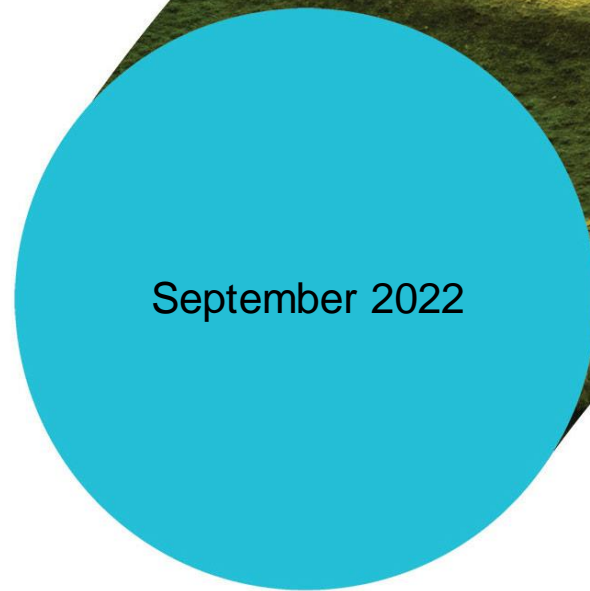


# GTR-22 BATTERY DURABILITY LD COMMERCIAL VEHICLE

Web-Audio

September 2022

acea



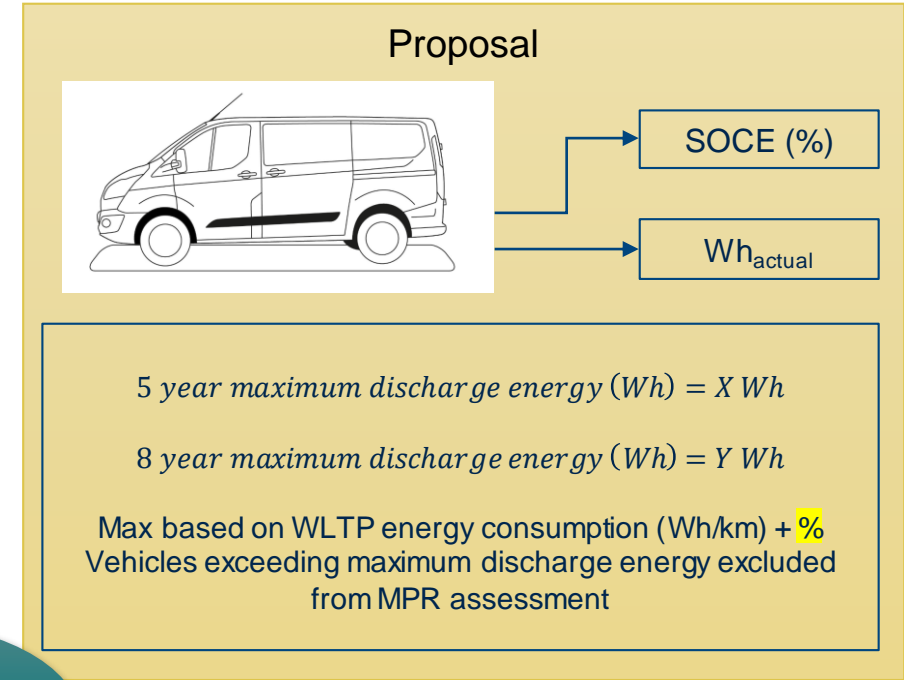
# COMMERCIAL VEHICLE PROPOSAL

- Light commercial vehicles are **work tools** chosen to meet specific operational needs addressing a **broad range of use cases**
- No / limited data available for commercial vehicles - preliminary simulations show up to **5-10% additional degradation** over 8 years compared to passenger cars
- Battery ageing significantly influenced by **battery cycling** (mileage, high payload, & external loads – worst case external load whilst driving) and fast charging
- **Energy Throughput (Wh) concept** developed to define performance targets against mileage, age and battery throughput (Wh)
- Throughput accounts for heavy loads, external loads, V2X and driving combined



Sample Customer	Profile Examples
<b>Ambulance</b>	<ul style="list-style-type: none"> <li>High up-time with long daily shifts</li> <li>Low mileage</li> <li>High aux load</li> <li>Multiple daily DCFC</li> </ul>
<b>Rural delivery</b>	<ul style="list-style-type: none"> <li>Medium up time - high mileage/av. speed</li> <li>Daily AC charge with multiple daily DC top-ups</li> <li>Food delivery including refrigeration – high V2L</li> </ul>
<b>City delivery</b>	<ul style="list-style-type: none"> <li>Medium-high up time - med mileage, lower av. speed than non-city</li> <li>Daily AC charging, with DCFC top-ups when required</li> <li>Food delivery including refrigeration – high V2L</li> </ul>
<b>Local trades</b>	<ul style="list-style-type: none"> <li>Low driving time - commuting mileage</li> <li>High aux load V2L</li> <li>Daily AC charge at home - No DCFC</li> </ul>
<b>Park-at-home utility operator (no home charger access)</b>	<ul style="list-style-type: none"> <li>Medium up time</li> <li>DC only charging</li> <li>Low-med aux load for tablet/power tool chargers.</li> </ul>

Many more use cases / scenarios possible



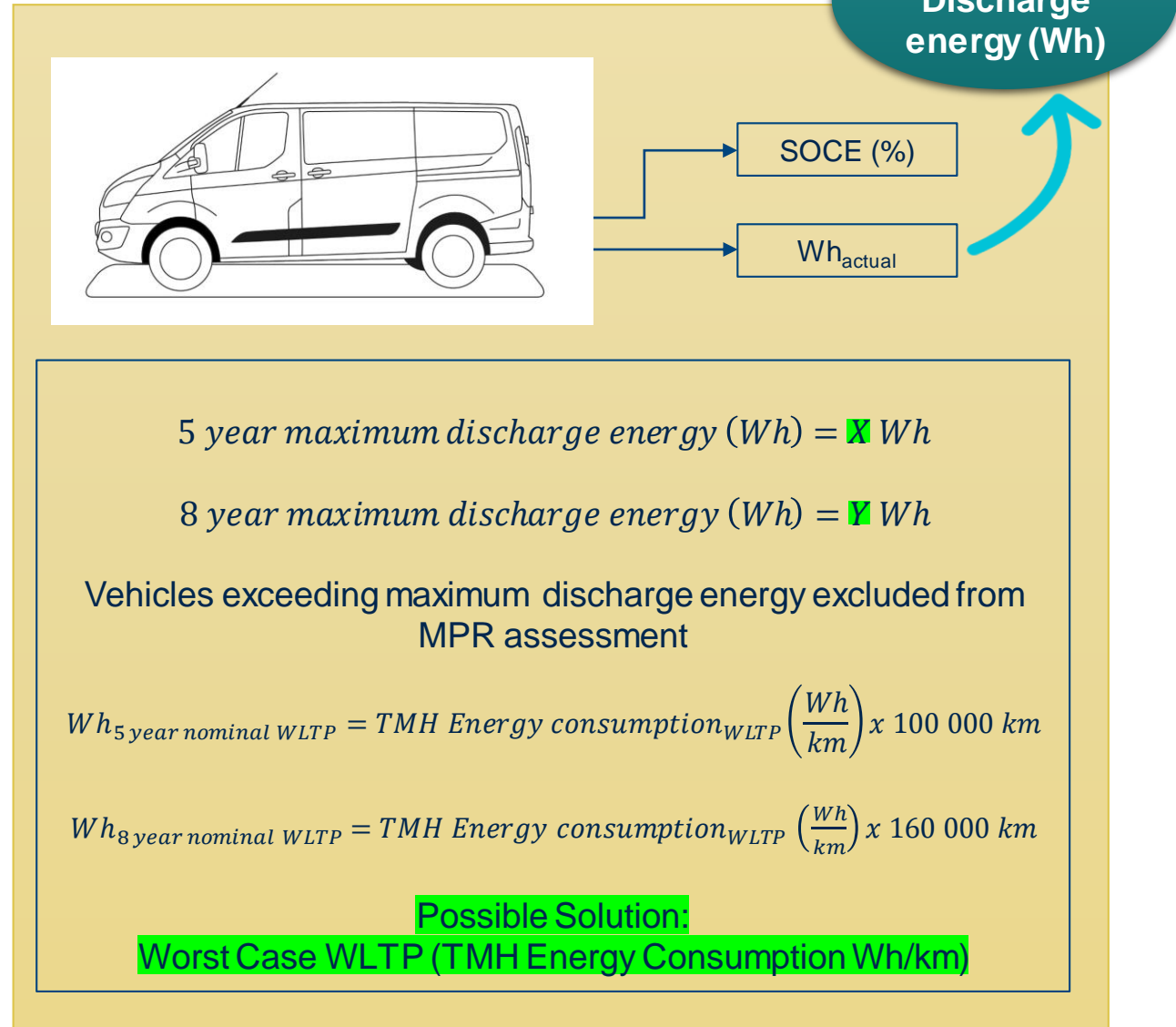
# THROUGHPUT PROPOSAL

Capacity Retention	PV PHEV / BEV Minimum Performance (EU7)
Up to 5 years or 100,000 km	80%
Up to 8 years or 160,000 km	70%

Capacity Retention	CV PHEV / BEV Minimum Performance (EU7)
Up to 5 years or 100,000 km or x Wh	Monitoring TBD%
Up to 8 years or 160,000 km or x Wh	Monitoring TBD%

Link to GTR-22 HDV Proposal: OICA Proposal MPR Threshold based on total cycle energy

$$\text{Number of full cycles} = \frac{\text{Total Cycled Energy}}{\text{Total Energy in Battery System at start}}$$





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**ACEA**  
European Automobile  
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+32 2 732 55 50  
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# HOME ENERGY STORAGE– WARRANTY EXAMPLES



[www.acea.auto](http://www.acea.auto)

Warranty Terms				
Product	Capacity	Energy Retention	Time	Throughput
Tesla Powerwall 2	13.5kWh	10Y-80% / 10Y-70% Italy or Portugal	10 Years	Unlimited for Solar self-consumption/ backup. <b>37.8 MWh</b> Any other application
LG Chem RESU10H	9.8kWh	10Y-60%	10 Years	<b>22.4 MWh</b>
Pika Energy Harbor Plus	20.3kWh		10 Years	<b>45.3 MWh</b>
Sonnen Eco	5-15kWh	65-70%	10-15 Years	<b>10,000 – 15,000 Cycles</b> (examples show equivalent MWh)
Nissan XStorage	4-10 kWh	60-65%	5-10Years Reduces referenced to historical ambient avg temperature	<b>65,000 Ah – 313,000 Ah</b>
Enphase Encharge 10	10kWh	70% Provided referenced historical ambient avg temperature in limits	10 Years	<b>4,000</b> discharge cycles, or <b>2.8MWh AC energy per kWh installed</b>

**Battery Products Typically Reference Throughput in MWh or Total Cycles  
Use of Historical Measured Ambient Temperature to Bound Warranty**