



Michigan Council on Climate Solutions

Transportation and Mobility Workgroup Recommendations

October 2021

Co-chairs:

Charles Griffith, Ecology Center

Judson Herzer, Michigan Department of Labor and Economic
Opportunity/Office of Future Mobility and Electrification

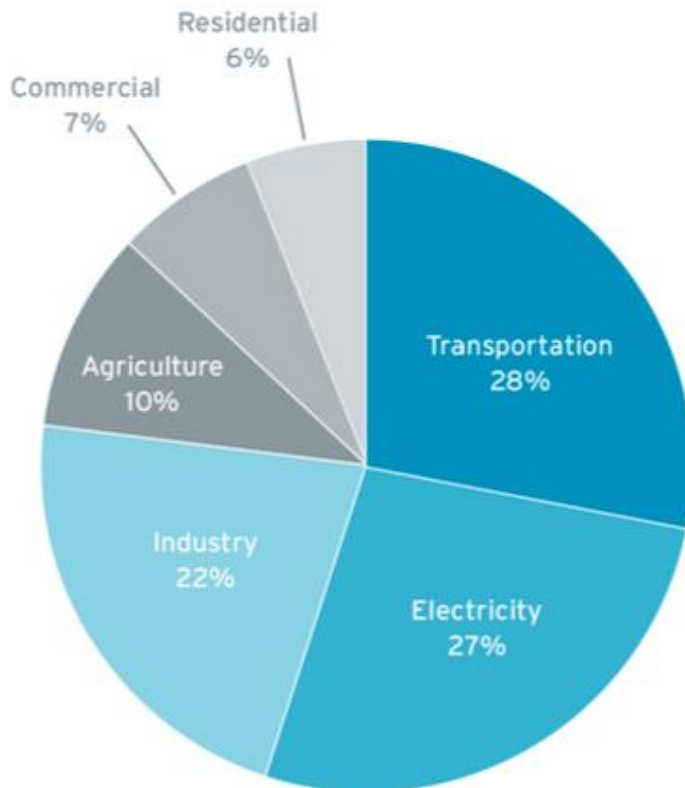
Table of Contents

Background	3
Summary of Recommendations	6
Top 5 Recommendations	8
I. Establish a Comprehensive Transportation Electrification Plan	8
II. Establish Electric Vehicle (EV) Purchase Incentives.....	13
III. Adopt a Michigan Clean Fuels Standard.....	18
IV. Develop GHG Budgets for Transportation plans.....	24
V. Expand Access to Convenient, Zero-Emission Public Transit.....	28
Additional Recommendations	32
VI. Develop a statewide plan to encourage nonmotorized mobility.....	32
VII. Repurpose CMAQ Funds for Greater Climate Impact.....	37
VIII. Establish a More Equitable VMT-Based EV Fee.....	39
IX. Update Building Codes to Ensure EV Readiness	42
X. Establish EV Dealer Certification Program	50
XI. Allow HOV Lane Access for Plug-in Electric Vehicles.....	52
XII. Prepare to Adopt LEV, ZEV, ACT, and HDO Rules	55
XIII. Develop EV Procurement Goals for State Fleets	60

Background

As of 2018, Michigan's transportation sector accounted for 28% of the state's total greenhouse gas (GHG) emissions, officially surpassing the electricity sector as the leading source. This proportion is likely higher today given additional known reductions in the electricity sector. Transportation emissions are primarily due to the combustion of petroleum products such as gasoline and diesel, with biofuels, propane, natural gas and electricity making up the remainder.

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2018



Source: [U.S. Environmental Protection Agency, 2021](#)

This workgroup began its process by inviting a range of national and local experts to speak about the needs and opportunities for GHG reductions in the sector, as well as transportation-related policy recommendations made in other state climate plans. Based on this input and discussion in the Workgroup, two subgroups were formed: one focused on GHG emission reduction strategies from vehicle electrification and low-carbon fuels, and the other on strategies for reducing vehicle-miles traveled (VMT). These subgroups then met to flesh out more detailed recommendations for the full group's consideration.

In the course of the workgroup's deliberations, a few themes emerged that cut across all of the strategies:

- 1) **It's not just a light-duty vehicle problem.** While light-duty passenger vehicles are responsible for about 2/3 of transportation GHG emissions, heavy- and medium-duty (HMD) vehicles make up about a quarter of the emissions for the sector. Those emissions have also been growing, in part due to changes in online purchasing and delivery trends. In addition, HMD vehicles are responsible for an even greater share of criteria pollutants like nitrogen oxides and particulates. This is a significant environmental justice concern due to the higher proportion of emissions (primarily from diesel trucks) occurring in low-income and BIPOC communities. In addition, the HMD sector offers unique opportunities for emission reductions given that many of these vehicles are managed as corporate or government fleets and purchase in bulk. They also tend to be more motivated by potential cost savings, such as lower operational costs from fueling and maintenance. For these reasons, HMD vehicles are an integral element in most of our recommendations. The group did not address aviation, rail or marine vehicles, but these will be additional important segments of transportation to decarbonize as well.
- 2) **There's no silver bullet.** While electrification is the key new technology that experts agree is needed to meet any 2050 reduction goals for the sector, it also can't get us there on its own, especially in the near-term. Even with the ambitious national 50 percent sales goal for light-duty electrification by 2030, for example, the vast majority of vehicles on Michigan's roads will still be burning gasoline. This is because of the slow turn-over rate of our vehicle fleet and one of the reasons that meeting our 2050 goals requires long-term planning. The slow-turnover rate also illustrates the need to employ multiple reduction strategies in the near-term, like increasing safe and convenient transit and biking options, as well as increasing vehicle fuel-efficiency and the use of lower-carbon fuels.
- 3) **There's a need for state-based strategies.** While the federal government certainly plays a major role in transportation and vehicle policies, it was also clear to the workgroup that states have been providing key leadership in reducing GHG emissions for the sector. This is particularly true with regard to the electrification, fuels and VMT reduction strategies that we are proposing to the Council. State leadership will also be key to being able to take advantage of federal funding opportunities, such as the significant electric vehicle and transit programs that are proposed in federal infrastructure bills.
- 4) **Equity and justice opportunities are plentiful.** As the workgroup considered its charge to identify solutions to resolve impact disparities, we found there were a number of opportunities to incorporate policy elements that could improve equitable outcomes for low-income and BIPOC communities as well as workers that may be negatively impacted by the transition to new technologies. In addition, the proposals to increase access to transit, walking and biking inherently addresses disparities in transportation, since many Michiganders do not have access to personal vehicles to get to work, school or health care. Our workgroup welcomes additional input from the Climate Justice Braintrust and other stakeholders to further improve the recommendations on these topics.

There was not complete agreement among workgroup participants on all of the recommendations, but overall there was a high degree of agreement on the approach and strategies the state needs to take to decarbonize Michigan's transportation and mobility sector. We've done our best to represent differing views and perspectives where they remain, and also propose some potential opportunities to resolve or mitigate those concerns. Many of the recommendations will, of course, require significant additional discussion and stakeholder engagement to enable their adoption and implementation by the appropriate policymakers. Hopefully, though, the workgroup's recommendations provide a solid foundation from which these discussions can begin.

In selecting our group's Top 5 Recommendations, the workgroup chairs sought to include those policy ideas that would have the biggest impact on reducing GHG's while also promoting equitable outcomes that help resolve historical disparities. They also tended to enjoy the broadest support of workgroup members. The additional recommendations developed by the workgroup are worthy of continued consideration as well, as some could be implemented quickly and with a relatively minor financial or administrative cost.

Summary of Recommendations

Below, we have summarized the list of recommendations. The full recommendations, including additional details and a rationale for each, follow this list. The numbers are for reference purposes only and do not indicate a ranking or prioritization.

Top 5 Prioritized Recommendations

1. Michigan should establish a coordinated and comprehensive transportation electrification plan, supportive of national goals, and allocation of sufficient resources and personnel to responsible state offices to create the plan.
2. Michigan should establish a consumer and fleet electric vehicle (EV) incentive program, including new and used EVs, to support a rapid and accelerated transition to EVs among the driving public.
3. Michigan should adopt a clean fuels standard as part of a comprehensive approach to reducing greenhouse gas emissions (GHG) in the state, and as a potential revenue source for enhancing low/no carbon mobility options to more Michiganders.
4. The Michigan Department of Transportation (MDOT), and regional and local road agencies, should develop plans for implementing GHG budgets into their transportation planning.
5. MDOT, metropolitan planning organizations (MPO's), and local transit providers should develop comprehensive plans to expand access to convenient, zero emission public transit throughout the state of Michigan, with a goal of increasing the state's investment by an amount great enough to support the mobility needs of the state's residents.

Additional Recommendations for Consideration

6. Michigan should develop and implement a statewide plan that takes a Safe Systems Approach to reduce Vulnerable Road User (VRU) fatalities and serious injuries to zero in order to encourage more trips by bicycling and walking.
7. MDOT and MPOs should adopt new policies to exclusively use CMAQ (federal Congestion Mitigation Air Quality program) funding for projects that decrease vehicle miles traveled (VMT), improve air quality and reduce GHG emissions. Projects that will likely increase VMT and don't serve a public safety priority should no longer be eligible for CMAQ funding.
8. Michigan should establish an alternative, VMT-based EV fee that is more in alignment with Michigan's climate goals and recognizes the higher efficiency of electric vehicles.
9. Michigan's building codes should be updated to assist with EV adoption.
10. Michigan should establish a certification program for dealers to recognize dealers that are educated on EVs and know how to sell and maintain them.
11. Establish new policies to allow Plug-in Electric vehicles (BEVs, PHEV's and FCEV's) to use Michigan's High Occupancy Vehicle Lanes (HOV lanes) regardless of passenger occupancy.

12. Michigan should signal its commitment to electrification by preparing to adopt a Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) standards in the Advanced Clean Cars Program, as well as the Advanced Clean Truck (ACT) and Heavy-Duty Omnibus (HDO) rules.
13. The State of Michigan should establish EV procurement goals for state-owned and state-leased fleet vehicles including a broad, long-term plan as well as short-term targets to electrify a practical subset of the state fleet.

Top 5 Recommendations

**Please note, the numbering of the top five do not indicate a priority or preference. These have been identified as the top five but are in no particular order.*

I. Establish a Comprehensive Transportation Electrification Plan

1) Overview of recommendation (250-word limit).

Rationale: Electrifying the transportation sector won't happen overnight and simply adopting another state's strategy doesn't always translate easily. A strategic plan for how Michigan will equitably approach electrification, with clear goals for what we will strive towards, and the sequence of the work to be done to reach them is essential. A map is always a useful tool to help get to where you're going.

Recommendation: Michigan should establish a coordinated and comprehensive transportation electrification plan, supportive of national goals, and allocation of sufficient resources and personnel to responsible state offices to create the plan.

- a. A Transportation Electrification Plan (TEP) for the State of Michigan will:
 - i. Provide a roadmap setting out the necessary steps to take for the equitable deployment of charging infrastructure across the state to support 2 million light-duty plug-in electric vehicles by 2030, which is in line with OEM goals of 50% electric vehicles sales;
 1. The roadmap should also include steps for equitably deploying heavy and medium-duty vehicles, supporting 30% sales of electric buses, delivery vehicles and other trucks by 2030¹.
 - ii. Encourage the optimal integration of vehicle charging in the state's power system and promote consumer confidence in electric vehicles as a suitable means of transportation;
 - iii. Provide a strategy for supporting the industry-led transition of Michigan's auto manufacturing industry to the electric future to ensure a comprehensive economic benefit for the state; and
 - iv. [Identify second-life and end-of-life strategies for EV batteries, and address any gaps that need support from the state.](#)
 - v. Lay out a vision for increasing the adoption of both LD and HMD EVs, e-bikes, and other electric mobility devices.
- b. Existing state offices and councils, like the Office of Future Mobility and Electrification (OFME), should be leveraged to create the TEP. In developing the TEP, input should be solicited from stakeholders including, but not limited to, the MPSC, EGLE, electric investor-owned utilities, local publicly-owned electric

¹ According to RMI modeling, 1 in 3 buses need to be electric by 2030 and 1 in 7 heavy and medium duty trucks.

utilities, MDOT and local transportation and transit agencies, charging infrastructure companies, environmental groups, environmental justice groups, consumer advocates, automobile manufacturers, labor unions, convenience stores, and interested members of the public.

- c. After release of the TEP, the relevant agencies would implement the transportation electrification plan, including the adoption of policies identified in the plan that can be implemented immediately, and support programs to incentivize electric vehicle supply equipment to address remaining market barriers and any market failures. Such programs shall be accompanied by any new education and outreach programs developed by the stakeholder group. The Michigan Public Service Commission should open dockets on rates, rules and utility investments as necessary to develop and implement the TEP.

2) In what timeframe is this recommendation achievable?

Plan could be achieved within 1 year. Goals to be achieved by 2030 with interim goals to be set by the TEP.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

820 metric tons of CO2 equivalent **by 2030.**

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

A comprehensive TEP will ensure that the benefits of transportation electrification are shared equitably by all Michiganders – including the most vulnerable communities, regardless of their circumstances. Ensuring this requires the recognition of two persistent challenges; (1) the pervasive need for meaningful access and the opportunity to participate in relevant decisions; and (2) that there are barriers to the ability of many communities to enjoy the benefits of electrification programs.

It is important for states to recognize that, even where they intend to be inclusive or already consider their policies to be so, they may not have all the information they need to actually deliver on good intentions. They often need better information to craft truly equitable policies. This will help ensure meaningful engagement and the shared understanding of how to best achieve transportation electrification benefits.

To ensure that transportation electrification programs can meet the needs of all energy consumers, the TEP should start by considering whether the programs currently being delivered are meeting equity goals, and how existing programs further Michigan's concepts of equity. Second, the TEP should improve opportunities for meaningful engagement. With the information, the TEP can be intentional in its design of equitable transportation electrification programs for all of Michigan's citizens.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

Using electricity to power transportation leverages changes in the electricity sector to create local jobs. Clean energy jobs are growing in every state and frequently increase

at a greater rate than the overall employment rate. Greater EV adoption and charging will only increase these employment prospects. In Michigan, automotive OEMs and several technology companies and investors are planning on building or transforming manufacturing facilities that will sustain thousands of new jobs, though there could be job losses due to fewer parts and workers that may be needed to manufacture vehicle components and assemble EVs. Aftermarket service and parts needs of EVs are also expected to be less than internal combustion engine vehicles. The statewide construction of charging infrastructure needed to support electric vehicles, including public and private charging stations, can also be expected to stimulate the state's economy and boost job growth.

Multiple studies suggest that the U.S. could see between 52,000 to 109,000 net new jobs annually between 2015 and 2040 and a \$2.5 billion to \$9.9 billion increase in gross domestic product annually. The United Auto Workers union supports EVs but is also calling for decision-makers to work with automakers to retool existing facilities and retrain workers to produce new energy vehicles, and to adopt other policies to ensure that good-paying auto jobs are retained in the U.S. The U.S. DOE estimates the utility sector will demand 105,000 skilled workers by 2030 as a result of demand for EV charging and distributed generation, and we are on track to fill only 25,000.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

This recommendation would increase the speed of adoption of electric vehicles in Michigan and has significant environmental benefit potential. Tailpipe emissions are responsible for 53,000 premature deaths each year in the U.S., more even than power plant emissions. They contain particulate matter, nitrogen oxides (NOx), and volatile organic compounds, and contribute to ozone formation. Exposure to these pollutants leads to serious illness and premature mortality. Because EVs do not generate tailpipe emissions, they result in a net reduction in air pollutant emissions, even when charged in electric systems that rely heavily on fossil fuels.

In addition to the greater efficiency of EVs, electrifying transportation can also help facilitate greater grid flexibility. Because EVs are flexible in when they can be charged and used, they can function like batteries. This enables grid managers to shift load to times when there is less demand for electricity, and when generation is often cleaner. EV charging flexibility can also be used to capture variable renewable generation that might be otherwise curtailed, giving managers the ability to integrate and use variable renewable energy, avoid unnecessary system upgrades, and get a greater return out of their current electric distribution systems. Consequently, increased vehicle electrification can lead to increased utilization of renewable energy and decrease harmful emissions from the electric grid. This in turn helps to improve air and water quality in Michigan.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

The premise of this recommendation is that with accessible EV charging that benefits all Michigan communities, including low-income and rural communities, EV adoption will

accelerate. More EVs in Michigan can bring economic benefits to EV owners, utility ratepayers and the public, and then create economic development opportunities. Transportation electrification benefits EV owners, because over the lifetime of a vehicle, EV owners save money because EVs are cheaper to operate and maintain than gasoline- or diesel-fueled vehicles. EVs benefit utility ratepayers as evidence from California and the northeast indicates that EVs have increased utility revenues more than they have increased utility costs, leading to downward pressure on electric rates for EV-owners and non-EV owners alike.

Communities and businesses that host public charging stations may also see economic benefits as EV drivers eat or shop while their vehicles charge. In Minnesota, a study found that installing 150 EV chargers would generate \$14.2 million in economic activity, including \$4.6 million in labor income. A study of charging stations in New York found that retail locations earned additional revenue that increased the profitability of hosting a charging station between 7 and 250%.

Additionally, a supportive environment for EVs in Michigan, an acknowledged transportation and mobility hub, could attract new companies and business to the state and region. The statewide construction of charging infrastructure needed to support electric vehicles, including public and private charging stations, can also be expected to stimulate the state's economy.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

The costs of this recommendation are primarily the administrative staff time that would be required, and the costs for procuring relevant data from industry associations and consulting firms. Identifying the costs of the strategies recommended would be another outcome of the TEP.

9) Who is empowered to implement this recommendation?

- Local government
- State government – Executive
- State government – Legislative
- Private sector

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

Some concerns were raised by stakeholders about how to ensure that EV programs would be equitable, and that workers in the auto sector who may be displaced are given new opportunities in the transition to EVs. These goals will be important to consider carefully in the proposed TEP.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

The TEP should include both short- and long-term goals for electric vehicles², charging infrastructure, and associated technologies in this state. To ensure its success, the TEP should include, at a minimum, the following elements:

- a. an assessment of state EV related incentive programs and determine the sufficiency of such programs for meeting Michigan's transportation goals. Additionally, OFME should recommend new programs and outreach efforts that could improve incentives and access to them;
- b. an analysis of barriers to clean mobility in harder to serve areas for electrified transportation, including but not limited to rural, low-income communities and multi-unit dwellings, and options for addressing these barriers.
- c. identification of areas in this state for which additional publicly accessible electric vehicle charging infrastructure is needed to ensure that the vehicle choice of Michigan residents is not constrained by a lack of access to adequate public electric vehicle charging infrastructure;
- d. an outline and time schedule for the provision of safe, dependable, serviceable; and operational public electric vehicle charging infrastructure sufficient to meet and enable future demand for electric vehicles in this state to enable users of electric vehicles of various classes to travel border to border and community to community on interstate highways and other major roadways in this state and in rural communities, multifamily and underserved communities, town centers, commercial and retail areas, parks and other publicly owned lands.

The plan should also seek to:

- a. maximize the benefits associated with transportation electrification;
- b. stimulate competition, innovation, consumer choices in public electric vehicle charging and related infrastructure and services;
- c. encourage private capital investment, by partnering with federal grants and utility rebate incentives;
- d. specify the number and types of electric vehicle chargers per general location that are needed to meet the requirements above;

² Electric vehicles include a vehicle that uses an electric motor for propulsion and can include, but is not limited to, cars, truck, trains, airplanes, boats, port vehicles, tractors and other heavy machinery, motorcycles and scooters and spacecraft.

- e. enhance commerce by ensuring an adequate distribution of public electric vehicle charging infrastructure is available throughout the state to stimulate lower cost and lower emissions from heavy duty trucking and delivery services;
- f. promote the adoption of demand response functions and two-way electricity flow capability in order to allow both load management and vehicle to grid integration for cost savings, grid reliability, and resiliency; and

II. Establish Electric Vehicle (EV) Purchase Incentives

1) Overview of recommendation (250-word limit).

Rationale: An accelerated transition to EVs is critical for Michigan to reach its climate goals and for the world to avoid the worst consequences of climate change. In fact, the deep emissions cuts delivered by EVs versus conventional counterparts are a key reason that widespread and ultimately universal use of EVs features so prominently in mitigation pathways intended to limit global warming.³ Unfortunately, EVs represent only a small fraction of Michigan’s auto market today. In 2020, just 0.62 percent of all vehicles sold in Michigan were EVs.⁴

One of the key barriers to widespread uptake today is the higher purchase cost typically associated with these vehicles. Despite impressive advances in battery technology in recent years, battery costs remain high, and the battery pack continues to be the most expensive component of any EV and the major contributor to EV price premiums. Similar challenges exist for the medium- and heavy-duty vehicles commonly used by commercial or public fleets such as delivery vans, buses, and trucks.

Consumer- and fleet-facing EV purchase/leasing incentives address this issue directly and are **a proven approach for boosting EV sales** while the market and underlying technology continues to mature. Incentives can take different forms, including:

- Income tax credits
- Sales tax exemptions or holidays
- Cash rebates or vouchers, including “feebate” programs that use fees levied on heavily polluting vehicles to fund the rebates awarded to EVs
- Rebates to dealers

Recommendation: Michigan should establish a consumer and fleet electric vehicle (EV) incentive program, including new and used EVs, to support a rapid and accelerated transition to EVs among the driving public. For maximum environmental benefit and to support the full range of electrified vehicles coming to market, Michigan should extend purchase or leasing incentives to medium- and heavy-duty electric vehicles, as well as

³ <https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change>

⁴ Battery Electric Vehicles (BEVs) only. <https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard>

e-bikes and other micro-mobility vehicles. Incentives should also be tiered to provide a bonus for lower-priced vehicles and low-income buyers to make more equitable. Dealers who assist with the EV incentive program should be provided a modest incentive as well.

To make more equitable, incentives should be extended to the used vehicle market where many Michiganders buy their cars. This would help distribute the consumer benefits of an incentive more broadly and increase the likelihood that used EVs remain registered and driven in Michigan beyond their first owner. The state should also evaluate creating a tiered incentive that provides a bonus to lower-priced vehicles or low-income buyers.

Based on the Sierra Club's Nationwide Study of the Electric Vehicle Shopping Experience from 2019, Americans are encountering difficulty while shopping for EVs especially at the dealer – customer interface. Vehicle availability and salespersons knowledge were major factors in this challenge. Dealerships have a lot of control when it comes to these factors, and by incentivizing Michigan dealerships to sell more electric vehicles (new/used), dealerships can be part of the solution in EV adoption.

Several state-run examples exist around the country—including New Jersey's sales tax exemption for passenger EVs, Connecticut's [CHEAPR](#)⁵ EV rebate and dealer incentive program, and California's Hybrid and Zero-Emission Truck and Bus Incentive Project—from which Michigan could learn and develop a tailored approach that meets its own goals. The Michigan Office of Mobility and Electrification (OFME) will be completing a study on state incentive best practices that should provide additional guidance to policymakers.

2) In what timeframe is this recommendation achievable?

By 2025: Establishing an EV purchase incentive will require legislation, the support for which will take time to build. Nonetheless, granting the organization of a stakeholder coalition and political support, the necessary legislative action and contingent regulatory development could take place relatively quickly.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

To develop a full emissions reduction estimate would require thorough modeling of Michigan's passenger car market and its response to an EV purchase incentive, which is beyond the scope of this group's work. However, research finds that EV purchase incentives successfully increase EV sales and accelerate under-developed EV markets such as Michigan's. Between 2010 and 2014 about a third of all EV sales in the United States were directly attributable to the federal EV tax credit and, in general terms, every \$1000 offered in rebates increases EV sales by 2.6 percent⁶. Across the United States

⁵ <https://portal.ct.gov/DEEP/Air/Mobile-Sources/CHEAPR/CHEAPR---Resources>

⁶ <https://journals.sagepub.com/doi/abs/10.3141/2572-11>;
<https://www.sciencedirect.com/science/article/abs/pii/S0301421518302891>

today, most EV sales take place in states with an incentive on offer⁷. Other countries exhibit similar patterns. In the months immediately following introduction of its feebate system (also known as “bonus-malus schemes,” feebates raise fees on polluting vehicles in order to subsidize more efficient or electric models), Sweden saw EV sales rates triple.⁸

We can be confident that an incentive program in Michigan would grow the state’s EV market, and where those EVs replace or are bought instead of a conventional vehicle, they will reduce transportation emissions directly. The sooner these incentives drive additional EV sales the better, both in terms of cumulative emissions reductions over time and because of the impact EVs in use can have on market growth. As early adopters drive their EVs on our roads and in our communities, they effectively advertise the technology in familiar and everyday contexts with direct benefits for consumer awareness and enthusiasm.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

The transition to EVs has significant potential to positively impact BIPOC, low income, and frontline communities. A well-designed EV incentive program would increase EV adoption in historically underserved communities while improving air quality in communities that are most affected by transportation emissions. If the EVs themselves are made more affordable, they can also provide an affordable mobility option, due to their lower fuel and maintenance costs.

Programs can and should be designed specifically with environmental justice outcomes in mind. By reducing the upfront cost to both new and used EVs, the market of potential buyers should grow. Programs can be designed to reduce or eliminate the need to finance vehicles, like a “cash on the hood” program that gives the rebate automatically at purchase lowers a key barrier to owning an EV. Extending the incentives to used vehicles can also help to bring more Michiganders into the market. And communities bordering major roadways and highways, often among the most pollution-burdened and socioeconomically challenged, would enjoy direct air quality benefits as the vehicles traveling on those routes electrify.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

Growing the EV market means growing the EV industry with direct benefits for employment in vehicle and battery research, design, and manufacturing here in Michigan. Automakers, including several with major operations in the state, are investing billions of dollars in EV development and are creating the jobs of the future in the automotive industry as a result. Establishing strong supportive policies like a consumer EV purchase incentive would build on this momentum, bolstering demand for the products Michigan’s car companies are now building, maintaining Michigan’s image as

⁷ <https://www.autosinnovate.org/initiatives/energy-and-environment/electric-drive>

⁸ <https://theicct.org/blog/staff/swedens-feebate-system-20181008>

the home of automotive innovation, and creating additional reasons for other EV makers and suppliers to locate and hire in the state.

At the same time, some stakeholders express concern about the possibility of attrition in the automotive manufacturing workforce because EVs have fewer components to assemble and could be less labor-intensive to produce. While the ultimate net impact of vehicle electrification on the auto industry's workforce remains to be seen, the state would be prudent to engage proactively in discussions and policymaking aimed at ensuring a just transition for auto workers.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Electric vehicles decrease greenhouse gas, NOx, SOx, and particulate matter pollution. EVs do not have a tailpipe, reducing emissions significantly with particular benefits for local air quality in high density and highly trafficked areas. Economywide decarbonization scenarios consistent with the goals of the Paris Agreement assume rapid and widespread vehicle electrification.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

To attract and retain the best talent in the EV industry, and to encourage companies to locate in Michigan, we must continue to adopt innovative and effective EV policies.

While we don't have modeling numbers to show that this policy will increase jobs and revenue in the state, we do know that more Michiganders are employed in the advanced mobility industry than the fossil fuels industry. Promoting EV adoption will only serve the Michigan economy.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

In addition to the relatively minor administrative costs the relevant state agency(ies) will incur in implementing and managing an incentive program, an EV purchase incentive might require direct funding, or the forgoing of revenue, from the state's budget. Without thorough economic and consumer preference modeling it is difficult to estimate the fiscal impact of an incentive program with any certainty, but a modest initiative could trigger fiscal costs in the tens of millions annually. (For a rough sense of scale, a rebate program that awarded \$2,000 per vehicle and supported sales of 25,000 EVs per year would cost the state \$50,000,000 annually. Michigan recorded 3,306 EV sales in 2020.⁹) However, with appropriate program design the state could fund an incentive entirely outside of the state budget. For instance, feebates can self-fund while clean fuels standards generate private market revenue that can support EV purchase incentives if appropriately regulated.

⁹ Battery Electric Vehicles (BEVs) only. <https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard>

9) Who is empowered to implement this recommendation?

- State government – Executive
- State government – Legislative

While the legislature would pass the legislation establishing an incentive program and appropriate any necessary funds, the executive branch of the state government would implement and administer the incentive.

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

The workgroup enjoys consensus on the concept of an EV purchase incentive but did not seek a consensus recommendation on detailed design and implementation questions. These are raised below and elsewhere in the recommendation as issues for consideration and deliberation by policymakers.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

While EV purchase incentives are powerful tools for growing the EV market, the state should carefully consider how to design and pursue an incentive for maximum impact.

In general, best practices include providing the incentive “on the hood” at the time of purchase and providing potential benefits to all buyers regardless of income. This rubric tends to favor rebates/vouchers or sales tax exemptions, with benefits realized immediately in the vehicle sale price, and disfavor income tax credits that recipients must apply for during tax filing if they even have sufficient tax liability to realize the credit (although states can address the latter concern by making tax credits fully refundable.) In the medium- and heavy-duty sectors, incentives work best when not tied to a scrappage requirement. Michigan should be aware that without appropriate planning and foresight, medium-duty passenger vehicles—namely full-size SUVs and large pick-up trucks, which are increasingly popular among drivers—can fall into gaps between incentive programs due to their weight and classification. With a growing number of electric models produced by Michigan manufacturers set to launch in this segment in the coming years, it will be important that the state design incentive programs that ensure their eligibility.

Creating an incentive that extends to the used vehicle market can also help distribute the consumer benefits more equitably across a larger cross-section of buyers while improving the odds of keeping used EVs registered and driven in Michigan but would need to be carefully designed to avoid potential challenges.

The state will need to balance questions of design with fiscal impact considerations. Certain incentive program designs, namely rebate or voucher programs, often require annual appropriations. (Well-designed feebates, however, can be budget-neutral, using the fees they charge to heavily polluting vehicles to fund rebates for EVs, and could represent an alternative approach.) The experience of other states reveals that even with strong political support for EV incentives, fluctuating economic and budget

conditions can put pressure on rebate/voucher programs and lead to “on again, off again” cycles of uncertainty, disruption, and program suspension or cancellation. While tax credits or exemptions avoid these pitfalls, they incur another kind of cost in the form of lost revenue. Constituencies that rely disproportionately on the revenue of certain taxes—such as schools with the state sales tax—might raise concerns about the impact of a tax exemption on their priorities and needs.

Adopting a clean fuels standard might offer the best solution. A companion recommendation offers a full description of what a clean fuels standard is and can accomplish but for this discussion its most relevant feature is that it creates a private market that rewards participating entities for the distribution and use of clean transportation fuels, including electricity. Under the appropriate program design, revenues generated by EV charging can be reinvested in the EV market by funding EV purchase rebates. These programs do not levy taxes or spend public money. They can also create positive feedback loops. As more EVs charge, they generate more revenue for reinvestment, which in turn can support the sale of more EVs.

In any case, establishing an EV incentive requires political will and organizing to succeed. Advocates should prepare for an extended campaign of coalition-building. Here, too, a clean fuels standard might offer particular benefits. Experience from other states shows that clean fuels standards enjoy bipartisan support and the endorsement of uncommonly diverse stakeholder coalitions that include environmental, automotive, and agricultural interests, who can build cross-sector support for the policy.

III. Adopt a Michigan Clean Fuels Standard

1) Overview of recommendation (250-word limit).

Rationale: Clean fuels standards do more than just reduce transportation sector GHG emissions, they can also result in positive economic benefits, including job creation and expanding business opportunities for advanced and emerging fuels including electricity, hydrogen, and biofuels. One of the most exciting aspects of clean fuels standards is the support they provide for the emerging transportation electrification sector, which offers significant GHG emission reduction opportunities. At the same time, the policy can also incentivize lower-carbon liquid fuels that can be deployed in today’s vehicles and during the transition. Importantly, the credit/deficit trading mechanisms in clean fuel standards can also create a reliable pool of private-sector funding for reinvestment in vehicle purchase incentives or EV charging infrastructure to support the use of cleaner fuels and vehicles. In this way, a clean fuels policy can enable additional policymaking—for example, a statewide EV purchase rebate—that supports a multi-pronged approach to decarbonizing transportation without necessarily relying on taxpayer funding.

Recommendation: Michigan should adopt a clean fuels standard as part of a comprehensive approach to reducing greenhouse gas emissions (GHG) in the state, and as a potential revenue source for enhancing low/no carbon mobility options to more Michiganders.

A clean fuels standard, also called a clean fuels policy or low carbon fuel standard, is a technology-neutral, performance-based policy to reduce the carbon intensity of transportation fuels. A Clean Fuels Standard ratchets down carbon emissions in the transportation sector over time, increasing the use of lower carbon fuels and reducing the use of higher carbon fuels. By setting a standard that grows more stringent over time, the program dramatically increases private investment into lower carbon fuels. Such policies have been enacted in the United States and internationally, and are under consideration in several other Midwestern states. Experience in other states demonstrates that a clean fuels standard leads to steep reductions in transportation GHG emissions and large economic benefits through new clean fuel industry economic activity. Clean fuels standards are based on full lifecycle GHG assessment that evaluate each individual fuel producer's emissions and provide incentives for lower carbon production.

2) In what timeframe is this recommendation achievable?

Adopting a clean fuels standard is possible by 2025, with certain elements of the policy ready for implementation immediately. To secure passage of an effective clean fuels standard for Michigan a multi-year stakeholder collaboration and campaign is likely required to ensure that appropriate/effective standards are being proposed and that the policy is politically viable. In short, it would require consistent, effective conversations and strategic alliances to ensure the policy could pass the Legislature, ensure support from the governor, and then be implemented effectively. However, it is one of the few policies available to us that would effectively reduce carbon emissions and dramatically increase private investments to help fund many of the additional policy/program opportunities discussed within the Transportation and Mobility Working Group. In other states, broad coalitions have supported these policies.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

Unknown: A clean fuel standard's GHG emissions reductions would be directly tied to the standard(s) that are implemented as part of the program. An estimated reduction in emissions specific to Michigan would require complex modeling that is out of the scope of this group's work, however, is recommended as the policy is being drafted to ensure standards are selected that help to meet the stakeholder groups' goals. That said, modeling done by the Midwestern Clean Fuels Policy Initiative shows carbon intensity reductions of 20% by 2030 is achievable using resources available in the Midwest. [CARB](#) estimates that California's clean fuel standard program reduced transportation GHG emissions by 47 MMT between 2011 and 2019. Relatedly, [according to Mazzone, et al.](#), "California and British Columbia transportation fuel carbon intensity (CI) standards have been in effect since 2011, and Oregon's since 2016. Total transport energy consumption under the programs was over 23 billion gasoline gallon equivalents (gge) in 2019. By 2019, the transport energy share from lower-carbon alternative fuels rose under each program to about 11%, 8%, and 7% in California, Oregon, and British Columbia, respectively." Additional analysis could help to estimate the potential GHG reductions from a Clean Fuel Standard in Michigan.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

The transition to cleaner fuels is central to addressing the impacts of fossil fuel pollution in environmental justice communities and disadvantaged populations, including Black, Indigenous, Persons of Color (BIPOC) populations, low income, and frontline communities. Because transportation emissions come from mobile sources that travel on the major highways and arterial roads that disproportionately traverse or border BIPOC, low income, and frontline communities, clean fuels policies have enormous potential to improve air quality where it is needed most. A well-designed clean fuel standard will decrease emissions statewide, resulting in improved air quality in all communities, and create targeted improvements at the neighborhood scale in areas with significant, cumulative sources of air pollution, such as the [City of Detroit and adjacent communities](#).

Further, a well-designed clean fuel standard allows for wealth building and community resilience, including energy security, by encouraging development and use of low-carbon fuels by and for local markets. Areas that are resource rich with regard to biofuels feedstocks or solar or wind energy could produce liquid fuels or electricity from these feedstocks locally and use these fuels locally. Encouraging a diversity of low-carbon fuels can insulate from energy price shocks or fuel supply disruptions as such incidents are more likely when fuel is imported and/or there is an over-reliance on a single fuel type. The first to suffer from energy supply disruptions, energy price shocks, and pollution from high-carbon fuels/energy are those in front line (EJ) communities or disadvantaged communities who are least able to weather the negative impacts of such occurrences. (See also section 7, Economic Development).

Finally, specific aspects of a clean fuels standard's design can directly address issues of environmental justice. For instance, "advance credit" provisions can pull credits forward to support the near-term business case for fleet switching in medium- and heavy-duty contexts such as transit buses, and regulators could design a program that more richly rewards EV charging installation in underserved communities.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

Michigan's automotive, fuel production, and fuel distribution workforce consists of dedicated, hard-working individuals who, when there is policy change, are best served when policies respect the role of workers in achieving the policy objective. Policy-makers and public agencies can deliver on this respect by communicating effectively and being transparent about the policy and its impacts. Clean fuel standards can preserve and create jobs as well as provide job security and good wages.

Many of these jobs will be in the automotive manufacturing sector where Michigan's advanced vehicle and EV makers will benefit directly from the additional demand spurred by a clean fuels standard. Considering fuel production and fuel distribution (including retailers), job growth in renewable electric and gaseous fuels, and biofuels is possible from a clean fuel standard. For example, electric fuel production and distribution largely mirrors that of electricity for buildings, allowing for a relatively clear path for

retraining of workers seeking to enter this sector of the workforce from other sectors or young people entering the workforce for the first time. Biofuels production and distribution largely mirrors that of the petroleum fuel model, requiring minimal cost/retraining of workers entering this sector. The exception is that electric fuel distribution exists in a largely different model than the conventional retail vehicle fuel market. Electric vehicle filling stations are often at parking sites, as opposed to the conventional gasoline/diesel fuel pump. However, fast charge EV filling stations come nearer to the conventional model and can be suitable as a value-add for existing vehicle fueling stations. Job growth in EV filling station production, installation, maintenance, and customer support are all possible with a clean fuel standard.

Clean fuels standards also create new opportunities for research and development of advanced fuels--including advanced biofuels, potentially net-zero synthetic liquid fuels, and more efficient batteries and EV charging technology--that could be harnessed here in Michigan if a growing market for such fuels existed in the state.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Transportation is the leading cause of GHG emissions in the nation. In order to adequately, quickly, and effectively reduce emissions from the transportation sector, Michigan needs to set standards that incentivize reduction from *all* transportation fuels. A clean fuel standard is designed to reduce the carbon intensity of every fuel, leading to positive environmental benefits from *every single vehicle* on the road. This policy impacts the fuel providers all the way down to the farm-level and provides large incentives for practices that reduce the environmental burden of the fuels.

The negative impact of GHG emissions on climate change and the health of the environment is well established. Clean fuels standards have proven themselves successful in reducing GHG emissions from the transportation sector in places where they have been established. Cleaner alternative fuels also have important air quality benefits and reduce air pollution. Nitrogen in the air is contributing to [nitrogen loading in waterways](#) in Michigan and beyond, as transportation related air pollution moves from the Midwest to the Chesapeake Bay Region. Nitrogen loading leads to eutrophication - dead lakes and rivers - due to algae blooms. Other benefits would include reductions in smog-forming precursors as well as particulate matter that causes respiratory problems in humans and [harms tree health](#) - inhibiting the ability of trees to take up CO2 and release oxygen while reducing drought tolerance and increasing tree susceptibility to insect attack. Each of these issues can be positively addressed through a clean fuel standard that reduces GHG and other transportation emissions.

In 2021, automakers have made commitments to [produce a half of new vehicles](#) with zero-emission powertrains in the medium-term (by 2030). While some of this production is occurring at factories outside of the U.S., there are opportunities for production within the U.S. to deliver on meeting federal fuel economy and renewable fuel objectives. A clean fuel standard could drive automakers to commit low-carbon fuel vehicle production where zero-emission powertrains are not possible (in the near-term to medium-term). A

clean fuels policy naturally creates opportunities for “drop-in” fuels such as highly blended ethanol-based biofuels to drive emissions reductions in the existing conventional vehicle fleet, avoiding locking into continued reliance on petroleum fuels. Consider that [with no incremental cost](#) to the customer automakers can produce gasoline vehicles as flex-fuel capable. This means vehicles could use gasoline or any blend-level of ethanol with gasoline up to 85% ethanol (E85). Similarly, diesel powertrain manufacturers could update their warranty limitations to allow for biodiesel blend levels of at least 20% bio- to petro-diesel. The bottom line is, a clean fuels standard will create these opportunities and present automakers and fuel providers with choices, each of which could deliver significant GHG emissions reductions from the transportation sector.

Federal policy is addressing the overall fuel economy of the vehicles on America’s roads. Michigan policy can leverage federal policy to drive carbon neutrality efforts across the finish line.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

A Clean Fuels Standard creates additional market incentives, strengthens innovation and market development, and would increase Michigan’s profile as a leader in the clean vehicle industries. According to a model produced by [ICF for the Midwestern Clean Fuels Policy Initiative](#), a Clean Fuels Standard that reduces the carbon intensity of fuels by 15% by 2030 would create nearly 15,000 jobs and \$946 million in employment income. It would also increase the regional gross domestic product by \$1.98 billion and provide net benefits to gasoline sectors including gasoline car users and the trucking sector.

To attract and retain the best talent in the EV and clean fuels industries, and to encourage companies to locate in Michigan, we must continue to adopt innovative and effective clean mobility policies. While we don’t have modeling numbers to show the extent to which this policy will increase jobs and revenue in the state, we do know that more Michiganders are employed in the advanced mobility industry than the fossil fuels industry. Promoting clean vehicle adoption and the fuels that drive those vehicles will only serve the Michigan economy.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

Implementing a clean fuel standard would incur certain relatively modest administrative costs, primarily staff time at the administering state agency. However, a clean fuel standard neither taxes nor spends. Any related programs, such as an EV rebate, could be essentially self-funded using the revenue created by the standard’s credit/deficit market. Legislative sponsors through the Legislative Service Bureau and/or central staff covering policy for the Parties in the Michigan Legislature can take this research further.

9) Who is empowered to implement this recommendation?

- State government – Executive

- State government – Legislative

The Legislature would need to adopt the policy. State agencies would be responsible for administering the program. The Michigan Department of Agriculture and Rural Development (MDARD) already oversees the Weights and Measures rules related to liquid fuels, for example, however, the Legislature would need to identify the appropriate agency to oversee a clean fuel standard.

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

Groups concerned about potential land use issues and the impact of agriculture have brought forward concerns about continuing to promote ethanol and other plant-based fuels. Others countered that it is possible to design a clean fuel standard that would address those concerns and that drop-in low-carbon fuels can play an important role in cutting GHG emissions during a transition to electric vehicles. Because all types of transportation fuel can result in non-GHG environmental impacts, policymakers would need to assure that a Michigan Clean Fuels Standard does not lead to unintended consequences. Policymakers should seek to maximize benefits to the environment and natural resources, and include safeguards and incentives to protect natural lands and enhance environmental integrity, including biodiversity.

The program should also seek to support, through credit generation or other financial means, voluntary farmer-led efforts to adopt agricultural practices that benefit soil health and water quality while contributing to lower lifecycle greenhouse gas emissions from clean fuel feedstocks.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Developing a clean fuels policy is complicated and requires evaluating many details, involving many stakeholder perspectives, and working in coalition with a broad set of organizations that may not have a history of working together. Additionally, each state and region is unique, and creating an effective Clean Fuels Policy means taking the time to design a program that works for the many stakeholders in the transportation industry while still reducing the carbon intensity of fuels to help meet climate goals.

Clean fuels standards are broadly supported and legislation in other states has passed. Clean fuels policies in the U.S. have 10 years of implementation on the books and recently introduced policy in other states has fared well during initial debates. The work of the Midwestern Clean Fuels Policy Initiative is one example. A diverse group of stakeholders, covering the agriculture, biofuels, EV, EV charging, and gaseous fuel industries, the Initiative has researched and discussed clean fuels policies specifically designed for the Midwest's unique needs and opportunities for success. Their consensus principles and [recommendations](#) informed the drafting and introduction of bipartisan legislation in Minnesota that passed the House in 2021 and is gaining momentum and support leading into 2022. This underscores the possibility of finding agreement and political success with this issue in Michigan. Modeling done by the Initiative shows that achieving carbon intensity reductions of 20% by 2030 is achievable

using resources available in the Midwest. Finding consensus is critical in order to move expeditiously toward addressing GHG emissions from transportation.

Beyond this, the key issues policymakers will need to consider are some of the implementation details involved in establishing a clean fuels standard, which can be complex. Some of these are best left to the regulatory process so the Legislature will want to ensure that adequate resources are provided to the administering agency. Some of the questions to weigh include how to establish carbon intensity values for various fuels, how and whether to establish credit price floors and ceilings, who will be eligible to generate credits, what kinds of reinvestment requirements will be placed upon credit generators, and how to assure an equitable distribution of program benefits. Fortunately, the work of the Midwestern Clean Fuels Policy Initiative can help guide many of these discussions with consensus principles and recommendations.

IV. Develop GHG Budgets for Transportation plans

1) Overview of recommendation (250-word limit).

Rationale: In order to address the GHG emissions from the transportation sector, Michiganders need safe and convenient alternatives that enable them to drive less, including more public transit, trains, and bicycle amenities, as EV adoption will not ramp up quickly enough to achieve the necessary carbon reductions. A key component of reducing emissions is reducing the amount of time people spend in personal vehicles, often measured as vehicle miles traveled (VMT). This can be done through many approaches while allowing those who wish to keep driving a personal vehicle.

Recommendation: MDOT, and regional and local road agencies should develop plans for implementing GHG budgets into their transportation planning. (Colorado has recently drafted rules taking this approach.) MDOT and local road agencies five-year plans would need to meet the state's GHG budget for transportation by prioritizing projects that will achieve the needed GHG reductions, which would decline over time. They would also need to show that their plans do comply, or risk losing funding. This reprioritization of investments would serve to decrease VMT, and projects that increase VMT would therefore become ineligible for funding without significant mitigations elsewhere. This could include transit expansion projects, bike facilities, carpooling programs, designated HOV lanes, better connectivity to alternative mobility options, and more dense communities. The reduction goals would most likely need to be developed in a rulemaking by either EGLE or the Michigan Transportation Commission.

2) In what timeframe is this recommendation achievable?

Though the plans here can likely be accomplished by 2025, the implementation will go forward into the future.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

The reductions will largely depend on the GHG budget that is set. As an example, Colorado’s budget (below) sees a nearly 4 MMT reduction by 2050, but we could target higher.

Table 1: GHG Transportation Planning Reduction Levels in MMT of CO2e

Regional Areas	2025 Baseline Projections (MMT)	2025 Reduction Level (MMT)	2030 Baseline Projections (MMT)	2030 Reduction Level (MMT)	2040 Baseline Projections (MMT)	2040 Reduction Level (MMT)	2050 Baseline Projections (MMT)	2050 Reduction Level (MMT)
DRCOG	14.9	0.27	11.8	0.82	10.9	0.63	12.8	0.37
NFRMPO	2.3	0.04	1.8	0.12	1.9	0.11	2.2	0.07
PPACG	2.7	N/A	2.2	0.15	2.0	0.12	2.3	0.07
GVMPO	0.38	N/A	0.30	0.02	0.30	0.02	0.36	0.01
PACOG	0.50	N/A	0.40	0.03	0.30	0.02	0.4	0.01
CDOT/Non-MPO	6.7	0.12	5.3	0.37	5.2	0.30	6.1	0.18
TOTAL	27.4	0.5	21.8	1.5	20.6	1.2	24.2	0.7

8.01.3 Baseline Emissions Due to Projected Number of Light Duty Electric Vehicles

Table 2: Baseline Emissions Due to Projected Number of Light Duty Electric Vehicles

	2025 Projections (MMT)	2030 Projections (MMT)	2040 Projections (MMT)	2050 Projections (MMT)
TOTAL	27.0	20.0	14.0	8.9

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

We know that EV adoption is going to be difficult for a number of reasons. One of these is cost driven. Many in environmental justice impact areas will not be able to afford EVs for a number of years, meaning they will not see the benefits of reduced auto pollution (including other emissions like ozone) for many years. This recommendation looks at people driving less in the interim and creating spaces for people to be mobile outdoors - biking, walking, transit.

Safe transit and bike options will allow more people to get to work safely and will reduce pollution in these neighborhoods. Additionally, E-bike affordability programs in California appear to be the most cost-effective way to reduce climate change, as shown by a [Portland State University study](#). California’s pilot E-bike affordability program specifically targets low-income persons who would struggle with the needs to provide for EV ownership. By opening up safe options for people to use these alternatives, we can address equity issues, while also reducing far more GHG/mile than EVs while also not depleting other resources.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

Access to work is a key difficulty in areas of the state, particularly in Detroit and southwest Michigan. Increasing transit and safe routes for non-motorized transportation to meet the GHG budget targets will allow more people to work safely. [Studies on bike infrastructure have shown that increasing bike lanes and other low stress bike routes, creates more access to jobs for people without vehicles.](#) These infrastructure investments are far more cost effective and providing job access than similar projects for automobiles.

Though this recommendation will result in less new pavement being laid, it would still support jobs repairing our already damaged roads, while also connecting many to employment opportunities they would not have due to a lack of non-car options to get around. Additionally, this recommendation could actually increase road construction jobs as building pathways for biking and walking creates more jobs on a per-dollar basis than vehicle-only road projects. A 2011 study from the Political Economy Research Institute University of Massachusetts, Amherst found:

For each \$1 million, the cycling projects in this study create a total of 11.4 jobs within the state where the project is located. Pedestrian-only projects create an average of about 10 jobs per \$1 million and multi-use trails create nearly as many, at 9.6 jobs per \$1 million. Infrastructure that combines road construction with pedestrian and bicycle facilities creates slightly fewer jobs for the same amount of spending, and road-only projects create the least, with a total of 7.8 jobs per \$1 million.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Increased multimodal transportation will have benefits on air quality and public health above and beyond decreasing greenhouse gases. Vehicles emit particulate matter, VOCs, NOX, SO₂, Carbon Monoxide, and Ozone, among other pollutants. By reducing the amount of vehicle travel in the state, these pollutants should also go down.

In addition, providing safe routes for cycling and walking will encourage people to get outside and choose more active travel - which should benefit public health as exercise will be more readily accessible.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Transit-oriented development (TOD) has been a proven strategy to attract young talent to metropolitan areas. [Today's workers look for a place to live first, and then a job.](#) By investing in more multimodal opportunities, this will allow people looking for places to live without a car to target Michigan as a destination.

Public transportation produces a powerful impact on economic productivity: [Investment in transit can yield 49,700 jobs per \\$1 billion invested, and offers a 5 to 1 economic return.](#) This investment offers productivity gains long after the short-term stimulative

effect, according to “Economic Impact of Public Transportation Investment” by Economic Development Research Group.

Studies on TOD have shown that when you build around transit and mobility hubs, residents are happier. In a series of [case studies in New Jersey](#), the biggest concerns that were had with TOD were that more practical retail stores need to be attracted, and that more needs to be invested into pedestrian access to ensure safety for those walking and biking.

Additionally, the same case studies make the case that just as you can have “induced demand” when you expand a highway, if you build functional transit and mobility friendly spaces more people choose to walk, bike, and use transit. Planning and developing around transit hubs is good for economic development and for the planet.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

Unknown and would largely depend on the targets set by MDOT. Repairing road is generally less expensive than building new roads, so this should be a cost savings to the state

9) Who is empowered to implement this recommendation?

- Local government
- State government – Executive
- State government – Legislative
- Federal government – Executive
- Federal government – Legislative
- Private sector

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

Implementing GHG budgets into transportation infrastructure planning will not be an easy administrative feat. Public safety must remain the paramount criteria for determining transportation asset management plans. The cost differences between the current process for determining project plans (e.g. five-year plans) and a GHG budgeted process could be purposed instead towards increasing shared mobility solutions, like increased funding for transit and passenger rail, and nonmotorized solutions. The lack of funding resources for transportation infrastructure is prevalent across the transportation system, and asset managers would prefer the strength and effort of the Council on Climate Solutions instead focus on increasing revenue options for shared and nonmotorized mobility.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

V. Expand Access to Convenient, Zero-Emission Public Transit

1) Overview of recommendation (250-word limit).

Rationale: Personal driving is a leading source of climate pollution, yet most Michiganders feel they have no option but to drive everywhere they need to go. The first step in decreasing emissions from transportation must be to ensure all Michiganders have access to public transportation that is safe, reliable, affordable, and accessible. That ensures people have a real choice in how to get around and can choose to drive less often or choose not to drive at all, thus substantially cutting their GMG emissions.

Recommendation: The Michigan Department of Transportation, MPO's and local transit providers should develop comprehensive plans to expand access to convenient, zero emission public transit throughout the state of Michigan, with a goal of increasing the state's investment by an amount great enough to support the mobility needs of the state's residents.

The plan should identify the necessary actions and funding to ensure:

- All residents (rural and urban) have access to paratransit that guarantees seniors and people with disabilities door-to-door rides to essential appointments;
- All residents in urbanized areas have access to regular local public transit (within 1 mile); and
- 90% of Michiganders have access to daily passenger rail or inter-city bus service (within 10 miles);and
- Transit vehicles are increasingly electric, with a goal of 100% of new vehicles electric by 2030.

Implementation:

A critical first step must be understanding current access and need. MDOT funding should be increased to support annual quantifying and mapping how many Michiganders have access to the above mentioned types of public transit, as well as high-frequency transit that runs every 15 minutes and 24-hours a day.

Providing this breadth of service will require a significant increase in funding for public transit and passenger rail, which can be accomplished through a combination of ways:

- € Double state investment in public transit and passenger rail, including flexing funding that can be used for roads to rail and transit
- € Supplement transit funding with parking taxes, TNC (like Uber and Lyft) taxes, and other related taxes and fees
- € Provide more flexibility and options for municipalities and transit authorities to fund public transit locally, potentially including enabling local revenue options for public transit and amending PA 51 to increase funding for transit and shared mobility solutions.

Additional policy actions would also support this effort include:

- Remove transit funding opt-out option for municipalities and increase maximum millage time period (Act 196 of 1986)
- Support Rail Passenger Fairness Act which prioritizes Amtrak's legal right of way for passenger service.

2) In what timeframe is this recommendation achievable?

Development of a plan can be achieved by 2025, including quantifying and mapping current access and identifying necessary actions and funding. If begun promptly, full funding could potentially be achieved by 2025, since increases in state funding are an annual budgetary matter and supplemental funding mechanisms, municipal funding options, and other policy actions are largely legislative processes. Constitutional issues including allowing county sales tax and eliminating the Headlee amendment will take even longer, but can be completed before 2030.

An EV bus purchasing program and mechanic training program can be launched by 2025 and fully implemented by 2030.

Once transit agencies have more funding, they'll need another 2-3 years to buy more buses, hire and train drivers, implement service expansion, and promote new services to riders. As residents become more aware of options available to them, they'll adjust travel decisions and deliver measurable GHG emission reductions before 2030. Greater investment can further produce greater reductions over time, as younger people prefer urban living and public transit more than older generations.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

The magnitude of reductions depends on the speed and breadth of transit expansion and the level of individual mode shift. A typical trip on public transit emits 55% fewer greenhouse gas emissions than driving or ridehailing alone, according to recent data from the National Academy of Science's [Transit Cooperative Research Program](#).

The American Public Transit Association has estimated that single person commuting alone by car who switches a 20-mile round trip commute to existing public transportation can reduce his or her annual CO₂ emissions by an average of 4,800 pounds per year, equal to a 10% reduction in all greenhouse gases produced by a typical two-adult, two-car household.

If 4% of Michiganders switch to commuting on public transit, Michigan could cut roughly 1 million metric tons of GHG every year, which should be easily achievable by 2030. If 12% of commuters switch to transit, Michigan could cut roughly 3 MMT a year, which should be achievable by 2040.

Alternatively, a tool developed by the National Academy of Science's [Transit Cooperative Research Program](#) estimated that tripling Michigan's current ridership levels would net 0.8 MMT CO₂e, assuming no change in transit vehicle electrification, once the

emissions from the transit vehicles and transportation and land use efficiencies were accounted for. But that did not account to expanding transit to new areas.

For comparison, existing US public transit is estimated to reduce CO2 emissions by 37 million metric tons annually.

Michigan should also rapidly expand the use of EV buses, which emit 62% fewer emissions, with a goal of all new buses to be electric by 2030. This should be supported by a state program of mechanic recruitment, training, and re-training on how to maintain EVs. Existing public transit produces 55% less GHG emissions than single occupancy driving, so any shift to transit is net-positive for the climate but the benefits would be greater if those vehicles were electric.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

Expanding access to public transit is enormously beneficial to environmental justice in several ways.

Broad access to public transit is essential to addressing inequities (both current and future) caused by the expense of driving, the number of people unable to drive, and structural and systemic racism.

Expanding transit will decrease tailpipe emissions that harm public health in EJ communities in overwhelming proportions.

Additionally, [people of color are three times more likely to lack a car](#) (in southeast Michigan, 21% of Black households do not have access to a car, compared to 6% of White households). Expanding and improving public transit will improve access to good jobs, attractive schools, healthy foods, doctors, and shopping for everyone.

The commute time for people currently riding public transit is double that of drivers (averaging 51 minutes on transit vs 26 minutes by car), due to limited and infrequent transit availability. Since a majority of public transit riders are people of color, this places a significant undue burden that transit improvement can help erase.

Driving a car is extremely expensive and electrification is likely to make it more so. The poorest fifth of Americans already spend 42% of their annual household budget on automobile ownership, more than twice the national average. Workers who have access to reliable and efficient public transportation spend about 7% less of their overall household budget on transportation.

5) Describe the potential impacts of this recommendation on labor. (250 word limit).

Expansion of public transit service will result directly in more jobs available to drivers, mechanics and others, most of which are represented by the Amalgamated Transit Union or other unions. National analyses have also found that investment in transit can yield 49,700 jobs per \$1 billion invested, including both direct and indirect jobs.

Electrification of transit vehicles could have an impact on aftermarket service work due to fewer parts to maintain, so reskilling of those employees should be included in workforce development activities.

It will also improve access of workers to a diversity of jobs, increasing the pool of available workers and jobs by several-fold.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Expansion of public transit can provide a significant positive impact on the environment by decreasing emissions from single-occupancy vehicles and decreasing the need for paved impervious surfaces.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

National analyses have also found that [investment in transit offers a 5 to 1 economic return](#). Investment offers productivity gains long after the short-term stimulative effect. Economic development officials should also target transit vehicle manufacturers to the state to take advantage of additional job opportunities in this sector.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

This is challenging to quantify before the plan is fully in place, but by estimation, doubling state investment in public transit and rail would add around \$400 million a year.

Federal investment may help cover much of the costs of new electric buses and infrastructure, as this is a priority in several federal infrastructure proposals.

9) Who is empowered to implement this recommendation?

The central components of this recommendation can be implemented within the state administration, specifically by the Michigan Department of Transportation. Budget components require legislative action and the Governor's office. Constitutional issues require the legislature and public, plus broad campaigns to explain and build support for them.

Support from the federal and local governments can make implementing these recommendations significantly easier.

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

No substantive objections have been voiced (just recommendations to acknowledge differences between urban and rural areas and to address areas like product delivery).

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Success for this recommendation depends in part on public willingness to utilize public transportation. But given increasing demand among the growing population sectors of seniors, young people, and immigrants, it is reasonable to expect a strong willingness to utilize a convenient, safe, high-quality transit system.

It is also important to recognize that expansion of public transit will have more impact in urbanized areas than in rural ones, so expectations should be set accordingly. Every community needs to have some level of public transportation, but the fixed-route and high-frequency transit appropriate for urbanized areas can have the greatest impact on decreasing auto usage. Across the US, more than 2/3 of vehicle miles travelled are in urbanized areas, so this strategy can still have substantial impact on Michigan's climate goals.

Also of note, emissions from transit vehicles per passenger mile in 2018 were 26% lower than in 2005. Transit kept pace with auto efficiency improvements over the last decade.

Additional Recommendations

**Please note, the numbering of the additional recommendations do not indicate a priority or preference, they are in no particular order.*

VI. Develop a statewide plan to encourage nonmotorized mobility

1) Overview of recommendations (250 word limit).

Rationale: We can reduce carbon emissions by shifting transportation trips from non-transit motor vehicles to bicycling, walking, and personal mobility devices. Studies show that more people choose these clean modes of travel where these modes are safe, convenient, and accessible.

There is low-hanging fruit for mode shift. According to the 2010 National Household Travel Survey, half of all vehicle trips are 3 miles or less, while 28% are a mile or less. The widespread adoption of e-bikes and other assisted modes of travel further expand this opportunity.

Unfortunately, most Michigan roads have not been designed for safe use by all legal road users -- just motor vehicles -- especially in urban and suburban areas. They're not "Complete Streets".

Besides discouraging more biking and walking trips, these unsafe roads lead to increased road crashes. Despite their lower overall mode share, nearly 20% of all 2020 Michigan road fatalities were bicyclists and pedestrians, a percentage that's above the national average and climbing.

Recommendation: Michigan should develop and implement a statewide plan that takes a Safe Systems Approach to reduce Vulnerable Road User (VRU) fatalities and serious injuries to zero in order to encourage more trips by bicycling and walking.

This would include:

- Creating and carrying out a statewide Vulnerable Road User Safety Assessment

- Reinforce existing policies requiring Safe Systems Approach in all road projects (i.e. [PA 134 and 135](#)), and engage local transportation authorities more around implementation.
- Working with Michigan Planning Organizations to understand barriers to local adoption of the 2010 Michigan Complete Streets Advisory Council’s model for Safe Systems Approach policies and develop solutions.

2) In what timeframe is this recommendation achievable. (250 word limit).

VRU safety assessments can begin by 2025 but implementation will be ongoing through 2050. If passed, the federal Infrastructure Investment and Jobs Act will require the assessments to be started within two years of the bills enactment.

Policy changes can be implemented by 2025.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

Michigan	VMT (billion miles)	CO2 (metric tons)*	Population (millions)	CO2 (metric tons) per person
1980	61.1	24,684,400	9.2	2.68
1990	81.2	32,804,800	9.3	3.53
2000	94.9	38,339,600	9.9	3.87
2010	97.7	39,470,800	9.9	3.99
2019	102.2	41,288,800	10.0	4.13
2030	<i>1% annual decrease starting in 2030</i>	40,875,912		
2040		36,967,442		
2050		33,432,692		

*Average passenger vehicle CO2 emissions (EPA) = 404 grams per mile

0.41M metric tons of CO2 equivalent per year; _0.41M_ metric tons of CO2 equivalent **by 2030.**

4.3M metric tons of CO2 equivalent per year; _26.4M_ metric tons of CO2 equivalent **by 2040.**

7.8M metric tons of CO2 equivalent per year; _89.3M_ metric tons of CO2 equivalent **by 2050.**

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

People of Color suffer disproportionately when it comes to road safety. According to National Highway Traffic Safety Administration (NHTSA), Michigan motor vehicle crashes from 2015 through 2019 killed 740 bicyclists and pedestrians. 29% of those fatalities were Black despite the statewide Black population being 14%. Making Michigan roads safer for all provides a substantial benefit to communities of color.

According to the U.S. Environmental Protection Agency (EPA), poor air quality in near-road environments contributes to adverse health outcomes as well as health disparities due to race and income between communities and populations. Reducing vehicle miles traveled will improve health outcomes for those living in near-road environments.

Vehicle ownership is expensive in Michigan but especially in cities like Detroit where approximately a third of all residents don't have access to a motor vehicle. While walking, bicycling, and transit are critical, it's not always a safe or convenient option. This can limit access to jobs, education, health care, and other essential services.

Continuing to design communities to only accommodate safe travel by motor vehicle – either ICE or electric vehicles – perpetuates poverty.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

As noted in (4), having safe and convenient non-motorized travel options will increase access to job opportunities and transit for many who do not currently have access to a motor vehicle.

This recommendation will increase road construction jobs as building for biking and walking creates more jobs on a per-dollar basis than vehicle-only road projects. A 2011 study from the Political Economy Research Institute University of Massachusetts, Amherst found:

For each \$1 million, the cycling projects in this study create a total of 11.4 jobs within the state where the project is located. Pedestrian-only projects create an average of about 10 jobs per \$1 million and multi-use trails create nearly as many, at 9.6 jobs per \$1 million. Infrastructure that combines road construction with pedestrian and bicycle facilities creates slightly fewer jobs for the same amount of spending, and road-only projects create the least, with a total of 7.8 jobs per \$1 million.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Bicycling and walking have a much smaller negative impact on the environment. Bicycling is the world's most energy efficient form of transportation.

All motor vehicles, as well as their required road and parking infrastructure have a significant negative impact on the environment. Motor vehicles are very inefficient from energy efficiency and size perspectives compared with bicycles and walking. These operational inefficiencies impart external negative costs on the environment.

This recommendation reduces impacts of:

- Tailpipe emissions from ICE vehicles (PM, VOC, NOX, SO₂, carbon monoxide, ozone, and other pollutants)
- Unregulated vehicle emissions such as PM from tire wear, clutch, and brake wear
- Impervious road and parking pavement that concentrates stormwater and feeds flooding events
- Greenspace lost to roads, clear zones, and parking

Motor vehicles produce methane (CH₄) and nitrous oxide (N₂O) from the tailpipe as well as hydrofluorocarbon emissions from leaking air conditioners. Per the EPA, "emissions of these gases are small in comparison to CO₂; however, the impact of these emissions can be important because they have a higher global warming potential than CO₂."

Increases in bicycling and walking also produce positive physical, social, and mental health outcomes.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Bicycle-friendly and walkable communities are increasingly being sought by both young and old Americans. This recommendation would improve our infrastructure to better meet this desire. Additionally, employers are attracted to these communities as well.

Studies find that bicycle and pedestrian infrastructure also raise property values as well as attract tourism.

The Detroit Riverfront Conservancy's Economic Impact Study (2013) found a billion dollar return on investment for the RiverWalk. Not only did it attract other investments, it increased tax revenues, positive press, over 16 thousand construction jobs, and 1,300 on-going jobs.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

The cost is unknown currently largely due to transportation funding changes at the federal level. If passed, the Infrastructure Investment and Jobs Act would increase

federal funding for non-motorized infrastructure and safety. It's unclear if additional funding from the state and local governments would be required.

Building safer roads will reduce crashes for all travel modes. The cost savings from a decrease in road fatalities and injury crashes would be significant. The National Safety Council found the average economic cost of a road fatality in 2019 was \$1.7 million. Reducing Michigan's 1,083 road fatalities (2020) by 50% would result in \$920 million in annual economic cost reduction. Reducing road fatalities to zero would be a \$1.8 billion annual savings.

Increasing bicycling and walking will improve the physical, social, and mental health of Michigan residents. This would result in significant reductions in health care costs.

9) Who is empowered to implement this recommendation?

- Local government
- State government – Executive

This recommendation would largely be implemented by MDOT and the state transportation commission. Local governments would also be involved as the VRU Safety Assessment encompasses all roads, including those owned by the state, counties, and cities/villages.

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Shifting modes to clean transportation has been proven to work. Historically, Michigan's transportation carbon emissions were negligible when walking and bicycling were more predominant modes. Increasing bicycling and walking is a primary strategy for other cities and countries looking to reach carbon neutrality. It has been a very successful approach in many cities outside of North America (e.g. Copenhagen.)

These successes have focused on encouraging more bicycling and walking by building safer transportation infrastructure.

Michigan can follow these successes, especially in areas where trip lengths are shorter and can be more readily replaced by bicycling and walking.

This recommendation is very feasible since it does not require other major technological improvements. It can largely be funded through existing and forthcoming transportation funding sources. It builds upon the state's Complete Street, Safe Routes to Schools, and Towards Zero Deaths work.

This recommendation is also aligned with the federal Infrastructure Investment and Jobs Act, which is expected to be enacted this year. That act will likely require Michigan to perform VRUs and apply Safe Systems Approach.

Unlike other likely recommendations, this one only shifts a minimal amount of carbon emissions to other categories such as manufacturing and energy production. That's why one recent study found that lifecycle carbon emissions from bicycling can be more than 30 times lower per trip than ICE vehicles and about 10 times lower than EVs.

VII. Repurpose CMAQ Funds for Greater Climate Impact

1) Overview of recommendation (250 word limit).

Rationale: The majority of CMAQ funds in Michigan have been used for “Congestion Reduction & Traffic Flow Improvements”. See the 2020 accomplishments [here](#). These projects can include adding turn lanes, adding passing flares, and traffic signal timing. These types of projects can increase VMT, which ultimately drives up emissions of GHG. While these projects certainly serve the purpose of moving vehicles more quickly and stopping idling type emissions, they do nothing to get at the source of the emissions - which is the car centric system itself.

Instead of dedicating more than half of these funds each year to vehicle travel improvements, MDOT and MPOs should dedicate CMAQ to projects that will not only decrease emissions, but also decrease VMT. This means almost all of the funds should be used for Transit, bicycle and pedestrian, and shared ride programs, instead of the currently nearly 2/3rds going to Traffic flow.

Recommendation: MDOT and MPOs should adopt new policies to exclusively use CMAQ (federal Congestion Mitigation Air Quality program) funding for projects that decrease vehicle miles traveled (VMT), improve air quality and reduce GHG emissions. Projects that will likely increase VMT and don't serve a public safety priority should no longer be eligible for CMAQ funding.

2) In what timeframe is this recommendation achievable. (250 word limit).

By 2025: This can be implemented immediately by MDOT.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

The emissions reductions will be largely unknown, but based on estimates from Washdot, every mile of [VMT reduced equates a savings of nearly half a kilogram of CO2e](#). With an [annual VMT of 101.7 Billion miles](#) traveled in 2021, the potential for savings is enormous.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

CMAQ funds are designed to be targeted where NAAQS (National Ambient Air Quality Standards) are exceeded. By better spending these funds on completely removing emission sources by decreasing the amount of cars on the road, environmental justice communities that are experiencing NAAQS exceedances should see a bigger decrease

in pollution in the air. Creating more bike and pedestrian friendly infrastructure will remove the mobile emissions sources and create more livable communities.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

Access to work is a key difficulty in areas of the state, particularly in Detroit and southwest Michigan. Increasing transit and safe routes for non-motorized transportation to meet the GHG budget targets will allow more people to work safely.

This recommendation will result in less new pavement being laid and less traditional road work being done. However, by creating safer routes to employment for people without cars, overall job access should increase as seen in studies out of Minneapolis.

Additionally, this recommendation will actually increase road construction jobs as building for biking and walking creates more jobs on a per-dollar basis than vehicle-only road projects. A 2011 study from the Political Economy Research Institute University of Massachusetts, Amherst found:

For each \$1 million, the cycling projects in this study create a total of 11.4 jobs within the state where the project is located. Pedestrian-only projects create an average of about 10 jobs per \$1 million and multi-use trails create nearly as many, at 9.6 jobs per \$1 million. Infrastructure that combines road construction with pedestrian and bicycle facilities creates slightly fewer jobs for the same amount of spending, and road-only projects create the least, with a total of 7.8 jobs per \$1 million.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Increased multimodal transportation will have benefits on air quality and public health above and beyond decreasing greenhouse gases. Vehicles emit particulate matter, VOCs, NOX, SO₂, Carbon Monoxide, and Ozone, among other pollutants. By reducing the amount of vehicle travel in the state, these pollutants should also go down.

In addition, providing safe routes for cycling and walking will encourage people to get outside and choose more active travel - which should benefit public health as exercise will be more readily accessible.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Transit-oriented development (TOD) has been a proven strategy to attract young talent to metropolitan areas. [Today's workers look for a place to live first, and then a job](#). By investing in more multimodal opportunities, this will allow people looking for places to live without a car to target Michigan as a destination.

Public transportation produces a powerful impact on economic productivity: [Investment in transit can yield 49,700 jobs per \\$1 billion invested, and offers a 5 to 1 economic return](#). This investment offers productivity gains long after the short-term stimulative effect, according to "Economic Impact of Public Transportation Investment" by Economic Development Research Group.

Studies on TOD have shown that when you build around transit and mobility hubs, residents are happier. In a series of [case studies in New Jersey](#), the biggest concerns that were had with TOD were that more practical retail stores need to be attracted, and that more needs to be invested into pedestrian access to ensure safety for those walking and biking.

Additionally, the same case studies make the case that just as you can have “induced demand” when you expand a highway, if you build functional transit and mobility friendly spaces more people choose to walk, bike, and use transit. Planning and developing around transit hubs is good for economic development and for the planet.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

This is simply reprioritizing dollars the state already receives, so there is negligible cost to the state.

9) Who is empowered to implement this recommendation?

- Local government
- State government – Executive

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

Transportation authorities would strongly prefer that CMAQ funds not be even more restricted given the overall lack of funding for the transportation system.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Though there are federal rules on how CMAQ money can be spent, the allocation of those dollars is at the discretion of MDOT. This is fully feasible and achievable in a very short amount of time.

VIII. Establish a More Equitable VMT-Based EV Fee

1) Overview of recommendation (250 word limit).

Rationale: Michigan’s road maintenance fees on electric vehicles (EVs) have been shown to be significantly higher than those for similar conventional gasoline vehicles, thus potentially discouraging EV purchase--especially for lower-income residents. As a uniform fee, it also does not reflect the mileage traveled on MI’s roads where the more you drive, the more tax you pay. The result is a fee structure that effectively disincentivizes EV purchases while also having no basis in actual road usage. An alternative approach that would be fairer to EV drivers and in alignment with state goals regarding vehicle electrification would assess an EV fee that is comparable to other efficient gasoline vehicles, as well as be based on actual miles driven. This solution will also better prepare the state’s transportation infrastructure financing system for the long-

term and the natural reduction of fuel tax revenues caused by the electrification of the transportation sector.

Recommendation: Michigan should establish an alternative, VMT-based EV fee that is more in alignment with Michigan's climate goals and recognizes the higher efficiency of electric vehicles.

- Given the strong interest of policymakers in advancing vehicle electrification and establishing more permanent and fair solutions to assessing road maintenance fees for EVs, this alternative could go a long way in helping to address those concerns.
- Effective program design and implementation would be required to ensure program success.
 - Several states have implemented VMT-based pilots, though only one that we know of applies specifically to EV's (Utah).
 - MDOT or another implementing agency would have to develop the program and work with the Secretary of State to market the program to potential EV participants and collect the fees.
 - Keeping administrative costs low and making the program easy for EV drivers to participate in, with lower fees as an outcome, would be the ultimate measure of a program's success.

2) In what timeframe is this recommendation achievable. (250 word limit).

2025, although a pilot program could be implemented in 1-2 years.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

Reducing the impact of onerous EV fees is key component of a comprehensive strategy to accelerate EV adoption which is essential to achieving Michigan's CO2 reduction goals. One study found that a \$100 EV fee would likely result in a 10% reduction in EV sales.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

Reducing high upfront registration fees for EVs would most benefit lower-income Michiganders interested in purchasing an electric vehicle, including used EVs. VMT-based fees are also based on actual mileage, thus being fairer to those who drive less. Since the fueling costs are typically lower for EVs than gasoline vehicles, reducing barriers to EV ownership would enable more affordable transportation options for MI residents while reducing air pollution in EJ communities.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

To the extent that the lower upfront cost will remove a disincentive for potential EV purchasers, this policy would support more Michigan-made EVs and associated jobs.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Increased EV adoption with lower emissions of CO₂ and other air pollutants.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

The proposed policy would help MI move from a high-EV fee state to one that is an innovator in the area of EV fees. This would help attract EV manufacturers and other advanced automotive businesses to the state, as well as environmentally-conscious employees that are needed to work for them.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

The cost of administering the program is not yet known, but would likely be modest. Some upfront funding would be needed to develop the program and purchase any needed equipment. Revenues from EV drivers could then be used to help cover ongoing administrative costs. There may also be opportunities for federal funding from USDOT, which has supported other state VMT programs.

There would also be a modest impact on revenues resulting from lower EV fees, but this would be negligible based on the number of vehicles that would likely enroll and the small percentage of vehicles that are EV's relative to all registered vehicles. In addition, the anticipated increase in EV sales would likely offset those short-term losses due to the higher sales taxes and registration fees associated with more expensive EVs, until market pressures and battery innovation lower EV prices to the point they reach parity with internal combustion engine vehicles. Overall, a friendlier tax environment for EVs would likely be good for state revenues.

9) Who is empowered to implement this recommendation?

The state legislature would need to authorize funding for the program as well as allow EV drivers to enroll in the alternative VMT fee. A state agency would need to implement the VMT program and be responsible for collection.

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Given the strong interest of policymakers in advancing vehicle electrification and establishing more permanent and fair solutions to assessing road maintenance fees for EVs, this pilot would go a long way in helping to address those concerns.

Effective program design and implementation would be required to ensure program success. Several states have implemented VMT-based pilots, though only one that we know of applies specifically to EV's (Utah). MDOT or another implementing agency would have to develop the program and work with the Secretary of State to market the program to potential EV participants and collect the fees. Keeping administrative costs low and making the program easy for EV drivers to participate in, with lower fees as an outcome, would be the ultimate measure of a program's success.

IX. Update Building Codes to Ensure EV Readiness

1) Overview of recommendation (250 word limit).

Rationale: A major barrier to the transition to EVs is the lack of charging infrastructure at businesses and the potential need for extensive electrical upgrades, which often require the installation of conduit through existing concrete to connect the electric vehicle supply equipment (EVSE) to electrical service. It is more cost-effective to ensure a building is "EV ready" when it is being built or undergoing major renovations than to conduct these extensive upgrades. A recent study from the California Air Resources Board found that EV ready construction can save about \$7,000 to \$8,000 per parking space when installing a Level 2 charger, compared to a space that did not already have the required retrofits installed at the time of construction.³ Work-place charging will also increasingly become important to support the electrification of corporate, municipal, and state fleets and to facilitate the charging of commuting employee's vehicles.

To charge these new EVs, the U.S. will need 9.6 million charge ports, a substantial portion of which will be installed in single and multi-family residential buildings. However, it can be costly and challenging to install residential charging due to the potential need for extensive electrical upgrades. This often requires the installation of conduit through existing concrete to connect the electric vehicle supply equipment (EVSE) to electrical service. It is more cost-effective to ensure a new home is "EV ready" when it is being built or undergoing major renovations than to conduct these extensive electrical upgrades when a charger is installed.

Recommendations: Michigan's building codes should be updated to assist with EV adoption.

1. To reduce expensive retrofit costs, it is therefore critical that Michigan's building codes require parking spaces to be EV-ready. Some Michigan cities (e.g. East Lansing, Ann Arbor) have already passed zoning ordinances to require EV readiness, but a statewide code would be a more transformative approach.

2. Require that all new single-family homes with parking include an EV Ready space, that is, a parking space that is provided with at least one NEMA 14-50 branch circuit that can support a Level 2 EV charger.
 - a. This proposed code change is being considered in Denver, Colorado, Washington, DC and Wisconsin.
3. Study optimal policies to retrofit existing MDUs and include EV ready infrastructure in new MDU construction.
4. Study optimal policies to retrofit existing hotels and include EV ready infrastructure in new hotel construction.
5. Building codes should also be updated to include accessibility requirements.

**See appendix at end of document for suggested building code updates.*

2) In what timeframe is this recommendation achievable. (250 word limit).

By 2025: This code update is achievable within the next year and the impacts will be notable by 2025 if not earlier as the code influences new buildings in Michigan over that period of time.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

In 2018, the transportation sector was the second largest source of Michigan's greenhouse gas emissions, representing 32 percent of total emissions. In order to meet Governor Whitmer's goal under Executive Directive 2020-10 of 100% carbon neutrality in Michigan by 2050, policies must be put in place to reduce transportation sector greenhouse gas emissions and to support the transition from gas-powered vehicles to EVs in the state. President Biden's commitment to 50% EV sales by 2030 will require significant investments in charging infrastructure. EV-ready buildings play a role in enabling this transition and the associated emissions reductions. Based on a 50% EV sales target, emission reductions should be approximately 60% lower for vehicles sold in 2030 than in 2020.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

EV ready spaces are utilized in residential occupancies where EV owners are more likely to choose specific EVSEs with features that meet their personal, long-term needs. The minimum capacity of those EV ready spaces would be set at Level 1 charging under this proposal. Even though Level 1 charging is required for EV-ready spaces, the proposal includes a requirement for EV Ready spaces to have wiring and panel bus bars that support higher capacity charging to enable a cost-effective upgrade to load managed higher-capacity charging in the future.

EV capable spaces avoid the significant cost of parking lot re-trenching, which is one of the largest single costs of charging infrastructure retrofits but only a minor investment in new construction. EV capable spaces for residential properties, workplace charging, and

multi-family properties reduces future expenses for potential EV drivers, reducing costs associated with EVs for underserved communities. Requiring level 1 charging and ability to expand to level 2 charging keeps costs affordable for all communities. As a broader matter, the further adoption of EVs generally will also help accelerate reductions in localized pollution in environmental justice communities.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

When adding new building code provisions, concerns about discouraging new buildings – and in turn hurting the labor that build those buildings – are common. This proposal, however, should not add significant cost to the project because it is much cheaper to invest in EV readiness at the time of construction. Additionally, the various provisions are designed with potential expense impact in mind and should not discourage construction in any manner. With that in mind, it seems unlikely that EV-readiness provisions alone would result in fewer buildings being built and the upgrades needed will require skills workers to implement based on the code update.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

In 2018, the transportation sector was the second largest source of Michigan's greenhouse gas emissions, representing 32 percent of total emissions. In order to meet Governor Whitmer's goal under Executive Directive 2020-10 of 100% carbon neutrality in Michigan by 2050, policies must be put in place to reduce transportation sector greenhouse gas emissions and to support the transition from gas-powered vehicles to EVs in the state.

Increasing access to EV charging will also encourage further adoption of EVs and will, in turn, help reduce localized air pollution as more fossil-fuel powered vehicles are taken off the road.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

A major barrier to the transition to EVs is the lack of charging infrastructure at businesses and the potential need for extensive electrical upgrades, which often require the installation of conduit through existing concrete to connect the electric vehicle supply equipment (EVSE) to electrical service. It is more cost-effective to ensure a building is "EV ready" when it is being built or undergoing major renovations than to conduct these extensive upgrades. A recent study from the California Air Resources Board found that EV ready construction can save about \$7,000 to \$8,000 per parking space when installing a Level 2 charger, compared to a space that did not already have the required retrofits installed at the time of construction.³ Work-place charging will also increasingly become important to support the electrification of corporate, municipal, and state fleets and to facilitate the charging of commuting employee's vehicles. To reduce expensive retrofit costs, it is therefore critical that Michigan's building codes require parking spaces to be EV-ready.

These investments for businesses will help small businesses attract customers and support a positive public image with their clients and community.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

There are no costs for the State of Michigan beyond any existing costs of building code adoption and enforcement.

9) Who is empowered to implement this recommendation?

State government - Executive

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

The achievability and feasibility of this recommendation depends heavily on the process for the update of the building codes that is underway. Notably, it is crucial that a balance is struck between EV-readiness requirements and the cost of such requirements. If requirements are too expensive and onerous, not only will they be unlikely to survive the building code process, but they are also unlikely to incentivize as widespread action as hoped in their implementation and may have a negative impact on low-income communities. Multi-family dwelling properties need special support for implementation of this recommendation. Cost recovery and EV space sharing are the biggest hurdles for many owners. Additionally, the achievability and feasibility of this recommendation is also dependent on the enforcement of the building codes by local enforcement officials.

APPENDIX OF SUGGESTED BUILDING CODE UPDATES:

Proposed Language for Commercial:

AUTOMATIC LOAD MANAGEMENT SYSTEMS (ALMS). A control system that allows multiple connected EVSE to share a circuit or panel and automatically reduce power at each charger, reducing the total connected electrical capacity of all EVSE.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current. Plug-in hybrid electric vehicles are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats and the like, are not considered electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) SPACE. A parking space that is provided with a dedicated EVSE.

EV CAPABLE SPACE. A parking space that is provided with some of the infrastructure necessary for the future installation of an EVSE – such as conduit, raceways, electrical capacity, or signage – or reserved physical space for such infrastructure.

EV READY SPACE. A parking space that is provided with an electrical circuit capable of supporting an installed EVSE.

Revise text as follows:

C401.2.2 ASHRAE 90.1

Commercial buildings shall comply with the requirements of ANSI/ASHRAE/IESNA 90.1 and Section C405.14.

Revise table as follows:

TABLE
C405.12.2 ENERGY USE CATEGORIES

LOAD CATEGORY	DESCRIPTION OF ENERGY CUSE
Total HVAC system	Heating, cooling and ventilation, including but not limited to fans, pumps, boilers, chillers, and water heating. Energy used by 120-volt equipment, or by 208/120-volt equipment that is located in a building where the main service is 480/277-volt power, is permitted to be excluded from total HVAC system energy use.
Interior lighting	Lighting systems located within the building.
Exterior lighting	Lighting systems located on the building site but not within the building.
Plug loads	Devices, appliances and equipment connected to convenience receptacle outlets.
Process load	Any single load that is not included in HVAC, lighting or plug load category and that exceeds 5 percent of the peak connected load

	of the whole building, including but not limited to data centers, manufacturing equipment, and commercial kitchens.
<u>Electric vehicle charging</u>	<u>Electric vehicle charging loads.</u>
Building operations and other miscellaneous	The remaining loads not included in this table, including but not limited to vertical transportation systems, automatic doors, motorized shading systems, ornamental fountains, ornamental fireplaces, swimming pools, in-ground spas and snow-melt systems.

Add new sections as follows:

C405.14 Electric vehicle charging infrastructure. Parking facilities shall be provided with electric vehicle charging infrastructure in accordance with this section and Table C405.14 based on the total number of parking spaces and rounded up to the nearest whole number. EVSE, EV ready spaces and EV capable spaces may be counted toward meeting minimum parking requirements. EVSE spaces may be used to meet requirements for EV ready spaces and EV capable spaces. EV ready spaces may be used to meet requirements for EV capable spaces. An ALMS may be used to reduce the total electrical capacity required by EVSE spaces provided that all EVSE spaces are capable of simultaneously charging at a minimum rate of 1.4 kW. Where more than one parking facility is provided on a building site, the number of parking spaces required shall be calculated separately for each parking facility.

Exception: In parking garages, the conduit required for EV capable spaces may be omitted provided the parking garage electrical service has no less than 1.8 kVA of additional reserved capacity per EV capable space.

TABLE C405.14
ELECTRIC VECHILCE CHARGING INFRASTRUCTURE REQUIREMENTS

<u>OCCUPANCY</u>	<u>EVSE SPACES</u>	<u>EV READY SPACES</u>	<u>EV CAPABLE SPACES</u>
<u>Group B Occupancies</u>	15%	NA	40%
<u>Group M Occupancies</u>	25%	NA	40%
<u>R-2 Occupancy</u>	NA	100% ^a	NA
<u>All other Occupancies</u>	10%	NA	40%

Or one EV ready space per dwelling unit.

C405.14.1 EV Capable Spaces. EV Capable Spaces shall be provided with electrical infrastructure that meets the following requirements:

Conduit that is continuous between a junction box or outlet located within 3 feet (914 mm) of the parking space and an electrical panel serving the area of the parking space

The electrical panel to which the conduit connects shall have sufficient dedicated physical space for a dual-pole, 40-amp breaker

The conduit shall be sized and rated to accommodate a 40-amp, 208/240-volt branch circuit and have a minimum nominal trade size of 1 inch

The electrical junction box and the electrical panel directory entry for the dedicated space in the electrical panel shall have labels stating “For future *electric vehicle* charging”

C405.14.2 EV Ready Spaces. The branch circuit serving *EV Ready Spaces* shall meet the following requirements:

Wiring capable of supporting a 40-amp, 208/240-volt circuit,

Terminates at an outlet or junction box located within 3 feet (914 mm) of the parking space,

A minimum capacity of 1.8 kVA.

The electrical panel directory shall designate the branch circuit as “For electric vehicle charging” and the junction box or receptacle shall be labelled “For electric vehicle charging,”

C405.14.2 EVSE Spaces. The *EVSE* serving *EVSE spaces* shall be capable of supplying not less than 6.2 kW to an electric vehicle and shall be located within 3 feet (914 mm) of the parking space.

Proposed Language Residential:

Add new definitions as follows:

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current. Plug-in hybrid electric vehicles are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats and the like, are not considered electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the *electric vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *electric vehicle*.

EV READY SPACE. A *parking space* that is provided with an electrical circuit capable of supporting an installed *EVSE*.

Add new section as follows:

R404.5 Electric vehicle charging infrastructure. Electric infrastructure for the current and future charging of *electric vehicles* shall be installed in accordance with this section. *EV ready spaces* are permitted to be counted toward meeting minimum parking requirements.

R404.5.1 One- and two- family dwellings and townhouses. One- and two-family dwellings and townhouses with a dedicated attached or detached garage or on-site parking spaces and new detached garages shall be provided with one *EV-ready space per dwelling unit*. The branch circuit shall meet the following requirements:

A minimum capacity of 9.6 kVA

Terminates at a junction box or receptacle located within 3 feet (914 mm) of the parking space, and

The electrical panel directory shall designate the branch circuit as “For electric vehicle charging” and the junction box or receptacle shall be labelled “For electric vehicle charging”.

R404.5.2 Group R occupancies. Parking facilities serving Group R-2, R-3 and R-4 occupancies shall comply with Section C405.15.

Revise table as follows:

TABLE C405.2

REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE

SECTION ^a	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
<u>R404.5</u>	<u>Electric vehicle charging infrastructure</u>

TABLE R406.2

REQUIREMENTS FOR ENERGY RATING INDEX

SECTION ^a	TITLE
Electrical Power and Lighting Systems	
R404.1	Lighting equipment

R404.2	Interior lighting controls
<u>R404.5</u>	<u>Electric vehicle charging infrastructure</u>
R406.3	Building thermal envelope

X. Establish EV Dealer Certification Program

1) Overview of recommendation (250 word limit).

Rationale: Based on the Sierra Club’s Nationwide Study of the Electric Vehicle Shopping Experience from 2019, Americans are encountering difficulty while shopping for EVs especially at the dealer – customer interface. Vehicle availability and salespersons knowledge were major factors in this challenge. Dealerships have a lot of control when it comes to these factors, and by incentivizing Michigan dealerships to have EVs on the dealership lot, maintain educated salespeople, and sell more electric vehicles (new/used), more dealerships can hopefully be part of the solution in EV adoption.

Recommendation: Michigan should establish a certification program for dealers to recognize dealers that are educated on EVs and know how to sell and maintain them.

Passenger vehicle sales that count towards EV adoption are any that promote zero-emission driving for a specified number of miles. This can be passenger or commercial vehicles and can include new or used vehicles in the following categories (xEV):

- PHEV (based on EV range)
- BEV
- FCEV

Certification should require certain actions by the dealership, including but not limited to:

- Live EV charging on site
- EV inventory on the lot
- Commitment to training with OEM or certification body (could be State-run or administered by a third-party)
- Asked to actively promote EV sales by having knowledgeable salespeople and/or educational materials in the showroom
- Provide anonymized sales data to certification body
- Provide test drives of EVs
- Certified dealers will be recognized so that potential EV buyers know where to go to purchase their EV, thus providing an incentive of car sales to dealers

- Allow data collection with regards to program design

2) In what timeframe is this recommendation achievable. (250 word limit).

By 2025

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

Unknown

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

Increased participation is expected to result in higher EV adoption. However, even though the certification program would apply to the entire state, the dealership's geographic location could potentially impact the equitable rollout of this program pending local participation.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Encourages dealership economic activity by broadening the market to include more EV's.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

9) Who is empowered to implement this recommendation?

- Local government
- State government – Executive
- State government – Legislative
- Private sector – dealerships, fleet owners selling vehicles

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

- For PHEV, need to study how much EV range would qualify as an xEV sale. One method could be based on median miles traveled/trip.
- A tracking system of dealership xEV sales may need to be developed. Data is reported to MDOT/Secretary of State however would need to create system for certification body to compile and analyze the data.
- Should this certification program apply to virtual dealers i.e. Carvana, Vroom, etc.?
- Need to study how long to keep the program in place. Could be time-based, based on EV adoption rate, other?
- Could provide additional recognition / awards to dealers that are:
 - Giving the most test drives of xEVs
 - Selling the most xEVs
- Additional research to identify and characterize primary barriers to EV sales at dealerships
- Conduct research to explore the relationship between salesperson EV ownership and positive EV perceptions, to inform program design
- Possibly collaborate with Michigan's dealer association (NADA-equivalent) to broaden program outreach, awareness, and familiarity

XI. Allow HOV Lane Access for Plug-in Electric Vehicles

1) Overview of recommendation (250 word limit).

Rationale: Typically, HOV lanes are restricted to vehicles carrying more than one person, encouraging carpooling in exchange for access to a dedicated lane that allows carpoolers to move quickly through traffic on busy highways. HOV lane access is highly desirable in congested metropolitan areas. These initiatives are powerful inducements for EV sales. A UC-Davis study analyzing 25 research papers on non-financial EV incentives found that HOV lane access is an effective mechanism for increasing EV sales. While Michigan only has one designated HOV lane currently (along a new section of I-75), allowing electric vehicles to use this new lane in a high-capacity corridor could still have a big impact and set a precedent for any new HOV lanes in the future. Sunset dates should be considered based on a percentage of EV adoption being achieved.

Recommendation: Establish new policies to allow Plug-in Electric vehicles (BEVs, PHEV's and FCEV's) to use Michigan's High Occupancy Vehicle Lanes (HOV lanes) regardless of passenger occupancy.

2) In what timeframe is this recommendation achievable. (250 word limit).

By 2025

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

There are a few variables at play: The number of EVs on the road, where they are located, how they are charged, and how much renewable energy is integrated into the power grid are all factors. A detailed analysis would be needed to accurately estimate the reductions in greenhouse gases and other pollutants from this proposal. Given studies showing that HOV lane access is a driver of EV ownership and increased adoption, and studies showing that EVs reduce emissions compared to gasoline vehicles, we can be confident that this proposal will decrease greenhouse gas emissions in Michigan.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

Electric vehicles and HOV lanes reduce harmful pollutants both from increased EV use but also from reduced idling on highways. The air quality benefits of this proposal would be highest in the communities directly surrounding the highways with HOV lanes, which are often some of the communities with the worst air quality.

Many HOV lane programs only allow new EVs to be eligible for HOV lane use. However, we recommend modeling the Michigan program off an amendment to [California's HOV lane rules](#) that allows drivers who make less than 80% of the median income and purchase a used EV to qualify for the program. The program should not be limited to only those who can afford new electric vehicles.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

This program would incentivize EV ownership and increase EV sales, which impacts labor in a few ways. EVs require fewer parts and thus less assembly, however an increasing number of Michiganders are employed in the advanced and electric mobility industries. We don't anticipate this proposal would have a substantial effect on labor in Michigan.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Electric vehicles decrease greenhouse gas, NOx, SOx, and particulate matter pollution. Using HOV lanes to their fullest potential by allowing EV use will increase EV sales and reduce idling by increasing the number of cars that can travel at higher speeds on the highways.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Allowing EVs to use HOV lanes is a strong signal that Michigan supports this exciting and important market. We want Michigan to remain the capital of automotive innovation,

however in a recent scorecard published by the American Council for an Energy Efficient Economy, Michigan [was ranked 29th](#) in its support for transportation electrification. To attract and retain the best talent in the EV industry, and to encourage companies to locate in Michigan, we must continue to adopt innovative and effective EV policies.

While we don't have modeling numbers to show that this policy will increase jobs and revenue in the state, we do know that more Michiganders are employed in the advanced mobility industry than the fossil fuels industry. Promoting EV adoption will only serve the Michigan economy.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

\$35,000 per year; \$175,000 total by 2028

There would be an administrative program expense – human hours to verify that vehicles are eligible to use the program and obtain the stickers or license plates and send them out. This estimate includes an approximate wage for a .5 LTE employee to run the program for 5 years. This proposal is designed to end when EV adoption is higher, which means costs beyond 2030 will likely not be realized. Other potential expenses could accrue in the form of attempted enforcement against and lost revenue from noncompliant violators.

Also, EV drivers pay more to register their vehicles, so that funding could be redirected to the administration of EV incentive programs.

9) Who is empowered to implement this recommendation?

- State government – Executive
- State government – Legislative
- Other: There are two bills (HB 4178 and HB 4179) introduced in the Michigan House of Representatives that would give MDOT jurisdiction over eligible users of HOV lanes.

10) Is there consensus among the subgroup for this recommendation, or are there differing perspectives? If differing perspectives, what are they? (250 word limit)

The group enjoys consensus on the concept. Specific considerations regarding an appropriate sunset date and administrative staffing needs were not fully discussed within the group and will be best left to policymakers.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

- The most important consideration is what state agency would be responsible for the administration of the program. The program could be administered by MDOT, Secretary of the State, or another relevant agency like EGLE. However, integrating the program administration into current vehicle registration processes would make it more effective. Ultimately, the implementing agency could learn

from the experiences of the many other states with HOV lane access programs to identify best practices.

- This proposal will incentivize electric vehicle ownership at virtually no cost to the state.
- Programs in 11 states allow electric vehicles to use HOV lanes, though none are in the Midwest. Many of these programs use stickers or special license plates issued by the Department of Transportation to identify eligible HOV lane users.
 - EV drivers would request the sticker or plate yearly with their vehicle registration.
 - Many of the existing HOV lane programs include sunset dates aimed to retain the high-speed nature of an HOV lane.
- It is important to design the program with an appropriate sunset date. To maintain the integrity of HOV lanes, we want to ensure that they remain fast moving and incentivize carpooling, which also reduces VMT and thus reduces emissions. Choosing a date or goal that sunsets the EV occupancy in HOV lanes is critical to the success of the program.
- Michigan's first HOV lane will debut in the fall of 2023 on I-75 in the Metro-Detroit area. This is a congested corridor and a key commuting route between downtown Detroit and suburban communities. We recommend adopting the necessary laws and regulations to allow for EV access to the lanes upon opening. If adopted, this could set a precedent for future HOV lanes in Michigan.

XII. Prepare to Adopt LEV, ZEV, ACT, and HDO Rules

1) Overview of recommendation (250 word limit).

Recommendation: Michigan should signal its commitment to electrification by preparing to adopt a Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) standards in the Advanced Clean Cars Program, as well as the Advanced Clean Truck (ACT) and Heavy-Duty Omnibus (HDO) rules. The state needs a much greater investment in EV charging and LEV fueling infrastructure in particular to facilitate these policies.

- The LEV standard requires a reduction in tailpipe emissions and fuel evaporative emissions of criteria pollutants and greenhouse gases from mobile internal combustion engines found in new, light-duty and medium-duty motor vehicles sold in Michigan starting from model year 2025.
- The ZEV standard requires that automakers supply a certain increasing percentage of ZEVs to the state or purchase credits from other automakers to meet the state requirements starting with model years 2025.
- The ACT and HDO rules are similar, but for medium- and heavy-duty vehicles. The ACT rule requires manufacturers produce an increasing number of zero-

emission medium- and heavy-duty vehicles beginning in 2025. The HDO rule cuts NOx pollution from new fossil fuels medium- and heavy-duty trucks by 90 percent and implements new warranty and emission testing practices that better reflect vehicle operations.

2) In what timeframe is this recommendation achievable. (250 word limit).

By 2025

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

Conservative estimates of adoption from data in 2017 by a study done by [M.J. Bradley](#) show a scenario where there would be 999,450 PEVs in Michigan by 2030, rising to 3.9 million in 2040, and 5.4 million in 2050. This equates to 10.8 percent of in-use light duty vehicles in Michigan in 2030, rising to 41.5 percent in 2040 and 55.7 percent in 2050. In this scenario, this will result in annual reductions of GHG emissions by up to 7.7 million tons, and a cumulative reduction of 99 million tons by 2050.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

Adopting a vehicle emission standards in Michigan will help us address our carbon emission reduction goals and reduce the harmful air pollution associated with higher risk for heart attack, cancer, and asthma [link](#). Transportation pollution include particulate matter (PM), nitrogen oxides (NOx), and volatile organic compounds (VOCs). According to the EPA, the transportation sector is responsible for over 55% of the NOx emissions [link](#). Despite only making up 10% of the vehicles on the road, heavy-duty vehicles make up for 28% of global warming emissions and up to 57% of fine particulate emissions [link](#). Because Black and Brown communities, and other traditionally underserved communities, are more often located near transportation hubs, they suffer disproportionate harm from transportation pollution. Cleaning up the transportation sector by transitioning to zero-emission technology in the long-term while reducing pollution from new fossil fuel vehicles in the near-terms, will help address environmental injustices and reduce GHG emissions.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

A Clean Cars program in Michigan could result in a direct economic impact to auto manufacturers by requiring them to deliver for sale in Michigan Low Emission Vehicles and increased numbers of Zero Emission Vehicles, and to prepare and submit associated compliance reporting.

Over [24,000 Michiganders](#) have direct clean transportation jobs or around [69,000 jobs](#) if indirect and induced jobs are included. A ZEV Standard could dramatically increase those jobs and jobs in other clean energy sectors by 2030. To give a further snapshot, according to a recent report done by the [Advanced Energy Economy](#), investing in transportation electrification would yield a five-fold return.

Reduced spending on auto maintenance and gasoline may lead to reductions in jobs in regulated businesses and industry in the short-term. While some jobs that are currently structured around the manufacturing of internal-combustion engine vehicles will not remain in their exact same form, there will be a net increase in jobs as a result of electrifying Michigan's transportation sector. Increased spending on EV purchasing, grid investments, EV charging infrastructure and research and development, as well as the positive effect of transportation electrification on re-spending owing to its cost-effectiveness, produce net positive gains in jobs and income over the long-term. Workforce transition and training programs will be crucial to realizing the potential benefits for Michigan's workers.

In addition, Michigan spends billions of dollars a year on importing fossil fuels. Under LEV/ZEV standards, [Michigan would see a reduction in fuel spending and maintenance, saving consumers, governments, and businesses money](#). These savings would allow Michiganders to spend more money in the state, benefiting the state's broader economy. This could also positively impact federal foreign policy and national security policies.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

- As EVs proliferate, they not only reduce CO2 emissions to fight climate change, but also emissions of other pollutants that are dangerous to human health and the environment (nitrogen oxides, particulate matter, and volatile organic compounds).
- Full life-cycle of LEV/ZEV vehicles have a lower carbon footprint than conventional ICE vehicles. As Michigan's electric generation portfolio continues to transition away from coal to cleaner fuels and renewable resources EV's and alternative fueled vehicles will yield greater environmental benefits.
- The development of cleaner vehicles under a LEV/ZEV standard has the potential to decrease the U.S.'s and Michigan's dependence on petroleum
- Medium- and heavy-duty trucks are a major source of air pollution, often concentrated near freight corridors located in disadvantaged communities. can be improved.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

9) Who is empowered to implement this recommendation?

- State government – Executive

- Michigan Department of Environment, Great Lakes, and Energy
- Michigan Department of Transportation
- Michigan Department of Licensing and Regulatory Affairs
- State government – Legislative
 - The state legislature would need to authorize the rules

10) Is there consensus among the subgroup for this recommendation, or are there differing perspectives? If differing perspectives, what are they? (250 word limit)

While a clean cars standard and clean truck standard does have support from a plurality of the workgroup, there is some opposition to having one in Michigan. In particular, some voices representing the automotive manufacturing industry, which has a vested interest in the adoption of EV product models, does not believe a mandate on clean cars standard in Michigan is an appropriate solution.

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

- Colorado, Connecticut, Delaware, Massachusetts, Maryland, Maine, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and the District of Columbia, which together comprise 36 percent of the auto market, have adopted California’s clean car standards. Four more states are in the process of adopting the standards (Nevada, New Mexico, Minnesota, and Virginia), so this is something that is both achievable and feasible. New Jersey also just announced plans to adopt California’s Advanced Clean Truck (ACT) and Heavy-Duty Omnibus rules.
- California is currently updating the Advanced Clean Cars Program for model years 2026 and beyond. These updated standards are expected to be issued in 2022 and will increase the sales requirements for auto manufacturers for the following decade, with an expectation that the 2035 sales requirement will be 100% ZEV sales. When it comes to the credit system, Michigan should look at Nevada that has offered a blueprint to maximize the effectiveness of the ZEV standard, which is explained here. Michigan is going to need to review and adopt these new California standards to ensure its program remains consistent with the updated rules, including provisions pertaining to the use of proportional credits.
- Michigan should sign onto the Multi-State Medium and Heavy Duty MOU. This will help guide Michigan in achieving the truck standards through commitment targets and progress tracking. By signing on, it will allow us to collaborate with the other 15 signatory states and District of Columbia to explore a range of other actions the state could take to support truck electrification through the ZEV Task Force and state action plan. Recently, 37 businesses and investors sent a statement of support to the states that had made the pledge.

- As of 2021, electric light-duty and MHDVs have lower total cost of ownership than fossil fuel powered vehicles. Even with higher upfront purchase costs now, the savings from maintenance and fuel costs will save consumers, the state, and fleet operators money over the lifespan of these EVs. As battery technology improves, the upfront costs for EVs will be at price parity for some vehicle by the mid- to late-2020s with their fossil fuel powered counterparts. Rebates and incentives on the purchase of EVs can help jump-start the market during the early adoption phase. Moreover, we will need to look at further policies to advocate for incentivizing EVs outside of purchasing, such as fleet commitments, charging infrastructure development, taking advantage of funding available through the Volkswagen settlement to accelerate the electrification of targeted fleets for which EVs are already commercially available.
- We need to think of all communities and income levels. Lower income individuals and communities of color are not able to afford EVs as currently stands are the ones who bear the biggest burden of pollution, so we need to think about policies and incentives for these individuals and communities. As the transportation sector decarbonizes, principles of equity and justice will need to guide the transition.
- Due to long vehicle lifetimes and low fleet turnover rates, Michigan needs ambitious policies imminently to achieve our state's climate goals. More than half of cars, light trucks, and MDHVs in the United States remain on the road for longer than 15 years, which means that vehicles sold in the next several years could lock in GHG emissions far into the future beyond 2050. To reduce transportation emissions and meet its long-term climate goals, Michigan has to implement a LEV/ZEV standard that will quickly increase the share of new vehicle purchases that are EVs and be at 100% new car sales being EV by 2035.
- For MHDVs, Michigan should adopt a Advanced Clean Truck (ACT) rule, which will require new sales of trucks and buses to be 100% zero-emission by 2045. However, due to the lifespan of MHDVs which can live up to 18 years, the 2045 target is too far out and would mean that polluting trucks and buses will still be on our roads in 2060. Michigan should seek ways to phase out fossil fuel powered MHDVs by 2035. Since more long-lived fossil fuel engines will continue to be built and sold over the next several decades, the Heavy-Duty Omnibus rule is a vital complement to reduce NOx emissions on newer engines that cannot be fully electrified and will ultimately zero-out harmful pollution from heavy-duty vehicles. This rule will help manufactures innovate and deploy technically feasible and cost-effective technology sooner.

XIII. Develop EV Procurement Goals for State Fleets

1) Overview of recommendation (250 word limit).

Rationale: The State of Michigan has slightly more than 13,500 vehicles on the road across its various agencies. Comparatively, there are only 13,011 all-electric vehicles and 13,893 plug-in hybrid electrics on Michigan's roads. In this context, a commitment from the state could have a significant impact on the advancement of the EV market in Michigan.

Recommendation: The State of Michigan should establish EV procurement goals for state-owned and state-leased fleet vehicles including a broad, long-term plan as well as short-term targets to electrify a practical subset of the state fleet.

- The Governor should direct the appropriate departments to promote the use of EVs in the state's fleet, including the following:
 - Procure EVs for all newly purchased or leased light-duty vehicles in state fleets by 2023 as reasonable and practicable.
 - Install EV charging infrastructure at all state-owned buildings and parking lots by 2023.
 - Direct the Department of Technology, Management and Budget (DTMB), with guidance from EGLE and the Department of Transportation (MDOT), to develop an EV fleet plan for transitioning to 100% EVs in the state fleet by 2030. To make the plan more equitable, DTMB should prioritize transitioning fleet vehicles in high-density areas which have been historically disadvantaged by higher pollution levels. The plan should be updated annually based on vehicle availability, price declines, and lessons learned and use data obtained from telematics deployed in the state fleet.
- To make sure the state fleet can still operate successfully during this transition, strict exceptions can be designed for certain vehicles based on whether electric vehicles are practical based on the conditions and uses of the fleet and whether electric vehicles are reasonably available when factoring in sufficient supply of vehicles, delivery systems, and potential limitations of the current procurement process.
- The states goals and lessons learned should be shared with local units of government, state universities and other large fleets to encourage electrification as well.

2) In what timeframe is this recommendation achievable. (250 word limit).

This would be a multi-step process with achievable targets by 2023 and 2030.

3) What is the relative magnitude of this recommendation, in terms of GHG emissions reductions?

According to the US Environmental Protection Agency, a typical passenger vehicle emits 4.6 metric tons of carbon dioxide per year. Estimating approximately 11,000 light-duty vehicles that may be suitable for replacement in the state fleet based on the 2019 state fleet report and assuming the conversion of these vehicles, the emissions would be as follows:

50,600 metric tons of CO2 equivalent per year starting in in 2030.

50,600 metric tons of CO2 equivalent per year; 506,000 metric tons of CO2 equivalent by 2040.

50,600 metric tons of CO2 equivalent per year; 1,012,000 metric tons of CO2 equivalent by 2050.

4) Describe the potential impacts of this recommendation on environmental justice (250 word limit).

A transition of the state's fleet to 100% all-electric light duty vehicles will help reduce localized environmental pollution, increase publicly available charging options, and help drive down the cost of electric vehicles in Michigan. While not directly engaging environmental justice communities, this would help make electric vehicles more accessible and help accelerate the reduction in localized pollution from transportation vehicles.

5) Describe the potential impacts of this recommendation on labor (250 word limit).

A state procurement target will support increased demand for electric vehicles made by Michigan companies and manufactured by Michigan labor. Additionally, an investment in charging infrastructure at state buildings will create job opportunities for electricians and laborers to install such infrastructure.

6) Describe the potential impacts of this recommendation on the environment (250 word limit).

Per the estimates above, a state fleet transition will help directly reduce vehicle emissions from the state fleet, but it will also encourage more widespread adoption of vehicles in public and private fleets across Michigan, which will result in additional environmental benefits.

7) Describe the potential impacts of this recommendation on economic development (250 word limit).

Setting a state fleet procurement target sends a signal to charging infrastructure companies and automakers alike, catalyzing further investment from large companies and from entrepreneurial ventures.

8) What are the relative costs of this recommendation? Unknown, or different timeframe – explain why (150-word limit):

The costs of the transition are hard to predict due to the availability of incentives, the nature of how electric vehicles are operated once in the fleet, and the cost of future EV models.

For ~\$200,000 or less (based on estimates from subject matter experts and consultants) the state of Michigan could conduct a comprehensive plan to transition to an all-electric fleet based on data gathered via telematics in a sampling of state vehicles.

9) Who is empowered to implement this recommendation?

- State government – Executive

10) What are some of the notable perspectives shared and questions raised with respect to this recommendation? (250 word limit)

11) What are the most important considerations for achievability and feasibility of this recommendation (500 word limit)?

Michigan's state government can lead by example by driving the rapid deployment of EVs in the state fleet in a manner that reduces the environmental impact of the state fleet, decreases long-term maintenance and operations costs, and sends a signal to the broader market that Michigan is a leader advanced mobility. The transition to an electric fleet requires consideration of current state processes, timelines, vehicle types including cost, vehicle availability, and practicability given the use of a vehicle, education of government staff, and whether to build in exceptions. It also requires consideration of charging infrastructure availability and how to pay for the necessary investments to accommodate an electrified fleet.

Michigan should set goals that are prescriptive and detailed to avoid loopholes in implementation. However, it would be reasonable to allow for thoughtful and purposeful exceptions. For example, certain vehicles or certain state functions may not be suited to electrification, at least in the short-term. Forcing vehicle electrification in areas where it is not yet appropriate can lead to inefficient processes and may result in unintended hurdles. Some states have dealt with this by creating qualifying metrics around "reasonableness" or "practicability," others have simply limited the vehicles that will be subject to the rule, and others have set cost thresholds. Any of these approaches could be appropriate, but they should be specific and clearly defined to ensure these exceptions or provisions do not undermine the objective of increasing EVs on the road.

Perhaps the most fundamental consideration for achieving these goals is to gather the correct data to purchase and utilize electric vehicles. Directing DTMB/EGLE/LEO/DOT to develop a plan for full fleet electrification – not just new vehicle purchases – provides an ambitious vision, while allowing for room to evaluate costs and feasibility. The plan will need to be updated regularly as the industry and technology develop.