

Innovation Frontier Electrification by Stealth: surviving the "EV Winter"



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Written by Mikhail Zverev

"EV Winter"

Electric vehicles (EVs) have received a lot of bad press lately. Once one of the most popular investment themes in the market, EVs are now widely perceived to be both cyclically and structurally challenged.

President Trump had targeted \$7.5 thousand US EV credits in his rhetoric and talked about removing funding for EV charging stations. Details are still to be determined but the mood music remained hostile. In the UK and Europe there are calls for diluting net zero commitments, including zero emission vehicles quotas.

The auto industry is slow respond to (production planning and model cycles take many years to change) but we have seen signs of de-commitment: for example, in the US Ford delayed their launch of new EV models and investment in EV manufacturing capacity. Its CEO publicly expressed regret in the excessive pace of their EV investment during the previous few years. Some industry executives have even called EV investments "the biggest capital misallocation" in living memory.

Even Tesla, which has been a category leader, saw a decline in deliveries – down 13% year on year in Q1 2025, after a lacklustre 2024.

China remained a bright spot, with EVs comprising over 40% of all vehicles sold in the country. Indeed, China largely drove the global EV penetration statistics to just over 20%, while the US and Europe were weak even before the likely impact of regulatory changes and trade tariffs.

No wonder the industry is talking about an "EV Winter".

Technological progress continues

No technological change ever occurs in a straight line. It often follows a hype-reality

curve, which has initial peaks of enthusiasm, followed by the subsequent troughs of disillusionment. The underlying picture is a lot more nuanced and suggests the long-term opportunity to electrify transport is still intact and in fact is progressing at pace, even if obscured by the negative headlines. This is what we refer to as "electrification by stealth".

The first point to make is that EV technology continues to progress. Often cited obstacles to broader adoption of battery electric vehicles are battery cost, range anxiety and charging time. In Spring 2024 CATL, the leading Chinese battery maker, demonstrated its Shenxing Plus battery, which has a range of 1000km and a charging time to 600km of only 10 minutes. We have not yet seen EVs incorporating this technology, but it appears to offer significant improvements. The company uses a subtly different chemistry, known as LFP, which avoids some of the more expensive battery materials that push the EV prices higher. Since then, we have also seen BYD, the Chinese carmaker, launching EV models with charging times of only 5 minutes.

China leads the world in battery manufacturing, with its two leading giants, CATL and BYD, accounting for 55% of the global market share in 2024. That said, in our conversations with the industry it looks like this leadership is not due to some unique and irreplicable technological breakthroughs - it is a consequence of investments at scale, policy decisions and the size of the domestic market demand. These advances will proliferate throughout EV markets globally and will benefit multiple OEMs (Original Equipment Manufacturers) and EV buyers over time. The same Ford which delayed some of their EV initiatives, has hired an illustrious team of EV designers, some with Tesla backgrounds, to work on its next generation EV platforms. Global auto makers are not changing their mind about the long-term future – it remains electric.

Many shades of electrification

Electrification is not binary, with the extremes of either internal combustion or pure battery electric options.

Hybrids are a part of the electrification continuum. Plug-in hybrid electric vehicles were 7.4% of total global vehicle sales in 2024, about a third of the combined 20.1% global EV penetration number. That share has increased significantly from 4.9% in 2023. If China is a guide to how the EV market will develop, hybrids will continue to grow – they amounted to about 19% of all vehicles sold in China last year.

One success story in the China hybrid market is the "extended range hybrid electric vehicle", or EREV. This is a vehicle architecture in which an electric with smaller battery car а is supplemented with petrol-powered а generator, that tops up the battery charge. This way the battery can be smaller than otherwise would have been the case (saving costs), and the range will be longer than without the extra generator. The generator of course comes at an additional cost, but since it never really drives the car, it can run on the most optimal RPM (Revolutions Per Minute) speed, maximising efficiency and avoiding the need for expensive drive train components.

EREVs already on the market demonstrate the benefit of this approach. XPeng, another Chinese car maker, has launched an EREV system that has a total range of 1,400km, of which 430m are battery powered. Talk about range anxiety – 1,400 is better than internal combustion vehicles are capable of, and even longer range EREVs have already been announced.





XPeng launch presentation of their EREV system. Source: XPeng

Dodge <u>Ramcharger</u> 1500 EREV. Source: Stellantis

Again, despite this vehicle architecture originating from China, EREVs will proliferate across the world. Stellantis (the parent company of Fiat, Peugeot Citroen and Chrysler groups) is launching an EREV pick-up truck, Dodge Ramcharger 1500, in 2025. It uses the benefits of EREV to combine torque, range and towing capacity, which could not have been achieved by pure battery electric vehicles before.

Crab walks and tank turns

Electrification of separate vehicle systems such as braking or power steering is another growth driver. The schematic below shows how braking and power steering is moving from hydraulic to electric power, decoupling from the internal combustion engine, and eventually converging into a "corner module", a unit that combines a traction motor, steering and breaking in one wheel assembly.





Braking and steering systems and corner module. Source: Allegro Microsystems

Hyundai vehicle demonstrating "crab walk" manoeuvre. Source: Hyundai Mobis

This technology change, which is already underway, is leading to tangible improvements in how cars function, enabling them to "tank turn", or spin on the spot, or "crab-walk" sideways into a parking place. Doing away with the dreaded parallel parking or 3-point turn may become an even more compelling reason to upgrade to an electric car, over and above the quietness and acceleration which appeals to EV owners today.

Implications for the supply chain

Electrification of vehicles has profound implications for the supply chain, and a number of specialist components are enabling this technology transition. EVs and hybrids have increased connectivity, requiring specialist

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connectors, that can reliably work in the harsh environments that the vehicle has to cope with. Managing high voltages of electric drive train requires power semiconductors and passive electronic components with performance and ruggedness far above those required for consumer electronics, for example. Specialist sensors are needed to both measure the currents inside the EV circuitry and to sense the speed and positioning of various moving parts. The attraction of these Enabler business models is that investors do not have to bet on a winning EV brand – these companies benefit whether it's Tesla, Volkswagen or BYD that succeeds in the market. The content per vehicle growth is another factor -EVs sometimes contain multiples these of components compared to traditional cars, driving growth even if overall auto market volumes remain flat. The Amati Global Fund holds Amphenol Innovation US. connectors), Allegro Microsystems (US, sensors), Infineon Technologies (Germany, power semiconductors and controllers) and Yageo (Taiwan, passive components), which are all positioned to benefit from the ongoing electrification of the global auto sector, even through the "EV Winter".



Sales Contacts

Rachel Le Derf

Head of Sales & Marketing SE England & East Anglia rachel.lederf@amatiglobal.com +44 (0) 7979601223

Colin Thomson

Sales Director Northern England, Scotland & NI colin.thomson@amatiglobal.com +44 (0) 7884026517

Jonathan Woolley

Sales Director London, Midlands, SW England & Wales jonathan.woolley@amatiglobal.com +44 (0) 7818203013

Samantha Dalby

Sales Manager London, Midlands, SW England & Wales samantha.dalby@amatiglobal.com +44 (0) 131 503 9116

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Amati Global Investors Ltd

8 Coates Crescent, Edinburgh, EH3 7AL

+44 (0)1315039115 info@amatiglobal.com www.amatiglobal.com

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