

“The U.S. Automotive Industry at Risk”

WHITE PAPER

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EXECUTIVE SUMMARY

Purpose: The White Paper is meant to influence U.S. policy towards ensuring that the automotive industry remains a vibrant and healthy engine of the economy and national defense.

The U.S. automotive industry—a critical part of the nation’s industrial base and national defense—is at risk. Regulatory pressures, enormous technological change, powerful Chinese competition, and a stagnant market are threatening to cripple the industry by the end of this decade. There are many steps the industry needs to take on its own to boost its competitiveness, but it cannot do it alone. What is needed is a coherent, sustainable, and strategic national policy that ensures the United States maintains a vibrant, competitive, and profitable automotive industry and it needs to happen quickly. These are the conclusions that were reached at the 2024 SAE Detroit Section’s Global Leadership Conference (GLC).

AN INDUSTRY HEADING TOWARDS A BREAKING POINT

This is an historical turning point for the automotive industry as we previously have known it. Multiple waves of technological changes are washing across the industry and revamping the ways in which cars and trucks are engineered, manufactured, sold, and recycled. The industry has also hit Peak Auto, meaning that car markets in the U.S., Europe, Japan, and South Korea have stopped growing. At the same time, Chinese competition is of a size and scope the established industry has never confronted before. We are already starting to see the old order crumble.

The problem is particularly acute in Europe, where several major automakers and large suppliers are in serious trouble. Multiple manufacturing plants are slated to close, and tens of thousands of workers are facing the loss of their jobs. Yet, this is just the beginning. What is going on in Europe is merely a preview of what will happen to the U.S. automotive industry unless the U.S. takes specific action to support its industry.

The automotive industry is a vital component of the American economy and accounts for about half of all manufacturing in the country. It employs over a million people, generates over \$1 trillion in annual revenue, accounts for 5% of GDP, and is a critical element of industrial and national security. The automotive industry supports ancillary industries such as steel, composites, tool and die, machine tools, electronics, and software that the defense community considers critical for its own procurement. Those thousands of automotive factories and facilities located across

the country are an important part of the employment and tax base for thousands of local communities.

This is an industry that the United States should want to nurture, yet it is often hampered with stringent government policies that often can conflict with market realities. For example, the U.S. automotive industry is investing tens of billions of dollars in electric cars and plug-in hybrids to meet emission and fuel efficiency standards which become especially stringent in 2027 through 2032. So far, the public is not purchasing these vehicles in the numbers required to satisfy those requirements. In fact, a significant part of the public wants no part of them. While EV sales continue to grow, they are not growing fast enough to meet the regulations or pay for the massive investment that has been made to manufacture them. The industry is losing tens of billions of dollars annually on EVs, with no respite in sight. Moreover, if automakers fail to meet these standards because not enough people are buying electric vehicles, they face enormous penalties and fines.

Of immediate concern is the ZEV, or zero emission vehicle mandate, set by California's Air Resources Board. The ZEV standard has been adopted by another dozen states, which collectively account for about 40% of U.S. car sales. It requires that 35% of the vehicles sold in those states must be BEVs or PHEVs for the 2026 Model Year, which starts in the summer of 2025. Presently, California is at 27%, Colorado 22%, and Washington 20%. These are commendable achievements, but they still do not meet the standards. Other states are not even close. New York is only at 12%, New Mexico only 5%, and Rhode Island only 9%. If the regulations stand as they are, this is going to be a problem for automakers and especially for car dealers when they are forced to limit what they can sell to customers. For the 2027 Model Year, the ZEV mandate rises to 43%, and in 2028 to 51%.

AN INDUSTRY UNDERGOING ENORMOUS TECHNOLOGICAL CHANGE

In addition to the transformational transition to electric vehicles, there are three significant technological changes requiring enormous investment in areas that are new to traditional automakers and their suppliers.

First, the industry is scrambling to develop software-defined vehicles (SDVs), a completely different methodology and processes for developing new vehicles. Second, automakers are developing all-new zonal, centralized computing platforms for their vehicles, which is far more efficient, yet overly complex and difficult to achieve. Third, they are transitioning to using digital twins to develop new cars and components.

All these transitions are happening simultaneously and while the industry will manage to master these ground-breaking technologies, it is taking an enormous effort, with many delays, and at huge expense.

A RAPIDLY CHANGING MARKET

Concurrently, the Chinese automotive industry is expanding into global markets at a prodigious rate. It has a lot of incentive to do so. For one thing, exports serve as something of a relief valve for the massive amount of manufacturing overcapacity in China. For another, thanks to a national strategy to lock up the supply chain for electric vehicles, Chinese EVs command a 35% cost advantage. They are finding eager buyers for their cars in most markets around the world. By the end of this decade, China is on track to export as many vehicles as the U.S. makes annually.

Over the last five years, the Detroit Three automakers lost 6.6% points of global market share to Chinese automakers and EV startups. That represents about 5.6 million units of capacity and tens of thousands of jobs. In a global market of 86 million light vehicles annually, each percentage point of share equals 860,000 vehicles, which in turn equals three or four assembly plants worth of production. Each of those plants have several thousand employees. Japanese automakers have lost 3.4% points of share, the Germans 1% point, while the Koreans have not lost any. China gained 8.2% points and the EV startups—mainly Tesla—gained 2.1% points. The loss of global market share by the traditional automakers is reducing their economies of scale and economic output.

The erosion of the U.S. manufacturing base is deeply concerning, and it goes well beyond the automotive industry. The U.S. Army is down to one assembly plant for main battle tanks. The U.S. Navy is running television ads to try and recruit the workforce needed to make nuclear submarines. Today, the Navy has the capacity to make about one and a half nuclear subs a year. In the 1960s, it built 44 of them over ten years. As the U.S. loses automotive manufacturing, it also loses defense capabilities.

PEAK AUTO

One of the most serious trends affecting the automotive industry is that the sales of new vehicles have stalled out in North America, Europe, Japan, and South Korea. Fewer new vehicles are sold annually in those markets today than there were a decade ago. This is particularly worrisome in the U.S., where new car sales are lower than they were a decade ago, even though the population of the country increased by more than 30 million people. It is called Peak Auto, and it is unlikely that new car sales will return to their pre-covid levels anytime soon, if ever.

The discussions at the GLC noted that this is a perfect storm of disruptive changes hitting the industry at the same time: regulations forcing investments that will not produce a financial return; the necessity of adopting new technology that is difficult and costly to master; intense Chinese pressure that is only gaining momentum; and a stagnant marketplace that offers little opportunity for growth.

The automotive industry is a resilient and competitive industry. It has weathered turbulent times in the past and emerged stronger than before and with the right strategy and policies, it can do that again. What the industry needs is a national

policy that recognizes its importance to the economy and national defense, and provides regulations that are consistent, achievable, and cost-effective.

CURRENT RESPONSES TO THESE CHALLENGES

Automakers and suppliers are responding to these competitive threats by re-shoring and near-shoring critical components and raw materials and leveraging their North American supply chains via the U.S. Mexico Canada Agreement (USMCA). They are actively seeking out ways to cut costs and speed up product development.

The U.S. government has also stepped in to help with 100% tariffs levied on Chinese-made EVs to keep them out of the U.S. market for now. The U.S. Commerce Department is also proposing rules that will bar any connected car from being sold in the U.S. market if it uses Chinese hardware or software.

While the U.S. industry welcomes tariffs on Chinese EVs for now, it does not see them as a long-term solution and will need time to adjust to these new market challenges. Catching up to China's 35% cost advantage is going to take some tough changes and painful adjustments. At some point, those tariffs should be phased out because competing with the Chinese will only make the U.S. industry stronger and healthier.

WHAT THE INDUSTRY NEEDS TO DO

Government policies alone are not going to save the automotive industry. There are significant changes it needs to make itself if it is to make a successful transition to selling more electric vehicles and be able to compete with the Chinese automotive industry.

One obvious example is that automakers need to "unlearn" old engineering practices and specifications that made sense for internal combustion vehicles but are not needed with electric cars. For example, the structural beams inside the instrument panels on EVs from some legacy automakers are built to specifications that were needed for cars with piston engines. Those specs were drawn up to eliminate the vibrations that come from piston engines. Yet even though electric cars do not generate those kinds of vibrations, the structural beams are still built to those specs and that adds unnecessary cost and weight.

Another example of a practice that must be "unlearned" is with the sealant applied to the panels in the trunk area, which is there to prevent carbon monoxide from leaking into the passenger cabin. Even though EVs do not emit carbon monoxide, those trunk wells are still built to the old specs with sealant. Automakers need to review their specifications and eliminate those which are unnecessarily driving up the cost of making electric vehicles.

Automakers also must change their relationship with their largest suppliers, nurturing more collaborate relationships instead of purely transactional ones. Early

supplier involvement at the very beginning of a new vehicle program can lead to better designs with modern technology and lower costs that hit the market faster. Today, most suppliers are asked to bid on business that has already been designed, which leaves them little opportunity to find innovative ways to design cost out.

LEARNING FROM CHINA

While Chinese OEMs and suppliers benefit from their own government's policies and subsidies, they have also become quite good at new product development. They move faster and more efficiently than traditional automakers. A key point to keep in mind is that the new Chinese OEMs use Tesla as their benchmark. There is a lot to be learned from Tesla and Chinese automakers, just as American automakers learned from the Japanese in the 1980s.

For example, traditional automakers need to review the number of specifications they give to their suppliers to build parts and components. One traditional supplier, working collaboratively with a Chinese OEM, was surprised at how fast it completed the project. One reason things went so quickly was that the Chinese automaker provided it with only 50 pages of specifications compared to the 4,000 pages it can get from traditional automakers. Chinese OEMs are better at telling suppliers how they want a component to perform and letting them figure out how to achieve it, instead of trying to dictate all the steps a supplier must follow.

Tesla and the best Chinese automakers also focus on designing the best overall vehicle systems they can, while traditional automakers try to optimize each individual system and then try to synthesize them together. There is a significant difference in each approach. A total systems approach results in designs that are lighter, lower cost, and completed more quickly. The traditional approach is far more cumbersome and time consuming.

The Chinese do not worry if their early design is not perfect, they just try to get it to work, and then they begin optimizing it with an eye to getting it into production quickly. They also continue to make improvements after a vehicle is in production. Their on-going design changes can also be used to reduce cost and introduce modern technology more quickly. This process gets them to the market faster than the legacy automakers who try to perfect a vehicle before putting it into production. While the old approach made sense in the past, today's software defined vehicles using over-the-air-updates can be easily updated long after a car has left the showroom.

COMMONIZATION & COLLABORATION

Automakers can also cut costs and bring products to the market faster by using common components. Certain parts, if they were made common across all car lines, could be bought off the shelf and used by almost all automakers. Instead, automakers typically want parts of their own design. In many cases, these are items that car buyers largely do not care about and do not contribute to a brand's image. A good example is windshield wiper actuators or tire pressure monitoring

sensors. Making these parts common could cut costs and speed up the time it takes to come out with new vehicles.

One positive development in this regard is that the U.S. automotive industry is working together on a shared software portal, through which automakers and suppliers can buy the software they need, rather than writing it in-house, or shopping for it across a myriad of software companies. This portal was just launched, but it is a good example of pre-competitive collaboration between automakers and suppliers to collectively drive innovation, tackle industry challenges, and accelerate product development.

POTENTIAL POLITICAL POWER

The challenges the automotive industry faces are largely invisible to the public and the country's political leadership. It is going to be up to the industry leaders to change that. They need to begin pushing for a strategy that will generate public and political support to enact policies that will keep the U.S. automotive industry competitive and sustainable. The industry also must recognize that it should be able to muster far more influence in setting national industrial policy discussions than it currently does.

When it comes to lobbying in Washington DC, the automotive industry punches well below its weight. A key reason is that it is a fractionalized industry. The domestic automakers often see things differently than the foreign automakers. Automotive suppliers have different concerns than the automakers. Dealers lobby on their own issues and the unions have their own agendas. If they spoke with one voice, they could exert enormous political power.

Only three of the sixteen or so automotive manufacturers operating in the U.S. have their own Political Action Committee (PAC). The industry seriously under-invests in government affairs, and most companies do not have strong enough relationships with most politicians. Politicians in turn do not understand what the industry needs, so prejudices and misconceptions fill the void. While elected officials may not always agree with what the industry wants, the automotive industry needs to do a better job of being able to make its case to them.

CREATING A NATIONAL STRATEGY

It is in the self-interest of the United States to have a healthy and vibrant automotive industry. It is an economic engine for the economy and a key component of its national defense. The U.S. market is especially attractive. Most every major global automaker and supplier manufactures and sells cars in the U.S. It is a competitive, profitable industry but it needs good national policy to help keep it that way.

Current U.S. policy towards the industry is largely conducted through a tangle of regulations carried out by several different agencies. The agencies, of course, merely carry out what Congress mandated them to do. Congress has never thought

about the industry through a total-systems perspective. The rewards of doing so could be far reaching.

In the short term, the traditional industry needs a rethink of regulations for plug-in vehicles that matches mandates with a realistic timetable for consumer acceptance. Sales of plug-ins will continue to grow, but they are simply not growing fast enough to keep up with the mandates. The industry will continue to work towards net zero green-house gas emissions, but it needs more flexibility.

In the longer term, the automotive industry could benefit from far simpler levels of regulation, yet still be held accountable to world-class levels of safety, emissions, autonomy, security, and privacy.

The bottom line is that the U.S. automotive industry is at risk. Our manufacturing capacity and industrial workforce is withering away. On its current path the automotive industry will end the decade as a much smaller and weaker economic engine than it is now. Hundreds of thousands of jobs could vanish and thousands of local communities could lose their tax base, but it does not have to be that way. New ways of thinking and smart policy can breathe energy into the industry and accelerate its economic contribution.

This White Paper is a Call to Action to begin formulating that kind of strategy.

ABOUT THE GLC

The Global Leadership Conference (GLC) is organized by the SAE Detroit Section, an SAE International Section. Now in its 74th year, the GLC is an annual invitation-only, two-day gathering of top executives, and speakers from both within and outside the automotive industry at the historic Greenbrier resort in West Virginia. Plenary sessions and smaller leadership conversations give the participants the chance to talk openly and without competitive restraint about the challenges facing the industry. Due to its strictly off-the-record policy, the GLC is virtually unknown outside of the automotive industry, and not even well known inside it. Yet, the GLC presents the insights and ideas of some of the top thought leaders in the industry, including automakers, suppliers, consultancies, government departments, automotive retailers, and financial analyst firms. The GLC Committee is so concerned with what they see coming in the automotive industry that, for the first time, they decided to publish this White Paper and issue a Call to Action.