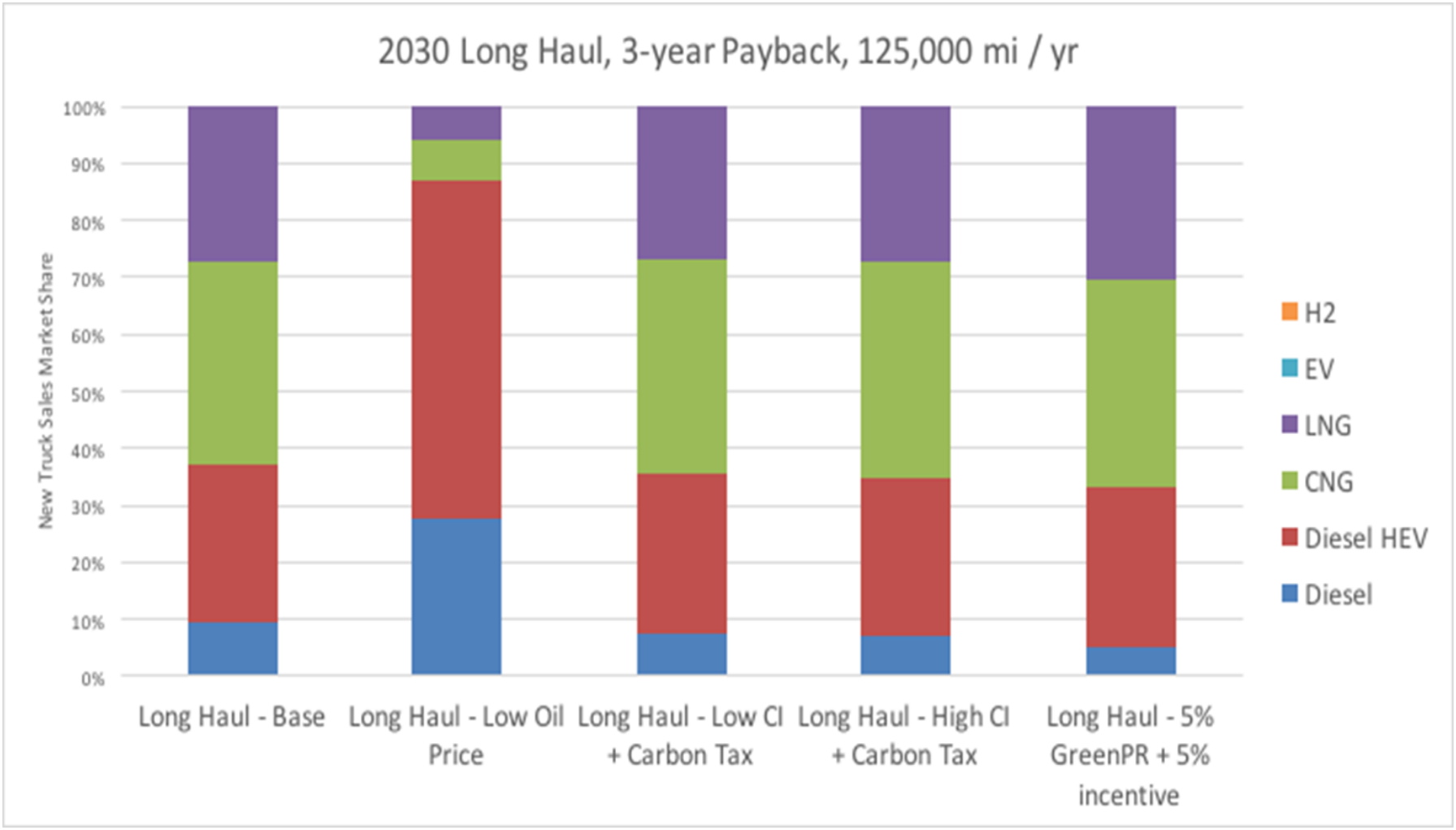


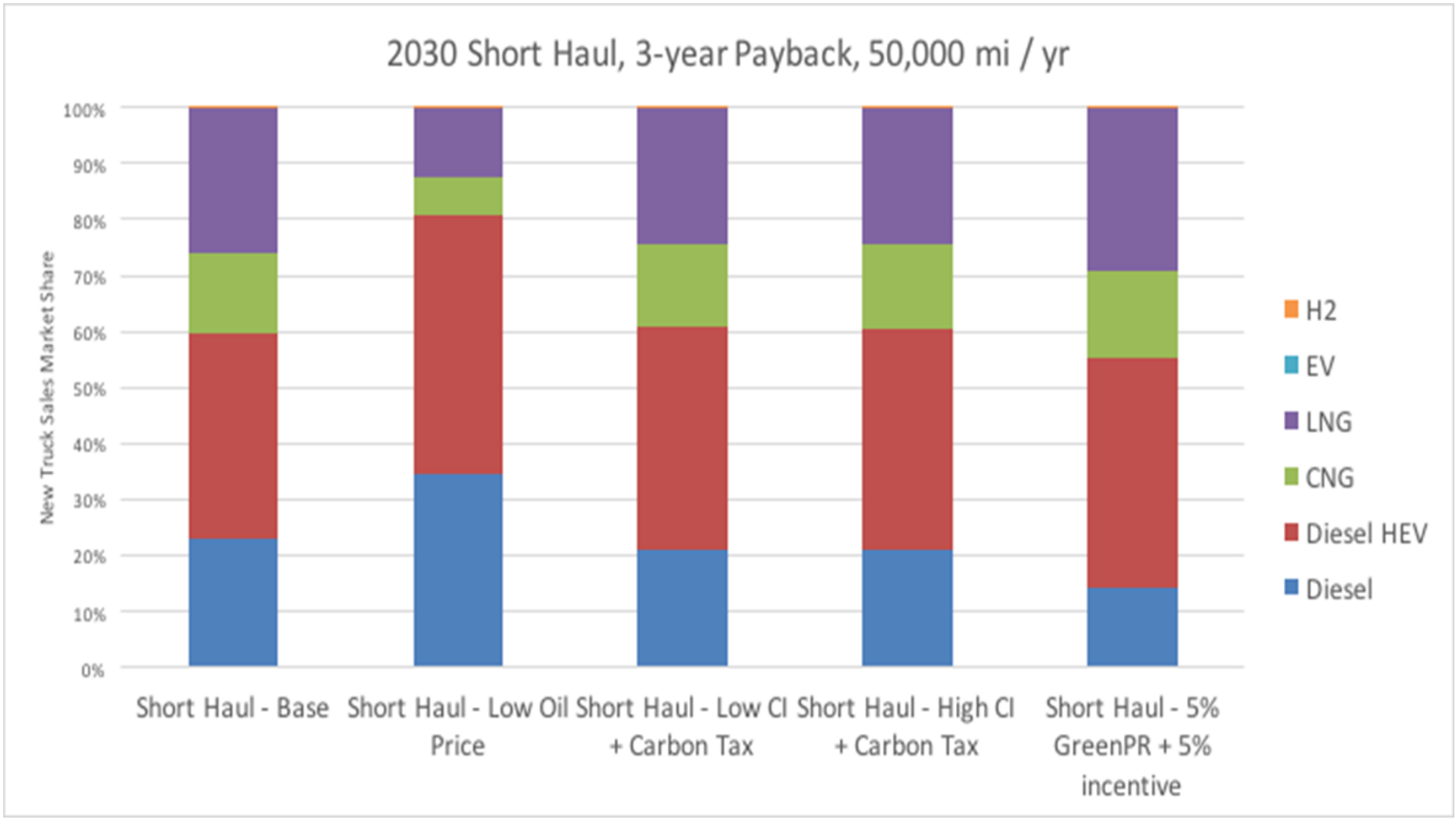


2030 MD Delivery Market Shares – Similar Conditions






2030 Long Haul, 3-year Payback, 125,000 mi / yr
New Truck Sales Market Share
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Long Haul - Base
Long Haul - Low Oil Price
Long Haul - Low CI + Carbon Tax
Long Haul - High CI + Carbon Tax
Long Haul - 5% GreenPR + 5% incentive
H2
EV
LNG
CNG
Diesel HEV
Diesel


2030 Short Haul, 3-year Payback, 50,000 mi / yr
New Truck Sales Market Share
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Short Haul - Base
Short Haul - Low Oil Price
Short Haul - Low CI + Carbon Tax
Short Haul - High CI + Carbon Tax
Short Haul - 5% GreenPR + 5% incentive
H2
EV
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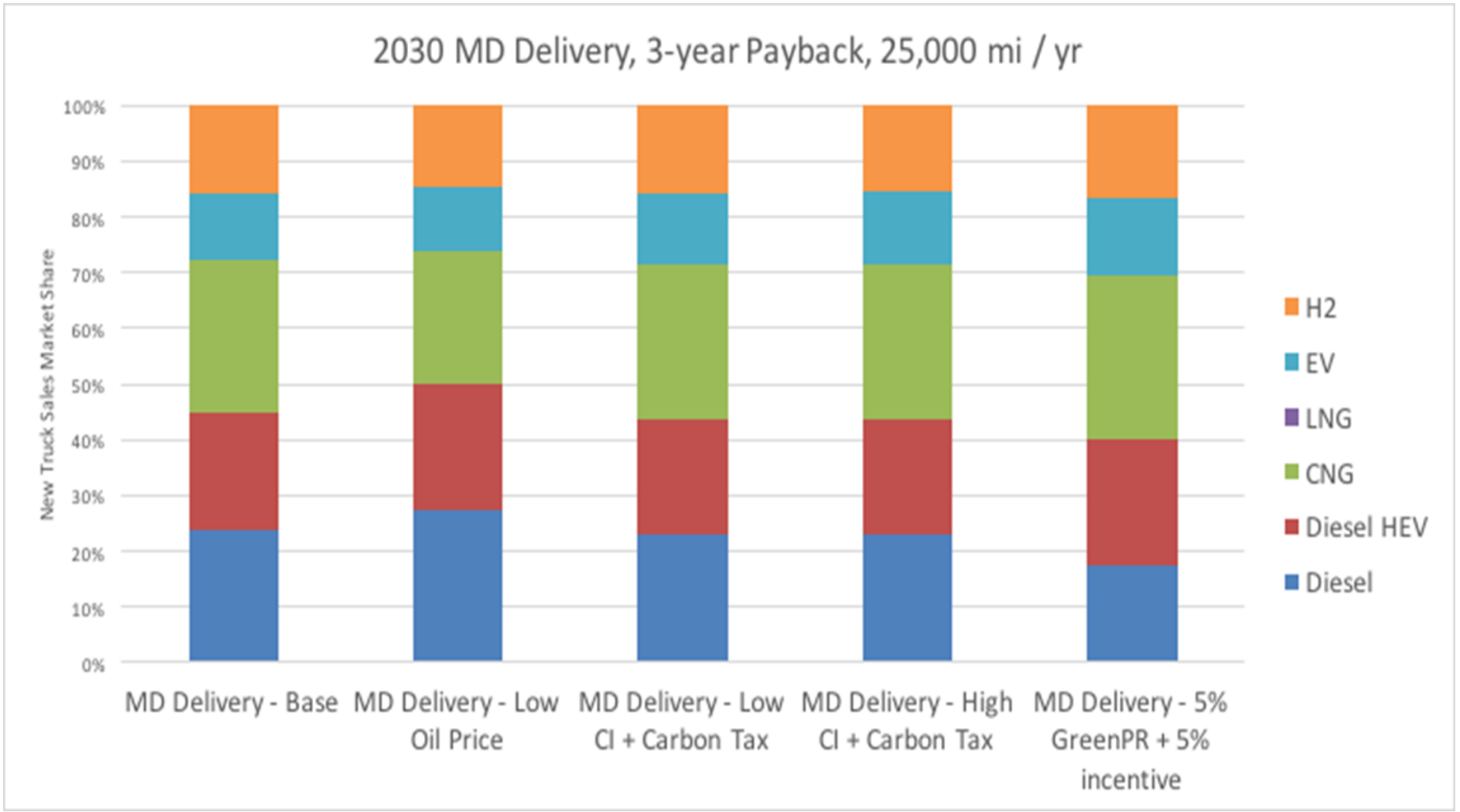
2030 MD Delivery, 3-year Payback, 25,000 mi / yr
New Truck Sales Market Share
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
MD Delivery - Base
MD Delivery - Low Oil Price
MD Delivery - Low CI + Carbon Tax
MD Delivery - High CI + Carbon Tax
MD Delivery - 5% GreenPR + 5% incentive
H2
EV
LNG
CNG
Diesel HEV
Diesel

Next Steps

- Continue to tune monetary value of factors
- Determine more accurate input parameter values for all trucks types (e.g. capital cost and fuel economy versus time)
- Differentiate sub-categories of trucking fleets that have different choice factors
- Calibrate to present market shares
- Include other truck classes (buses, heavy-duty vans and pickups, vocational trucks, etc.)
- Identify policy levers that would deliver truck market shares aligned with sustainability goals

Thank You