CERV 2023
Stationary Wireless Charging

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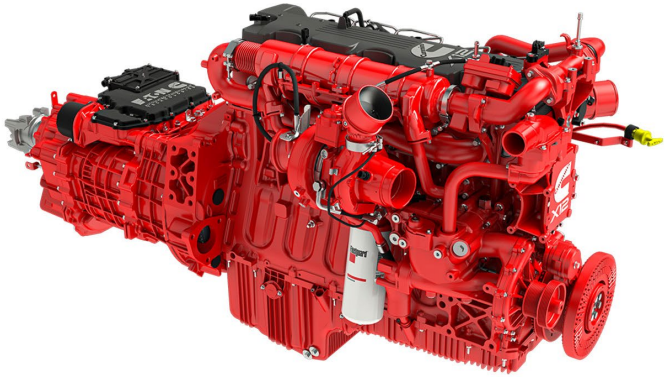
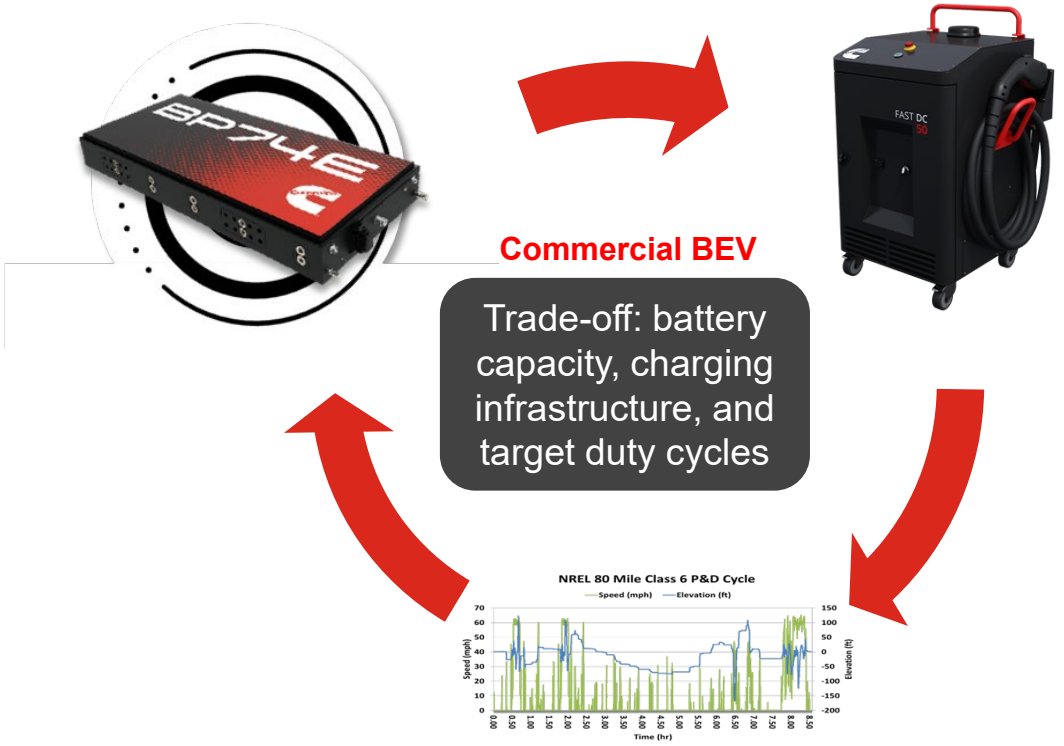
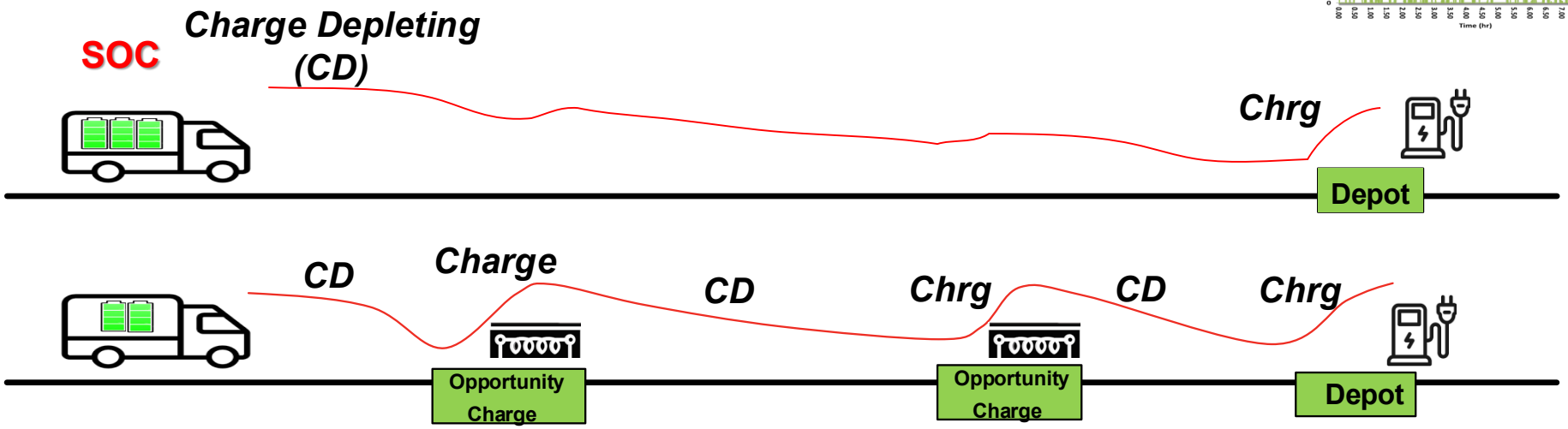
February 6, 2023

Commercial BEV development is primarily* an Energy Management Problem



Development of diesel powertrains is primarily* a **power** management (including optimizing combustion for emissions and efficiency) problem





Cummins supports stationary wireless charging for (production) transit bus and (demo) Class 8 tractor

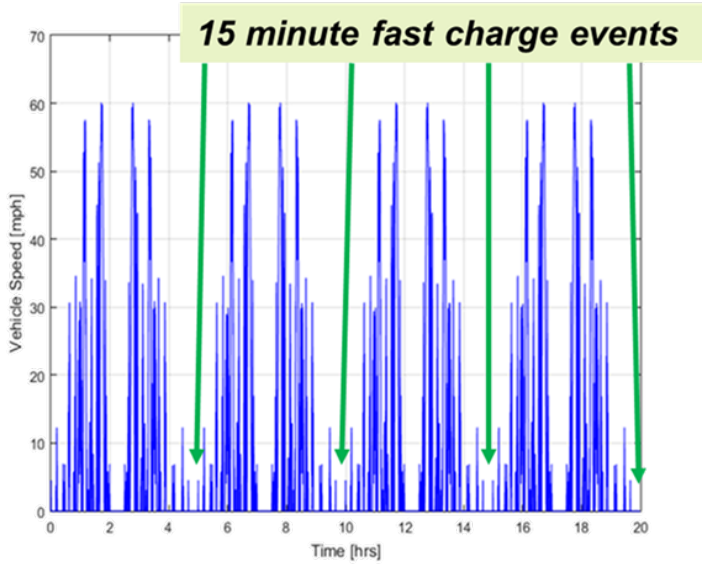
* - yes, this is a simplistic view!

500 kW Stationary Wireless (XFC) Charging Project

Under a DOE contract, Cummins is working with Wireless Advanced Vehicle Electrification (WAVE) utilizing stationary **500 kW wireless charging** (15 min charge) for class 8 drayage/logistics application

Customer deployment Q3 2023

Modified NREL drayage cycle extended to 20 hours plus bridge grades



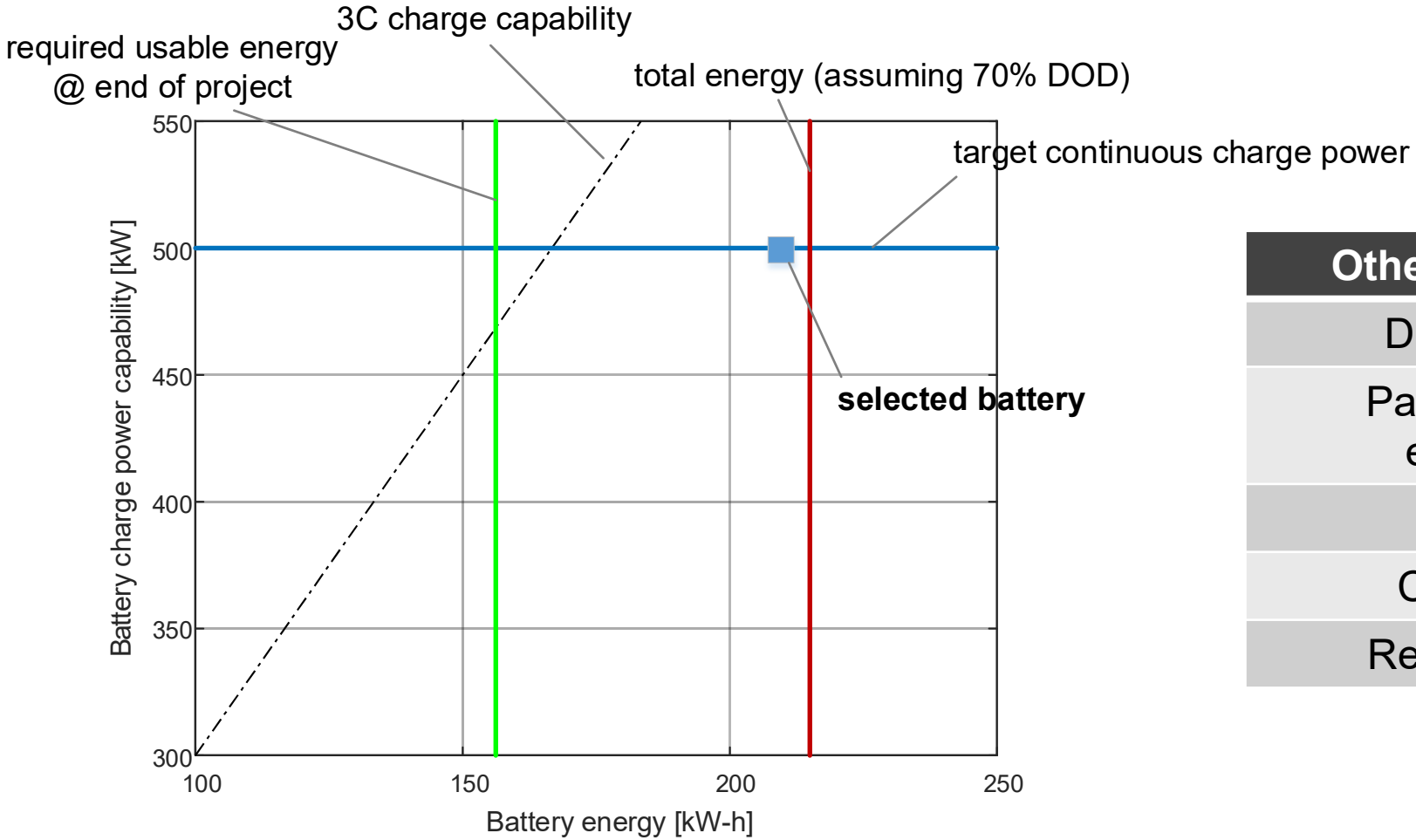
Primary Pads

Secondary Pads

500 kW WAVE stationary wireless charging system

Key vehicle metrics	Targets
Vehicle speed on 6% grade @ max GCVW	> 30 mph
Charge power (15 minutes) to 80% SOC	500 kW
Tractor weight	≤ 23.0k lb
Vehicle range (full charge, loaded)	> 45 miles
Work day duty cycle	20 hours / 160 miles

Battery Selection for XFC Project: Charge Power and Energy Requirements



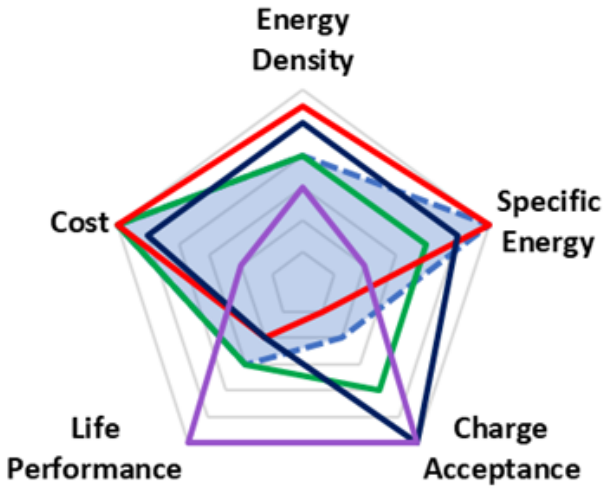
Other considerations
Discharge power
Packaging, weight, energy density
Durability
Cost, chemistry
Reliability, maturity

Note: this chart is using a power approximation for C-rate

Future Battery Selection Considerations

- Applications which rely on **depot/overnight and *dynamic* wireless** charging may have similar battery **chemistry** requirements focused on cost; depot/overnight may require high energy density, too.
- Applications/charging eco-systems using very high power charging (***stationary* wireless** or other high power opportunity charging) require chemistries permitting high C rate charging

- Next generation commercial MD-HD BEV battery chemistries likely dominated by **LMFP** cathode



Next gen battery chemistries	Anode	Cathode
	Graphite	Lithium Manganese Iron Phosphate (LMFP) or Lithium Iron Phosphate (LFP)
	Lithium metal	
	Graphite + Silicon	
	Niobium Titanium Oxide (NTO)	

Requirements for BEV using depot/overnight charging


Cummins