



**CFM**

**Clean Fuels Michigan**

---

Growing Clean Transportation Technology in Michigan

Mike Alaimo, Executive Director

[malaimo@cleanfuelsmi.com](mailto:malaimo@cleanfuelsmi.com)

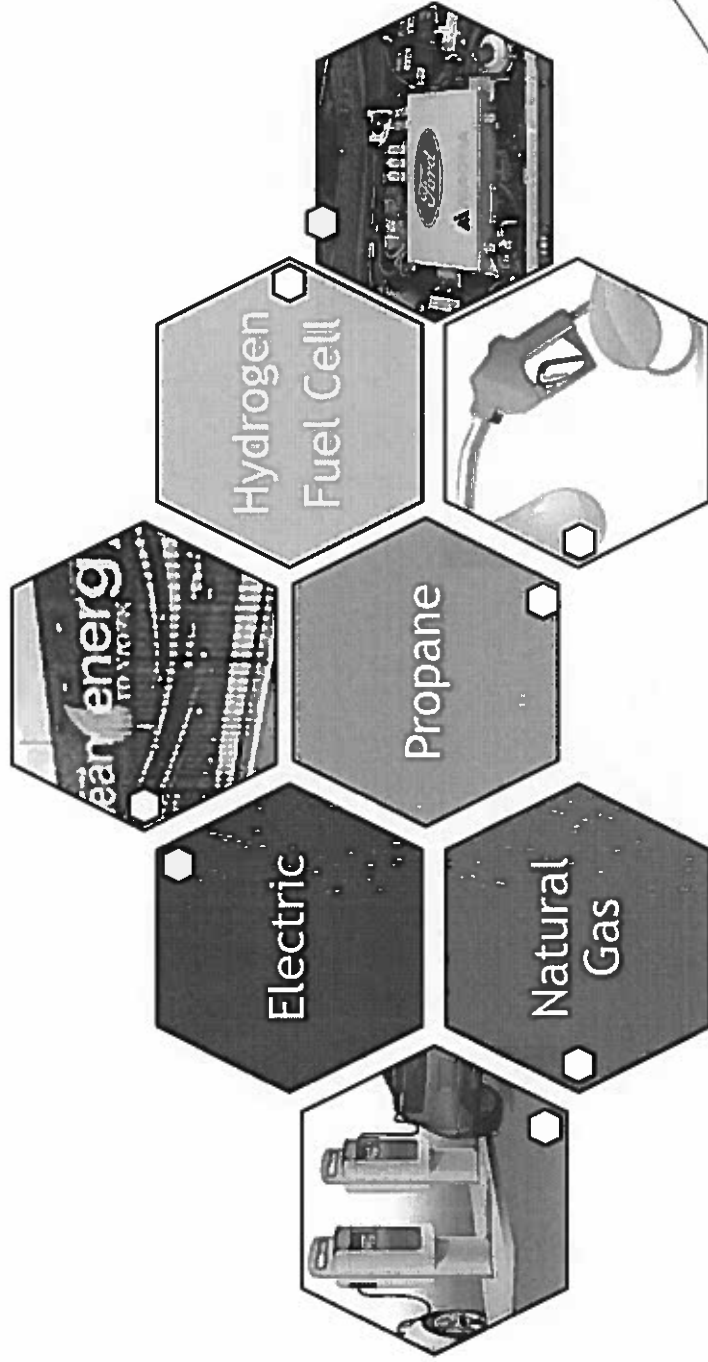
248-933-1798

## Mission

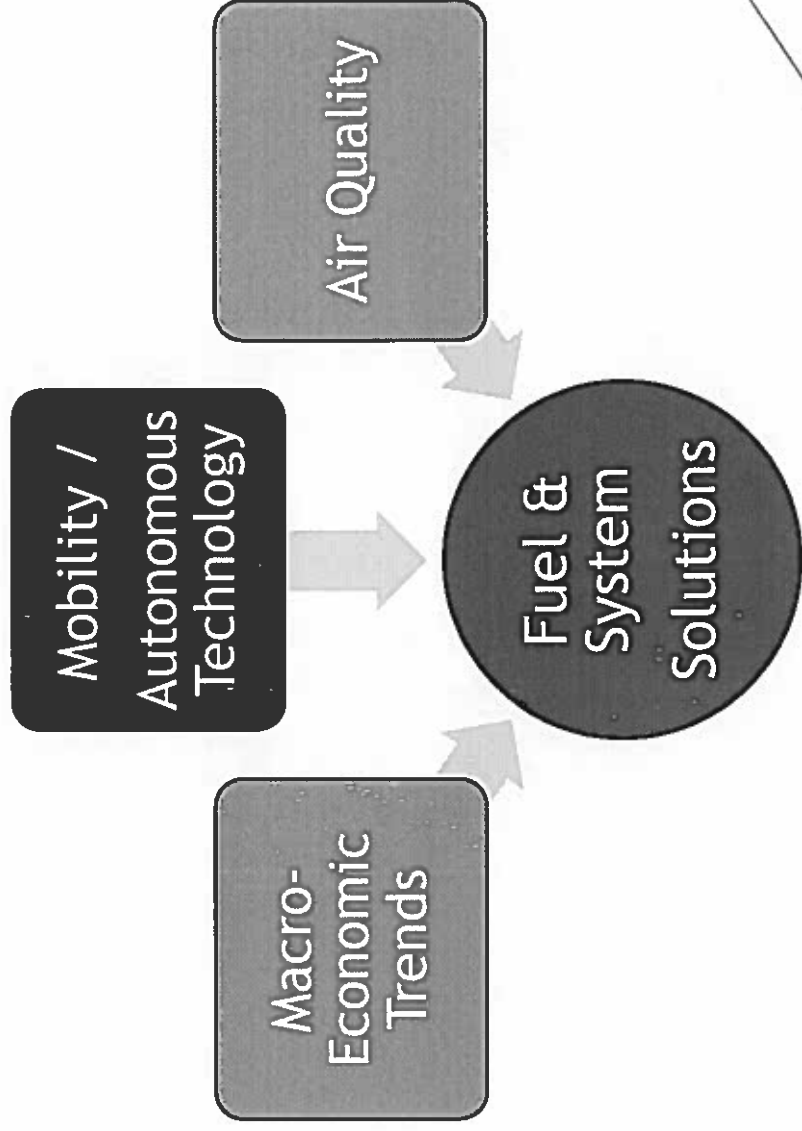
Clean Fuels Michigan is a non-profit organization focused on expanding Michigan's position as a global leader in automotive manufacturing by advancing a clear vision and strategy centered on new technology and clean fuels



# What are Clean Fuels?



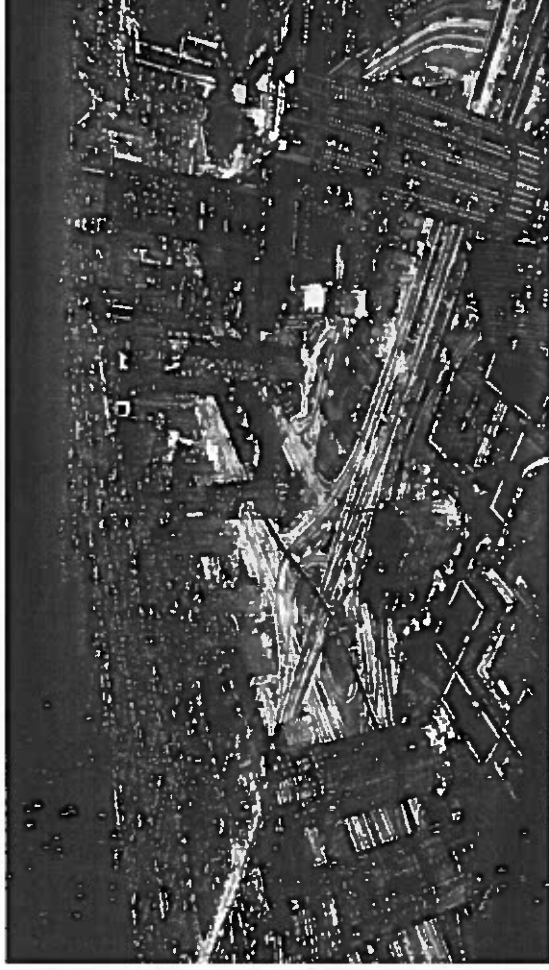
# Key Drivers for Clean Transportation



# Macro-Economic Trends

Urbanism/  
Congestion

Clean Energy Jobs



Policy Shifts

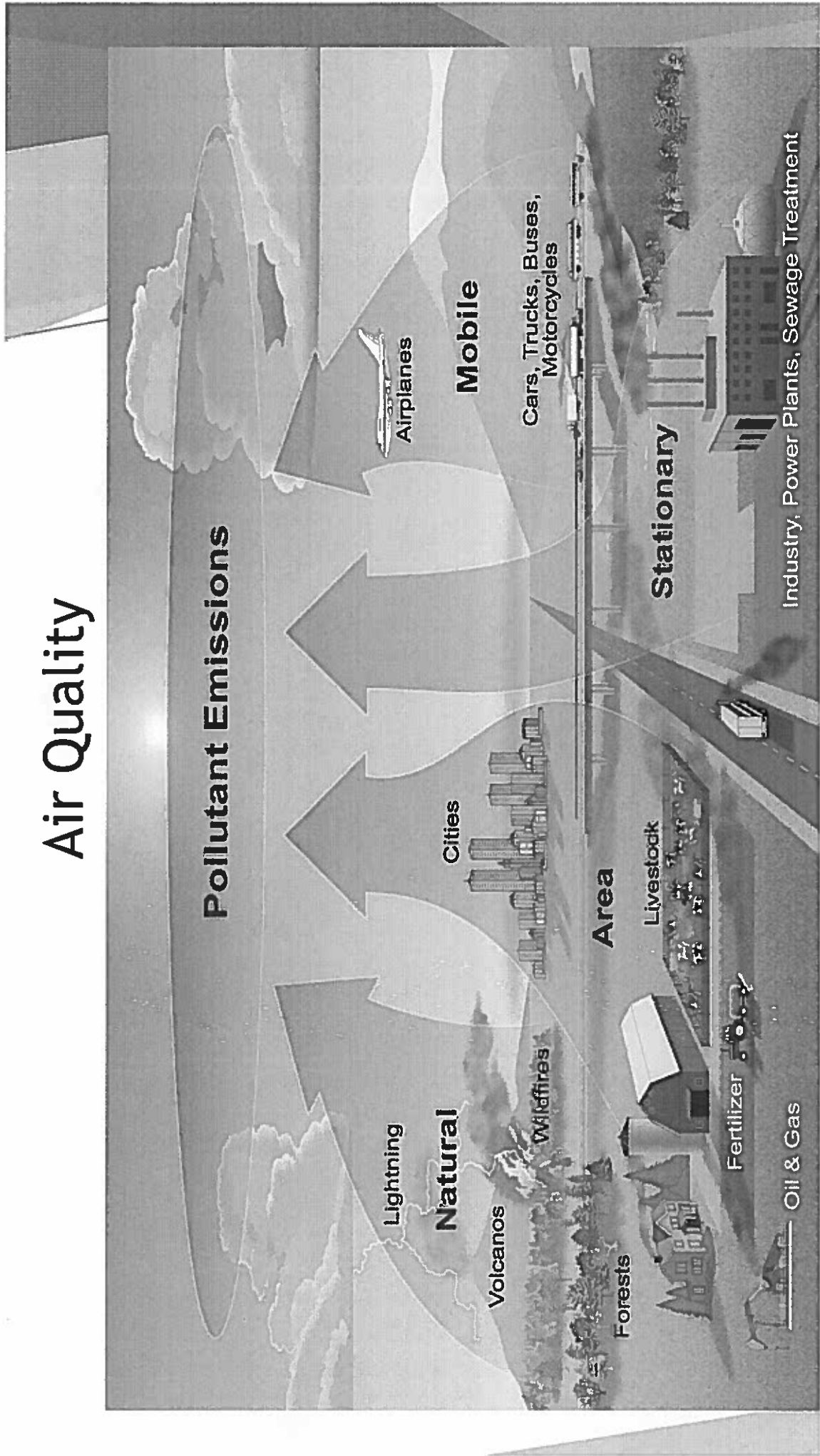
Consumer & Tech Trends

# Macro-Economic Trends

Countries in over half of global sales moving towards clean transportation:

- China - World's largest market, phase out of gas/diesel vehicles & mandates on EV sales
- U.S has 10 ZEV states- nearly a third of new-vehicle registrations in the U.S.
- India - Total phase out of gas/diesel vehicles by 2030
- France - Total phase out of gas/diesel vehicles by 2040
- Britain - Total phase out of gas/diesel vehicles by 2040
- Austria, Norway, Denmark, Germany, Ireland, Japan, the Netherlands, Portugal, Korea and Spain have set official targets for electric car sales.

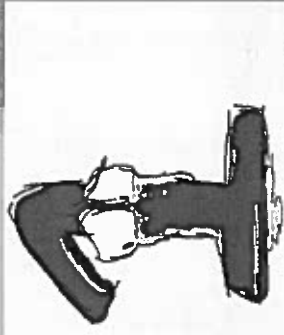
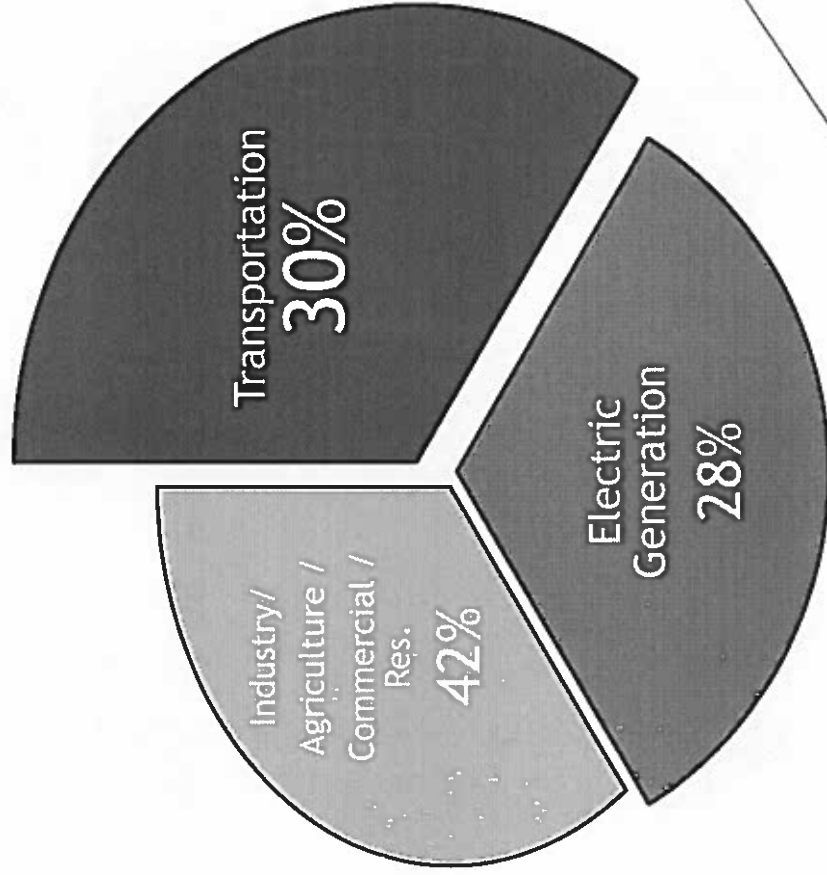
# Air Quality



Over the past decade power generation emissions have decreased through:

- 1) Energy efficiencies
- 2) Cleaner feed stocks (natural gas & renewables)
- 3) Capital investment.

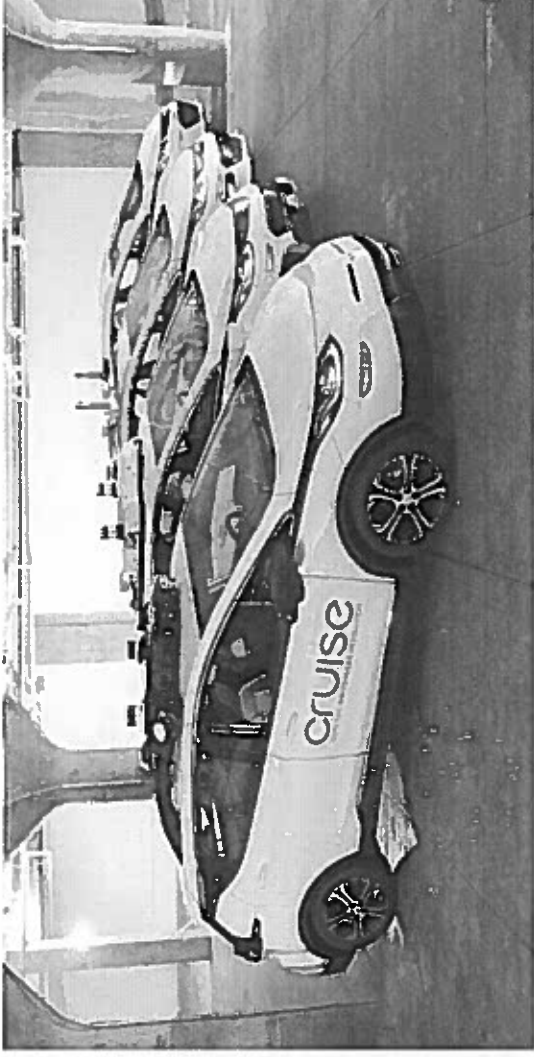
## GHGs by Sector



GHG Emissions in transportation are growing and now the #1 cause of air pollution in America

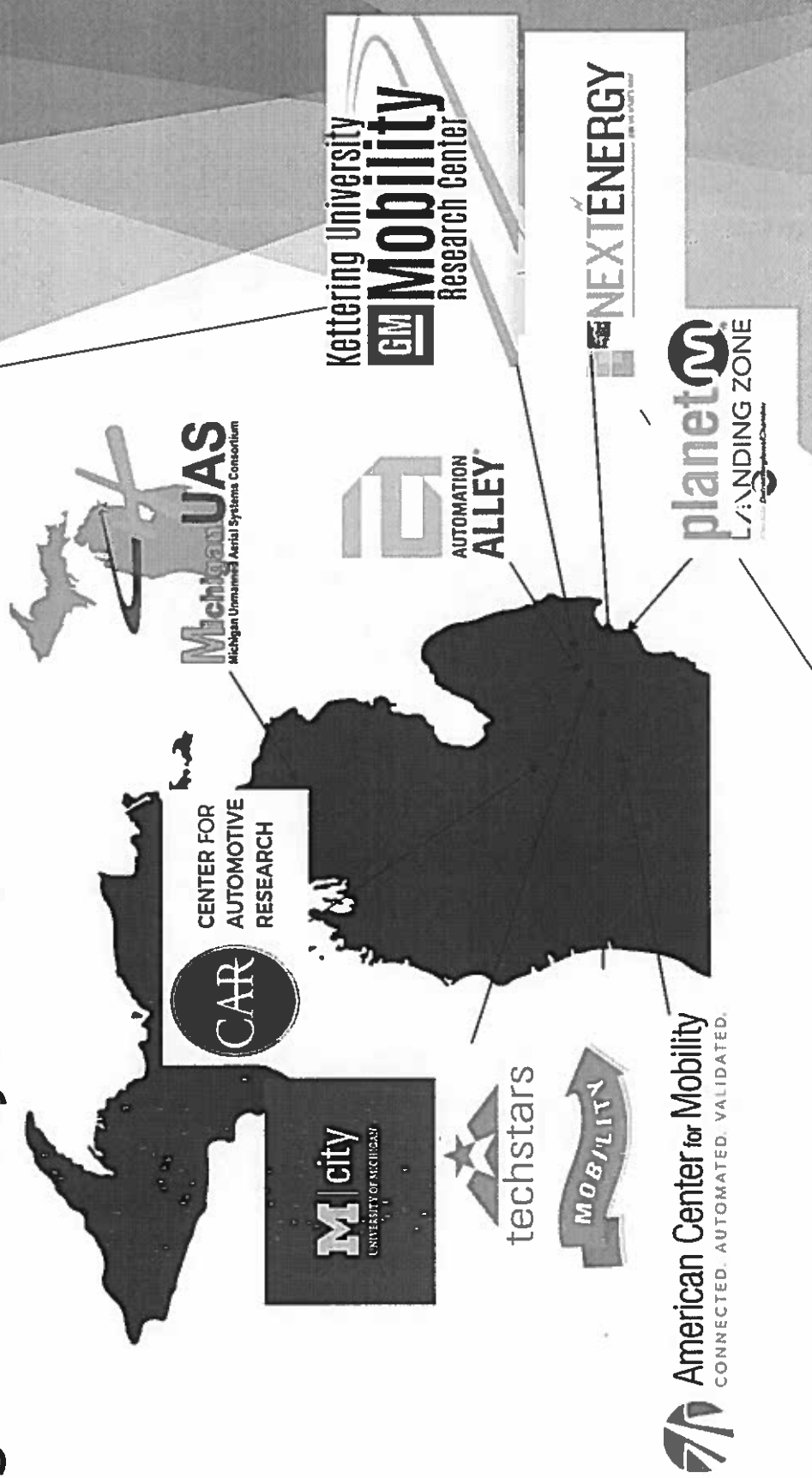


# Mobility / Autonomous Technology



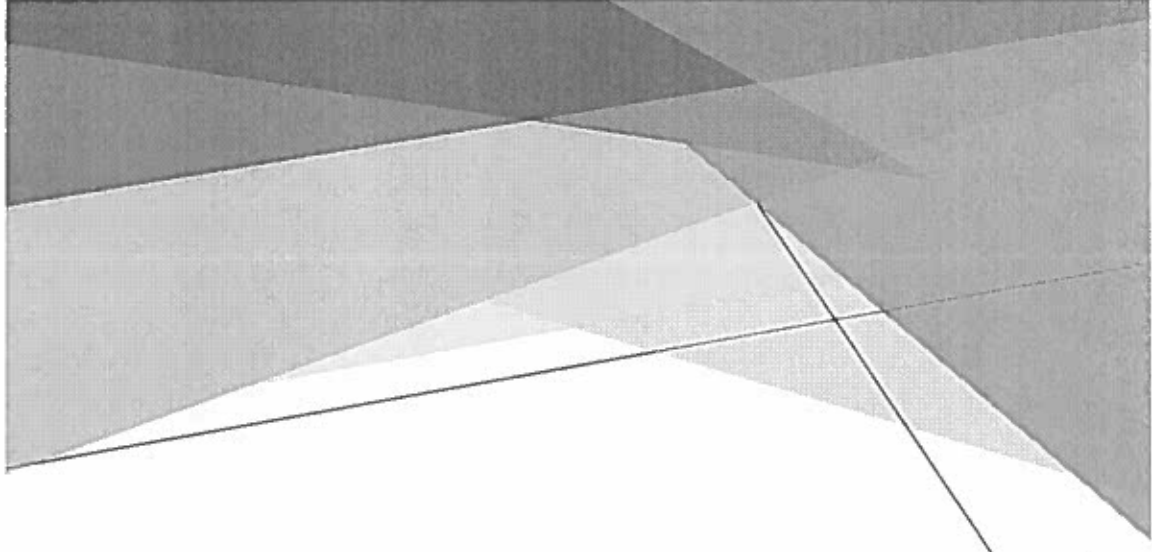
Electric Powertrains: The backbone of  
autonomous and connected vehicle platforms

# Michigan's Mobility Assets



# *Benefits of Clean Mobility in Michigan*

Scope: this whitepaper analyzes the economic impact of the four clean transportation fuels—electricity, hydrogen fuel cell, natural gas and propane—considered the primary drivers of advanced power-train development. A ten state comparative study was also conducted analyzing other policy approaches to encourage the growth of clean transportation technology



## Key Findings: General

- Clean fuel vehicle technology contributes over 80,000 jobs to Michigan's workforce. Annual job growth → 16% from 2017-2018
- Clean transportation jobs and investment contribute nearly \$19 billion to the state's economy & \$700 million in state/local taxes
- 57% of light duty vehicles produced by 2030 will be electric
- Michigan is home to 96 of the largest 100 auto parts suppliers, but without establishing a niche for EVs, 75 of them face obsolescence by 2030
- Generally, clean fuel vehicles are either cost-competitive or cheaper than gas and diesel counterparts when incorporating total life cycle costs.
- Propane and Natural Gas are crucial in reducing the carbon footprint of the mid and heavy duty vehicle sector. (Ex: replacing one older diesel bus with natural gas is equal to taking 21 gas-powered vehicles off the road)

## Key Findings: General (cont'd)

- Michigan is a leader in clean transportation innovation. From 2011 to 2016, researchers, entrepreneurs, and businesses submitted over 3,000 clean transportation patents—by far the most in the nation. The state is also home to 375 R&D centers, representing more than 70 percent of the country's automotive R&D spending.
- A study of ten states found that having the majority of a state's vehicles be emissions free by 2050 could reduce health costs related to vehicle air pollution by 88 percent.
- Michiganders stand to benefit from EVs: \$.8 billion in reduced electricity bills, \$6.3 billion in fuel and maintenance costs, and \$1.5 billion in emission-reduction benefits by 2050\*
- Michigan is poised to lead in the transition towards clean mobility but is falling behind other states in efforts to encourage its' growth

# Key Findings: State Comparison Study

## State-by-State Comparison

### Overview of Alternative Fuel Policies and Incentive

Compared to the other states surveyed, Michigan has a limited number of incentives in place to support alternative fuel vehicles. While Michigan's utilities are exploring programs to support development of alternative fuel vehicle infrastructure, the state does not yet have a standalone program, though the Michigan Energy Office has said that they plan

to use a portion of the state's \$3.9 million share of the Volkswagen settlement to fund charging infrastructure. While the state is using this settlement funding to support the replacement of school buses, Michigan has the opportunity to learn from its peers in areas such as promoting alternative fuel vehicle adoption and fleet expansion.

	MI	GA	TX	FL	OH	CO	PA	NY	NC	MN
<b>State Incentives</b>										
Vehicle Purchase Incentive			●	Natural Gas and Propane Only	Large Fuel Conversion	●	●	●	●	●
Infrastructure Incentive		●	●		●	●	●	●	●	●
Fleet Incentive			●		●	●		●	●	
School Bus Replacement Program	●		●		●	Partic Only		●		●
Weight Exemptions	●	●	●	●	●	●	●	●	●	●
Emissions Requirement Exemptions	●				●			●	●	
HOV Lane Exemption		●		●		●		●	●	
Technology Incentive		●		●		●	●	●	●	
Fuel Tax Exemption			●	●					●	
Sales Tax Exemption						●				

## Key Findings: State Comparison Study

- **Incentives for alternative fuel vehicle infrastructure are common. 8 of 10 states provide incentives for the installation of alternative fuel vehicle infrastructure, only Michigan and Florida do not. These incentives vary in size, and form but most states provide incentives in the form of grants or rebates.**
- **The majority of states provide an incentive for the purchase of alternative fuel vehicles. 7 out of 10 states provide some form of incentive for the installation of alternative fuel vehicle infrastructure, with five states - Texas, Colorado, Pennsylvania, New York, and North Carolina - providing incentives for alternative fuels in general.**

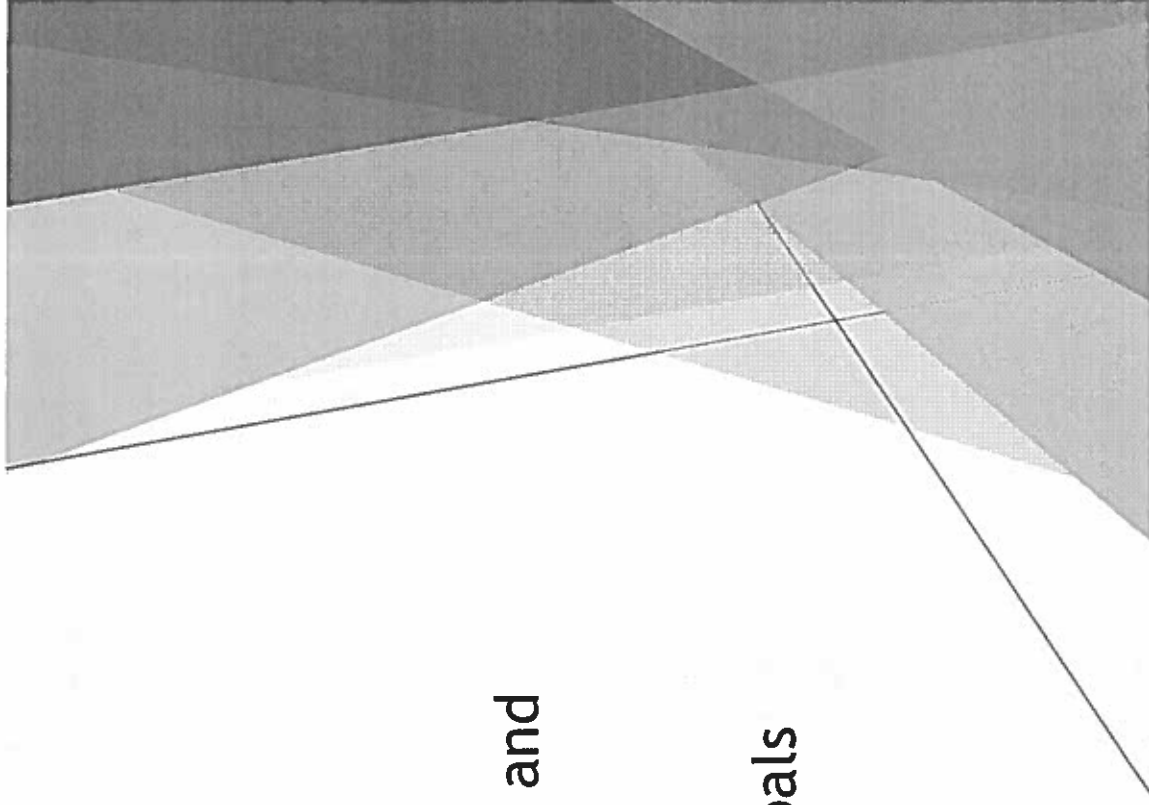
## Key Findings: State Comparative Study

- **A number of the states support research and development in alternative fuel vehicles. Six of the states—Georgia, Florida, Colorado, Pennsylvania, New York, and North Carolina—offer incentives focused on research and development of alternative fuels. Georgia provides a tax credit to businesses focused on alternative fuels based on the number of jobs they create. Florida, Colorado, Pennsylvania, New York, and North Carolina support projects that promote alternative fuels through research and development.**
- **Michigan stands out for its limited state incentives compared to other states. Compared to the other states surveyed, Michigan has a limited number of incentives in place to support alternative fuel vehicles. While Michigan’s utilities now have programs to support development of electric vehicle infrastructure, the state does not yet have standalone programs to encourage market growth**



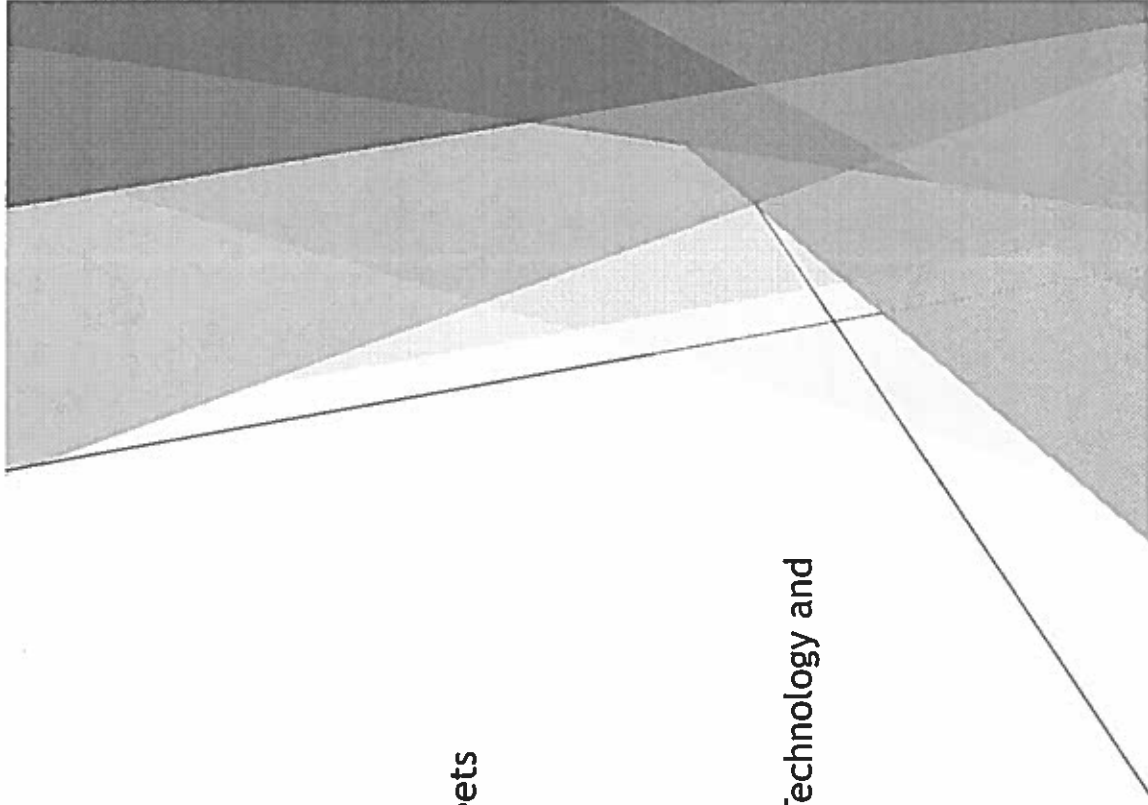
# The Challenges

- ▶ Upfront Cost
- ▶ Access to public charging
- ▶ “Change Anxiety” / Consumer Education and Awareness
- ▶ Outdated Zoning and Building Codes
- ▶ Alignment with State Strategies and Goals



# Policy Considerations

- ▶ Vehicle Lease and Purchase Incentives for Consumers and Fleets
- ▶ State Fleet Utilization
- ▶ Increasing Access to Charging/Fueling Infrastructure
- ▶ 'EV Ready' Zoning and Building Codes
- ▶ Data Transparency
- ▶ Programs to Support the Development of Advanced Mobility Technology and Jobs/Training in Advanced Manufacturing

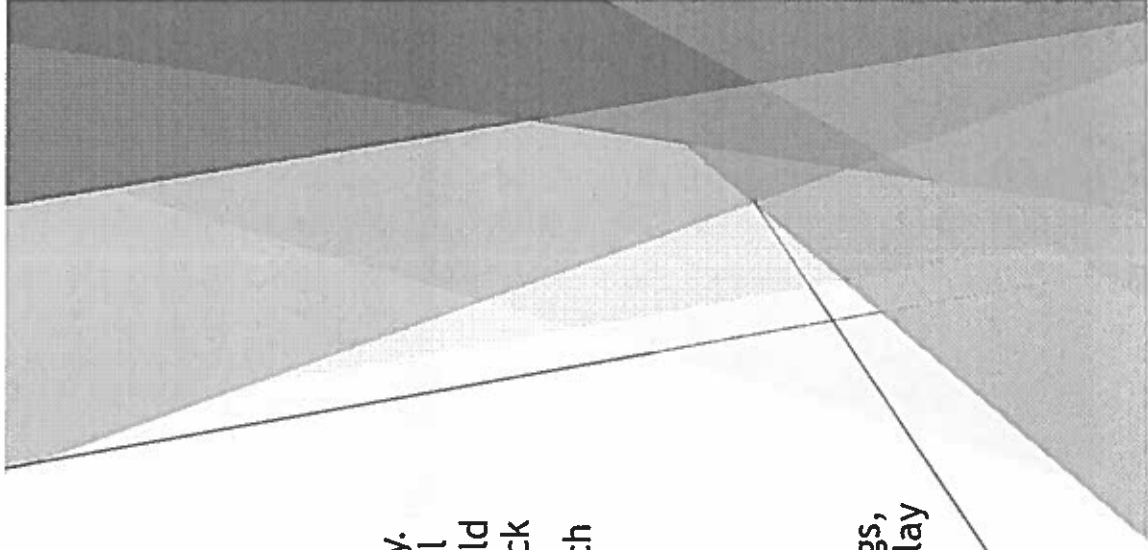


# EVs: Quick Facts



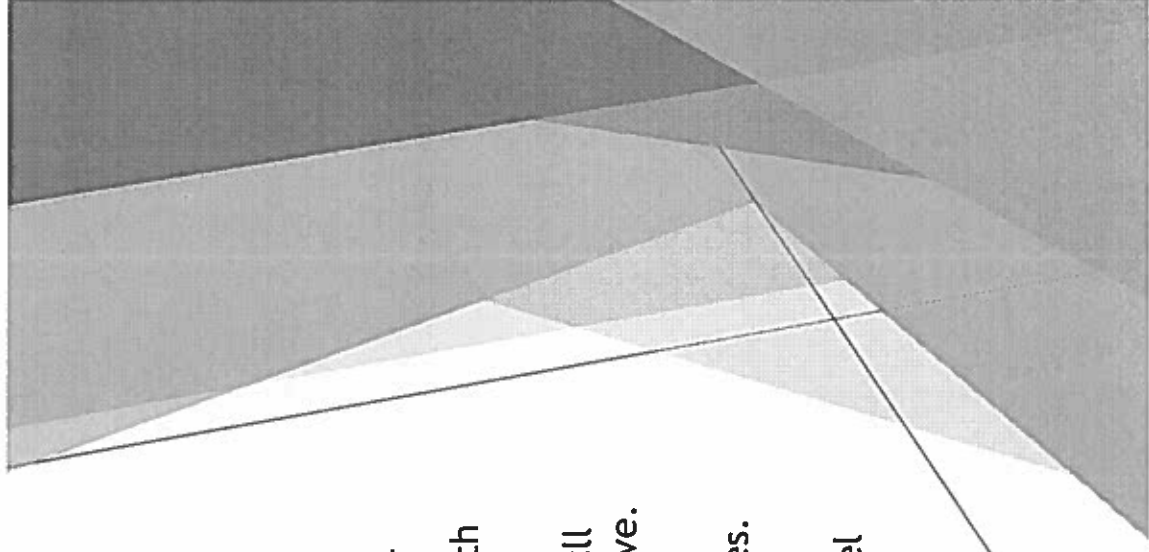
# The State of Electric Vehicles in the U.S. and Michigan

- ▶ Nationally, there are more than 1 million electric vehicles on the road today. Annual sales are expected to exceed 1.2 million by 2025, a 7% share of total annual vehicle sales. The projected rising level of annual sales will help build the national EV fleet to 7 million by 2025, a 900% increase from today's stock
- ▶ Michigan has had over 15,000 EV purchases since 2011, the majority of which have been PHEVs (11,000)
- ▶ Batteries costs are one-half of what they were in 2010. "True" cost parity- when batteries can be produced at \$70/kWh- projected over the next decade. If you consider total operational costs, EVs will reach cost parity much sooner.
- ▶ Recent reports have shown EV charging infrastructure is growing but still lags, that it incentivizes EV adoption, and spurs economic investment. Utilities play a unique and crucial role.



# The State of Electric Vehicles in the U.S. and Michigan (cont'd)

- ▶ 3X more efficient: 59%-62% of the electrical energy is converted into power
- ▶ Cost less to “fuel”: A typical electric vehicle can travel 43 miles for \$1 worth of electricity (about one-fourth of gas competitors)
- ▶ Operational costs are lower. In fact, if you were to take into account the full operating costs of electric vs. gas-powered vehicles, their cost is competitive.
- ▶ **Reduced energy dependence.** Electricity is a domestic energy source. Whether it is generated by natural gas, nuclear, renewables or other sources.
- ▶ Michiganders stand to benefit. According to a recent study by the coalition Midwest Evolve: \$2.6 billion in reduced electricity bills, \$23.1 billion in fuel and maintenance costs, and \$5.7 billion in emission-reduction benefits by 2050



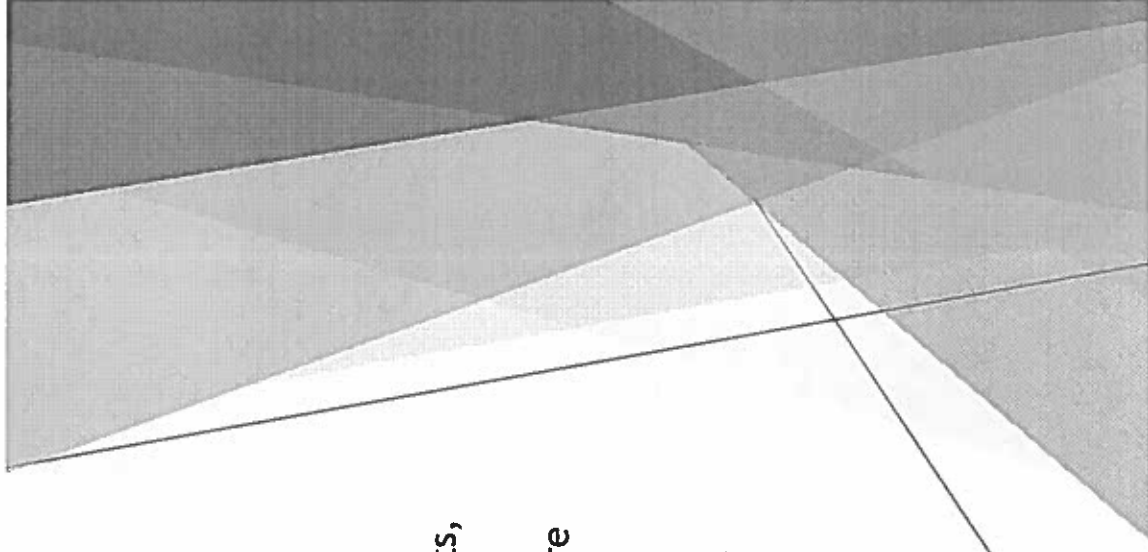
# Automaker Investment

Nearly every OEM has put in place a strategy to compete in the global arms race towards electrification:

- ▶ GM- 20 new all electric by 2023
- ▶ Ford- 13 new electrified vehicles by 2020s with focus on high-volume SUV/truck sales
- ▶ Chrysler - electrified versions of half its' vehicle fleet by 2022
- ▶ Nissan/Mitsubishi - 12 new all electric by 2022
- ▶ Honda - electrified all new european models in 2018,  $\frac{2}{3}$  new car sales electrified by 2030
- ▶ Tesla - currently all electric models, half of sales in U.S., 4th largest automaker by value
- ▶ Volvo - electrifying all new models starting 2019
- ▶ Volkswagen - electric versions of all of its vehicles by 2030
- ▶ Daimler/Mercedes Benz - 10 new electric vehicles by 2022, \$11B investment in development
- ▶ Toyota - phase out of all gas engines by 2040

# Michigan is Poised to Lead

- ▶ Clean tech jobs are growing rapidly, Michigan is #1 in the Nation for clean transportation patent development, and home to several EV assembly plants, as well as battery cell and battery pack assembly plants
- ▶ Michigan has long been the center of the U.S. auto industry, producing more cars and trucks than any other state.
- ▶ Michigan is home to 13 original equipment manufacturer (OEM) assembly plants, 35 OEM component plants, 96 of the 100 largest auto part suppliers, and 15 percent of its' workforce is auto-related
- ▶ 70% of the automotive R&D Investment in the U.S. is done in Michigan.



# What Other States Are Doing

▶ 37 States have incentives for clean fuel vehicles, Michigan is not one of them

## # of KEY EV-ENABLING POLICIES BY STATE



- EV-enabling Policy (# of states)
- BEV/PHEV Incentive (12)
  - HOV Exemption (11)
  - State Fleet Incentive (3)
  - NGO Incentive (2)
  - Building Codes (3)
  - Charging Incentive (21)
  - Charging Service Provider (20)
  - Utility Enabling Legislation (4)
  - Utility Filing (30)
  - Utility Incentive (20)
  - Utility Own/Operate (11)
  - EV Charging Rate (17)

Source of Data: AFDC; Atlas Policy