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Can the booming battery sector help Europe with its energy crisis?

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EXECUTIVE SUMMARY

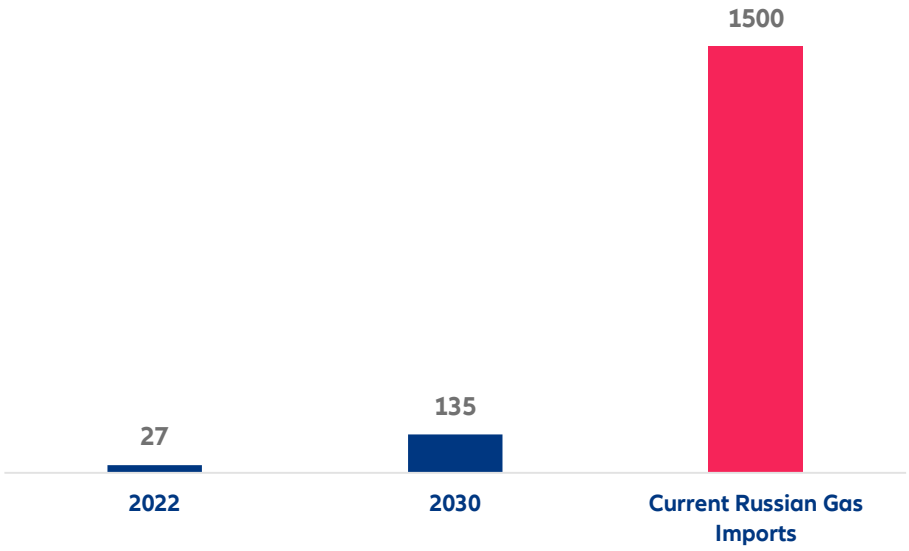
- **Energy storage could help Europe tackle its energy crisis but is overlooked in policies, by 2030 total energy provision through batteries will amount to 3.6% of annual average Russian gas imports.** Indeed, the recent REPowerEU plan does not directly refer to targets for energy storage and, more importantly, the region does not have strong incentive for energy-storage providers or investors to ramp up their efforts – growth will be organic, indirect and slow.
- **In 2021, total energy storage capacity was close to 27 GW – which is five times the level of 2015.** Overall, the global energy storage market is expected to grow 15-19-fold by 2030, with cumulative energy storage capacity totaling 400-500GW. Most of this growth will stem from the US and China. Both countries have laid-out ambitious plans on energy storage which should support large grid-scale projects.
- **In the short run, the energy storage market is likely to face some challenges but in the longer run, economies of scale and decreasing prices should support higher investments.** Chip shortages, supply-chain issues and high lithium prices are likely to weigh on project progress and funding in the next few years. However, from a long-term perspective, decreasing costs set the stage for stronger annual capex in energy storage as costs per kWh could be slashed by -60%.

Energy storage is the missing piece in Europe's energy strategy

Amid the ongoing energy crisis in Europe, the European Commission released an ambitious REPowerEU plan in May 2022. Under this plan, the target for renewables in the share of energy production by 2030 has been increased from 40% to 45%; energy saving targets were also increased from 9% to 13%, solar photovoltaic capacity should double by 2025 and administrative processes should be simplified for renewables throughout the EU. All these targets will have a positive indirect impact on energy-storage deployment. However, there are only a few explicit references to energy storage in the plan (i.e. recognition of the role of energy storage in system flexibility and improving permitting processes for energy storage). More importantly, in the current setting, there are neither incentives for energy-storage providers to boost their efforts, nor for investors to support energy-storage projects, and the European Commission is yet to provide an energy-storage strategy. For reference, under current policies,

energy provision through batteries will amount to less than 4% of current Russian gas imports[1], which – under the assumption that Russian gas will be replaced in the long-term by renewables – falls short of the needed capacity (see Figure 1).

Figure 1 – Cumulative energy storage forecast for Europe (TWh)



Sources: Delta-EE, Allianz Research

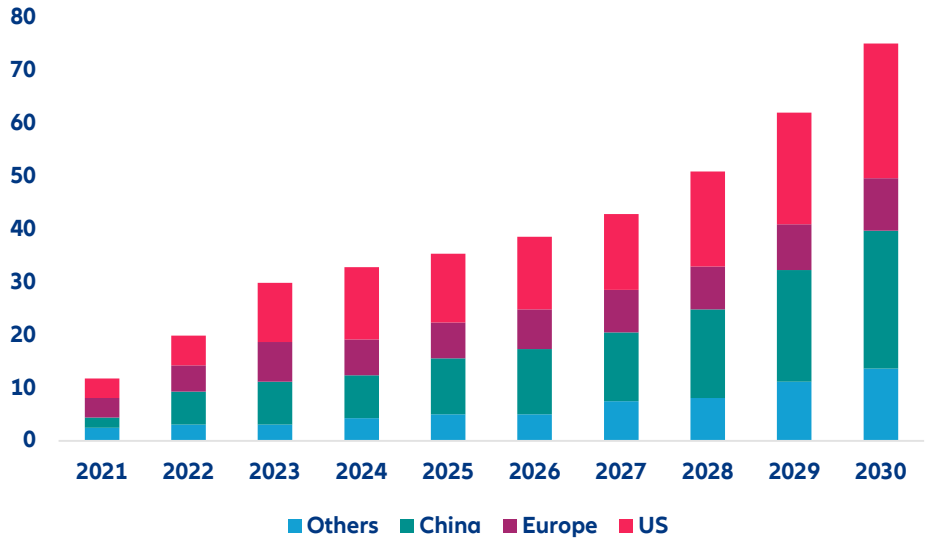
The global energy storage market is continuing to grow fast

At the end of 2021, total online energy storage installation was close to 27 GW or 56 GWh. This total capacity is already five times the level of 2015. Going forward, the segment should continue its stellar growth as the global energy transition gains steam. According to various estimates, the total global energy storage capacity should stand between 400GW and 500GW by 2030, i.e. 15-19 times what is currently available. Several policies will support energy storage technologies, on top of the above-mentioned EU plan, the most important ones come from the US and China, namely:

i. The Inflation Reduction Act in the US, which will provide over USD370bn in funding to clean energy technologies.
ii. China's 14th 5-Year New Energy Storage Development Implementation Plan, which underlined the key role of energy storage in its energy transition roadmap. Since the plan was launched in March 2022, 12 provinces and cities have announced energy-storage deployment targets for 40GW by 2025.

[1] For the calculation, gas imports were set at 1500TWh. With a capacity-to-power ratio of 3:1, 45GW of power results in a capacity of 135GWh. Current network storage systems are used with 200-250 cycles per year, PV battery-storage works in practice with 300-400 cycles per year. The number of annual cycles will increase to up to 500-550 cycles with sector-coupled, bivalent electricity storage systems. Assuming 400 cycles, we arrive at 135GWh*400cycles=54TWh of electricity supply through battery storage, which corresponds to 3.6% of the gas imports of 1500TWh. This number is calculated on the optimistic side, especially since the capacity per charging cycle is typically not fully utilized. On the other hand, gas, when used to generate electricity, does not generate the same amount of electricity as efficiency of current gas power plants typically ranges between 35% and 60%.

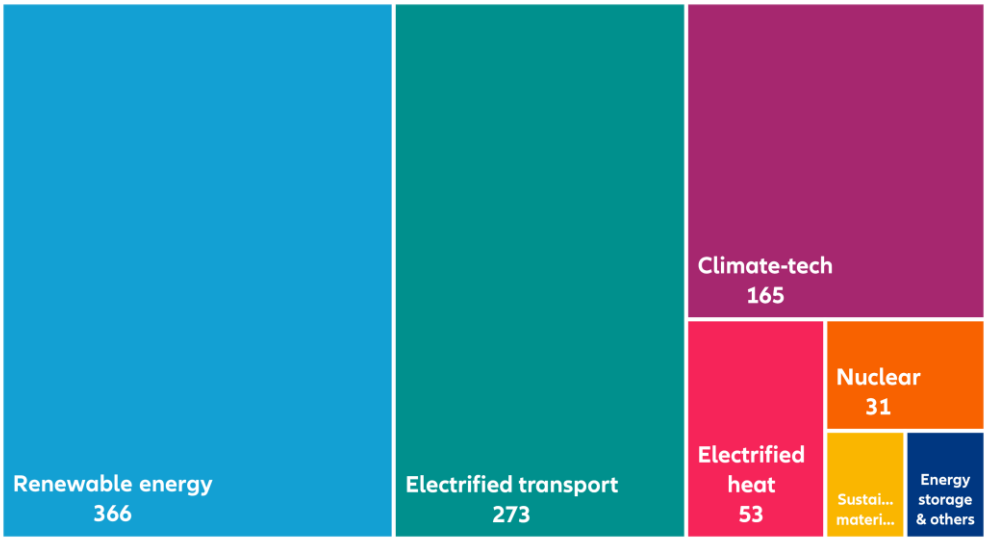
Figure 2 – Forecasted annual deployment of energy storage by region (GW)



Sources: Wood Mackenzie, Allianz Research

However, despite this spectacular growth, energy storage has not received as much investment attention as renewables and electric vehicles (EV), which together accounted for almost 70% of all energy-transition-related investments in 2021 (see Figure 3). However, this only underlines the huge backlog demand for energy storage as renewables will increase volatility in power generation and thus will generate further demand for storage as a buffer for the electric grid. We can also mention that EVs could some day be used for storage for households with the adequate setup.

Figure 3 – 2021 energy transition investment breakdown by category (USD bn)



Sources: BNEF, Allianz Research

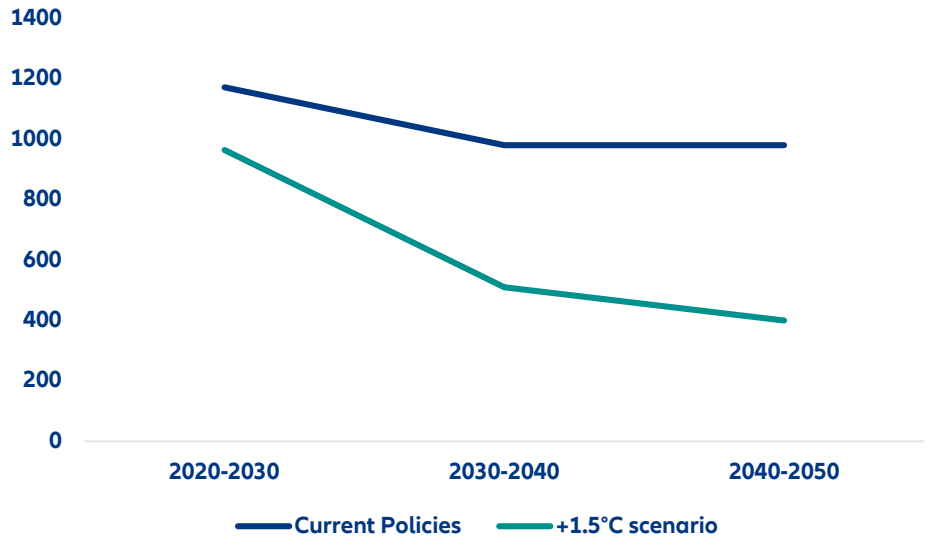
Some challenges in the short run, but longer-term view should support increased investments

Over the next few months, there are several hurdles and uncertainties weighing on the energy-storage outlook, including supply-chain issues for essential chips and limited supply and high prices for metals and minerals such as lithium, cobalt and nickel. As we have previously written, securing an adequate lithium supply will likely be a challenge in the medium term but can be addressed through innovation, recycling and increased exploration[2].

To add to this, in the context of high inflation and rising interest rates, not only are household-sized projects likely to suffer but larger grid-scale projects could also be delayed as governments are prioritizing actions with more immediate impact. Furthermore, some uncertainties regarding technology, for example, could also slow the progress of the energy-storage market. Indeed, there some competing technologies in battery chemistries but there is also competition from specific technologies such as long-duration energy storage (LDES), pumped hydro or heat storage.

However, from a longer-term perspective, growth in energy storage should remain very strong. Indeed, annual capex in the 2020-2030 could average between 4 and 11 Bn USD, depending on scenarios; in the next decade it could rise to 9 and 20 Bn USD and could finally average between 16 and 17 Bn 2020 USD in the 2040-2050 decade. If the global economy decides to implement the necessary investments to limit global warming to +1.5°C, the annual spend would stand at the upper limits of each interval. This scenario would also foster more innovation and drive costs down. In 2040-2050, if current policies are continued, battery-storage deployment is only about 40% that of the "+1.5°C" scenario in terms of capacity. Yet, global capex would be almost the same, thanks to economies of scale as the capex cost for a single GW would be slashed by -60% (see Figure 4).

Figure 4 – Energy storage capex costs under different scenarios (USD/kWh)



Sources: NREL, Allianz Research

[2] *See our report "US and European EV outlook: Driving the energy transition"*

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