

# **UNECE**

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## **Role of storage**

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# Flexibility needs could rapidly increase, with the emergence of new levers, such as battery storage

With the growth of variable renewable energies, the need for flexibility increases. The following solutions can be explored:

- **Electricity demand flexibility levers**, such as load management, distributed load shedding (heating, domestic hot water, etc.) or industrial load shedding.
- **Mature dispatchable low-carbon generation resources** such as nuclear and hydro.
- **Dedicated storage facilities**, such as stationary batteries. Given their costs, batteries are not currently appropriate for meeting flexible capacity requirements beyond the day.
- **Strengthening interconnected electricity networks.**
- **Other levers** : capping of variable renewable production, development of smart electricity grids etc.

# New storage solutions could be implemented with different timescales

New storage solutions could be implemented at the following timescales:

- **Sub-hourly**, to manage and optimise the supply of reserves and issues linked to the dynamic performance of the electric system (batteries, flywheel, etc.),
- **Daily and intra-daily on a small and medium scale**, to supplement controllable uses (domestic hot water, EV charging, stored heat, batteries);
- **Weekly, with conventional storage resources** such as hydroelectric reserves, and pumped storage hydro (PSH) still dominant, but electric vehicle (EV) charging could provide an additional source of energy;
- **Seasonal**, where 'power to gas' type solutions based on electrolytic hydrogen directly recovered or transformed into methane should be considered.

# 2023: a sharp increase in battery sales

Lithium-ion battery volumes in use have surged over the last three years

- **Electric vehicle batteries** : 90% of the total volume of batteries in 2023. Sales increased by almost half in 2023.
- The market for **stationary battery storage** doubled in 2023, 65% of which is accounted for by utility-scale projects and 35% by behind-the-meter systems.

With recent cost reductions and performance improvements, lithium-ion batteries now account for almost all batteries used in EVs and new storage applications.

- **Lithium-ion batteries**, have seen their costs fall by 90% since 2010, with increased energy densities and longer lifetimes. Lithium-ion batteries now account for almost all the batteries used in EVs and new storage applications.
- For new EVs, more than half of batteries use chemistries with a high nickel content, enabling high energy densities. Lithium iron phosphate (LFP) batteries account for the remaining 40%.

# Thank you !

*The views expressed in this presentation are those of Antoine Herzog  
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