Fleet Decarbonization Journey

Keith Wilson
President & CEO
TITAN Freight Systems

FOSSIL FUEL FREE TRANSPORTATION HUB

3. Renewable Diesel Tank

- Up to 80% less GHG compared to petroleum diesel
- Up to 40% less Black Carbon emissions compared to petroleum diesel
- Renewable Diesel is NOT Bio-Diesel

2. DC Fast Chargers

- 3 - 180 kWh chargers can charge an eCascadia in less than 2 hours
- 3 - 60 kWh chargers can charge an eM2 in less than 4 hours

5. Electric Standup Forklifts

- $2.00 electricity cost per 8-hour shift versus $21.36 for a propane forklift
- Zero Pollution Workplace – Unhealthy propane exhaust removed from the workplace

1. Electric Freightliner eCascadia

- 295 kWh battery
- 150 - Mile Range – Perfect for short haul delivery routes

4. Level 2 Car Chargers

- 6 – 12 kWh Charging Ports
- Circa $1.00 cost per gallon equivalent

TITAN®
FREIGHT SYSTEMS

Vision 2020 Target
Reduce Emissions 20% by 2020

Vision 2020	2010	2019	Change
Fleet MPG (Class 6, 7 & 8)	6.84	7.26	6%

Missed Target Despite Every Available Add-On

Air Deflectors

Trailer Side Skirts

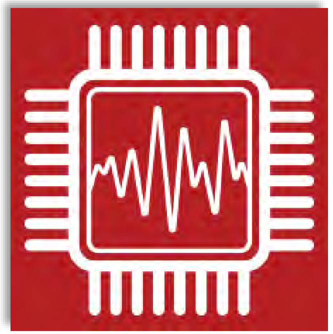
Aerodynamic Wheel Covers

Low Rolling Resistant Tires

Aerodynamic Mud Flaps

Engine Idle Shutoff

Artificial Intelligence

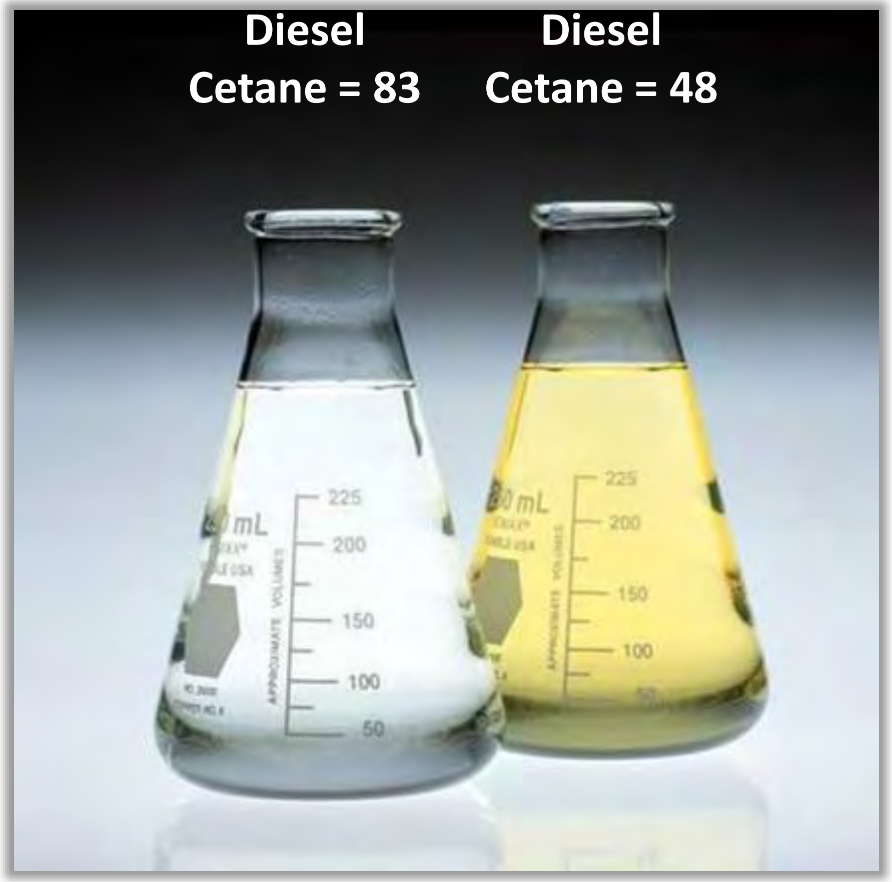


West Coast Alternatives to Petroleum Diesel

Diesel Application Energy Options	Energy Type	Carbon Intensity [g CO2e / MJ]	CI Reduction vs. Petroleum Diesel	ASTM (American Society for Testing and Materials)
Petroleum Diesel (B5)	**Fossil**	**97.75**	---	D975
Biodiesel (B20)	Fossil / Renewable	88.77	9% ←	D6751
Natural Gas (Compressed)	Fossil	79.98	18% ←	WK40094
Natural Gas (Biogas)	Renewable	56.68	42% ←	WK40094
Electricity (hydro, coal, natural gas, wind, nuclear)	Fossil / Renewable	43.41	56% ←	
Renewable Diesel (R99)	**Renewable**	**38.75**	**60% to 85%** ←	**D975**

DEQ 2020 Oregon Clean Fuels Program: Estimated Lifecycle Carbon Intensities of Common Fuels and Blends
DEQ 2021 Oregon Clean Fuels Program Updated Electricity Carbon Intensity Values:
Electricity CI statewide mix 147.60 divided by 3.4, the electric vehicle efficiency compared to combustion engine

April 1st 2020 -
Renewable Diesel is Ultra-Clean Burning



UP to 40% less soot & black carbon

Renewable Diesel = Lower Operating Costs

TITAN
FREIGHT SYSTEMS

- More than one cent (>$.01) per mile maintenance cost reduction
- $20,000 Annual Savings
- Since 2020, ZERO Diesel particulate Filter (DPF) cleanings or failures

- Penske is 'Huge Proponent of Renewable Diesel' CCJ Jan 23, 2023
- "We agree with the majority of the studies that are showing around a two cent ($.02) per mile maintenance (savings) when compared to traditional diesel."

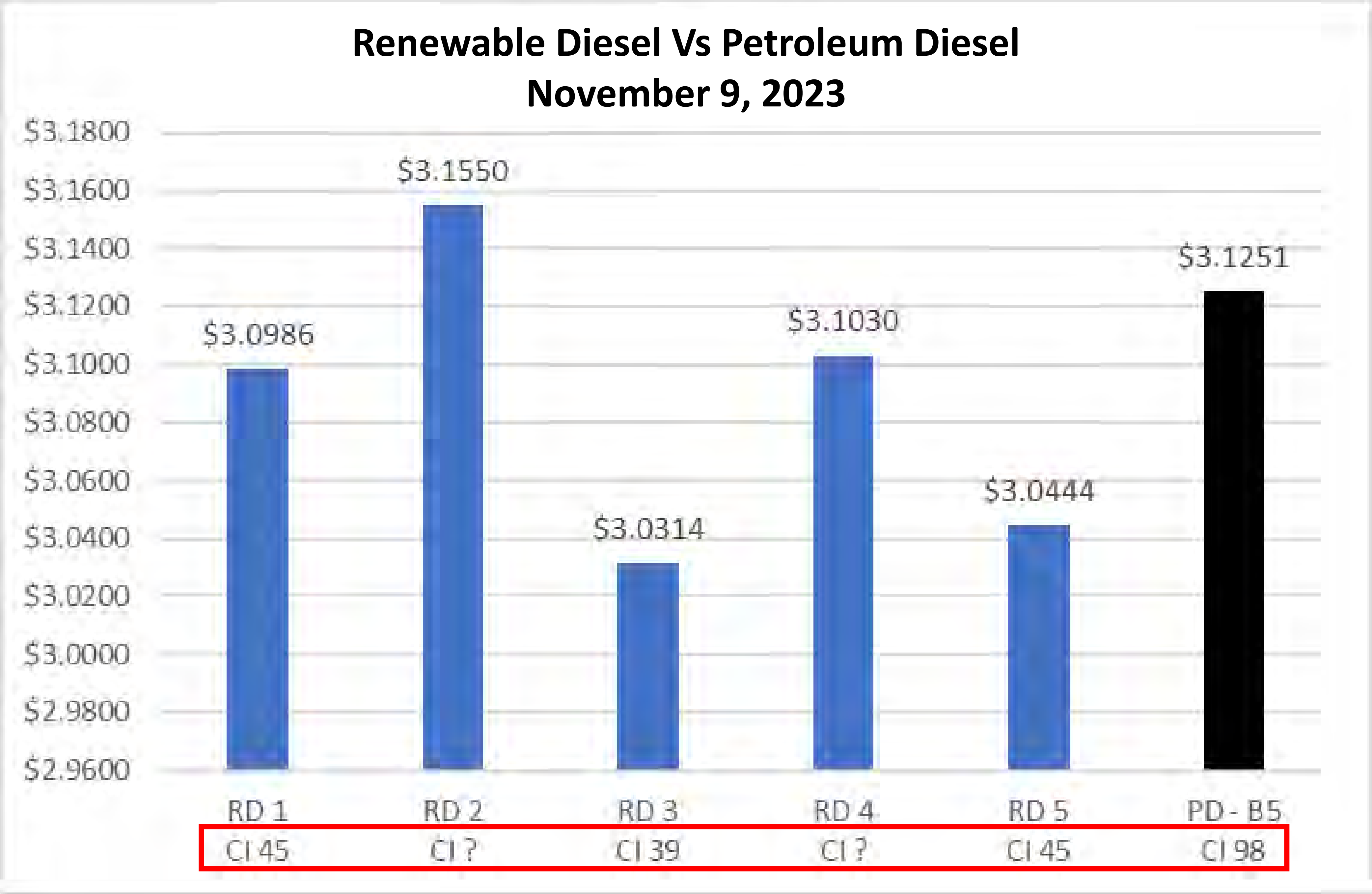
EWEB

Eugene Water & Electric Board

- "It's been a miracle fuel. Not one Diesel Particulate Filter has needed cleaning or replacement since 2015 using Renewable Diesel."

Gary Lentsch, Fleet Manager

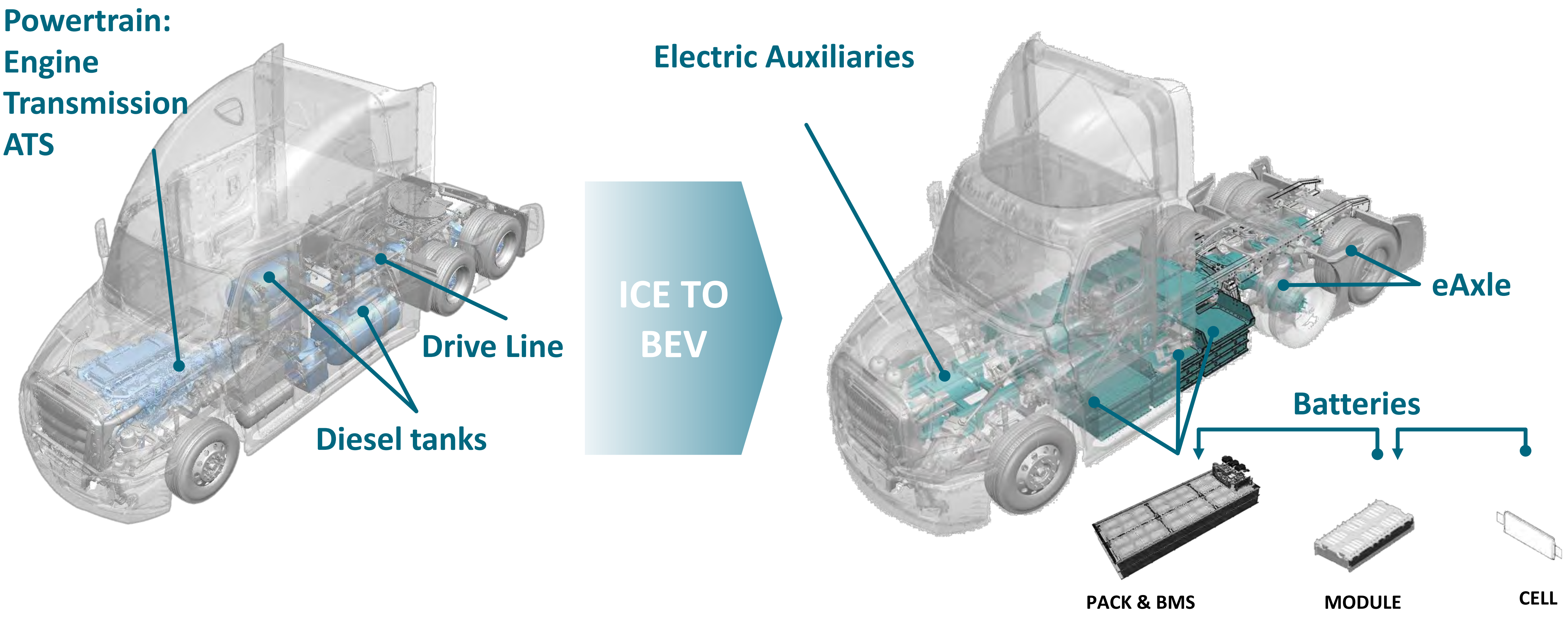
$66 million in lower costs to diesel owners = $39 for every household



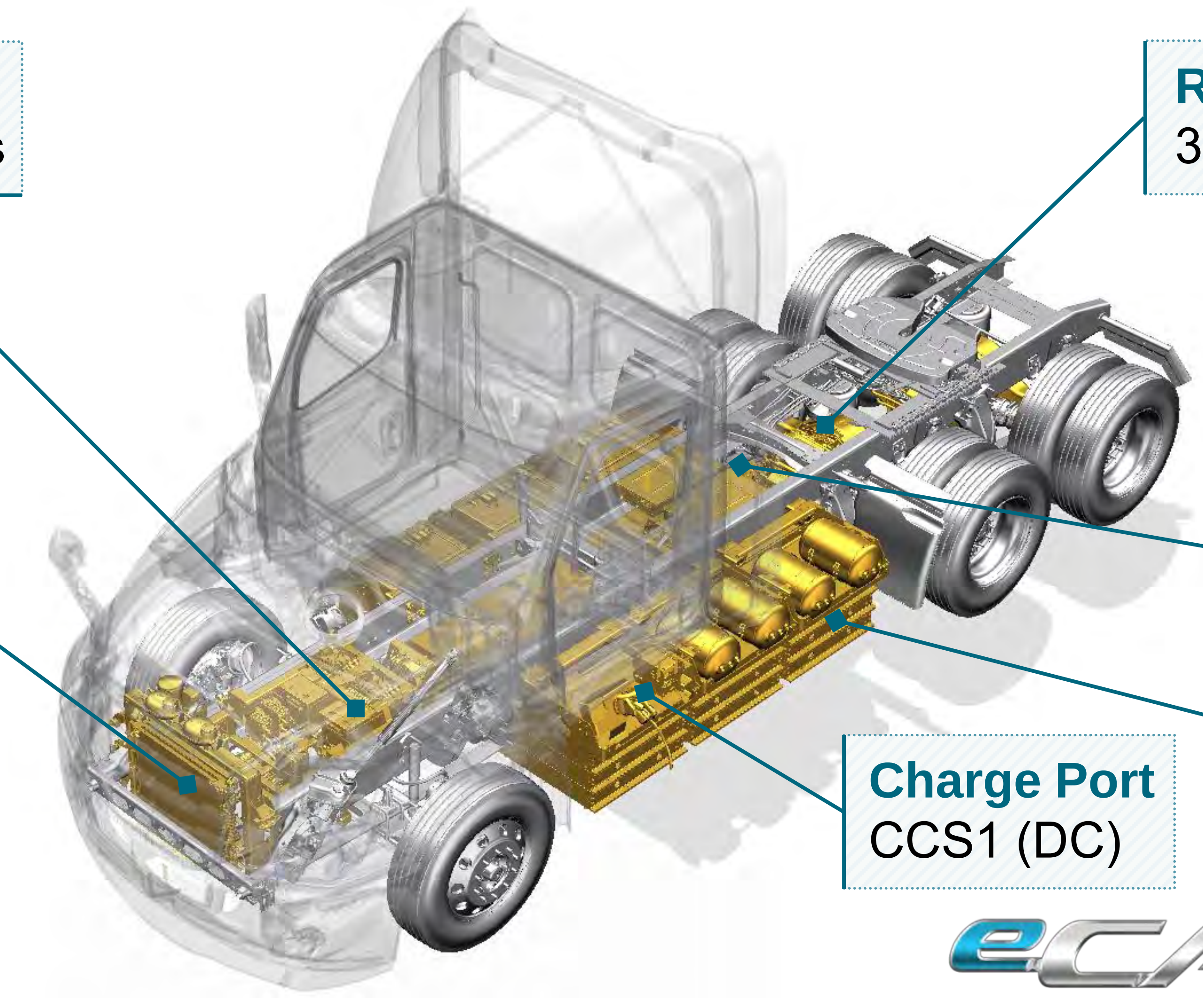
Renewable Diesel Vs Petroleum Diesel
November 9, 2023
$3.1800
$3.1600
$3.1400
$3.1200
$3.1000
$3.0800
$3.0600
$3.0400
$3.0200
$3.0000
$2.9800
$2.9600
$3.0986
$3.1550
$3.0314
$3.1030
$3.0444
$3.1251
RD 1
RD 2
RD 3
RD 4
RD 5
PD - B5
CI 45
CI ?
CI 39
CI ?
CI 45
CI 98

August 6th, 2023 –
First Battery Electric Freightliner in Oregon

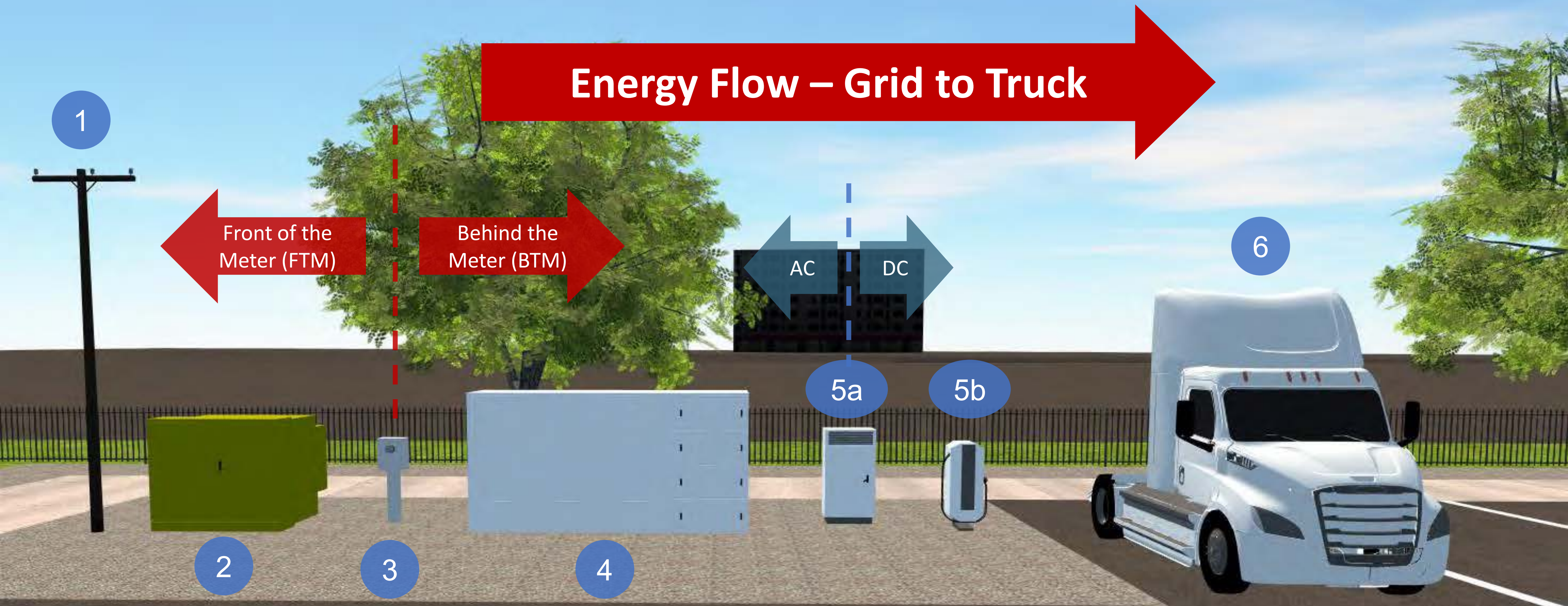
Diesel Powertrain to Full Electric Powertrain



Diesel Powertrain to Full Electric Powertrain



eCASCADIA



1. Grid Connection
2. Transformer
3. Utility Meter
4. Switchgear

5. Charger:
    a) Conversion Unit
    b) Dispenser
    c) Vehicle

HEAVY DUTY - CLASS 8 VEHICLE - ELECTRIC VS DIESEL - TOTAL COST OF OWNERSHIP (TCO)

EQUIPMENT COST PER MILE (CPM) ANALYSIS

Equipment Cost		**eCascadia**	**Cascadia**
	Unit Type	**Electric**	**Diesel**
	Max Energy Capacity	291 kWh	100 Gallons
	MSRP	$402,047	$140,000
	Grants, incentives, % MSRP	-$120,000	
	Federal Tax Credit	-$40,000	
	Total Unit Cost	**$242,047**	**$140,000**
Charging Unit Cost			
	Number of Charging Units Added	6	
	Unit Cost - Infrastructure	$0	
	Unit Cost - Charging Dispensers	$90,624	
	Federal Tax Credit	-$16,667	
	Total	**$73,957**	
	TOTAL UNIT & CHARGING COST	**$316,004**	**$140,000**

EQUIPMENT COST PER MILE (CPM) ANALYSIS			
Financing		**Electric**	**Diesel**
	Term Months	84	84
	Discount Rate, Interest Cost	5%	5%
	Factor - Principal & interest payment	1.19	1.19
	Payment Per Month	$4,477	$1,983
Operating Miles			
	Miles Per Day	125	125
	Operating Days Per Month	21	21
	Miles Per Month	2625	2625
	TOTAL EQUIPMENT CPM	**$1.705**	**$0.756**

VARIABLE COST PER MILE (CPM) ANALYSIS				
Energy			**Electric**	**Diesel**
	Unit of Measure		**kWh**	**Gallon**
	Cost Per Unit		$0.110	$4.410
	Miles Per Gallon			6.7
	kW Per Mile		1.9	
	Charging Efficiency		90%	
	kW Per Mile		2.11	
	Cost Per Mile		$0.232	$0.658
	Credit Per Mile - Oregon Clean Fuels Program		-$0.360	
	Energy Total CPM		**-$0.128**	**$0.658**
Maintenance				
	Diesel Cost Per Mile			$0.085
	EV Lower CPM		50%	
	Maintenance Total CPM		**$0.043**	**$0.085**
		TOTAL VARIABLE CPM	**-$0.085**	**$0.743**

<u>HEAVY DUTY</u> - DUTY CYCLE - TCO - 10 YEARS			**Electric**	**Diesel**
	Financing Period Months		84	84
	TCO		$357,241.21	$330,477.57
	Remaining Useful Life Months		36	36
	TCO		-$8,058.75	$70,233.25
	Duty Cycle TCO		**$349,182.46**	**$400,710.82**
				-13%
	Reduction in Operating Costs			
EV DELTA				
	10 Year		**-$51,528.36**	
	Per Year		**-$5,152.84**	

MEDIUM DUTY - CLASS 6 VEHICLE - ELECTRIC VS DIESEL - TOTAL COST OF OWNERSHIP (TCO)

EQUIPMENT COST PER MILE (CPM) ANALYSIS			
Equipment Cost		**eM2**	**M2**
	Unit Type	**Electric**	**Diesel**
	Max Energy Capacity	210 kWh	50 gallons
	MSRP	$280,201	$120,000
	Oregon EV Truck Rebate	-$85,000	
	Federal Tax Credit	-$40,000	
	Total Unit Cost	**$155,201**	**$120,000**
Charging Unit Cost			
	Number of Charging Units Added	6	
	Unit Cost - Infrastructure	$0	
	Unit Cost - Charging Dispensers	$90,624	
	Federal Tax Credit	-$16,667	
	Total	**$73,957**	
	TOTAL UNIT & CHARGING COST	**$229,159**	**$120,000**

EQUIPMENT COST PER MILE (CPM) ANALYSIS			
Financing		**Electric**	**Diesel**
	Term Months	84	84
	Discount Rate, Interest Cost	5%	5%
	Factor - Principal & interest payment	1.19	1.19
	Payment Per Month	$3,246	$1,700
Operating Miles			
	Miles Per Day	125	125
	Operating Days Per Month	21	21
	Miles Per Month	2625	2625
	TOTAL EQUIPMENT CPM	**$1.237**	**$0.648**

VARIABLE COST PER MILE (CPM) ANALYSIS

		Electric	Diesel
Energy		**kWh**	**Gallon**
	Cost Per Unit	$0.110	$4.410
	Miles Per Gallon		8.8
	kW Per Mile	1.5	
	Charging Efficiency	90%	
	kW Per Mile	1.7	
	Cost Per Mile	$0.183	$0.501
	Credit Per Mile - Oregon Clean Fuels Program	-$0.313	
	Energy Total CPM	**-$0.129**	**$0.501**
Maintenance			
	Diesel Cost Per Mile		$0.085
	EV Lower CPM	50%	
	Maintenance Total CPM	**$0.043**	**$0.085**
	TOTAL VARIABLE CPM	**-$0.087**	**$0.586**

MEDIUM DUTY - DUTY CYCLE - TCO - 10 YEARS		Electric	Diesel
	Financing Period Months	84	84
	TCO	$253,588.79	$272,043.07
	Remaining Useful Life Months	36	36
	TCO	-$8,190.00	$55,389.89
	Duty Cycle TCO	**$245,398.79**	**$327,432.95**
	Reduction in Operating Costs		**-25%**
EV DELTA			
	10 Year	**-$82,034.17**	
	Per Year	**-$8,203.42**	

Terraline

The Next Generation

500+ mile range & 500+ kWh charging Capability

The World's Most Advanced Battery-Electric, Zero Emissions Truck

Designed and engineered from the ground up, Terraline's long-haul truck is the world's most advanced, zero emissions Class 8 vehicle ever. With 500+ miles of range, our truck is the freight transportation platform the industry has been waiting for.