

Lube 2025 Digital Exclusive

THE EUROPEAN LUBRICANTS INDUSTRY MAGAZINE

September 2025

The official journal of



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electric vehicles,
a new road**

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The global automotive industry is facing the most dramatic upheaval since the dawn of the internal combustion engine. Electric vehicles, once a niche market confined to experimental models and early adopters, are now surging into the mainstream. In 2024, global EV sales exceeded 14 million units, representing almost one in five new cars sold. Governments from Europe to Asia are setting deadlines for phasing out combustion engines, while major manufacturers are pledging all-electric fleets by the mid-2030s. For consumers, the shift is becoming visible on every road, from Tesla's sleek models in California to BYD's fast-rising exports from China.

For the lubricants industry, this revolution is both a challenge and an opportunity. The traditional backbone of the automotive lubricants sector—engine oil—is directly threatened by electrification. Without pistons, crankshafts, valves, or combustion chambers, electric drivetrains have no need for the lubricants that once accounted for the largest share of global volumes. At first glance, the future looks bleak: less demand for oil changes, fewer aftermarket products, and a shrinking role for lubricants altogether.

Yet this impression is misleading. Electric vehicles still rely heavily on fluids and greases. They may need them in different places and in smaller quantities, but in many ways the demands placed on these lubricants are more stringent than ever before. The EV era does not herald the end of lubrication—it marks the beginning of a new chapter, one defined by high-tech requirements, premium formulations, and closer collaboration between OEMs and chemical innovators.

The myth of the lubricant-free EV

One of the most persistent misconceptions among consumers, and sometimes even within the industry, is that EVs no longer need lubricants. The assumption is simple: no engine, no oil. While it is true that the familiar routine of changing engine oil every 10,000 miles may soon be consigned to history, electric vehicles still require a complex array of fluids to operate efficiently and safely.

The heart of most EVs is the combination of an electric motor and a single-speed reduction gearbox.

This system generates immense torque instantly—often more than 400 Nm delivered directly to the wheels. Without a carefully formulated lubricant, the gears and bearings within the transmission would wear rapidly, overheat, and produce excessive noise. Traditional gear oils are not suitable, because EV transmissions must also contend with electrical conductivity, copper corrosion, and higher rotational speeds than their internal combustion equivalents.

Beyond the transmission, EVs pose a new frontier in thermal management. Lithium-ion batteries, the lifeblood of modern EVs, are highly sensitive to temperature. If a pack becomes too hot, it risks thermal runaway, a chain reaction that can lead to fire or explosion. If it becomes too cold, efficiency drops sharply, reducing both performance and driving range. Managing this delicate balance requires advanced coolants, often dielectric fluids capable of transferring heat without conducting electricity. As charging times shorten and fast-charging stations become widespread, the thermal load on EV batteries is intensifying. Without innovative fluids, the promise of rapid charging and extended range cannot be fulfilled.

Finally, EVs still rely on greases for wheel bearings, suspension components, and electric motors. In fact, the demands on these greases are even greater than before. Because EVs operate almost silently, consumers are far more likely to notice even the faintest whine, squeak, or vibration. The grease in a bearing is not only a protective lubricant—it is also part of the vehicle's acoustic performance.

The reality is clear: EVs need lubricants, but the specifications have changed. Instead of one dominant product category, the future will be a mosaic of specialised fluids tailored to electric mobility.

Reinventing transmission fluids

Among the most important of these new categories are e-gear oils, designed specifically for EV reduction gearboxes. Unlike conventional engine oils, which are changed regularly, EV transmission fluids are expected to last the lifetime of the vehicle. This requires exceptional oxidation resistance, shear stability, and thermal endurance.

At the same time, e-gear oils must be compatible with the copper used in motor windings, resist foaming at high rotational speeds, and support noise reduction in an environment where mechanical sounds are more noticeable. Lower viscosity is often preferred to reduce energy losses, but this must be balanced against wear protection.

Leading lubricant suppliers have already launched dedicated ranges to address these needs. Castrol's ON e-Transmission Fluid, for example, has been adopted by Ford for its all-electric Mustang Mach-E, while other OEMs have entered into partnerships with TotalEnergies, ExxonMobil, and Shell. These fluids are more than lubricants—they are enablers of performance, efficiency, and consumer experience in EV drivetrains.

Cooling the future: Thermal management fluids

Perhaps the most revolutionary development for the lubricants industry is the rise of thermal management fluids. While cooling systems have always been important in vehicles, the demands of EV batteries elevate them to a new level of criticality.

A lithium-ion battery pack is happiest within a narrow temperature window of roughly 20 to 40 degrees Celsius. Outside this range, performance and safety decline. Managing these conditions becomes particularly challenging during fast charging, when intense currents generate significant heat. Consumers want to recharge their vehicles in 20 minutes, not several hours, but the physical stress this places on the battery is enormous.

This is where advanced coolants come in. Some are water-glycol blends adapted from traditional

antifreeze technology. Others are highly engineered dielectric fluids capable of direct immersion cooling, allowing them to circulate around individual battery cells without risk of short circuit. Companies such as 3M, BASF, and ExxonMobil are at the forefront of this research, working alongside battery giants like CATL and BYD.

In China, immersive cooling systems are already moving from prototype to production, and Western OEMs are beginning to follow. If adopted at scale, this could transform the very identity of the lubricants sector, as products once dominated by hydrocarbons become increasingly chemical and materials science-driven.

Grease under pressure

Greases, too, are experiencing a quiet revolution. Wheel bearings, e-motor bearings, and suspension components all rely on grease, but the conditions have changed. EVs exert higher torque loads, operate at higher rotational speeds, and must maintain silence across their lifespan.

Suppliers such as SKF and Klüber Lubrication are developing greases with enhanced noise-dampening properties, alongside longer service lives to match the reduced maintenance schedules of EVs. The acoustic properties of grease—an attribute rarely discussed in the ICE era—are now part of the performance equation.

Market shifts: Winners and losers

The technical challenges of EV lubrication are only part of the story. Equally important are the economic and strategic implications for the industry. Engine oils account for almost 40 per cent of global lubricant consumption by volume. As EV adoption accelerates, this category faces inevitable decline.

The loss will not be offset entirely by growth in EV fluids. E-gear oils and thermal management fluids are required in smaller volumes, and EVs generally need fewer fluid changes over their lifetime. However, these products are more complex, more valuable, and more closely integrated into OEM systems. That means margins are higher, approvals are more exclusive, and the potential for differentiation is greater.

Regional dynamics will play a crucial role. In China, where EV penetration already exceeds 30 per cent

of new car sales, domestic lubricant suppliers are racing to secure contracts with local OEMs. In Europe, regulatory pressure is forcing rapid transition, with Volkswagen, Mercedes-Benz, and Stellantis all demanding advanced EV fluids. In the United States, the shift is slower but accelerating, particularly with Tesla's dominance and the Biden administration's incentives for electrification. Meanwhile, in emerging markets such as Africa, South America, and parts of Southeast Asia, ICE vehicles will remain dominant for at least another decade, ensuring a dual-portfolio approach remains necessary.

Case Studies from the frontline

The industry is already full of examples that demonstrate how EVs are reshaping lubricant innovation. Tesla has reportedly collaborated with ExxonMobil on dielectric coolants for next-generation battery systems, though details remain tightly guarded. Ford's adoption of Castrol ON fluids shows how major OEMs are willing to align with trusted brands for critical performance areas. In China, BYD's rapid rise has been supported by domestic chemical companies developing tailor-made e-gear oils for its expanding fleet.

Each of these examples highlights the centrality of OEM-lubricant partnerships in the EV age. Where once a consumer could buy a generic engine oil for almost any car, tomorrow's EV fluids will be highly specific, developed for and often branded alongside particular vehicle models.

Risks on the horizon

The shift to EVs is not without dangers for lubricant companies. The decline in overall volume could reduce revenue streams, even if margins are higher. Skills gaps may emerge, as electrochemistry and dielectric properties replace some of the traditional tribology knowledge base. Approval processes could become more complex, as OEMs demand bespoke solutions. And competition may come from unexpected quarters—chemical companies that have never sold lubricants may find themselves well-placed to dominate battery cooling fluids, for example.

Opportunities for reinvention

Yet with every risk comes opportunity. For lubricant companies willing to adapt, EVs offer the chance to redefine relevance. Fluids can become part of OEM marketing strategies, with performance claims tied

directly to branded lubricants. Aftermarket education presents another avenue, ensuring that garages and service centres understand the unique requirements of EV greases and coolants.

Sustainability is another powerful driver. As EVs are associated with net-zero goals, offering low-carbon, recyclable, or bio-based fluids allows lubricant suppliers to align themselves with the broader narrative of green mobility. Digitalisation, too, creates potential, with fluid monitoring integrated into vehicle sensors and telematics systems, paving the way for predictive maintenance and subscription-based services.

Looking to 2030 and beyond

By 2030, it is likely that EVs will account for half of new vehicle sales in leading markets. Engine oils will shrink dramatically, perhaps by as much as 50 per cent in Europe and China. Yet new fluid categories will flourish, particularly e-gear oils, greases, and thermal management solutions.

The lubricant industry has weathered many transitions before—from steam to internal combustion, from aviation to space exploration. Each time, adaptation and innovation allowed it not only to survive but to thrive. The EV age is no different. For those willing to embrace the science of electricity as much as the art of lubrication, the future is full of possibility.

Conclusion: The electric age of lubrication

Electric vehicles do not eliminate lubricants; they elevate them. From the gears that transfer torque to the fluids that protect batteries, lubricants remain central to performance, safety, and consumer experience. The products may be fewer in volume, but they are greater in importance.

The lubricant industry stands at a crossroads. One path leads to decline, clinging to shrinking markets for traditional engine oils. The other leads to reinvention, innovation, and partnership in the age of electrification. The question is not whether EVs will reshape lubrication—they already have—but whether the industry is ready to seize the chance to redefine its role in the decades ahead.



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The Directory for the Global Lubricants Industry

a LUBE Media publication
Published by United Kingdom Lubricants Association
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