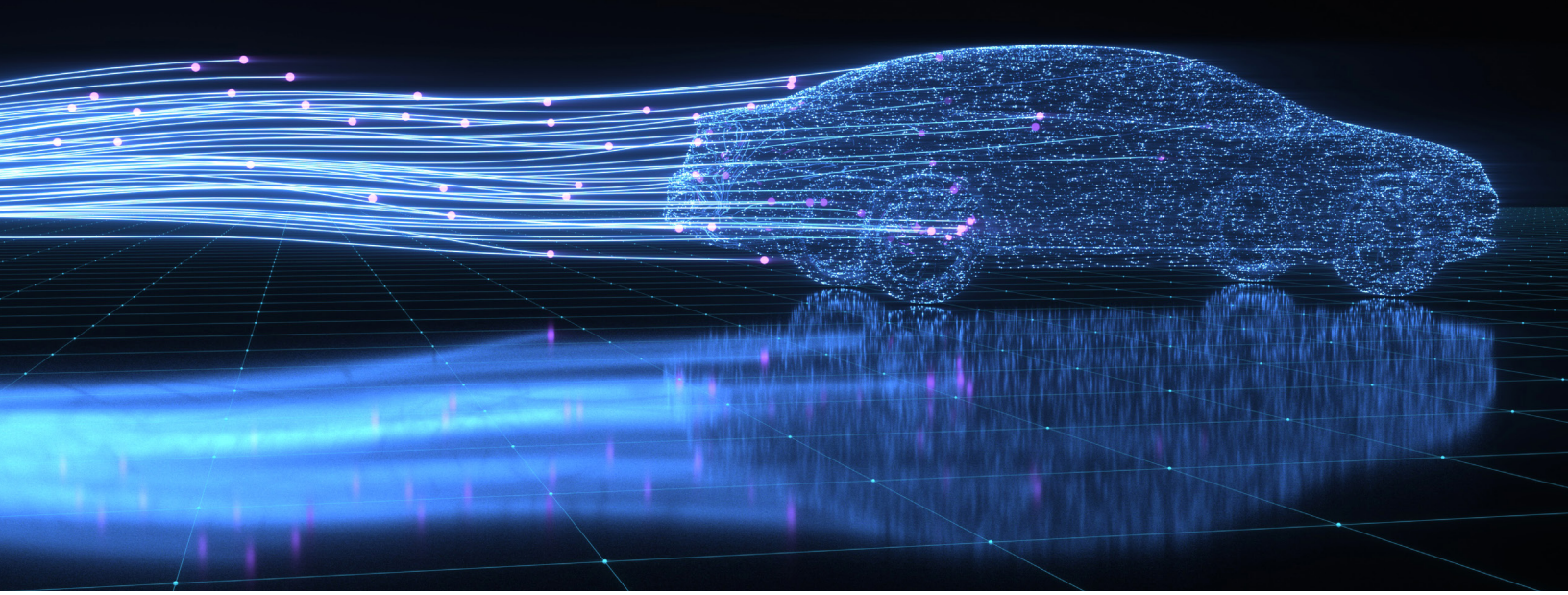
ALLIANCE FOR AUTOMOTIVE INNOVATION

Auto Innovation Agenda

December 2020



Background

We are on the cusp of a transformative moment for the automotive industry in the United States. Through substantial, long-term investments in electrification,[1] as well as advanced safety technologies, including automation, the industry has committed to creating a cleaner, safer, and smarter future for personal mobility. Due to intense global competition, the U.S. must recommit itself to developing these innovative technologies — supported by complementary legislative and regulatory policies — that will redefine motor vehicle transportation for decades.

This comes at a challenging time as the auto industry — and the nation — navigates near- and long-term uncertainty due to the ongoing COVID-19 public health emergency. In the U.S., the pandemic pushed industry sales from above average in February to a nearly 50 percent reduction in April when the industry — for the first time since World War II — witnessed the idling of all major North American production facilities.

Although motor vehicle manufacturing ground to a halt for roughly eight weeks, the automotive industry did not stop working. Instead, Auto Innovators' members continued innovating; putting decades of experience in precision manufacturing, supply networks, logistics, and purchasing to work in helping combat the coronavirus.

The innovative spirit that fueled the industry's contributions to the national response was coupled with efforts to create, adopt, and implement robust health and safety practices to protect employees and restart our nation's economic engine.

The auto industry has weathered COVID-19's storm remarkably well compared to other sectors, but its long-term economic effects are still unknown. While the industry continues to work to mitigate COVID-related losses, the loss in vehicle sales and economic uncertainty resulting from the ongoing public health emergency means there will be less capital to invest in future technology development. While the commitment to a cleaner, safer, smarter future is unwavering, the pathway to realizing that vision will be far more challenging, and it includes uncertainties related to the nation's leadership role.

In many respects, how individual nations respond to COVID-19 will shape the future of this highly competitive, capital-intensive industry. **Today, the auto sector employs roughly 10 million Americans, in addition to those who are employed in the technology and mobility sectors.** It accounts for nearly six percent of our country's gross domestic product and represents the nation's largest durable goods manufacturing sector.

This is what is at stake as we look to the future of the auto industry in the U.S. The nations that lead the development and adoption of innovative technologies, such as electrification, connectivity, and automation, will also shape supply chains, define global standards, and potentially, reshape the international marketplace. This is not just about the future of the auto industry in the U.S. — it is about the nation's global competitiveness and economic security.

To remain a leader in the development and adoption of these transformational technologies, the U.S. needs a comprehensive national vision and strategy rooted in economic, social, environmental, and cultural realities.

- What supply chains are available and how stable will they be? What are the challenges to developing the U.S. supply base for a specific technology?
- How are we preparing or repositioning the U.S. workforce, including auto workers, suppliers and related workers for these new technologies?
- What are the impediments to consumer adoption of specific advanced safety technologies or vehicle electrification?
- How do we address the challenges and barriers unique to certain communities, such as rural and disadvantaged, and ensure advanced vehicle technologies are accessible and beneficial to all Americans?
- What other industries, sectors, or stakeholders will be necessary to realize the potential of these important transformations?

These are but a few of the challenging questions at the core of a comprehensive approach to maintaining U.S. competitiveness in automotive innovation. Strategies that do not account for these realities and decisions deferred could, inadvertently, harm the nation's workforce, limit consumer options, and handcuff our nation's global competitiveness. Our goal is to avoid such outcomes by continuing to work collaboratively with policymakers and other stakeholders to maintain the U.S.'s global leadership in automotive innovation.

To that end, this document is an outline — the beginning of a broader conversation about what it will take to prepare for the future of automotive innovation, manufacturing, and personal mobility. It is the first step in developing the connective tissue and bipartisan support necessary to realize policy objectives through a shared understanding of economic and political realities.

Supply Side Transformation

While many traditional policy approaches focus on demand-side solutions (consumer incentives and technology mandates, for example), these only contribute to sustained U.S. leadership if they align with supply-side realities. In fact, the supply side may represent one of the best opportunities to develop long-term and sustainable U.S. leadership in automotive innovation.

1. Incentivize R&D

Globally, the automotive industry annually invests more than $125 billion in R&D, $20 billion more than the software and internet technology industry.[2] Roughly $26 billion of this annual investment occurs in the U.S., which harnesses the innovation and ingenuity of major automakers and their workforce.[3] As companies, including the broader supply chain, absorb the pandemic's economic effects with forecasted sales down 16 percent to 25 percent for 2020, evidence points to an existing capital resource strain. This will likely drive companies to curtail key investments, allocate resources toward technologies with the most promise, or markets with the most regulatory certainty. The U.S. has an opportunity to further its position in automotive R&D by:

a. Enhancing R&D incentives over the next 3-5 years;
b. Avoiding overly restrictive export control policies that could undermine the competitiveness of U.S.-based innovation in the global market; and
c. Facilitating and expanding access to capital to support such transformations over the next 3-5 years.

2. Modernize Regulatory Approaches for Advanced Technologies

Regulatory uncertainty creates tremendous challenges for companies looking to make investment decisions, especially in the current environment. For example, the U.S. has presented an attractive market for investments in the research, testing, and development of advanced safety technologies. At present, however, the U.S. risks falling behind global competitors that are moving more proactively to embrace and deploy these technologies. The U.S. can strengthen its position as a global leader in safety innovation by:

a. ***Advancing U.S. Leadership in Automated Vehicles (AVs)*** AV technologies have the potential to revolutionize motor vehicle safety — as well as mobility concerns such as congestion, emissions, equity, and quality of life — while also fueling a $2 trillion global industry. The U.S. can advance global leadership in developing these revolutionary technologies and new mobility business models through a national approach that reduces uncertainty and paves the way to long-term success. This coordinated approach would benefit from elements such as modernizing or adapting regulatory approaches to accommodate new technologies, clarifying and aligning federal and state roles and responsibilities, and advancing consumer education and awareness, among others.
b. ***Modernizing the New Car Assessment Program (NCAP)*** Uncertainty with respect to safety priorities from both a regulatory and consumer ratings perspective has an inhibiting effect on investment in advanced safety technologies. An effective and consistently maintained NHTSA NCAP, guided by mid- and long-term roadmaps, will leverage market forces to accelerate the development and deployment of advanced safety technologies — many of which serve as the building blocks for Automated Vehicles (AVs).

Policies that drive adoption of advanced automotive safety technologies exemplify the potential to evolve regulation to support the broader transformation to smarter, safer, and cleaner personal transportation. There are many examples across the regulatory landscape — from clean energy, to data, privacy security, and beyond — where creativity and collaboration present opportunity for U.S. leadership and innovation.

3. Support Manufacturing Investments

Global competitors have already established market dominance over certain supply chains and become the primary manufacturing base for certain innovative technologies. For example, China dominates the critical mineral global supply chain and EV battery manufacturing, creating potential long-term economic security risks. In contrast, the North American supply base heavily aligns toward internal combustion engine vehicles. Transitioning the existing U.S. supply base and retooling manufacturing facilities to produce the latest vehicle technologies will require substantial time and resources. Incentivizing these investments now will help prepare the manufacturing and supply sectors for greater adoption of new technologies, provide workforce transition opportunities, and limit the risk of workforce loss due to international investments elsewhere.

4. Encourage Evolution of the Workforce

Innovative automotive technologies have the potential to disrupt or transform existing jobs, professions, or even industries. Because these transitions will not happen overnight, we have an opportunity to understand and develop solutions to minimize how technology could possibly impact the greater workforce. In addition to the suite of complementary policies necessary to preserve the U.S. manufacturing and supply base, additional measures include developing or examining:

a. Training programs to educate and facilitate a transition of the existing workforce;
b. Programs to attract and develop a pipeline of new talent; and
c. The way in which specific technologies may impact jobs and whether potential compensatory measures are appropriate.

Complementary Demand Side Policies and Programs

Supply side measures are vital to transitioning and sustaining U.S. leadership in technology innovation and manufacturing. These efforts, however, are muted without a robust market and customer demand for these innovative technologies. **In the case of Zero Emission Vehicles (ZEVs), the auto industry plans to invest $250 billion in vehicle electrification by 2023 and IHS Markit predicts there will be 130 models available in the U.S. by 2026.**[4] Yet, despite more than 40 models available today, just 2 percent of all light-duty vehicles sold in the U.S. are currently zero emission vehicles.[5] Thus, strategies that facilitate consumer awareness and wider-scale adoption are critical to sustaining a robust supply base and providing a smooth transition to advanced clean technologies.

Rather than viewing this through the lens of "cost parity" to achieve meaningful consumer acceptance, we need to examine supportive policies that take it a step further, toward "convenience parity." This is most applicable in the context of EVs — what is necessary to reach a point where a consumer can go shopping for a new vehicle and look at the EV and ICE options with few questions about the relative costs, ease, or convenience of ownership between the two?

This is an opportunity to address these existing barriers and to ensure the U.S. can be a leader and not a follower in the adoption and use of lower-carbon technologies. The following examples reflect the supportive/complementary measures necessary to achieve regulatory requirements or policy objectives focused on accelerating the transition to electric vehicles:

1. Consumer Incentives

The industry has made significant progress in driving down electric vehicles costs — specifically battery technology, which is the largest cost-driver for EVs. Even then, these vehicles remain more expensive than their ICE counterparts, especially in the larger vehicle platforms that American buyers favor. Even as we get closer to price parity, complementary challenges around convenience factors, such as access to or cost of home charging infrastructure or the ability to drive longer distances and easily, quickly "refuel," are impediments to widespread adoption.

As the cost and convenience gaps narrow, broad-based consumer incentives (at the state and federal level) remain a strong complementary policy tool to drive greater EV adoption. In New York, for example, electric car sales surged 74 percent when the state implemented an electric car rebate. And in Georgia, sales dropped 90 percent when the EV incentive was phased out. Incentives can range from state or federal purchase/lease incentives, to consumer benefits such as free or preferred public parking, HOV access, and free charging, among others. Consumer incentives, however, are not a panacea and must be coupled with other supply and demand-side measures.

2. Infrastructure Investment

Access to electric charging and hydrogen fueling infrastructure along with concerns surrounding "range anxiety" are among the most substantial impediments to widespread EV adoption. Failure to align infrastructure investments or incentives will impede EV adoption and undermine shared policy objectives. We must work collaboratively on the near-term policy support, such as federal tax incentives or grants to spur infrastructure development, but also on the long-term questions — such as the need for, and effect on, grid resilience — to realize a sustainable market for these technologies. Likewise, while developing adequate infrastructure is a challenge across all communities, it is especially pronounced in disadvantaged communities, multi-unit dwellings, and urban settings where access to in-home charging is likely not an option. These are important factors that must be taken into consideration by federal, state, and local planning efforts.

3. Building Codes

The Department of Energy (DOE) estimates at least 80 percent of vehicle charging occurs at home.[6] Most homes and businesses, however, lack the electric infrastructure to support vehicle charging, creating additional expense or inconvenience for those seeking to adopt the technology. As part of a holistic approach to ensure that supply/demand barriers are reduced, we need to work together with state and local governments to carefully consider what is necessary to equip homes and businesses (especially new construction) with the infrastructure to support cleaner transportation both now and in the future.

4. Lead by Example

Federal and state governments have an opportunity to lead by example and maximize EV adoption by prioritizing these vehicles' purchases for public fleets. This action also has the benefit of ensuring growing demand for more EVs as they come to market, while also socializing consumers to the reality of EVs on American roadways. Further, government employees' experience of driving and charging an EV, even if only for work, helps expand consumer awareness to diverse communities, as they share their experience with family and friends.

Economic Contributions

THE AUTO INDUSTRY IS AN ECONOMIC ENGINE:

10.3 Million Jobs

$650 Billion in Paychecks

$1.1 Trillion Put into the Economy by Auto Manufacturing Each Year

$272 Billion Annually in the Form of Federal, State, and Local Tax Revenues

5.5% Percent Which the Collective Auto Industry Accounts for of U.S. GDP

$26 Billion in U.S.-based R&D, Annually, Supporting More Than 60,000 Jobs

A Time for Action

The U.S. has long been a leader in automotive innovation — as evidenced by the robust R&D investments by automakers, the number of patents issued on an annual basis, or the number of companies — new and established — at the forefront of testing, deploying, and manufacturing the next generation of innovative technologies here in the U.S. This not only benefits the auto industry and our workforce, but also the numerous other sectors that leverage our innovations and share similar supply chains, including defense and aerospace. For example, imagine what a robust U.S. battery industry would mean for the resilience of our electric grid, among other consumer applications.

While the U.S. is well positioned to continue its long-standing leadership in automotive innovation, we cannot be complacent. Globally, nations are backing bold commitments with government investments and policy support. China has already established EV battery supply chain and manufacturing dominance. Likewise, Europe is responding by developing its own supply chains. Meanwhile, Japan has made a bold commitment to support fuel cell technology advancements.

Similarly, China is moving aggressively to lead in safety technology advancements — including AVs. As evidenced by experience in other sectors — such as information and communications technologies — as well as the current EV battery supply chain, falling behind global competitors presents long-term risks to U.S. competitiveness and economic security.

For the millions of workers depending on the auto industry for their livelihoods, we must seize this window of opportunity. Working collaboratively to develop a coherent, national approach to automotive innovation opens the door to endless possibilities and avoids the unintended consequences of focusing on narrow policy objectives. For example, technology mandates without complementary supply side investments risk eroding the U.S. manufacturing base for innovative technologies. Likewise, a failure to embrace and encourage adoption of advanced vehicle technologies in the U.S. risks ceding technology leadership and supply chain dominance to global competitors. Fortunately, we have an opportunity to avoid those outcomes.

> **The auto industry has long been an economic engine for the nation, and it is poised to remain the bedrock of U.S. innovation and manufacturing for decades to come. Realizing this potential, however, requires collaboration, cooperation, and creativity among all stakeholders. This is an opportunity to open our minds to new possibilities and work together to take a fresh, comprehensive look at what it will take to realize a shared vision of a cleaner, safer, smarter future.**

References

[1] For the purposes of this document, the term electrification includes all zero emission or electric vehicles ("ZEVs" or "EVs"), including plug-in and plug-in hybrid EVs as well as fuel cell technologies.

[2] Strategy&. "The Global Innovation 1000 Study." Accessed November 2, 2020. https://www.strategyand.pwc.com/gx/en/insights/innovation1000.html?utm_campaign=sbpwc&utm_medium=site&utm_source=articletext.

[3] National Science Foundation. "U.S. Businesses Reported $441 Billion for R&D Performance in the United States During 2018, a 10.2% Increase from 2017." Accessed November 2, 2020. https://ncses.nsf.gov/pubs/nsf20316.

[4] Brinley, Stephanie. IHS Markit. "IHS Markit Forecasts EV Sales to Reach U.S. Market Share of 7.6% in 2026." Accessed November 24, 2020. https://ihsmarkit.com/research-analysis/--ihs-markit-forecasts-ev-sales-us.html.

[5] This includes battery electric, fuel cell, and plug-in hybrid electric vehicles.

[6] U.S. Department of Energy. "Charging at Home." Accessed November 24, 2020. https://www.energy.gov/eere/electricvehicles/charging-home.

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