Hedging Your Bets on e-Mobility and Electrification

CTI Symposium offers insight into the future of the automotive industry

Matthew Jaster, Senior Editor

At CTI Symposium USA 2025, the automotive industry discussed the challenges it faces in the fields of electric drives, power electronics, battery systems, e-machines and more. This year's symposium examined topics such as EV and plug-in hybrid technology, e-motors, thermal management, automotive market analysis, passenger and commercial vehicles and the latest on powertrain solutions for work trucks.

CTI brings together experts and decision-makers from passenger car and commercial vehicles, OEMs, system and component suppliers, engineering service providers, software developers and market specialists. It provides attendees with the latest developments, innovations, information, solutions and new contacts in the automotive and electrification industries.

The extensive lecture program is designed to meet the needs of the drivetrain community. Key notes, expert discussions, deep dive sessions and the accompanying exhibition cover the full range from complete systems to components to engineering services. The content is selected by the CTI advisory board and the sessions focus on market trends, electric and hybrid drives and components, impact of legislation, infrastructure, and development tools.

"The CTI Symposium looks at the direction of the automotive industry," said Patrick Lindemann, president, e-mobility and chassis, Mechatronics Americas at Schaeffler Group and CTI Symposium chair. "Is it still full steam ahead to BEVs or is the interim solution of hybrids not so interim? What is the ultimate long-term goal? How should suppliers position themselves to bet on the right horse?"

2025 Outlook

The political landscape and technology go hand in hand and guide the consumer to their decision making. CTI sheds light on both sides.

The tariff situation, for example, is highly dynamic according to a spokesperson for a top Tier One automotive supplier. "While scenario planning is ongoing with our customers, any significant changes to the automotive supply chain will require time, effort, and investment far beyond typical political planning horizons. We expect the trends towards supply chain resiliency and reshoring, particularly for critical components, to be supported by policy. Separately, the U.S. administration is placing more emphasis on advancing autonomous driving regulations, which could unlock additional innovation and accelerate adoption after several years of limited movement."

On the electric vehicle front, Lindemann said hybrids are here to stay but the symposium gave the entire automotive industry a sneak peek as to what this market will look like in the coming years. Obviously, electrification will still be the end game, but the question remains how many decades will it take to fully get there?

"The pure BEV focus is over for now," Lindemann added.

Some surprising automotive trends include the continued strength of ICE-related technologies in the U.S. and the resilience of plug-in hybrid vehicles in China. Tesla's recent challenges are also notable.

"Redefining trade and tariffs may ultimately impact the number of OEMs, suppliers and even the vehicle mix over time (may possibly see more consolidation within auto industry)," said the Tier One spokesperson. "More broadly, there is growing regional divergence—with different technology pathways emerging between North America, Europe, and China based on policy, trade regulation infrastructure development, and consumer behavior."

Additional trends taking place in the automotive industry include rethinking supply chain strategies, the integration of AI, IIoT and digital twins to predict real-time outcomes, leveraging autonomous driving technologies, as well as a greater emphasis on mobility-as-a-service (MaaS) and Fleet-as-a-service (FaaS).

According to Tech Insights, the automotive industry is transforming in 2025, driven by advancements in electric vehicles and automation. Demand for battery electric vehicles will rise with new efficient powertrain components, while Level 2 automation becomes standard in affordable models. China will lead the deployment of advanced electrical/electronic architectures, paving the way for software-defined vehicles. Additionally, 5G chipsets will surpass 4G in automotive applications, despite semiconductor suppliers facing inventory challenges.

Where the Industry Is Going

Lindemann said the last decade showed electric vehicles are real and major hurdles are overcome. The progress of EVs in the next decade will be tremendous.

"As stated earlier, electrification will be the ultimate end game, but hybrid technology will get us there," he said.

Hybrid vehicles will get stronger here in the United States with a slower increase of BEV sales. Europe will highlight a stronger trend to BEVs, but slower than expected with some range extender technology. In Europe, current market conditions do not support the legislated pace of change, and targets are clearly at risk; adjustments in vehicle types and a stronger focus on affordability are likely to follow.

China will continue its strong push in the BEV market. China is expected to continue leading in EV adoption, supported by strong industrial policy and government-driven market incentives across a wide range of vehicle segments.

Extended-range electric vehicles are having a moment right now, as automakers reassess their BEV plans for the rest of the decade and beyond amid a slowdown in demand in some EV segments, according to *Autoweek*. EREVs are front and center as consumers want to take their electric trucks and SUVs on long road trips and make purchase decisions accordingly.

According to the Tier One spokesperson, overall, electrification will not follow a one-size-fits-all approach. Different segments, regions, and use cases will evolve uniquely, shaped by social, economic, and cultural factors. In the U.S., electric propulsion growth will likely continue to slow due to reduced regulatory support.

New Component Technology

In addition to the symposium, CTI offers comprehensive articles online and in *CTI Magazine*. Here is some recent content on component technology in these changing markets:

External Damping of Roller Bearings and its Effect on the Acoustics of an e-Mobility Gearbox

Reducing the sound emitted by the vehicle and the noise perceived by the passengers is an essential part of the development of modern e-vehicles. Bearings are crucial to the transmission of vibrations within the vehicle powertrain. This article presents a method for studying the impact of external bearing damping on acoustic properties. For this purpose, damping elements between the outer bearing ring and the gearbox housing of a gearbox used in

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electric vehicles are introduced, and parameters relevant to damping are varied by means of design of experiments. First, the noise sources that occur in a gearbox for electric vehicles will be identified. The gear mesh is determined as one of the primary sources of noise. The vibrations generated by the gear mesh are transferred through the shafts, the bearings, and the gearbox housing.

cti-symposium.world/external-damping-of-roller-bearings-and-its-effect-on-the-acoustics-of-an-e-mobility-gearbox/

Dog Clutch Without Angular Backlash

Dog clutches are cost-effective but often suffer from angular backlash, causing discomfort. A novel, patented design has been developed to eliminate this issue using a purely mechanical blocking mechanism. This design, fully interchangeable with conventional mechanisms, requires no extra modifications but needs an external synchronization system. Featuring innovative gearshift dogs and blocking mechanisms, it was tested with two prototypes on test benches. The results showed the design's effectiveness, and robustness especially for hybrid and electric vehicles, addressing key shortcomings of traditional clutches.

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Intelligent Bearing Monitoring with LubeSecure from HCP Sense

HCP Sense is an innovative start-up from Darmstadt that develops intelligent bearing monitoring systems for industrial applications. With a focus on predictive maintenance and condition monitoring, HCP Sense offers solutions to maximize operational efficiency, minimize downtime and extend the lifespan of machines.

The LubeSecure technology utilizes the fact that a bearing under full lubrication can be viewed as a capacitor in the electrotechnical sense in which the lubricating film acts as a dielectric. By measuring the electrical impedance, it is possible to differentiate between different lubrication states. This innovative approach makes it possible to react to inadequate lubrication at an early stage, before permanent metallic contact and the associated increased wear and tear occur. With that, LubeSecure technology doesn't detect damages when they occur, as comparable condition monitoring technologies, but detects the underlying reasons for damages before they can actually form.

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CTI Symposium Europe

Decarbonization and digitalization, as well as global upheavals are challenging manufacturers and suppliers alike. New technologies, new competitors and new business models are changing the market and the global economic outlook at breakneck speed. In response, governments are seeking to strike a new balance between the development of sustainable mobility and the development of their economies while also having to acknowledge broader societal trends. The European CTI Symposium will take place December 2–3, 2025, in Berlin.

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