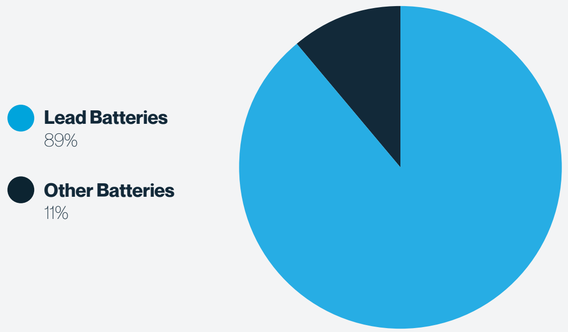
Facilitating the Global Movement of Goods:
Motive Power Applications

Lead batteries are critical for the global motive power market, representing **almost 90% of battery demand**



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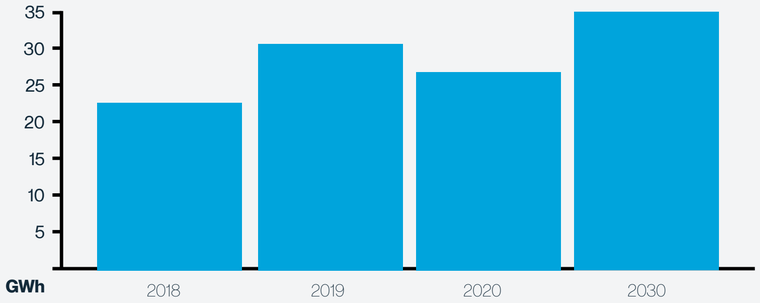
CBI market report 2021, Avicenne



Evolving technical demand:

- 24/7 use of batteries is much more common
- Total cost of ownership (TCO) is a significant technical parameter for end-users
- Shift to maintenance-free batteries

Achieving KPIs will ensure lead batteries:

- Meet future requirements of end-users
- Seize market opportunities
- Underpin the shift of the motive power market to higher levels of electrification and decarbonization

KPIs for lead batteries in motive power applications

Indicator	2021/2022	2025	2028
Service life	**5**	**5-6**	**6-7**
Energy throughput	**1200 equivalent cycles**	**1400 equivalent cycles**	**1600 equivalent cycles**
Cycle life IEC 60254	**2400 (50% DOD)**	**2800 (50% DOD)** **1750 (80% DOD)**	**3000 (50% DOD)** **2000 (80% DOD)**
Energy density (specific to charge efficiency)	**35 Wh/kg**	**40 Wh/ kg***	**42-45 Wh/kg***
Charge time to 30 – 80% Opportunity Charging (Highly dependent on charger/ charge current)	**Less than 2 hrs**	**1 – 1.5 hrs**	**1 hr or less**

*Will likely mean VRLA or some design other than flooded.

Key goals for motive power:

- Lower TCO by increasing cycle life
- Iincreasing charge efficiency
- Developing maintenance-free batteries

Contact us:
@CBIbatteries
Consortium for Battery Innovation
info@batteryinnovation.org
www.batteryinnovation.org

CONSORTIUM FOR BATTERY INNOVATION