

GORE® Automotive Vents

Take charge with innovative venting solutions



ELEVATE YOUR EV PERFORMANCE: #TAKECHARGE OF QUALITY AND SAFETY

Electric vehicle (EV) sales are on the rise, and original equipment manufacturers (OEMs) are gearing up to introduce hundreds of new models. Market research indicates that BEV sales approached 12 million vehicles worldwide, with a market penetration of 13 percent in 2023 and rising. Despite this growth, uncertainty persists regarding the timeline for widespread EV adoption.

While more consumers recognize the benefits of EV ownership, including environmental friendliness and lower total ownership costs, adoption rates are not as high as expected. Concerns about upfront purchase costs, operational range, and the safety and reliability of electrical components are hindering mass adoption.

So, how can OEMs and Tiers bridge this gap and entice more consumers to embrace electric vehicles (EV)? Gore recommends listening and tackling customers' immediate demands first.

Lowering upfront costs of electric vehicles

With many governments considering reducing subsidies for electric vehicles, most original equipment manufacturers (OEMs) are focusing on cutting production costs to meet consumer demand and improve profitability. This might involve making components for new models more cost-effective or improving current components to increase their value and lower ownership costs.

To reduce component costs, it is important to differentiate between factors that manufacturers

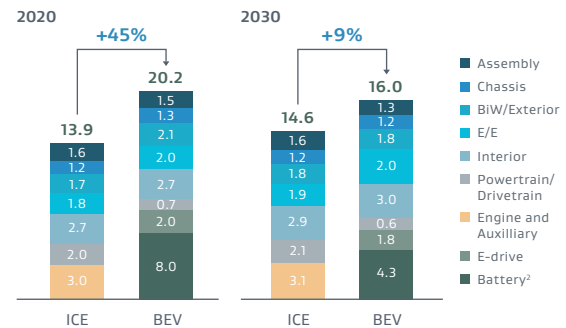
Figure 01

Vehicle Cost Development

Battery electric vehicles are expected to almost close the gap to internal combustion engine powered vehicles by 2030.

Comparison of direct costs ICE vs. BEV — European compact-class vehicle¹

In thousand EUR



1. Does not include direct costs (e.g. ramp-up, CAPEX, relative SG&A etc.)

2. Equals a 50kWh battery with 160 €/kWh in 2020 and Equals with 85 €/kWh in 2030

Source: Oliver Wyman FAST 2030 proprietary model, Bank of America, IEA Global EV Outlook, expert interviews, Oliver Wyman Research

can control, like production processes, and those influenced by external factors, such as raw material costs (Figure 1).

While manufacturers cannot control material costs, they can significantly reduce production costs by using design-for-manufacturing (DFM) and optimizing processes. Implementing DFM early can lead to substantial cost savings later. This requires close collaboration with suppliers to review materials and processes, ensuring everyone understands the desired outcome before large-scale production.

Together, improving life



Understanding this collaborative nature is crucial for success. Gore's approach includes product simulations, situational testing, and troubleshooting. This helps OEMs and Tiers achieve optimized DFM, reduce costs, and ensure long-term business sustainability.

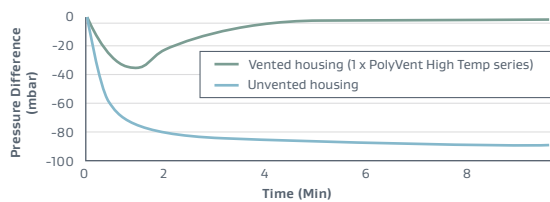
Improve mileage with efficient power management

In the realm of electric vehicles (EVs), power electronics play a crucial role in affecting mileage. They manage the battery's charge and discharge, optimize electric flow to the motor, and enable regenerative braking, which converts kinetic energy into electrical energy to recharge the battery. However, these functions make power electronics in plug-in vehicles larger and more complex, leading to increased heat generation.

Figure 02

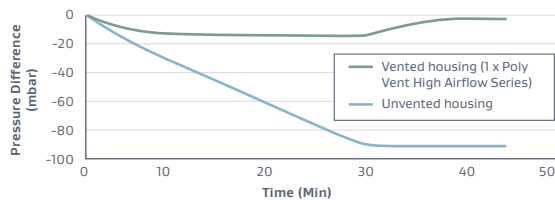
Pressure Difference Caused By Temperature Shock

Power electronics (with 4 L of free volume) cooling rapidly from 70°C to 40°C within a 5-minute period.



Pressure Difference Caused By Elevation

Battery box (with an available volume of 50 L), driving from 1,370 MASL to 570 MASL with a 15-minute break.



The impact of vents on pressure equalization due to environmental factors. Based on internal data from W. L. Gore & Associates, Inc.

When power electronics reach high operating temperatures, they can be rapidly cooled by cold spray from the road or at the car wash. This rapid cooling creates an extreme vacuum that pulls air in through the seals of the electronics housings. Over time, this

pressure equalization stresses the seals and sealing components, allowing dirt particles and liquids to enter and corrode the electronics. This can shorten their service life, especially since low-viscosity fluids and cleaning agents used in vehicles can increase the risk of ingress (Figure 2).

To address this issue, engineers can adopt an integrated system design approach by enhancing the cooling system, optimizing component layouts, or using advanced materials with better thermal attributes. However, these approaches can be complex and costly.

“For Gore, automotive vents are not just a product; they are a key component that helps OEMs and Tiers ensure that their battery performance claims and warranties are met without needing to overhaul their designs.”

At Gore, we leverage our membrane engineering capabilities to identify suitable and scalable venting solutions to help our customers succeed. We collaborate with OEMs and Tier suppliers to develop application-specific venting solutions while meeting specific demands and pricing requirements.



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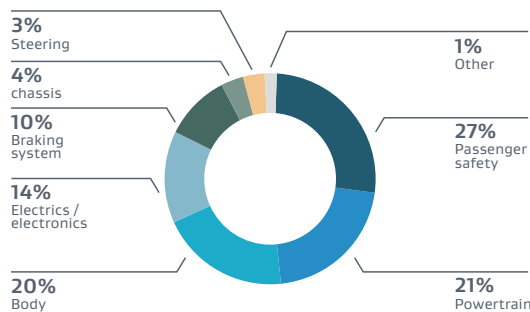
Reliable electric components, for a safer drive

A major automotive reliability survey has revealed that electric vehicles experienced 79% more issues compared to hybrid and gasoline-powered vehicles, primarily due to electronic component failures.



This may be attributed to the relative novelty of EV technology for legacy automakers, resulting in a lack of experience with batteries, electric sensors, and e-powertrains. This knowledge gap makes it challenging to identify optimal solutions to meet market expectations (Figure 3).

Figure 03
Distribution of Safety-relevant Field Problems
 Example of US market in 2020.



Electric component failure account for over 35% of EV safety issues.
 Source: Berylls

While experimenting with new component designs can address these failures, it poses significant risks in the rapidly evolving EV market. Electric components are becoming smaller, more complex, and interdependent, requiring quicker time-to-market. However, rapid design cycles coupled with small-volume validation

testing can lead to venting solutions that fail to deliver as promised.

Venting solutions are often selected based on small-volume tests, which cannot ensure quality consistency and reliable performance when it comes to large-scale manufacturing. This poses an increased supply security risk, as untested vents may have more defects, potentially delaying product integration and risking negative impacts on brand reputation.



To mitigate these risks, the industry players must ensure that venting suppliers have a proven track record and capabilities to deliver consistent, quality products in large volumes, with an on-time delivery (OTD) metric exceeding 98%.



Gore, with over two decades of experience, offers quality-consistent venting solutions that are delivered on time and at scale. Our customer-centric approach aims to provide an excellent customer experience and contribute to a more reliable and safer ride.

The road ahead

The future for electric vehicles and component makers is full of opportunities for innovation and collaboration. By focusing on customers' needs and utilizing innovative venting solutions to reduce costs,

improve mileage, and ensure component reliability, the automotive industry can overcome challenges and take charge of providing quality and safe venting solutions. The future of e-mobility is about returning to the basics of car ownership: finding safe, reliable cars, and Together, improving life.

About the author



Soaring Su

A seasoned global sales leader at Gore with over 18 years of experience, drives customer success at various material engineering conglomerates. He started at Gore as a sales associate for the ePTFE filtration business before transitioning to the regional sales leader for the micro-filtration industry. In this role, he focused on developing micro-filtration solutions for the electronics, hard disc drive, and semiconductor sectors. Currently based in China, he travels extensively across the globe in his role as automotive protective vent sales leader to help more customers succeed.

Gore's Sustainability Commitment

We use our materials science expertise to create products that improve the quality of life and address sustainability challenges for generations to come. We believe that one of the greatest contributions we can make to sustainability is through innovations that have a positive impact on human health as well as the planet.

For more information, please visit gore.com/about/responsible-enterprise

About Gore

W. L. Gore & Associates is a global materials science company dedicated to transforming industries and improving lives. Since 1958, Gore has solved complex technical challenges in demanding environments — from outer space to the world's highest peaks to the inner workings of the human body. With more than 13,000 Associates and a strong, team-oriented culture, Gore generates annual revenues of \$4.8 billion.

For more information, please visit gore.com

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