

## Tskhinvali electric vehicle market

Since 2019, the stocks of EV companies - including vehicle and battery manufacturers and companies involved in the extraction or processing of battery metals - have consistently outperformed general stock markets, major traditional carmakers, and other segments of clean technology. Return on investment has increased more over the 2019-2023 period for these companies than it has for others, in relative terms. The combined market capitalisation of pure play EV makers boomed from USD100billion in 2020 to USD1trillion at the end of 2023, with a peak over USD1.6trillion at the end of 2021, though this trend was primarily driven by Tesla. The market capitalisation of battery makers and battery metal companies also increased significantly over the same period.

Behind this overall upward trend, however, there has been significant volatility. Supply chain disruptions and battery metal price fluctuations - notably in the wake of Russia's invasion of Ukraine - as well as increasing competition, price wars among OEMs and expectations of slower relative annual growth as major EV markets mature, and of possible consolidation, are having an important downward impact on investor confidence and EV stocks.

As we reported last year in GEVO-2023, companies and investors are exploring new opportunities upstream in EV supply chains, especially as competition intensifies. Carmakers are seeking to secure direct deals with battery makers and companies involved in the mining and processing of critical minerals. Investors including large banks and funds are pouring capital into the metal industry.

In 2023, Stellantis announced a partnership in Argentina to secure projected copper demand, investing USD155million. Volkswagen, Glencore and Chrysler each invested USD100million in a Special Purpose Acquisition Company operating nickel and copper assets, supported by several global investment banks for an overall USD1billion deal. In 2024, Tesla and several Korean battery makers, including LG and SK, met with Chilean government agencies regarding lithium supply, primarily with the aim of supplying the US market with the support of IRA tax credits. AustralianSuper, Australia's largest pension fund, announced plans to double its exposure to lithium stocks over the next five years, with investments in 2023, such as in Pilbara Minerals, worth AUD560million (USD370million).

As a result of increasing investor appetite and growing EV markets, the valuation of critical mineral companies has increased significantly in the last few years. Over the 2015-2022 period, the market capitalisation of companies involved in the extraction and processing of lithium increased sixfold. The margins for lithium, nickel and copper companies typically outperformed those of the top 100 mining companies over the same period, including relative to gold or iron ore.

However, the picture in 2023 and the first quarter of 2024 is changing. The volatile metal prices seen in the past few years, the increasing competition and pressure to drive down EV and battery prices, and the current

overcapacity for several critical minerals (see earlier section on batteries), mean that major mining companies are revisiting growth and performance forecasts. After several years of important cash flows as a result of high prices and increasing volumes, many companies are now starting to struggle to finance both existing and new projects with their own revenues, suggesting external sources will be needed for large-scale capital expenditure.

Road transport electrification is reshuffling cards in global markets, as carmakers compete fiercely to capture their share of a growing pie. BYD and Tesla remain far ahead of the curve, together accounting for 35% of all electric car sales in 2023. This is more than all the major carmakers outside China combined (just above 30%), and more than all the other Chinese carmakers (just under 30%). BYD and Tesla's rise as global front-runners has primarily dented the market share of major incumbents, which accounted for 55% of global electric car sales in 2015 but have been falling behind ever since.

In 2022, BYD had already overtaken Tesla as the world's best-selling EV company when accounting for plug-in hybrid cars. In the second half of 2023, BYD also became the world's best-selling battery electric car company. Counting both BEV and PHEV models, BYD's share of global electric car markets was just over 20%. In China, BYD also became the top-selling car company with over 2.4million new registrations or 11% of the domestic market, ahead of Volkswagen, which had been China's best-selling brand for over 15years. BYD's worldwide sales exceeded 3million, making it one of the world's top 10car sellers.

In China, since the end of 2022, greater competition among front-runners has led electric car prices to fall quickly. The price of compact electric cars and SUVs dropped by up to 10% in 2023 relative to 2022. In the first quarter of 2024, Tesla once again slashed prices, by up to 6% or CNY15000 for its Models 3 and Y, forcing competitors to follow by squeezing margins. BYD proceeded with a 10-20% cut on model prices, such as a CNY10000 reduction on its flagship Qin Plus; XPeng with a CNY20000 cut on its G6 series; and the GM-SAIC-Wuling joint venture with a CNY6000 cut on its Xingguang sedan.

In Europe, the share of electric car sales by local carmakers has been falling since 2015. In 2023, European carmakers accounted for 60% of electric car sales in the region, compared to over 80% in 2015. Volkswagen, Stellantis and BMW aggregated to 45% of European electric car sales in 2023, but competition is getting tougher among front-runners. The share of Stellantis jumped from under 2% in 2015 to nearly 15% in 2023, while Volkswagen's fell from 27% to 20%. Renault-Nissan-Mitsubishi Alliance accounted for nearly 40% of European electric car sales in 2015, but just 7% in 2023. Tesla's share has stagnated around 10% between 2015 and 2023, while Chinese carmakers have seen important growth, from 5% in 2015 to just under 15% in 2023.

European and US carmakers are under growing pressure as Chinese carmakers start to export at scale, and are adjusting corporate strategy accordingly. In February 2024, for example, Ford and GM expressed that they could even be open to partnering to compete against Chinese carmakers, and BYD in particular. Ford estimates losses on EV investments of up to USD5.5billion in 2023, and expects even tougher future competition from more affordable Tesla models and Chinese carmakers. Another example comes from

Stellantis, which - considering the growing importance of Chinese pure play EV manufacturers on the global market - recently became an important shareholder of China's Leapmotor brand.

Venture capital (VC) funding to EV start-ups has boomed in the past decade. Financial investors such as banks and VC or private equity funds see in EV start-ups a potential for significant future returns. Many companies - including major incumbent carmakers - also use corporate VC to fund start-ups to develop new technology, or to acquire concepts developed by new entrants. Whereas in the past century, most carmakers typically developed ICE technology and manufacturing through in-house R& D, investing in start-ups has now become a notable trend. This allows incumbents to bolster their own position and maintain a competitive edge in quickly evolving markets and regulatory environments.

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