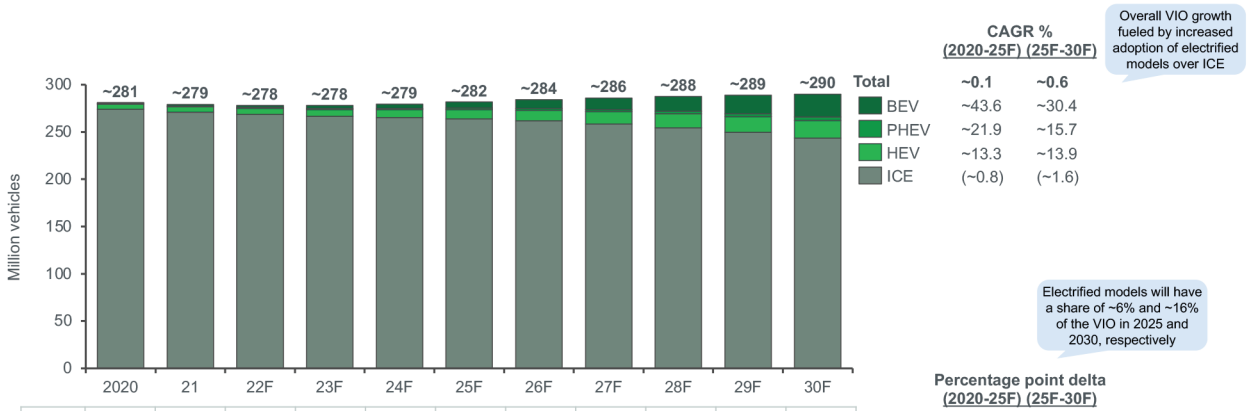
EXECUTIVE INSIGHTS

The Impact of Electric Vehicles on the Aftermarket

Over the next 10 years, the automotive market will see rising numbers of battery-powered electric vehicles (BEVs) in both yearly new vehicle sales and total vehicles in operation (VIO).[i] Companies in the aftermarket space are facing a more uncertain future as traditional internal combustion engine (ICE) vehicle numbers slowly decline over the long term, reducing sales of ICE-specific parts such as transmissions, fuel systems and powertrain components. However, this also creates new, attractive opportunities in the BEV-enabled aftermarket for needs like battery remanufacturing and charging equipment. But the timing of this market evolution is important. At least in the near to medium term, L.E.K. Consulting forecasts ICE vehicles (including hybrid electric and plug-in hybrid electric vehicles) will remain the large majority of the VIO (see Figure 1).

However, a continuous expansion of BEVs should be expected with a possible acceleration after 2025, requiring advance planning by aftermarket manufacturers to accommodate changes. Providers should act now to adjust their portfolios to reduce exposure to systems cycling out of use and to align business goals with a higher share of aftermarket systems for BEVs. Read on for an analysis on which parts systems will be declining and which are expected to grow as BEVs become more prevalent in the market.

Figure 1
Vehicles in operation forecast in the US 2020-2030



	2020	21	22F	23F	24F	25F	26F	27F	28F	29F	30F
BEV	0%	1%	1%	1%	2%	2%	3%	4%	5%	7%	8%
PHEV	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%
HEV	2%	2%	2%	3%	3%	3%	4%	5%	5%	6%	6%
ICE	98%	97%	97%	96%	95%	94%	92%	90%	88%	86%	84%

Note: CAGR=compound annual growth rate; BEV=battery-powered electric vehicle; PHEV=plug-in hybrid electric vehicle; ICE=internal combustion engine; VIO=vehicles in operation
Source: L.E.K. intellectual property and analysis

Comparing ICE and BEV systems

As the mix of vehicles in the VIO transitions from ICE to BEV, we expect to see meaningful shifts in aftermarket sales volumes of specific components.

The challenge with BEVs for aftermarket manufacturers is that, generally, electric vehicles both require fewer parts and see less wear and tear on those parts, driving a lower aftermarket replacement rate. Quite simply, an electrified powertrain requires simpler systems with little friction between the moving parts — conventional drivetrains contain 150 components that are unique to internal combustion engine vehicles.

The transmission in particular either becomes much simpler or disappears altogether — BEVs use a single-speed system, whereas ICE vehicles have multispeed gearboxes (for example, Tesla uses a motor that has only two moving parts and a single-speed transmission with no gears).[ii]

Other components that are unnecessary in an electric vehicle include radiators, fuel injectors, gas tanks, valvetrains and exhaust systems, and while chassis, powertrain and electrical systems remain, they will be very different from their ICE counterparts. Features like body structure, fenders, HVAC (heating, ventilation and air conditioning) and interior systems remain similar in both types of vehicles.

Finding aftermarket opportunities in BEVs

Though the proliferation of BEVs in the market will eventually result in fewer replacement parts, there are several opportunities in the BEV aftermarket due to BEV-unique systems or upgrades to existing vehicle systems. Manufacturers that are quick to invest in the development of BEV-specific performance upgrade parts stand to gain a higher market share and potentially greater customer loyalty as BEV sales accelerate.

New systems relevant to the upcoming shift to BEVs are estimated to result in about 40 new components.[iii] This includes electrical, e-motor, battery management and power control units (see Figure 2).

Figure 2
New systems that are unique to BEVs

System	Subsystems
Electrical (excluding the battery)	• High-voltage power cables • Charging port • On-board diagnostics (OBD) • Sensors • Centralized electronic control system
Battery pack and management	• Battery module • Battery management system • Battery cells • Battery pack
E-motor	• Stator • Rotor • Thermal management
Power control units	• Inverter • DC-to-DC converter

Source: L.E.K. research and analysis

A few examples include:

- **Battery remanufacturing:** The battery is the most integral and expensive part of a BEV. However, battery performance degrades over time, well before the overall vehicle's useful life — hence, there is likely to be a sizable future opportunity for remanufacturing of batteries, which is a much more cost-effective and sustainable solution than full replacement.

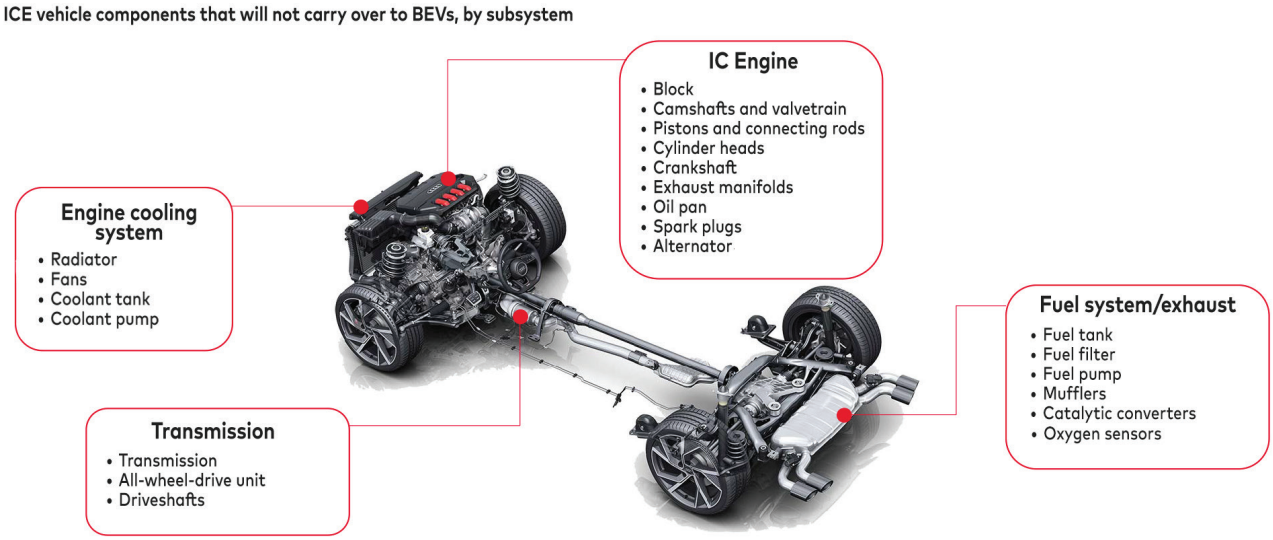
- **Brake systems:** A key difference in braking systems is that BEVs primarily utilize regenerative braking technology, while ICE vehicles use a friction braking system. Therefore, BEV brakes have a longer useful life, lasting up to twice as long as those of an ICE vehicle. While this reduces replacement opportunity, it does mean that BEV brakes are more prone to rusting due to underusage, which opens up a parallel avenue for the aftermarket to step in with solutions such as brake pads specifically designed for BEVs (more resistant to corrosion) and copper-free design (environmentally friendly due to reduced dust). There may also be new opportunities with replacement of regenerative brake components, which are more complex and expensive than traditional friction brake components.

- **Tires:** BEV tires see 20% more wear and tear than tires on ICE vehicles due to the increased torque and vehicle weight of BEVs.[iv] Their higher replacement rate creates a significant aftermarket opportunity; aftermarket manufacturers have already started developing more premium (and expensive) tire solutions that better address the needs of weighty BEVs. Durability is a key consideration for BEV tires, which tend to have a price point more comparable to sport and performance tires. Additional opportunities for upgraded product include tires with low rolling friction to increase range and reduce wear in temperate climates, and low-noise options to cover audible road noise that is more apparent in the absence of engine noise and vibration.

ICE-specific aftermarket systems facing risk

As can be expected, certain systems will experience decreasing demand as BEVs continue to penetrate the car parc, primarily those in the drivetrain. Engine blocks, camshafts, valvetrains, pistons, cylinder heads, crankshafts, oil pans, spark plugs and alternators will see a steadily shrinking market as BEVs become more commonplace (see Figure 3).

Figure 3
Subcomponent categories affected in the shift from ICE vehicles to BEVs



Source: L.E.K. research and analysis

It is important when calculating future opportunities to consider the time frame — while BEVs are gaining share steadily, ICE vehicles will still be by far a majority for the next 10 years and beyond. Additionally, consumers are holding on to their vehicles longer than ever before — the average age of vehicles in use in 2022 was estimated at 12.2 years — resulting in a longer-term need for continued ICE vehicle servicing. The goal of the aftermarket should be to balance these growing and waning demands over the next many years to ensure maximum market share.

Getting ahead of the aftermarket evolution

By 2030, it is expected that ICE vehicles will remain the greater part of vehicles on the road — 92% when combined with plug-in hybrid electric and hybrid electric vehicles — but the industry must also monitor the continuous expansion of BEVs, which should accelerate after 2025.

As BEVs become a more significant market share in the next 10 years, the more simplistic designs will put approximately 150 component parts of traditional ICE vehicle systems at risk of becoming obsolete. Because the main design differences between BEVs and ICE vehicles can be found in the powertrain, chassis and electrical system, those most at-risk parts include engine systems, fuel systems, exhaust parts and transmission parts.

Poised to offset this loss of parts demand is the expected rise in new BEV system needs, including e-motors, battery management, power control units and more advanced electrical systems — totaling about 40 components new to the aftermarket industry.

By planning for both increasing obsolescence and rising demand for certain ICE- and BEV-specific parts, the aftermarket will remain a resilient industry in the coming years. Portfolio adjustments made now will allow manufacturers to reduce exposure to legacy ICE systems that are going away and take advantage of new aftermarket opportunities arising from BEV growth.

For more information, please contact industrials@lek.com

Endnotes

[i]Automotivepolicy.ca, "From ICEVs to BEVs." https://automotivepolicy.ca/fromicevstobevs/

[ii]Interplex.com, "Electric Vehicle Drivetrains Only Have 20 Moving Parts Compared to Over 200 in Conventional Automobiles." https://interplex.com/resources/electric-vehicle-drivetrains-only-have-20-moving-parts-compared-to-over-200-in-conventional-automobiles/

[iii]Autonews.com, "ICE vs. EV." https://www.autonews.com/ice-vs-ev/

[iv]Ibid.

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