ELECTRIC VEHICLE (EV) BATTERY APPLICATION FOR SOLAR AND WIND ENERGY STORAGE

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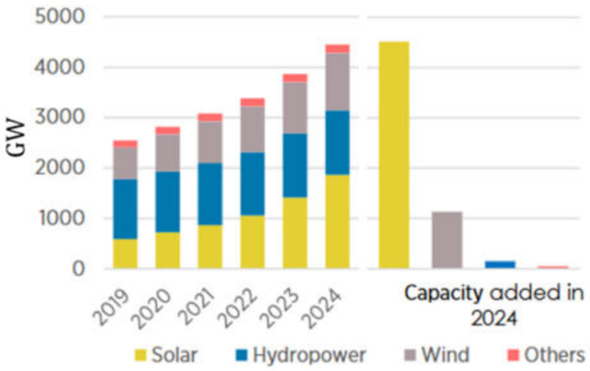
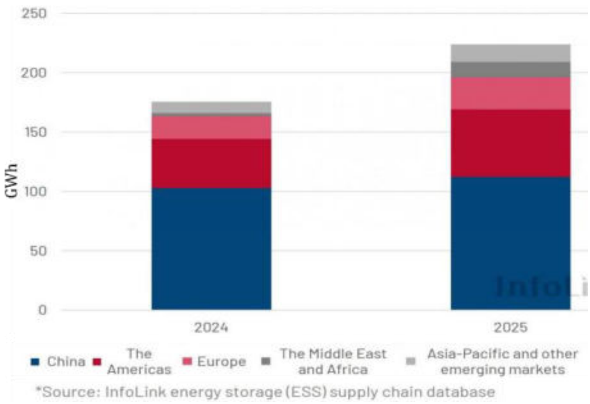
At the end of 2024, global renewable power capacity reached 4448 GW, solar and wind energy dominating with the share of 96.6% [1]. Being weather-dependent and, hence, unstable power sources, they require storage systems to provide smooth power submission to electric grids. Rapid growth of installed solar and wind energy capacity (fig. 1*a*) pushes up the demand for larger energy storage volumes. In 2024, the global energy storage market accounted for 175.4 GWh [2] with expectations to reach 221 GWh of capacity (Fig. 1.*b*), the most-widely applied energy storage technology being storage batteries.



a



b

Fig. 1 – Renewable power and energy storage dynamics: *a* – Renewable power capacity growth; *b* – Installed capacity of global energy storage market

A potential source of battery assemblies for renewable energy storage may come from electric vehicles (EVs), the market of which exceeded 17.1 mln units in 2024, with their batteries storing up to 75 % of maximum capacity at the end of their life in the vehicle. There are opposite views on possibility of used EV batteries repurposing for reuse in power grids due to opposite main functions of solar and wind energy batteries designed for deep long discharge and those of EV batteries with their shallow sharp discharge and much fewer cycles. However, extensive studies of the topic have been conducted in the leading EV battery manufacturing countries as the global EV battery market is expanding with the demand growth to 1 TWh and the average price of an EV battery pack dropped below USD 100 per kWh in 2024 [1], while EV battery recycling capacities are still low and the process is costly.

References:

1. Renewable Capacity Highlights 2025 [Electronic resource]. – Access code: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Mar/IRENA_DAT_RE_Capacity_Highlights_2025.pdf]

2. InfoLink: 222 GWh more energy storage worldwide in 2025 [Electronic resource]. – Access code: https://www.ess-news.com/2025/02/25/infolink-222-gwh-more-energy-storage-worldwide-in-2025/]