



# THE ZERO-EMISSION FREIGHT REVOLUTION:

## CALIFORNIA CASE STUDIES

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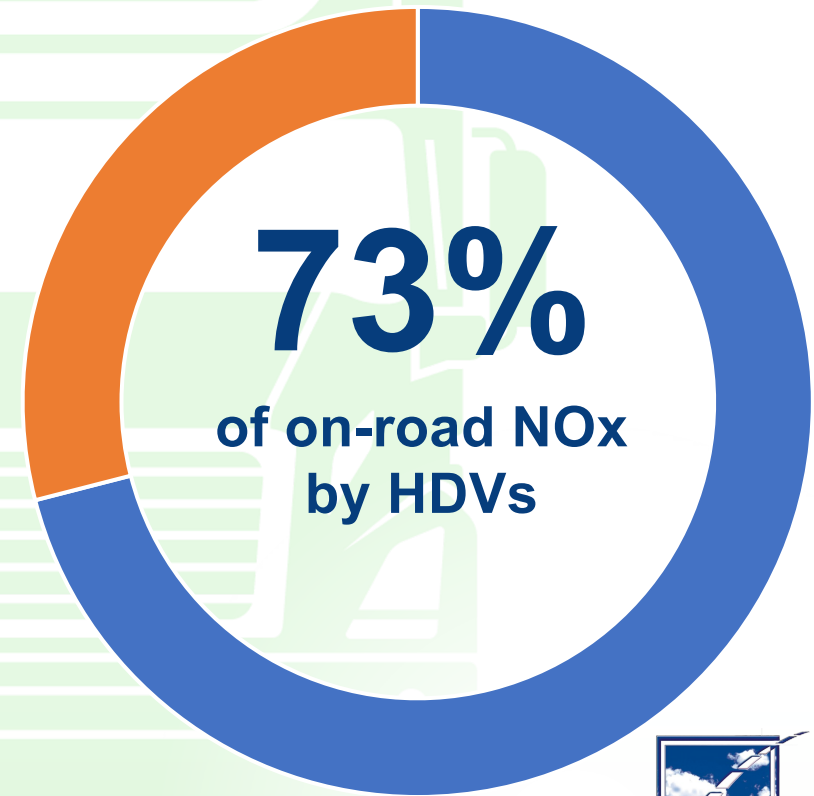
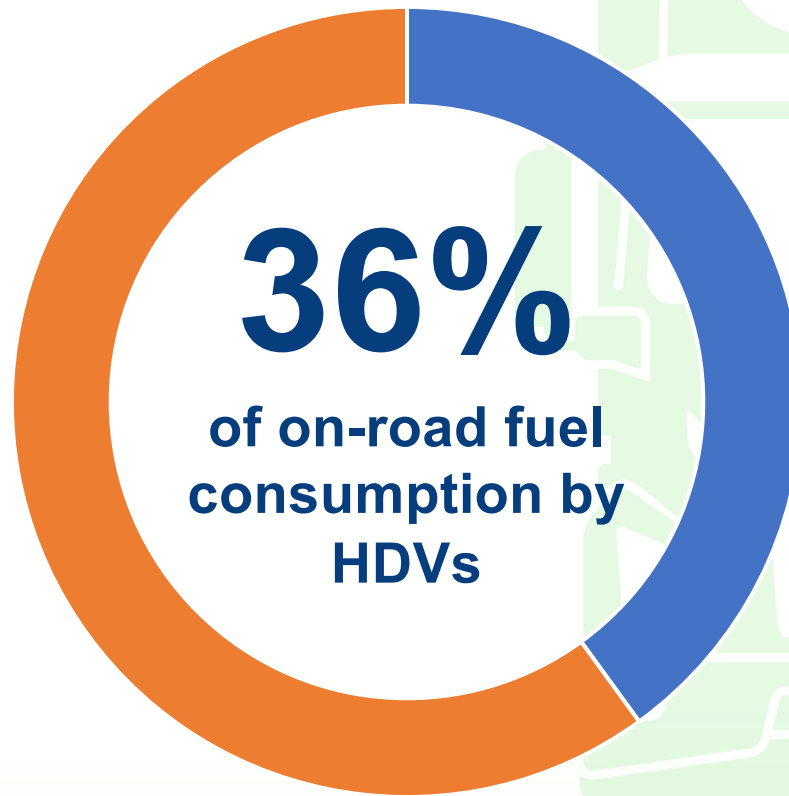
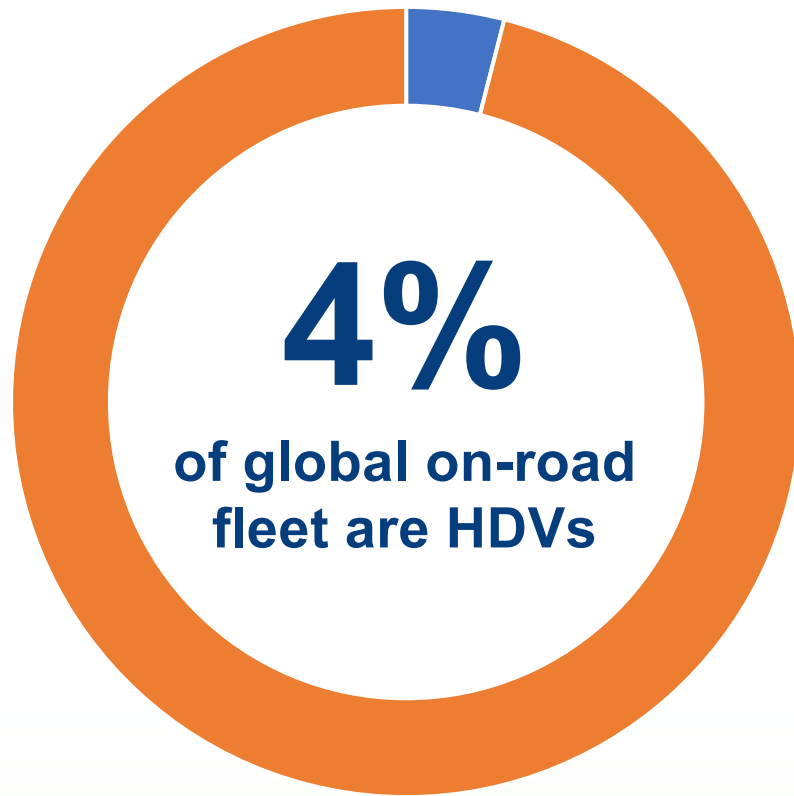
# EVS35

OSL2022

Over 300 Members



# WHY ZERO EMISSION FREIGHT: DISPROPORTIONATE EMISSIONS



ICCT (2020): Roadmap model





# CALIFORNIA'S APPROACH TO MARKET TRANSFORMATION

## Regulations

### Advanced Clean Trucks

Mandates OEMs to sell increasing percentage of ZE Class 2b-8 vehicles

### Advanced Clean Fleets

Would mandate fleets to purchase increasing percentage of ZE Class 2b-8 vehicles (expected to pass in 2022)

## Incentives

### Low Carbon Fuel Standard

Generates credits for low-carbon fuel producers and EV charger owners



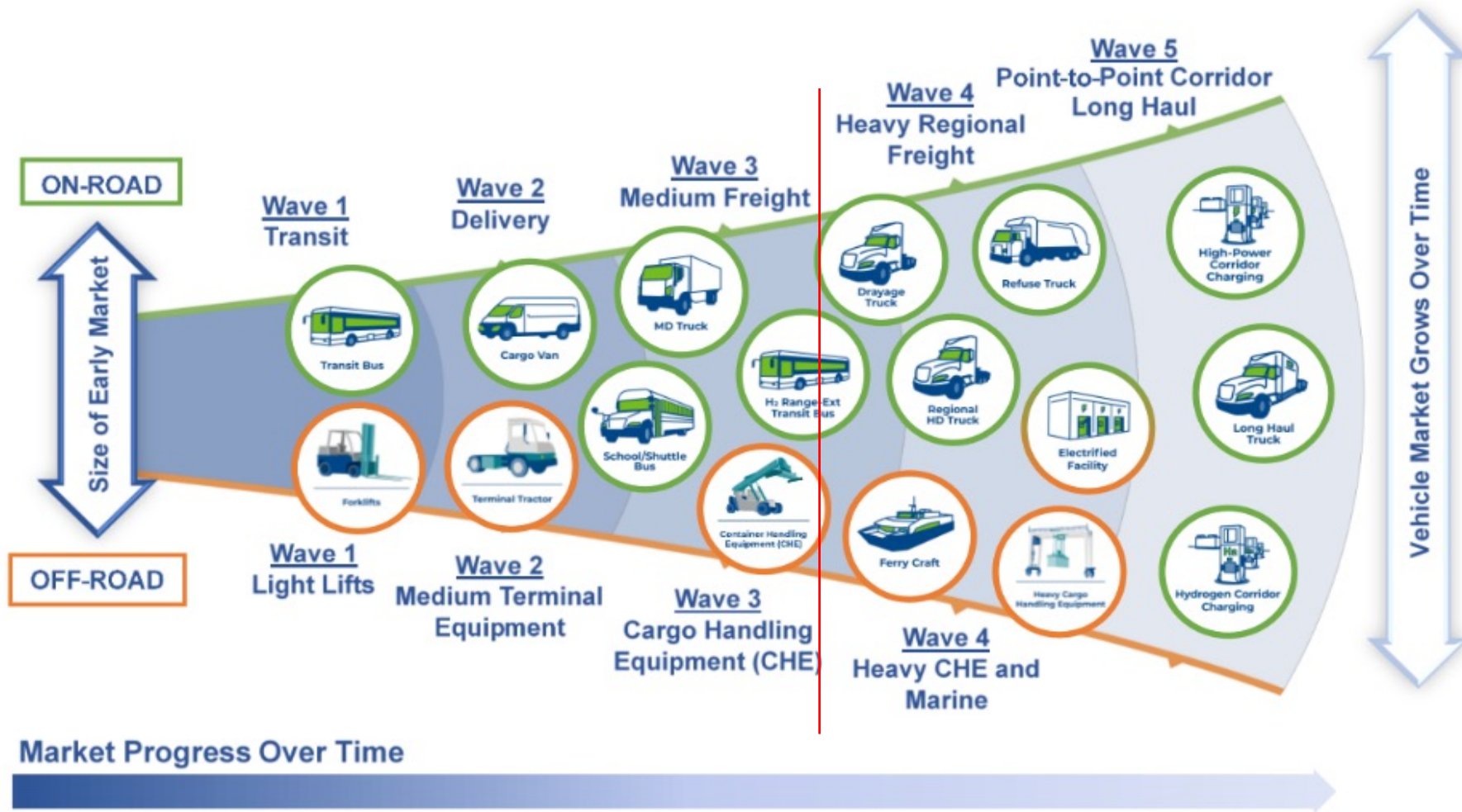
Point-of-sale incentives for clean trucks and buses



Point-of-sale incentives for clean off-road equipment



# BEACHHEAD MODEL: TARGET THE EASIEST TO ELECTRIFY SECTORS



# PROJECTS AND FLEETS

## Volvo LIGHTS (\$90M)

- DHE & NFI
- Ports of LA / LB
- Drayage + warehousing operations

## Project 2 (\$30M)

- Central Valley
- Manufacturing, warehousing + delivery





# VEHICLES DEPLOYED

## Yard Tractor

## Class 6

## Class 7

## Class 8

CONVERSION



Orange EV  
T-Series Pure Electric Terminal Truck

2



Kalmar Ottawa  
T2E 4x2 Terminal Tractor

2



BYD  
8Y (Off-Road)

3



Peterbilt  
Peterbilt Model 220 Battery  
Electric Truck

6

8,846 – 11,793 kg



Volvo  
Volvo VNRe Battery Electric Truck

1

11,794 – 14,969 kg



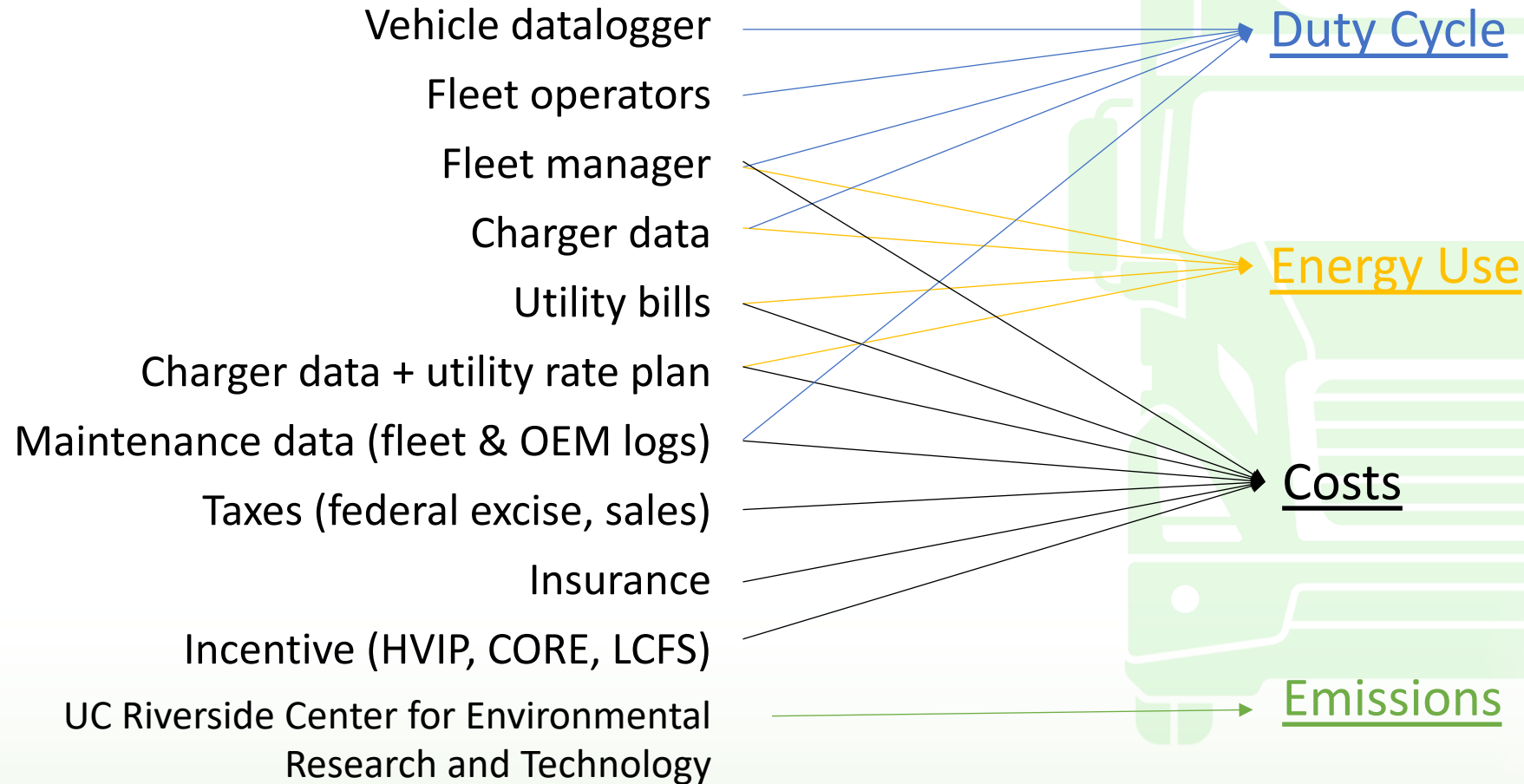
Volvo  
Volvo VNRe Battery Electric Truck

4

> 14,969 kg



# DATA COLLECTION





# E-YARD TRACTOR: 5X MORE EFFICIENT

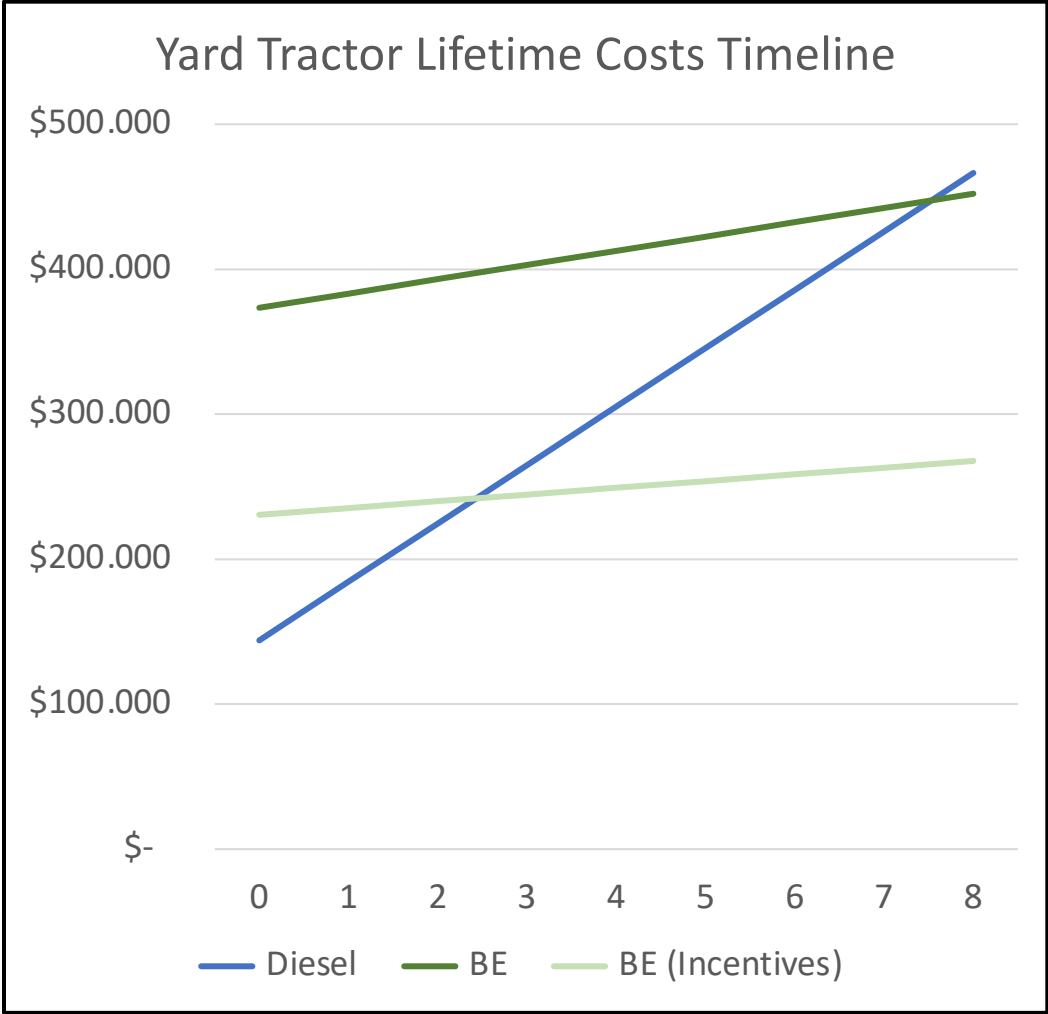
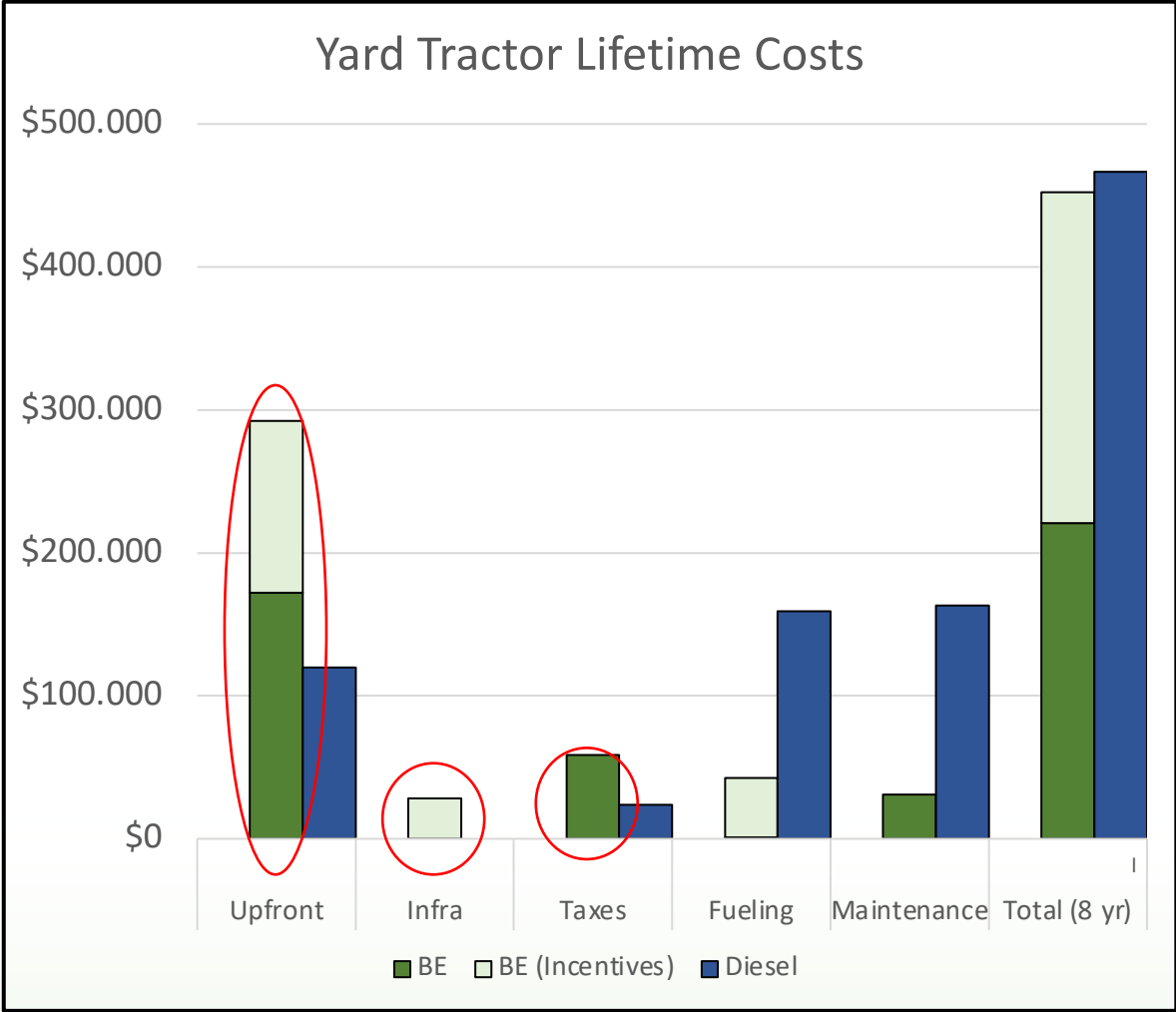
Same Duty Cycle as Diesel



More Energy Efficiency



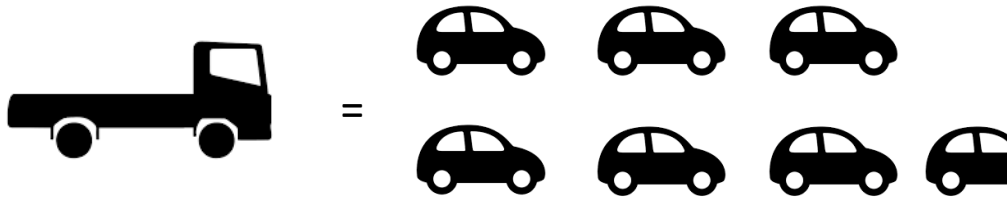
# E-YARD TRACTOR: BETTER TOTAL COST OF OWNERSHIP



# E-YARD TRACTOR: LOWER EMISSIONS & LIFETIME COSTS

## Emissions

- 1 yard tractor = 6.6 cars



## Summary

- ✓ Meet duty cycle
- ✓ Cheaper lifetime costs than diesel
- ✓ Major climate and pollution benefits





# CLASS 6 E-TRUCKS: GREAT SHORT-RANGE REPLACEMENT



Peterbilt

**Peterbilt Model 220 Battery  
Electric Truck**

- Replaced Class 8 diesel trucks
- Advertised < 160 km (100 mi)
- Max range seen = 320 km (200 mi)



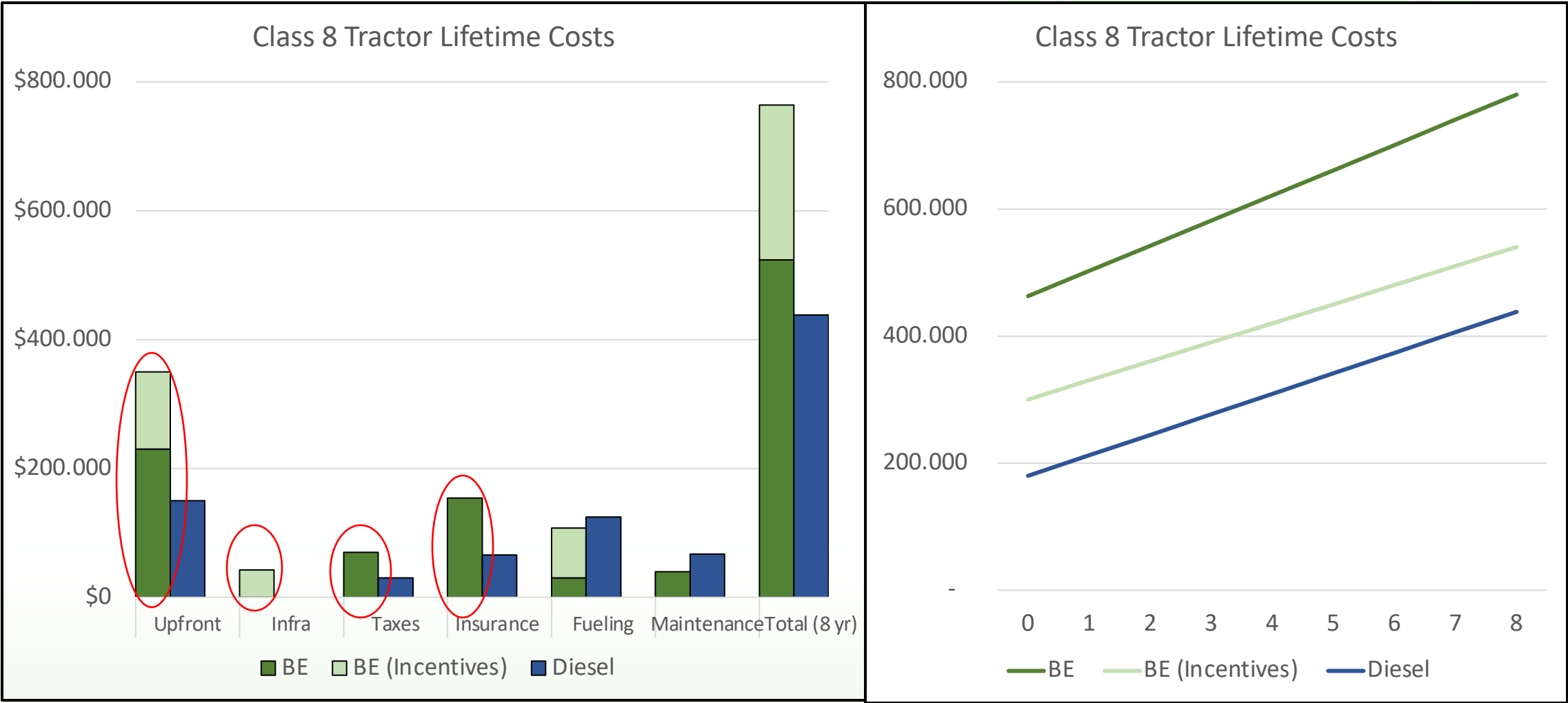
# CLASS 7-8 TRUCKS: MORE ENERGY EFFICIENT, LESS RANGE



- EVs 3x more energy efficient
- Class 7 EV ranged limited to 160 km per day (100 mi). 50-60% of DHE's nationwide  
Class 8 EV range limited to <240 km per day (150 mi) and 1 shift per day



# CLASS 7-8 TRUCKS – SEVERAL BARRIERS TO A LOWER TCO





# CLASS 7-8 TRUCK – HUGE EMISSIONS SAVINGS

## Class 7

(24,000 km, 15,000 mi)



=

5.2 cars



Volvo

Volvo VNRe Battery Electric Truck

## Class 8

(161,000 km, 100,000 mi)



=

36 cars



Volvo





Volvo VNRe Battery Electric Truck

At Port of Los Angeles, HD trucks make up:

- 44% of CO<sub>2</sub>
- 18% of NO<sub>x</sub>



# CONCLUSION

	Yard Tractor	Class 6	Class 7	Class 8
Vehicle				
Range	= Diesel	< 160 km < 100 mi	< 160 km < 100 mi	< 240 – 350 km < 150-220 mi
Cheaper Lifetime Costs		?		



# THANK YOU

  
**EVS35**  
OSL2022



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