

WHAT HAPPENS WHEN

AUTO

meets

acceleration

State of Michigan Automotive Strategic Plan

A global vision to attract highly skilled talent, investment and best-in-class technology

PURE *M*ICHIGAN®

Michigan is automotive

Our vision is that every significant entity in the global automotive industry has a strong presence in the state of Michigan.



Together, we will write a new chapter in Michigan's economic history.

By working with key stakeholders throughout Michigan, my administration is determined to enhance the competitiveness of our state's automotive industry. This has brought prosperity and renown to our state, and established Michigan as the global center of automotive excellence.

Coordinated and articulated by the State of Michigan's automotive advisor Nigel Francis, the strategic vision set forth in these pages is based largely on leveraging the state's extensive automotive assets. Most notably, these impressive assets include several original equipment manufacturers, a range of automotive suppliers, a research-and-development hub where more than 70 percent of all auto-related research dollars in the U.S. are spent, and a workforce that produces more vehicles, engines, transmissions and automotive parts than any other place in the United States.

We must take a collaborative approach in responding effectively to the challenges of today's global automotive industry. It is paramount we work together to address the most efficient, cost-effective means to integrate advanced manufacturing, technology, engineering expertise and consumers' preferences into the manufacturing of affordable vehicles with unparalleled performance, innovative designs, and the highest safety standards. The automotive industry strategic plan herein offers a clear vision of how we can further strengthen Michigan's leadership role in the future global economy.

There is no other place in the world that offers more reasons, proven automotive assets, and a wider range of economic development programs to assist in the building and growing of automotive-related business.

Thank you for being a vital contributor to Reinventing Michigan.

Sincerely,

A handwritten signature in black ink that reads "Rick Snyder".

Rick Snyder, Governor



Michigan Automotive Office

Introduction

A century ago, Michigan put the world on wheels. Those wheels—and many other automotive parts made here—were forged from dreams, hard work and ingenuity.

Making automotive vehicles is our heritage and it is our future.

In September 2013, Governor Snyder took a significant step toward further elevating Michigan's global leadership when he created the Michigan Automotive Office. Establishing this prominent office within state government affirms the highly important role of the automotive industry in Michigan's economic and cultural life.

Executive summary

Today, Michigan-based automakers are restructured, financially healthy, and leaders in the global marketplace. A business-friendly tax structure and a range of supportive public-sector initiatives have created a pro-growth, forward-looking and relentlessly positive attitude in Michigan. While we have come a long way in a short period, we must prepare for the rapid changes ahead.

Underpinning the Michigan Automotive Office strategic plan are three goals:

1. Retain and grow Michigan's current automotive industry base;
2. Strengthen Michigan as the center of the North American and global automotive market; and,
3. Grow the technologies, talents and infrastructure necessary to lead the global automotive market of the future.

Approaches to attaining these goals must consider current major industry trends, including changing demographics of vehicle markets, evolving vehicle designs, future of connected and automated vehicles, powertrain and propulsion technologies, utilization of lighter materials, and the heightened focus on emerging supply chain processes.

Furthermore, a collaboration between industry, academia, and government must focus on developing automotive technologies, attracting highly skilled talent, and making the case for greater private capital investment in Michigan.

The work ahead demands unprecedented collaboration. So let's join together to transform the global automotive industry and create shared prosperity for the state of Michigan, a great place to live, work and lead the future of mobility.

We will leverage
the strengths and
assets of Michigan's
automotive industry
for sustained
intellectual and
manufacturing global
leadership.

Michigan's automotive industry

Now is the time for
relentless positive
action.

— Gov. Rick Snyder

Michigan is known by many names — Great Lakes state, Wolverine state, Water/Winter Wonderland, the Mitten, Two Peninsula state. But when it comes to economic descriptions, there can be no doubt one title stands above all others — Michigan is the *global motor capital*. And here's why:

- Michigan's automotive industry directly supports 15 percent of workforce with more than 500,000 jobs, which represents 22 percent of U.S. auto industry workforce.
 - Michigan produces 23 percent of U.S. vehicles.
 - Michigan is home to 61 of top 100 North American automotive suppliers.
 - Michigan leads U.S. powertrain production with 31 percent of engine and 26 percent of transmission output.
 - Michigan has 12 auto assembly plants along with 35 parts and components plants.
 - Michigan ranks first nationally in concentration of industrial designers and engineers (65,000), research-and-development professionals (70,000), and skilled-trade workers (180,000).
- Michigan's 375 research-and-development centers represent more than 70 percent of U.S. automotive research-and-development spending.
 - There are 91 education and training institutions that offer 650 automotive-based degrees and programs.
 - In 2010, the automotive industry generated \$2.8 billion¹ to the Michigan Treasury with another \$14.5 billion² tax revenue generated from direct automotive jobs.
 - For each direct automotive job, there are approximately three more jobs created supporting that direct automotive job in the supply chain and communities where the business operates and individual workers live.

In the ever-changing global age, change is constant. The trend is clear: global change will intensify, driven by customers, regulations, technology and new entrants into the global OEM and supplier markets.

¹ Center for Automotive Research

² U.S. Census Bureau

Key future imperatives

Demographics and vehicle market

TRENDS

Rising urbanization
Vehicle segment shifts and usage
Global platforms

STRATEGY

Respond to shifting demographics and vehicle preferences
Adapt to growth outside U.S.

Vehicle design

TRENDS

Smaller and lighter
Connected
Personalized
Environmentally friendly

STRATEGY

Develop design capabilities for globally relevant future vehicles

Connected and automated vehicles

TRENDS

Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technologies
Increasing levels of automation
Intelligent transportation system integration with connected vehicles

STRATEGY

Capture leadership position
Foster innovation
Attract federal resources

Material technologies

TRENDS

Light weight
Advanced mixed materials
New forming technologies
New joining technologies

STRATEGY

Adapt new manufacturing and joining technologies
Modify supply chain competencies
Scale innovation

Powertrain and propulsion technologies

TRENDS

Continuing drive for CO₂ reduction
Harmonization of standards across global regions
Continuing need for higher fuel economy

STRATEGY

Develop new R&D and manufacturing competences
Transform manufacturing assets to support diversified powertrain technologies

Manufacturing and supply chain

TRENDS

Hyper-efficient
Sustainable
Modular manufacturing
Logistics/supply chain management

STRATEGY

Target R&D and pilot plant strategy
Support R&D and manufacturing shifts to the suppliers
Develop infrastructure

To prepare for the future, we must have a clear vision and understanding of consumer demands, high-tech innovations, engineering challenges, and marketplace realities.

Demographics and vehicle market

Increasing global urbanization will shift personal mobility choices toward smaller, lower-emission vehicles and “subscription service” rather than ownership.



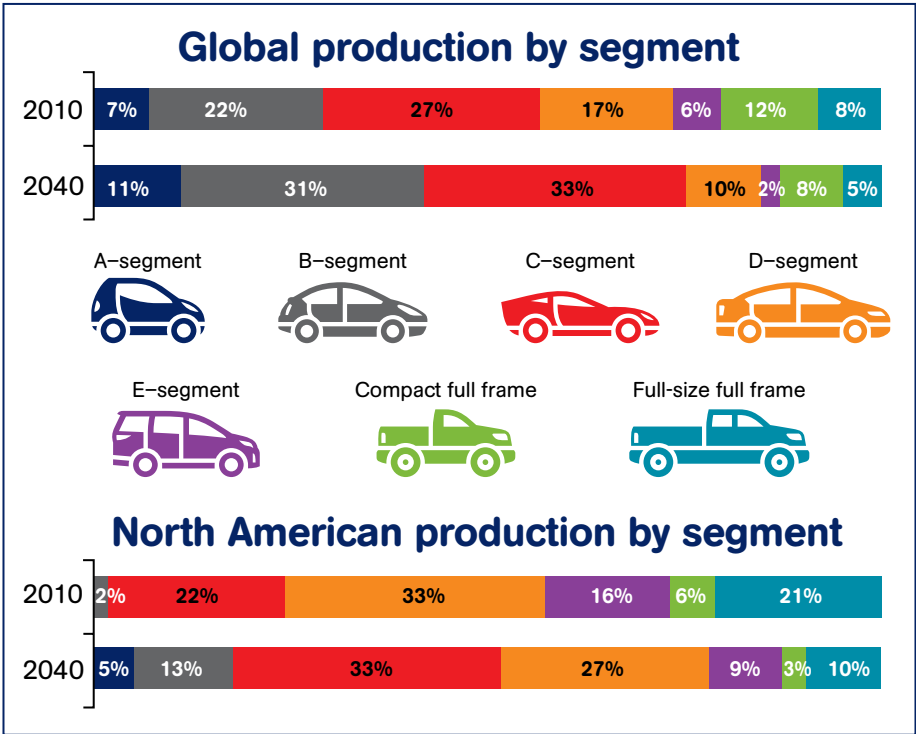
Growth in driving age population creates demand

- Strong global growth driven by developing markets (21 percent increase in annual global new vehicle registrations between 2015 and 2040; 96 percent growth of vehicles on the road in this period)
- U.S. grows at a slower rate (10 percent increase in U.S. new vehicle registrations between 2015 and 2040)
- U.S. registrations cap out at roughly 18 million units around 2030, as vehicle cost, traffic congestion and changing driver demographics slow overall growth
- By 2040, millennials and post-millennials will make up the bulk of the U.S. driving population

Urbanization is more significant in Europe, Asia and South America

- Share of “urban” population in developing markets will grow from 49 percent to 60 percent between 2015 and 2040
- U.S. urbanization share is already high, and growth will be modest, increasing from 85 percent to 89 percent between 2015 and 2040
- Increasing global urbanization will shift personal mobility choices toward:
 - * Smaller, lower-emission vehicles
 - * Subscription service rather than ownership

Vehicle design



The United States will remain among the most lucrative vehicle markets in the world based on higher profit margins in larger vehicle segments.

During the next three decades, global design and production will shift to smaller and lighter vehicles. Other advancements will focus on connected, personalized and environmentally friendly automobiles. During this period, it is projected the North American market will continue to produce predominately mid-size and larger cars and trucks. Michigan’s vehicle development and output must reflect these global marketplace changes, or risk becoming less globally relevant.

- Forecasts show a general shift toward smaller vehicle segments:
- More than half of Michigan’s vehicle output will be based on global platforms by 2018
 - Global production will be dominated by B/C segments while the North American focus remains and grows in C/D segments

Connected and automated vehicles

Michigan will leverage its strategic assets to focus on opportunities in connected and automated vehicle technologies.



Source: U.S. Department of Transportation

Michigan is strategically positioned to capture emerging opportunities in connected and automated vehicle technologies. A key to success is the continued attraction and retention of highly skilled talent.

Key future drivers

- ▶ Opportunities created by the confluence of connected and automated vehicle technologies and personalized apps
- ▶ Development of new vehicle ownership and business models
- ▶ Greater prevalence of intelligent transportation systems (ITS) in urban areas
- ▶ Emergence of non-automotive tech firms in intelligent mobility technologies
- ▶ Emergence of advanced driver assistance systems and V2V/V2I safety mandates

Strategies for Michigan

- Leverage Michigan's expertise and experience to attract federal and industry investment
- Support and lead federal V2V/V2I mandates
- Make Michigan the center for intelligent mobility-as-a-service business model
- Attract electronics, software, and systems integration firms
- Support industry investment in collaboration, testing, and certification facilities
- Expand relevant educational and training programs
- Increase collaboration between DoD and industry

Material and joining technologies



Michigan is leading the transformation from mild steel to lightweight, multi-material vehicles.

The design and engineering of tomorrow's vehicles will require the strategic use of advanced materials and joining technologies. Collaboration among suppliers and manufacturers is key to Michigan leading the transformation from mild-steel to lightweight, multi-material vehicles.

Key future drivers

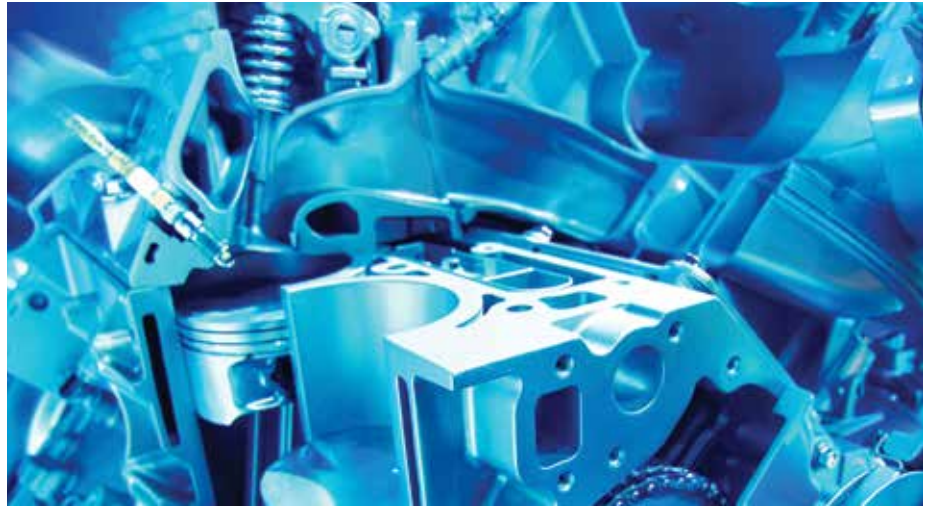
- ▶ Future vehicles will require aggressive use of advanced materials to meet regulations
- ▶ The demand for lightweight materials will require greater industry resources and a focus on collaboration
- ▶ Advance lightweight, mixed materials will require new forming and joining technologies, advanced simulation and engineering skills
- ▶ The transformation of high-volume, mild steel infrastructure to new alternatives

Strategies for Michigan

- Establish collaboration center for suppliers with linkages to automakers, material suppliers, tooling, fabricators, design and testing firms
- Leverage Michigan's expertise and experience to attract federal and industry investment
- Focus and leverage current assets including density of engineering talent and concentration of tooling facilities
- Develop talent in materials science, simulation and modeling, system engineering and integration, and skill trades

Powertrain and propulsion technologies

As future powertrains become more sophisticated and increasingly electrified, Michigan will lead advanced systems integration.



In response to the regulatory trend for higher fuel efficiency and continuous powertrain improvement, Michigan must focus on the areas of electrification and hybrid technology, along with advanced analytics and simulation.

Success will depend on the continued development of systems engineering competencies along with advanced analytics and simulation.

Key future drivers

- ▶ Regulatory trends will drive an expected doubling in fuel efficiency by 2040
- ▶ Greatest opportunity for greenhouse gas reductions in the United States, Europe and China
- ▶ Regulatory emission targets for the United States will likely lag Europe and China
- ▶ Strategies to meet regulatory targets will differ by region
- ▶ Developed markets will shift toward electrification and hybrid powertrains more rapidly in Europe than in the U.S.

Strategies for Michigan

- Provide advanced system integration from powertrain to vehicle to road
- Leverage Michigan's expertise and experience to attract federal and industry investment
- Focus on preparing future automotive engineers to meet a diverse set of skill and talent requirements
- Cultivate and attract talent in electrification and hybrid technology, advanced system integration and optimization, flexible control strategies, advanced analytics and simulation

Manufacturing and supply chain



Michigan must maintain its pre-eminence as the global leader in advanced manufacturing and build on existing logistics and supply chain assets to support the state's automotive industry.

Implementation of a research-and-development, advanced engineering and pilot plant strategy is critical as automakers perform more as integrators, shifting greater responsibility for systems/subsystems to suppliers.

The connective tissue in this transformation is a vibrant, highly coordinated logistics and supply chain to support the state's automotive industry. To that end, in 2013 Governor Snyder established the Commission for Logistics and Supply Chain Collaboration, which aims to develop and implement a statewide strategy in collaboration with industry in the pursuit of raising the international profile of Michigan's logistics capabilities.

Key future drivers

- ▶ Automakers will act as integrators, shifting greater responsibility for systems/subsystems to suppliers
- ▶ Automotive manufacturing will employ fewer, but more highly skilled workers
- ▶ Global platforms will become dominant, with regional variation to meet market needs
- ▶ Greater focus on sustainability of product and manufacturing processes
- ▶ Automakers will continue to build in the markets where they sell

Strategies for Michigan

- Develop and promote advanced technology processes created in a Michigan R&D, advanced engineering and pilot plant environment before global deployment
- Prioritize manufacturing process research and development
- Retain and support current manufacturing base and strategically pursue growth opportunities
- Scale advanced manufacturing processes to mass production
- Attract and develop talent in automation, robotics, virtual-physical system integration and communication

Michigan's automotive strategic plan

MISSION

To implement and execute a comprehensive strategic plan to drive Michigan's automotive industry forward.

TECHNOLOGY

Globally best-in-class

- Connected and automated vehicles
- Advanced light-weighting and multi-material vehicles
- Advanced powertrain and propulsion systems
- Advanced manufacturing
- Integrated and connected supply chain
- R&D, advanced engineering and pilot plant

TALENT

Attract and retain world-class talent

- Engineering and design
- Software and coding
- Systems integration
- Skilled trades including re-training
- Creation of "master technicians"
- Technology management excellence
- Manufacturing management excellence

CAPITAL

The right capital at the right time

- Federal funds
- State funds
- Government owned/contractor operated
- Industry investment
- Public/private partnerships
- Venture capital and private equity
- Foreign direct investment

Michigan Automotive Strategic Plan

Stakeholder collaboration

PHASE I
Plan

PHASE II
Build

PHASE III
Accelerate

PHASE IV
Leverage

Initiatives to drive success



Marketing and branding

Design and develop a marketing and communication strategy for the auto industry within the Pure Michigan campaign



Talent development and attraction

Establish new programs and services to meet the present and future talent needs of the auto industry



Strategic collaboration

Establish an advisory structure in collaboration with auto industry to focus resources, vision and implementation activities



Networks and infrastructure

Create statewide engineering collaboration centers that focus resources identified in strategic plan



Capital attraction and deployment

Align Michigan capital access strategies with priorities for auto industry and identify resources that align Michigan assets with potential funding programs



Policy and legislation

Provide policy development and analysis with focus on auto industry strategic priorities.



Business development

Leverage Michigan business development strategies for auto industry and serve as expert resource for identifying high-potential attraction and growth opportunities.

Summary

To implement and execute a comprehensive strategic plan to drive Michigan's automotive industry forward to remain as the global center of the automotive industry and to foster sustainable growth within the industry in Michigan.



Strategy snapshot

MEDC PRIORITIES

- Entrepreneurship
- Access to capital
- Business growth
- Vibrant communities
- Talent enhancement
- Image of Michigan

GOALS

- Retain and grow Michigan's current automotive industry base
- Strengthen Michigan as the center of the North American and global automotive market
- Grow the technologies, talents and infrastructure necessary to lead the global automotive market future

MARKET DRIVERS INFLUENCING INDUSTRY TRENDS

1. Demographics and vehicle market
2. Vehicle engineering and design
3. Connected and automated vehicles
4. Material and joining technologies
5. Powertrain and propulsion technologies
6. Manufacturing and supply chain

INITIATIVES

- Marketing and branding
- Talent development and attraction
- Strategic collaboration
- Networks and infrastructure
- Capital attraction and deployment
- Policy and legislation
- Business development

IN APPRECIATION

The Michigan automotive strategic plan has been created in close collaboration among industry, academia and government. Its success will depend upon ongoing strong collaboration among all stakeholders, including the talented and committed women and men engaged in our great automotive industry. These talented workers make everything possible and together we will create our great future!

PURE *M*ICHIGAN®

The Michigan Economic Development Corporation is the state's marketing arm and lead advocate for business development; talent and jobs; tourism; film and digital media incentives; arts and cultural grants; and overall economic growth. The MEDC offers a number of business assistance services and capital programs for business attraction and acceleration; gardening; entrepreneurship; strategic partnerships; talent enhancement; and urban and community development.

For more information about the Michigan automotive strategy visit michiganbusiness.org/auto.

To contact the Michigan Automotive Office at MEDC, e-mail automotive@michigan.org.