Detroit, Michigan
September 24, 2030
Case for Change

Strategy

Mobility refers to technologies and services that enable people and goods to move around more freely.

Electrification refers to the range of technologies that use electricity to propel a vehicle.
Case for Change
The creation of the Office of Future Mobility and Electrification is informed by five market trends.

- Industry Disruption
- Workforce Evolution
- More Competitive R&D and Startup Environments
- Increasing Importance of Smart Infrastructure
- Regional Asset Growth
The last decade has seen new technologies disrupt the auto industry. This disruption is shifting profit pools and creating new winners and losers along Michigan’s automotive supply chain.

**Emerging Profit Pool**

- **Electric Vehicle Technology**: Michigan has an 11% share of North American EV production. This is expected to fall to 8% by 2025.

- **Autonomous Vehicle Technology**: More than 50% of Michigan’s auto industry works on projects related to autonomous vehicles in-state.

- **Connected and Shared Technologies**: Michigan suppliers have contributed most to the state’s auto employment growth since 2013. But the car is changing, and so is the content suppliers need to provide.

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Boston Consulting Group Analysis, “Who Will Drive Electric Cars to the Tipping Point?” 2020
McKinsey Consulting Group, Mobility 2.0 Taskforce, Michigan Department of Labor & Economic Opportunity, 2019
Detroit Regional Partnership Research, 2019
Boston Consulting Group Analysis, “Where to Profit as Tech Transforms Mobility”, 2018
And, due to heavy reliance on the same foundational autonomous, connected, shared and electric technologies, many modes of transportation are converging. Future mobility will impact more than auto.

**Autonomous Tech will Grow to $3.3T USD by 2030**

But self-driving cars are only a portion of the market

- Fleet, traffic and Infrastructure, $1.13T
- Services, Systems and Data, $1.12T
- Maintenance and Aftermarket, $359B
- Autonomous Vehicles, $719B

**Extending Global Impact:**

Michigan can leverage its automotive advantage to drive other transportation modes forward, like shipping and last-mile delivery

- Autonomous technology should reduce logistics costs by **47% by 2030**. And it could save Amazon **$20B a year** on shipping.

- Commercial ground and aerial drones could represent up to **80% of consumer goods deliveries** by 2026.

- A single global shipment can involve **30 organizations and over 200 interactions** across various infrastructure assets.

- Using a electric bus instead of a diesel bus could save a district **$6,000 per seat**, or some **$230,000 per bus**, over a 14-year lifespan.

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Morgan Stanley, "Internet, Auto and Transport Report" 2020


The jobs impact of mobility and electrification will be significant.

Nationally, the mobility industry will need 45,000 new people with computer-related engineering skills by 2030. Michigan will need 12,000 people with these skills to retain its pole position as the global mobility leader.

Tech Degrees Completed vs. Tech Jobs Added by State\(^2\), Thousands, 2017

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Boston Consulting Group, Detroit Mobility Lab. “Future Talents for Mobility.” Economic impact calculated by Michigan Mobility Institute using Economic Policy Institute employment multipliers, 2019

Excess tech jobs indicate occupations are filled by external talent, while excess graduates indicate occupations are not being filled by local talent. McKinsey Consulting Group, Mobility 2.0 Taskforce, Michigan Department of Labor & Economic Opportunity, 2019

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2nd Market Trend: Workforce Evolution

Nationally, the mobility industry will need 45,000 new people with computer-related engineering skills by 2030. Michigan will need 12,000 people with these skills to retain its pole position as the global mobility leader.
Startups have enriched Michigan’s business R&D environment. Michigan is the second highest receiver of VC funds to mobility and electrification startups. However, that is still just a tenth of California.

And unlike other regions, 94% of VC funds to mobility startups in Michigan are for hardware. Software startup founders often get educated here but take ideas elsewhere to get funds.

<table>
<thead>
<tr>
<th>State</th>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>12.5</td>
<td>84</td>
</tr>
<tr>
<td>Michigan</td>
<td>1.2</td>
<td>94</td>
</tr>
<tr>
<td>Arizona</td>
<td>66</td>
<td>16</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Washington</td>
<td>0.1</td>
<td>49</td>
</tr>
<tr>
<td>Illinois</td>
<td>0.1</td>
<td>40</td>
</tr>
</tbody>
</table>

Top States Receiving VC Funds for Mobility and EV Startup Technologies, %, 2015-2019

McKinsey Consulting Group, Mobility 2.0 Taskforce, Michigan Department of Labor & Economic Opportunity. 2019
U.S. Bureau of Labor and Statistics, “2019 total gross job gains.” Total Gross Job Gains in US from Startups: 7,021,550. Total Gross Jobs Gains from MI Startups: 269,184. BLS cuts this data either by company size (# of employees) or company age (# of years). "Startup" defined as private companies that are less than 10 years old.
Smart infrastructure is a foundational platform that drives business attraction, growth and job creation.

Michigan is well-positioned as the home of the largest vehicle-to-infrastructure technology deployment in the U.S. However, to continue competing globally, a cross-departmental effort is required for integrated asset management.

**Michigan’s Smart Infrastructure Can Create Economic Opportunity as it’s Saving Lives**

- Almost **10,000 fatal car crashes** in Michigan over the last decade. **94%** due to human error. The sooner smart infrastructure is here, the more lives can be saved.

- MDOT has activated **nearly 500 miles** of technology-enabled corridors. In turn, **GM, Toyota, 3M, Bosch, Ford, Magna, Waymo, Continental** test and invest on it.

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**4th Market Trend: Increasing Importance of Smart Infrastructure**

**Applications**

- Intersection Safety
- Work Zone Management
- Road Weather Management
- Mobility Applications

Michigan Dept. of Transportation, CAV Strategic Plan. 2017


McKinsey Consulting Group, "Ten ways autonomous driving could redefine the automotive world". 2015
Over the last decade, Michigan has experienced a consistent drumbeat of new investment from companies that need customer proximity and reliable manufacturing expertise as the industry changes. $41.5B in new OEM and supplier investment and 90,000 new jobs from 2010 to 2019.

21 OEMs & EV TECHNOLOGY CENTERS

1,800 GLOBAL EV & AV SUPPLIERS

NEW MOBILITY COMPANIES

Note: Not a Comprehensive List
*Detroit Regional Partnership, 2019
### 5th Market Trend: Regional Asset Growth

#### Automotive Investment by State, Billions, 2009-2019

<table>
<thead>
<tr>
<th>State</th>
<th>Investment ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>$41.5</td>
</tr>
<tr>
<td>OH</td>
<td>$13.8</td>
</tr>
<tr>
<td>Other</td>
<td>$11.1</td>
</tr>
<tr>
<td>AL</td>
<td>$9.1</td>
</tr>
<tr>
<td>KY</td>
<td>$8.4</td>
</tr>
<tr>
<td>TN</td>
<td>$7.2</td>
</tr>
<tr>
<td>IN</td>
<td>$7.0</td>
</tr>
<tr>
<td>NV</td>
<td>$5.0</td>
</tr>
<tr>
<td>SC</td>
<td>$4.5</td>
</tr>
<tr>
<td>MO</td>
<td>$3.8</td>
</tr>
<tr>
<td>IL</td>
<td>$3.2</td>
</tr>
<tr>
<td>TX</td>
<td>$2.4</td>
</tr>
<tr>
<td>NY</td>
<td>$1.7</td>
</tr>
<tr>
<td>CA</td>
<td>$1.5</td>
</tr>
</tbody>
</table>

Source: Center for Automotive Research

#### Michigan: Top 2019 Mobility and Electrification Investments

- **Waymo (Google):** $13.6 Million investment in Detroit to build world’s first factory 100% dedicated to autonomous vehicles.
- **General Motors:** $3 Billion investment to retool production for electric pickups, vans, and battery modules.
- **Fiat Chrysler Automotive (FCA):** $2.1 Billion to introduce the Durango mHEV and next generation Grand Cherokee.
- **Ford Motor Company:** $700 Million to produce the all new F-150, new F-150 BEV, F-150 BEV battery build up and all new production the Raptor.
- **Akasol:** 400-person battery technology integration center in Michigan. AKASOL’s new Michigan production facility will have a similar capacity.
Michigan’s unique mix of regional assets give tech clusters like Silicon Valley, Israel, and other high-growth markets many opportunities for deeper partnership.

<table>
<thead>
<tr>
<th>High-Growth Tech Markets</th>
<th>Michigan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Gap</td>
<td>MFG Capacity</td>
</tr>
<tr>
<td>Risky Supply Chain</td>
<td>Low-Risk Supply Chain</td>
</tr>
<tr>
<td>Some End-Customers</td>
<td>End-Customer Density</td>
</tr>
<tr>
<td>Standard Testing</td>
<td>Diverse Testing</td>
</tr>
<tr>
<td>Engaged Michigan Expats</td>
<td>Mentoring and Capital Needs</td>
</tr>
<tr>
<td>Non-Dilutive Capital Gap</td>
<td>Non-Dilutive Capital Supply</td>
</tr>
<tr>
<td>Lots of Startups</td>
<td>Startup Demand from OEMs/T1s</td>
</tr>
</tbody>
</table>
But Michigan has strong competitors. So it is critical that the state’s mobility and electrification programs be resourced to keep up.

### 5th Market Trend: Regional Asset Growth

<table>
<thead>
<tr>
<th>Geography</th>
<th>Investment since 2010, $B</th>
<th>Best Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisco &amp; Silicon Valley (California)</td>
<td>$31.4B</td>
<td>Billions invested in mobility since 2010, comprises ~30% of global total.</td>
</tr>
<tr>
<td>Shanghai Region (China)</td>
<td>$24.4B</td>
<td>Sizable government subsidies (~$10K per vehicle) and grants for EVs.</td>
</tr>
<tr>
<td>Tel Aviv (Israel)</td>
<td>$17.9B</td>
<td>600 startups founded and Daimler/VW have opened R&amp;D centers as part of 30-year innovation program.</td>
</tr>
<tr>
<td>Munich Region (Germany)</td>
<td>$1.1B</td>
<td>Selected as German “Digital Car Hub” for proximity to OEM R&amp;D centers and elite technical universities</td>
</tr>
</tbody>
</table>
Strategy
Michigan’s Mobility Vision: A stronger state economy and safer, more equitable and environmentally-conscious transportation for Michigan residents.

Six Core Objectives:

1. Increase Mobility Investment in Michigan
2. Engage More Mobility Startups
3. Expand Michigan’s Smart Infrastructure
4. Accelerate Electric Vehicle Adoption in Michigan
5. Further Enable Michigan’s Mobility Workforce
6. Bolster Michigan’s Mobility Manufacturing Core
We will take an integrated approach to drive **sustained** economic development.

**Levers To Pull:**
- Dynamic Programming
- Responsive Policy

- **Strong talent pools attract growing companies**
- **Innovation pipelines support automakers and suppliers**
- **Companies develop new technologies on Michigan’s infrastructure**
- **Smarter infrastructure systems reinforce MI’s advantage**
- **Targeted training bolsters new talent pool**
~40 Mile Dedicated Self-Driving Vehicle Lane Between Detroit and Ann Arbor.

**Leads:** State of Michigan, Sidewalk Infrastructure Partners, Ford, UM, Local Governments

Autonomous Shuttle deployed to help senior communities in Detroit.

**Leads:** State of Michigan, Detroit Medical Center, NAVYA, DTE Energy, Flagstar Bank, Wayne State, City of Detroit

$1.7 million in grants announced for direct current fast chargers along well-traveled routes.

**Leads:** State of Michigan

Ford, Bosch and Bedrock announce automated valet parking demo in downtown Detroit, designed to allow drivers to exit and have the vehicle park itself.

**Leads:** Ford, Bosch, Bedrock, State of Michigan, City of Detroit
Establishing and interpreting traffic laws for the sky in Wayne County.

**Leads:** State of Michigan, Airspace Link, Wayne County (Aerotropolis)

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Testing autonomous maritime technologies in the UP that can help freight move faster and smarter.

**Leads:** Michigan Tech, State of Michigan

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Virus mitigation technology for May Mobility shuttles in GR. Autonomous cleaning robots in GR Airport. New plastic dividers on Detroit buses.

**Leads:** State of Michigan, City of Grand Rapids, May Mobility, GHSP, Pratt Miller, Gerald Ford Airport (GRR), Penske, City of Detroit.

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Announcement of Mobility Startup Accelerator in Detroit with a diversity focus.

**Leads:** Plug and Play, Michigan Minority Supplier Development Council, FCA, State of Michigan
Michigan Self-Driving Vehicle Corridor
### Objective #1: Increase Mobility Investment in Michigan

#### Year 1 and 2 Initiatives

<table>
<thead>
<tr>
<th>Programming</th>
<th>Targeted Economic Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MI Mobility Challenge Grants:</strong> To increase in-state private investment, create grants to incent mobility companies to bring pilot projects and field offices to Michigan.</td>
<td><strong>Grow % of MI suppliers in autonomous, connected, electric &amp; shared mobility</strong></td>
</tr>
<tr>
<td><strong>MI Testing Passports:</strong> Provide grants and custom data packages to AV and EV companies if they use Michigan testing sites and public roads over peer states.</td>
<td><strong>Grow % of mobility investment in MI for software</strong></td>
</tr>
<tr>
<td><strong>Startup ‘Assembly Lines’:</strong> Partner with best-in-class tech accelerators to grow next-gen mobility companies locally. Examples: New Lab (Brooklyn), Plug and Play</td>
<td><strong>Close gap in mobility VC spend with California</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explore R&amp;D and EV Tax Credits:</strong> Push for tools to incent companies to invest in R&amp;D that targets electrification, robotics and software innovations.</td>
</tr>
<tr>
<td><strong>Establish State-to-State Innovation-Based MOUs:</strong> Push for federal policy focused on favorable regulatory environments for AV industry growth.</td>
</tr>
</tbody>
</table>
Objective #3: Expand Michigan’s Smart Infrastructure

**Programming**

- **New Corridor Activations**: Lean in on the Detroit-Ann Arbor Corridor project. Use the corridor as a foundational asset to unlock new economic outcomes.

- ‘Goods Futures’ Grants: Prove out larger in-state private investment in goods delivery through grants that help leading mobility companies develop use cases.

- **Link Industry to Urban Mobility Opportunities**: Coordinate projects with industry that launch projects that focus on issues like parking and curbside monetization.

**Policy**

- **Tolling Study Support**: Leverage the pending new study to help uncover new state revenue models around AVs and EVs.

- **Council on Future Mobility and Electrification-Led Policy**: Topics could include 5G, FCC wireless spectrum, drones, post-pandemic transport, cybersecurity, traffic laws, etc.

**Targeted Economic Outcomes**

- Increase value ($) of goods shipments into Michigan.
- Annual % decrease in traffic fatalities, crashes and injuries
### Objective #4: Accelerate Electric Vehicle Adoption in Michigan

#### Year 1 and 2 Initiatives

**Programming**

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>More Support for Growing EV Companies:</strong></td>
<td>Develop financing tool to compete nationally for high-growth EV manufacturers/suppliers.</td>
</tr>
<tr>
<td><strong>Vehicle-To-Grid Pilots:</strong></td>
<td>Execute targeted programming for next-gen battery innovation and charging. Pilot wireless charging, adding locally-produced electricity to grid, etc.</td>
</tr>
</tbody>
</table>

#### Policy

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interstate Partnerships:</strong></td>
<td>To reduce range anxiety for interstate trips, craft of an MOU between states for priority deployment of EV charging.</td>
</tr>
<tr>
<td><strong>Streamline EV Permitting/Installation:</strong></td>
<td>Refine permitting/installation processes for EV charging.</td>
</tr>
<tr>
<td><strong>Allow Charger Placement on State Properties:</strong></td>
<td>With state and industry partners, develop mechanism for investing in charging on state properties.</td>
</tr>
</tbody>
</table>

#### Targeted Economic Outcomes

- Increase MI’s 11% share of NA EV production by 2025
- Minimize EV range anxiety
### Year 1 and 2 Initiatives

#### Objective #5:
Further Enable Michigan’s Mobility Workforce

#### Objective #6:
Bolster Michigan’s Mobility Manufacturing Core

<table>
<thead>
<tr>
<th>Programming</th>
<th>Targeted Economic Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ramp-Up Mobility Upskilling Programs</strong>: Work with partners to scale credential programs that focus on key AV and EV skills.</td>
<td>• Close gap between degree completions &amp; new tech jobs added</td>
</tr>
<tr>
<td><strong>Establish more EV Reskilling</strong>: Retrain existing factory talent to build/assemble batteries and electric drivetrains.</td>
<td>• 12,000 new computer-related engineers by 2030</td>
</tr>
<tr>
<td><strong>More Hardware-Software Matchmaking</strong>: Connect traditional tier-2 and tier-3 automotive suppliers with global mobility companies needing mfg.</td>
<td></td>
</tr>
</tbody>
</table>

**Policy**

- **Support LEO-Led Policy**: Support LEO to achieve strong labor standards and worker protections that ensure high-quality mobility jobs now and into the future of mobility.
Thank you