LOW CARBON HIGH COSTS

How a clean fuel standard would increase gas prices and living costs in Michigan

By Isaac Orr, Ewan Hayes and Mitch Rolling

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ISBN: 978-1-942502-83-8 | S2024-08 | Mackinac.org/s2024-08

The Mackinac Center for Public Policy

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Executive summary*

This report explains the costs and benefits of a so-called clean fuel standard in Michigan. We estimate that such a standard would increase gasoline costs by about $350 per year for a typical Michigan household. If the standard works to reduce carbon emissions, it might reduce future global temperatures by an estimated 0.0003° C in 2100.

Some key takeaways from the report include:

- Sen. Sam Singh and a group of state senators introduced Senate Bill 275 in 2023. It would create a low-carbon fuel standard, called a clean fuel standard, for the state. If passed, this law would act like an additional gas tax, increasing the cost of transportation fuels for families and businesses.
- The changes imposed by the bill would increase gasoline prices. Always On Energy Research calculated that Michigan's proposed clean fuel standard could increase gasoline and diesel prices by approximately 10%.† The proposed standard would, according to our model, increase gasoline prices by $0.34 per gallon and diesel prices by $0.39 per gallon by 2035.
- As a result, this mandate would increase the estimated annual cost of driving for Michigan residents by about $350 per household in 2035.
- The extra costs Michigan drivers would pay at the pump will not help upgrade the state's roads and bridges. In fact, the proposal would reduce revenue for roads, because higher prices mean drivers will purchase less fuel, reducing gas tax revenues. The primary beneficiaries of the standard will be companies that profit from producing and selling so-called clean fuels.
- The proposed clean fuel standard would increase the state budget, as the program would cost millions to run. Lawmakers would have to either raise taxes or redirect current spending priorities. A clean fuel standard would increase costs for local governments as well.
- The legislation requires the standard to become increasingly more stringent. The most common ethanol fuels like E-10 and E-15 would quickly be considered no longer "clean."

* This report was derived mainly from earlier work completed by the authors at Always On Energy Research and follows a template found in their earlier reports. This document reflects the proposed legislation — Senate Bill 275 of 2023 — and its impact on Michigan, but the structure and language of the paper mirrors the previous study.

† This calculation based on the average price of $3.54 per gallon of gasoline and $3.78 per gallon of diesel on June 19, 2024.

Introduction

Michigan lawmakers introduced in 2023 a proposal to create a so-called clean fuel standard in this state. It mirrors California's Low Carbon Fuel Standard. If enacted, this policy would act like an additional gas tax, increasing the cost of transportation fuels for families and businesses. Unlike a gas tax, however, this policy would provide no money for roads and bridges. It would also have no measurable impact on future global temperatures.

Under the standard proposed in Senate Bill 275 of 2023, Michigan would need to reduce its aggregate fuel supply's carbon intensity — a measurement of how much carbon dioxide is released per unit of fuel consumed — by 25% by the end of 2035, using 2019 as the baseline.[1]

These changes would raise gasoline prices across the state. Using data from the Oregon Department of Environmental Quality, Always On Energy Research calculated that Michigan's proposed clean fuel standard could increase gasoline and diesel prices by 34 and 39 cents per gallon by 2035, respectively.[2]

Increasing transportation fuel prices would raise the cost of driving for Michigan families by about $350 per household in 2035. Rising gas prices harm Michigan families and businesses by leaving them with less money for other everyday expenses like groceries, health care, education or savings. Higher fuel costs will also increase the prices of other goods and services, because businesses will have to raise their prices to absorb the higher energy costs.

Inflation is already a key concern for Michiganders. According to the June 2024 Michigan inflation report published by the Congressional Joint Economic Committee, Michigan households are paying "$1,002 more per month to purchase the same basket of goods and services as in January 2021. Cumulatively, the average Michigan household has spent $25,618 more due to inflation since January 2021."[3] A clean fuel standard will make this situation worse.

The proposed standard will increase prices at the gas pump and throughout the economy. It will also limit consumer choices. The standard forces drivers to pay more to drive vehicles that use gasoline, ethanol and diesel. Although details are lacking, the bill requires the state to subsidize ambiguously defined "clean energy and accessible transportation projects in disadvantaged communities." How these funds will be spent is, at best, unclear. "The specific projects and goals would be determined through consultation with credit generators, community leaders, and environmental justice advocates" are all the details provided, according to the Michigan Senate Fiscal Agency.[4]

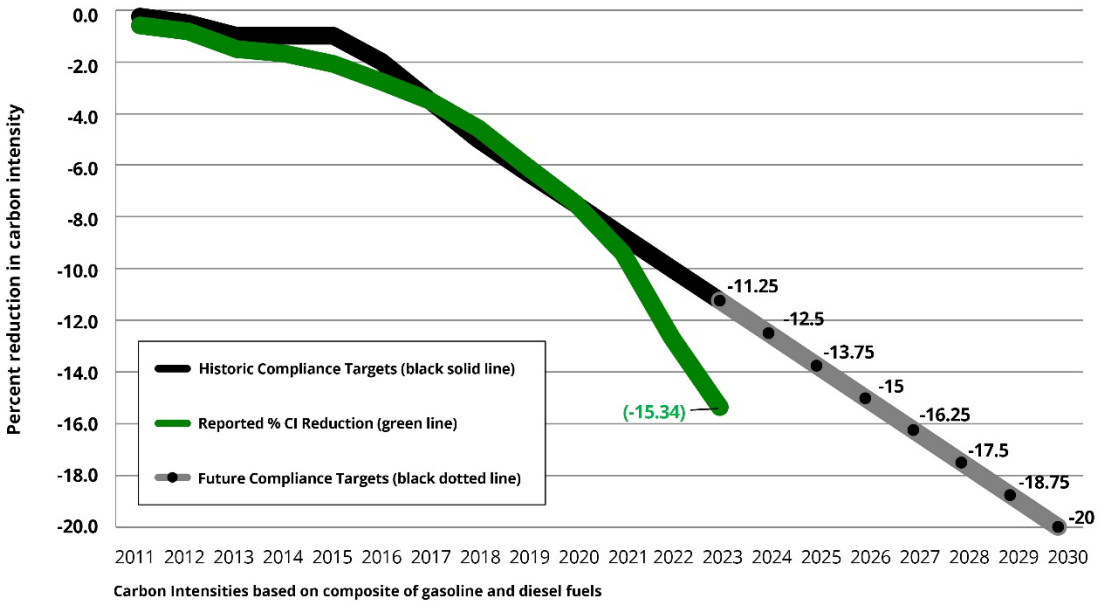
Clean fuel standards

California became the first U.S. state to enact a low-carbon fuel standard in 2007 when then-Governor Arnold Schwarzenegger issued an executive order. The regulations took effect in 2011.[5] Oregon started its program in 2016 and Washington in 2024.[6] While these programs go by various names, they all stem from regulations promulgated by the California Air Resources Board.[7] These regulations will hereafter be referred to as a clean fuel standard because that is the name of the program under consideration in Michigan.

Clean fuel standards are complicated cap-and-trade systems created by the government to lower greenhouse gas emissions. They force the transportation fuel industry to increase the production and sale of fuels that emit fewer greenhouse gases when burned. This is measured by a fuel's carbon intensity: the amount of greenhouse gas emitted in each gallon of fuel.

Under the regulations, the government sets a limit on the permissible carbon intensity score — called the carbon intensity standard — for fuels sold in the state, with the targets becoming more aggressive every year. In California, the carbon intensity standard requires fuel producers such as oil refineries to reduce the carbon intensity score of their fuels by an increasing amount annually until they reach a 20% reduction by 2030 (based on a 2010 baseline).[8] The mandated reductions in the carbon intensity score for California are shown by the black and gray line in Graphic 1.

Graphic 1: California Low Carbon Fuel Standard, 2011-2023, projected to 2030



Source: California Air Resources Board

Note: The government mandates a lower carbon intensity score for the fuels used in cars and trucks every year. By 2030, California will require a 20% reduction in carbon intensity, compared to a 2010 baseline, to generate credits instead of deficits.

Fuels sold in a state with a carbon intensity score above the limits set by the government are assessed as a deficit. Fuels sold with a score below the benchmarks are awarded as credits. (It helps to think of deficits as demerits and credits as merits.) Each credit represents one ton of carbon dioxide emissions averted compared to the carbon intensity standard.[9]

Fuel producers with deficits must blend lower-carbon fuels — such as ethanol or renewable diesel — with the gasoline or diesel fuel they sell. They could alternatively buy credits from other fuel producers who have accumulated them by producing fuels with carbon intensity scores below the standard. These credits would offset the deficits created by a fuel producer.

For example, ethanol and renewable diesel producers earn credits. Producers can either sell these low carbon-intensity fuels to oil refineries or sell the credits they generate by producing fuels with lower carbon intensity scores.

A variety of different businesses can earn credits under the program. Tesla receives clean fuel credits when drivers use the company's charging stations to power their electric vehicles. Electricity is considered a "clean fuel" and can generate credits. Tesla can then sell these credits to companies with deficits.[10] The government develops and administers the system used to track and trade credits under a clean fuel standard.

As the standards become more stringent year-by-year, gasoline and diesel fuel producers must purchase more credits to offset their deficits. According to Stillwater Associates, a transportation fuels consulting firm, each incremental reduction in carbon intensity becomes increasingly costly because it requires more extensive changes to the existing fuel mix.[11] Michigan's proposed standard will likely have limited initial costs but become increasingly expensive.

Supporters of low-carbon fuel standards argue that these programs are "a real free-market solution to the problem of climate pollution from our transportation sector."[12] However, with the state mandating the standard and controlling the system used to assign and exchange credits, it is a government-run program. Markets play a part, but they are forced to comply with the inefficiencies the program imposes. Government mandates, not markets, direct transportation fuel consumption to a preselected end.

Michigan follows in California's energy policy footsteps

Michigan State Sen. Sam Singh introduced Senate Bill 275 in 2023 with the support of several other state senators. This legislation would impose a more expansive and aggressive clean fuel standard on Michigan residents than currently exists in other states.

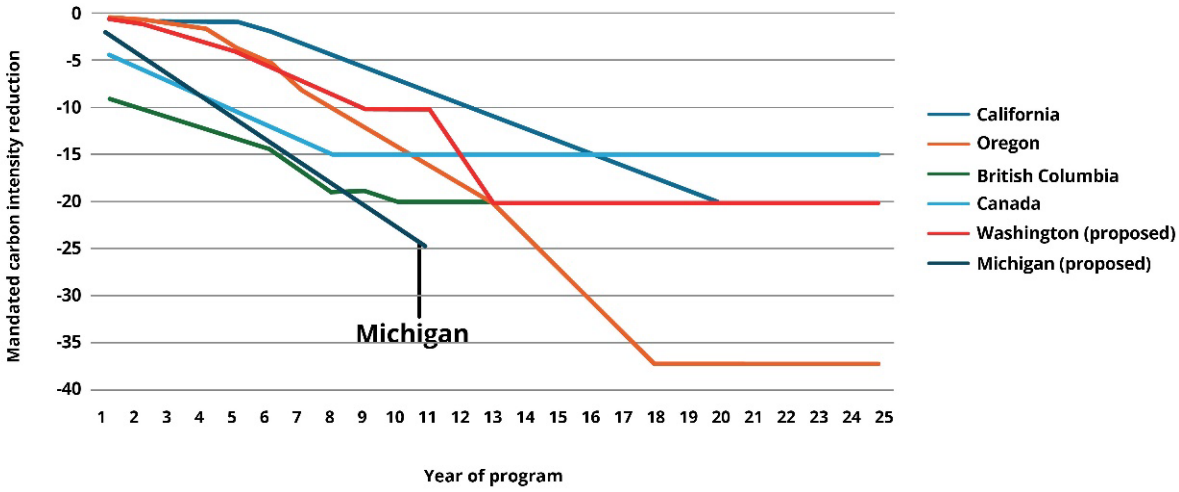
California's clean fuel standard compared to Michigan's proposal

California's clean fuel standard mandated a 10% reduction in the carbon intensity of transportation fuel produced or imported into the state by 2020 from a 2010 baseline.[13] These regulations took effect in 2011. The standard was updated in 2018 to require a 20% reduction in carbon intensity by 2030, which means the Golden State will have had 19 years to meet its standard.

In contrast, Michigan's proposed clean fuel standard would require a 25% reduction below a 2019 baseline by the end of 2035. This means Michigan's proposed standard is twice as aggressive as California's. Michigan's regulations would require a 2% annual decline in carbon intensity to meet its standard, whereas California fuel producers have only been required to reduce the carbon intensity by 1% each year.

Graphic 2 shows various clean fuel standards and their carbon intensity reduction schedules. Included are California, Oregon, Washington, the Canadian province of British Columbia as well as the national standard for all of Canada , plus the proposed standards in Michigan. It compares the stringency of the standards for each year after it was, or would be, enacted.

Graphic 2: Annual mandated carbon intensity reductions by implementation year



Michigan's clean fuel mandates would force fuel producers to reduce emissions by 25% in 11 years. In contrast, California has taken 13 years to reduce the carbon intensity of its entire transportation sector carbon intensity by 15.34% (see Graphic 1).

Higher gas prices for Michigan families and businesses

Adopting a clean fuel standard in Michigan will saddle families and businesses with higher prices at the pump for years. U.S. Energy Information Administration data show Michiganders consumed nearly 4.3 billion gallons of gasoline in 2022, which equates to approximately 1,048 gallons per household.[14] Increasing the cost of gasoline by $0.34 per gallon would result in an additional $356 per year in gasoline costs for the typical household.

The nonpartisan Michigan Senate Fiscal Agency highlighted the increased fuel costs that the proposed standard in Senate Bill 275 would create. The agency points out in its analysis of the bill that it is unlikely the revenue generated from the program could "offset the negative impacts on the poorest in the State." It further notes, "While low carbon fuel may be cleaner, it may also be less efficient, and costlier." That means drivers will have to pay a higher price at the pump

and buy more fuel than they otherwise would. In the end, as the agency writes, "fewer people could afford to drive."[15]

While some advocates of the clean fuel standard argue that it will not cause fuel prices to rise, the governments of California and Oregon admit it has increased fuel costs.[16] California recently released a study that found the state's attempt to make its standard more stringent would increase the cost of gasoline by 47 cents per gallon in 2025 and 52 cents per gallon in 2026. Diesel prices would rise by 59 cents per gallon in 2025 and 66 cents per gallon in 2026. The state is increasing its carbon intensity targets from 13.75% to 18.75% in 2025 and then to 21% in 2026.[17]

Additionally, an Oregon state department hosts a webpage, titled "Annual Cost of the Clean Fuels Program," that details the cost increases caused by the state's clean fuel standard.[18] This webpage outlines the cost of the standard in Oregon and provides the formula needed to calculate future costs based on various assumptions.

Comparing costs with Oregon

Advocates of clean fuel standards argue that enacting this policy in Michigan would have minimal or no impact, and even that it could lower gasoline prices.[19] Similar arguments were heard in Oregon because that state's program only increased the price of gasoline by 3.7 cents per gallon in 2020.[20] However, Oregon only required a carbon intensity reduction of 2.5% that year.[21] As the program has become more stringent in subsequent years, the cost of compliance has increased, rising to 9.8 cents per gallon for gasoline in 2023 and 11.17 cents per gallon for diesel.[22]

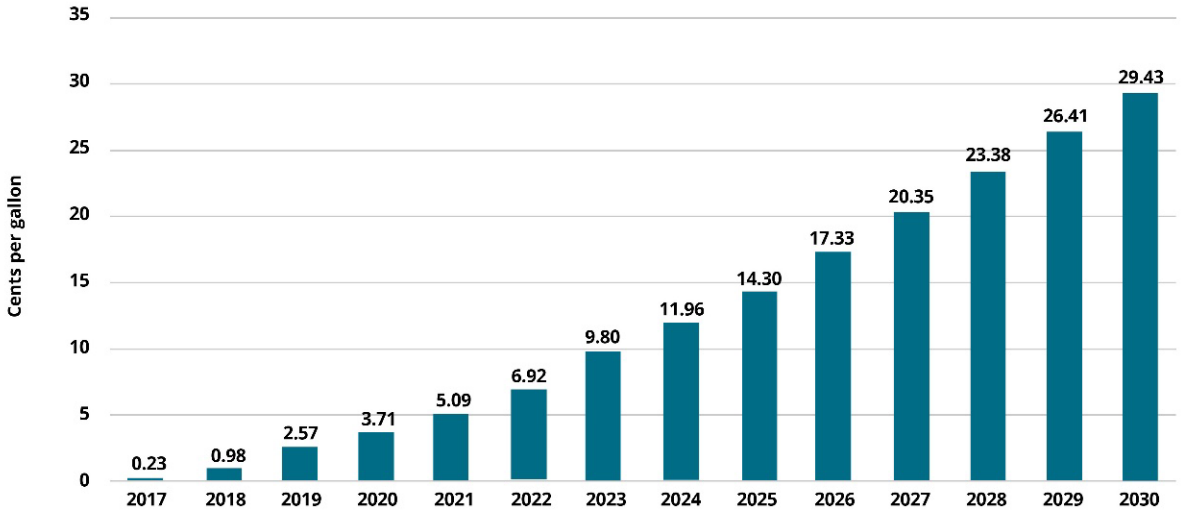
Prices in Oregon will continue to rise in the future. To demonstrate this point, Always On Energy Research used the formula provided by the Oregon state department and plotted the expected annual increase in gasoline costs based on the average credit price of $129.76 reported for 2023.[23]

At this credit price, the Oregon program would increase the cost of gasoline by 11.96 cents per gallon in 2024 and 29.43 cents per gallon by 2030, when the law requires a 20% reduction in carbon intensity.* The costs of the Oregon clean fuel standard will be higher than these estimates if credit prices increase over time or lower if credit prices fall.†

* Note that the cost per gallon in Oregon could be more expensive if the credit price becomes more expensive as the CI standard becomes stricter.

† Credit prices are essentially the cost of compliance with the rules. The formula used by the Oregon Department of Environmental Quality is $Average\ Cost$ = [($Carbon\ Intensity$ −$Standard$)×($Energy\ Density$)]×(1 tonne/1,000,000g)x (Credit Price).

Graphic 3: Oregon's projected gas price increases from clean fuel standard

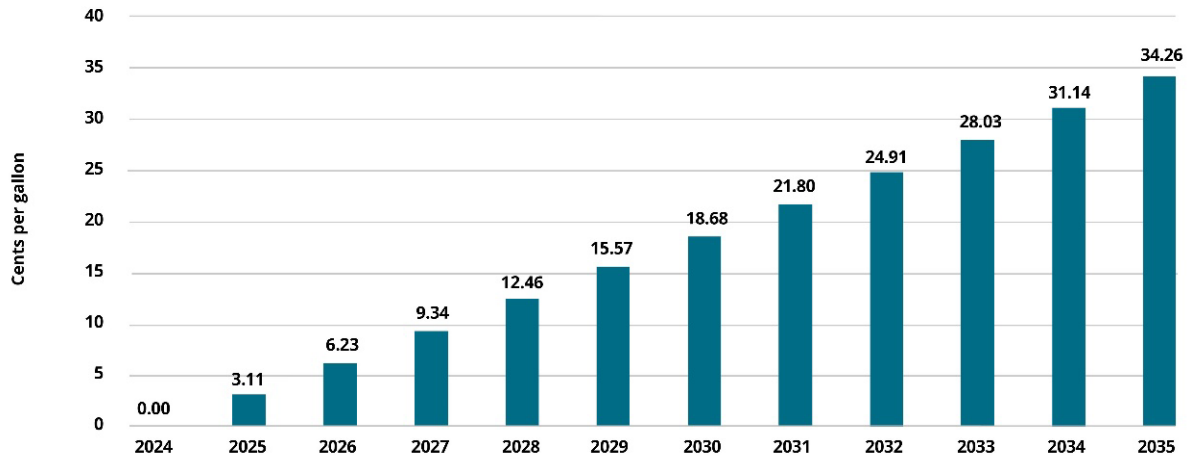


Note: The cost of the clean fuel program in Oregon is shown for each year using the formula provided by the Oregon DEQ. Price increases are minimum in the early years but quickly ramp up over time. A similar cost would likely be seen in Michigan. Historical average annual credit prices are used for 2017 through 2023.Credit prices in the future are held constant at $129.76.

It's important to note that the cost increase shown in Graphic 3 is only the direct cost of the program. It does not include the indirect costs consumers will likely pay in the form of higher prices for groceries and other goods and services due to the adoption of clean fuel regulations.

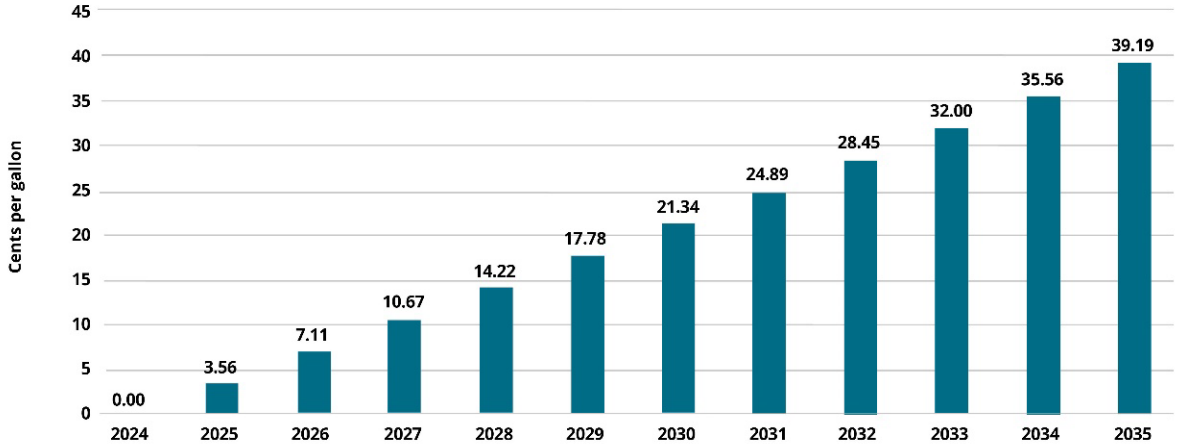
Oregon's experience can be used to estimate the potential impact of Michigan's proposal on drivers in the Great Lake State. The cost of gasoline under a standard ultimately depends on the cost of the credits sold — the more expensive it is for fuel suppliers to purchase a clean fuel credit, the higher the prices charged at the pump to recover those costs. Graphics 4 and 5 show the projected costs of a clean fuel standard at the pump in Michigan, from 2024 to 2035, for gasoline and diesel. These are based on Oregon's April 2024 fuel credit prices of $117.37 for gasoline and diesel.[24]

Graphic 4: Projected increased price of gasoline in Michigan with clean fuel standard, 2024-2035



Note: The proposed clean fuel program's cost per gallon of gasoline will increase yearly as the regulations become stricter. The price of gasoline under the program will depend on the price of credits under the mandate.

Graphic 5: Projected increased price of diesel in Michigan with clean fuel standard, 2024-2035



Note: The clean fuel program's cost per gallon will increase yearly as the regulations become stricter. The price of diesel under the program will depend on the price of credits under the mandate.

Graphics 4 and 5 show that gasoline and diesel costs will increase steadily under a clean fuel standard, rising to 34 cents per gallon by 2035 for gasoline and 39 cents per gallon for diesel. This assumes Michigan's future credit prices will be similar to Oregon's current prices. If Michigan's clean fuel credits turn out to be more expensive, the costs at the pump will be even higher.

Why it matters

There is no avoiding the fact that a clean fuel standard will raise prices at the pump across Michigan. Rising gas prices harm Michigan families and businesses by leaving them with less money for other important expenses like groceries, health care, education or savings. Higher fuel costs will raise the costs of inputs and services for the state's businesses, forcing them to increase the cost of their goods or services.

Where does the money go?

Under a clean fuel standard, Michigan residents will see increases in gasoline and diesel fuel costs. Unlike a gas tax, where revenue is (mainly) dedicated to infrastructure improvements like roads and bridges, none of the additional money that Michigan residents will be forced to pay at the pump will support needed infrastructure improvements. The money collected will not be used to meet Gov. Whitmer's signature campaign promise to "fix the damn roads." In the long run, the point of the clean fuel standard is to reduce the amount of gasoline and diesel sold, ultimately reducing gas taxes and funding for roads and bridges.

Instead of being used for infrastructure projects, the extra costs paid by Michigan families would become profits for a select group of companies. These businesses are mostly producers or importers of fuel that has a carbon intensity level below the standard. These companies will be able to generate clean fuel credits under the mandates imposed by this legislation and then sell them to companies that have deficits. Gasoline and diesel producers would be required to buy these credits to offset the deficits that result from their production and sale of transportation fuels with a carbon intensity above the standard.

The proposed clean fuel standard in Michigan would generate a small amount of revenue for the state. The Michigan Department of Environment, Great Lakes, and Energy would charge transaction fees for the buying and selling of credits. The department might also receive income from civil fines charged to violators of the mandates.

The proposed plan for Michigan would likely increase overall costs for the state. The Michigan Senate Fiscal Agency states that a clean fuel standard would require investing in "research and development to determine the carbon intensity levels of different transportation fuels." It would "require ongoing monitoring and enforcement to ensure compliance," which would "necessitate additional funding for the regulatory agencies to carry out inspections, verifications, and audits." The proposal would also "result in increased administrative costs" for two state departments and "mean higher costs for local units of government."[25]

Senate Bill 275 provides a mechanism for the state to support some infrastructure improvements, but the details are so scarce that it is difficult to assess the potential impact. The bill requires bureaucrats to write rules that "support clean energy and accessible transportation projects in disadvantaged communities." It is to do this by "directing certain credit generators to allocate revenue earned from trading certain credits toward these projects."[26] Since private businesses will generate these credits, it is unclear how the department plans to force companies to surrender their revenue to fund these unspecified projects.

Many supporters of clean fuel standards recognize the cost increases and laud them as a selling point for the policy. Rent-seeking businesses know that this legislation artificially raises prices on transportation fuels, which makes electric vehicles more competitive. The electric vehicle industry, including automakers, can also earn clean fuel credits, which could be an additional source of revenue.

Cory Bullis, public affairs director at FLO EV Charging, highlighted these elements recently, saying, "If Michigan is going to continue leading the automotive industry, we must provide the right economic signals to clean fuels producers, including EV charging providers, and this bill takes an important first step in reaching that attainable goal." He continued, "The Clean Fuel Standard Coalition brings together organizations and advocates that are committed to diversifying our transportation fuels market."[27]

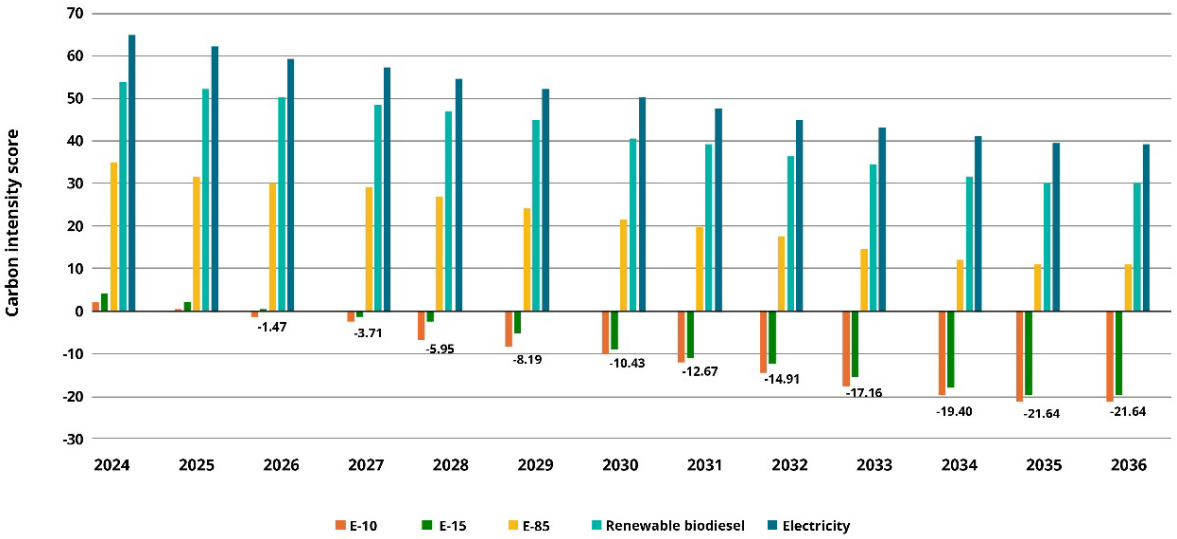
The proposed clean fuel standard for Michigan would artificially boost certain fuel producers at the expense of their competition and drivers who must pay higher prices at the pump. Firms producing so-called clean fuels, including the electric vehicle industry, would benefit the most. Clean fuel standards are often promoted as an essential component of decarbonizing and electrifying a state's transportation market.

A 'bait-and-switch' on biofuels

Proponents of clean fuel standards argue that they will boost the economy by stimulating demand for biofuels like corn-based ethanol and renewable diesel made from soybean oil. These have lower carbon intensity scores than gasoline or diesel. The proposed legislation, however, would quickly make these fuels deficit generators instead of credit generators. As a result, fuel producers would have less incentive to purchase biofuels.

Graphic 6 shows the carbon intensity of popular biofuel blends using the carbon intensity values generated in the first year of Oregon's fuel standard program. The zero value on the y-axis represents the annual carbon intensity standard in the Michigan proposal. The graph shows that E-10, a gasoline blend containing 10% ethanol, would generate deficits by 2026, just two years after the fuel standard is scheduled to go into effect. E-15, containing 15% ethanol, would be a deficit generator by 2027. Only E-85 would generate credits through 2035.

Graphic 6: Projected value of fuel standard credits by fuel type in Michigan, 2024-2036



Note: All ethanol blends would be credit generators in the program's initial years, but E-10 would generate deficits in 2026, and E-15 would generate deficits in 2027.

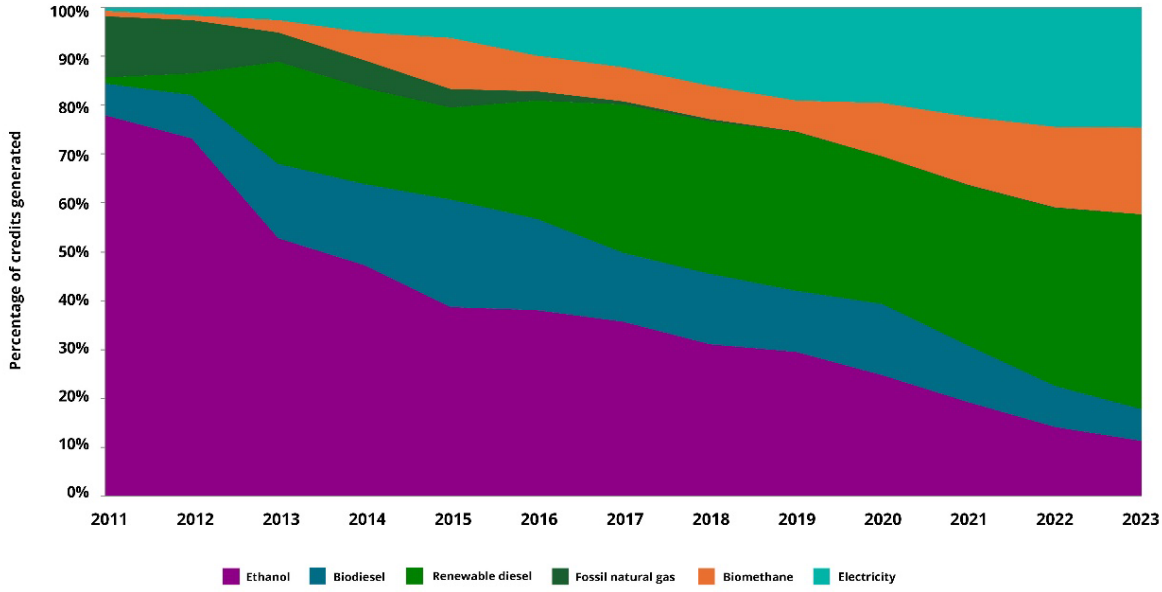
With some biofuels quickly falling from credit generation to deficits under the proposed standard, there would be little reason to invest in or promote their continued production. Even biofuels that generate credits under Michigan's current proposal, such as E-85, could become deficit generators as regulations grow increasingly stringent.

The proposed legislation in Michigan explicitly grants state bureaucrats charged with running the clean fuel program the authority to create progressively higher standards. The proposal grants the department the authority to further reduce the "the carbon intensity of the overall clean fuels standard" if it wants to. State officials must also "develop a mechanism that automatically increases the stringency" of the standard if more credits are produced than purchased for two straight years.[28]

This regulatory uncertainty means there will be little incentive to increase ethanol or renewable diesel production capacity in Michigan. Would-be fuel producers will see these as viable for no more than a few years. As a result, Michigan will likely import biofuels from refineries in states like Montana, Nebraska, and North Dakota.[29]

Graphic 6 demonstrates that Michigan's proposed clean fuel standard would effectively force the phase-out of much of the state's biofuel production, particularly corn ethanol, in favor of electric vehicles. Electricity receives a lower carbon intensity score than ethanol.[30] A similar trend is happening in California, where state data show ethanol making up a smaller share of the credits sold over time while electricity increases (see Graphic 7).[31] While this would not entirely phase out internal combustion engines, making the fuels used by this technology more expensive effectively places the government's thumb on the scale in favor of electric vehicles.

Graphic 7: California clean fuel credits, 2011-2022 (million metric tons)



Source: California Air Resources Board

Note: Renewable diesel has been a growing source of credits in California, and Michigan would follow suit unless the standards become increasingly strict. As a result, Michigan's proposed clean fuel standard creates government preferences for electric vehicles.

The carbon intensity score of ethanol could potentially be improved using carbon capture and sequestration technology. This technology involves capturing the carbon dioxide generated during fermentation, transporting it through a pipeline, and storing it safely underground.[32] Capturing and storing the carbon dioxide from ethanol plants would significantly reduce ethanol's score, allowing it to reduce its greenhouse gas emissions and compete with electricity for credits. However, environmental activists have attacked carbon capture technologies and the pipelines that transfer CO2 as corporate greenwashing by energy producers, so this alternative is unlikely to be viewed positively.[33] Many of these same groups are aggressively promoting the electrification of the entire transportation sector.[34]

It is important to note that the share of electricity credits would also increase in Michigan due to other policies to support EVs currently pursued by the Whitmer administration and Democratic lawmakers in Michigan. For example, Gov. Whitmer has promoted the MI Vehicle Rebate Plan that subsidizes the sale of EVs and hybrids, especially for those EVs/hybrids built by union labor.[35] Additional programs have mixed federal funding with state programs to promote the construction of electric vehicle charging stations across the state.[36]

Farmers should be wary of spending thousands of dollars on new equipment to increase grain production for biofuel markets when the clean fuel regulations reduce the demand for ethanol — which will affect grain prices — effectively favoring renewable diesel and electric vehicles.

Economically punitive, environmentally pointless

Lawmakers proposed a clean fuel standard as a necessary step in reducing Michigan's greenhouse gas emissions. However, implementing such a standard will have no measurable impact on future global temperatures, making this proposal all pain and no gain.

To understand how reducing emissions from Michigan transportation fuels by 25% by 2035 will impact future global temperatures, it helps to examine the impact of the Obama administration's Clean Power Plan. Proponents of the plan claimed it would have reduced annual CO2 emissions nationally by 730 million metric tons by 2030.[37]

The climate model used by the Obama Administration's Environmental Protection Agency to estimate the policy's effect on global temperatures was the Model for the Assessment of Greenhouse-Gas-Induced Climate Change. If fully implemented, this model found that the imposed reduction of 730 million tons of CO2 carbon emissions would reduce future global warming by only 0.019° C by 2100.[38]

The Energy Information Administration reports that Michigan's transportation sector emitted 47.5 million metric tons of greenhouse gases in 2021, below the pre-pandemic levels of 52.4 million metric tons in 2019.[39] The proposed clean fuel standard will reduce only 11.88 million metric tons of greenhouse gas emissions by 2035 (25% of the total). Eliminating these greenhouse gases will reduce future global temperatures by 0.0003° C by 2100.

In fact, eliminating all greenhouse gases from Michigan's transportation sector will have no measurable impact on future global temperatures. Removing 47.5 million metric tons of greenhouse gases would reduce future global temperatures by just 0.001° C by 2100.

The effectiveness of any policy should be measurable. Michiganders deserve a clear explanation of the proposed clean fuel standard's costs and benefits to know whether they receive value for their increased expenses. A more thorough explanation describes how the program will increase costs for Michigan families by about $350 per year in return for perhaps reducing future global temperatures by 0.0003° C by 2100, using the most optimistic assumptions.

Conclusion

All Michigan residents want a clean environment to pass on to future generations. However, environmental policies in Michigan need to prioritize affordable measures that do not burden residents with dramatic price increases, especially when those price increases offer little to no environmental gain. Unfortunately, the proposed clean fuel standard will increase Michigan's costs for zero measurable environmental benefits.

The Whitmer administration's pursuit of this policy is shockingly out of touch with the needs of families who, as we previously noted, are already paying $1,002 more to maintain the same cost of living they enjoyed in 2021. Lawmakers should not artificially increase the cost of energy for Michigan residents who are already struggling to put food on their tables.

Endnotes

1 Tyler P. VanHuyse, Jonah Houtz and Bobby Canell, "Clean Fuel Standards Act; Create (S.B. 275: Summary of Introduced Bill in Committee)" (Michigan Senate Fiscal Agency, June 21, 2023), https://perma.cc/3QGS-6V7G.

2 "Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality, June 17, 2024), https://perma.cc/G8C3-D553.

3 "Michigan Inflation Report: June 2024" (Joint Economic Committee Republicans, June 2024), https://perma.cc/NC6L-9MJR.

4 Tyler P. VanHuyse, Jonah Houtz and Bobby Canell, "Clean Fuel Standards Act; Create (S.B. 275: Summary of Introduced Bill in Committee)" (Michigan Senate Fiscal Agency, June 21, 2023), https://perma.cc/3QGS-6V7G.

5 Kevin E. McCarthy, "California's Low Carbon Fuel Standard" (Connecticut General Assembly, May 5, 2009), https://perma.cc/5M5A-EWBX; "Low Carbon Fuel Standard: About" (California Air Resources Board, 2024), https://perma.cc/XSR6-S82U.

6 "Clean Fuels Program Overview" (Oregon Department of Environmental Quality), https://perma.cc/JK69-QHE6; "Focus on: Washington's Clean Fuel Standard" (Washington Department of Ecology, August 2024), https://perma.cc/FYP7-9TZB.

7 "Low Carbon Fuel Standard: About" (California Air Resources Board, 2024), https://perma.cc/XSR6-S82U.

8 Arpit Soni, "Overview of Low Carbon Fuel Standard" (California Air Resources Board, July 29, 2020), https://perma.cc/X2CU-QXY9.

9 "Low Carbon Fuel Standard" (SRECTrade, Inc., 2024), https://perma.cc/S4TX-3S9Q.

10 Low Carbon Fuel Standard Credits Explained" (Freewire, March 15, 2021), https://perma.cc/2HGS-YNTS.

11 Adam Schubert, "How Might a Minnesota LCFS Play Out?" (Stillwater Associates, September 14, 2021), https://perma.cc/PP7P-X7V8.

12 "Why We Need HB 1091" (Clean Fuels Washington), https://perma.cc/WJ23-9Y9P.

13 Low Carbon Fuel Standard" (California Air Resources Board), https://perma.cc/ZM7B-AQXR.

14 "Total petroleum consumption estimates, annual" (U. S. Energy Information Administration), https://perma.cc/NN28-VVZX; 2022 American Community Survey 1-Year Estimates (U.S. Census Bureau), https://perma.cc/98Y9-7MGM.

15 Tyler P. VanHuyse, Jonah Houtz and Bobby Canell, "Clean Fuel Standards Act; Create (S.B. 275: Summary of Introduced Bill in Committee)" (Michigan Senate Fiscal Agency, June 21, 2023), https://perma.cc/3QGS-6V7G.

16 Todd Myers, "Will LCFS Raise Gas Prices? California, Oregon, and WA Budget Agency Say 'Yes,'" (Washington Policy Center, January 19, 2021), https://perma.cc/GCQ7-2NZW.

17 "Low Carbon Fuel Standard 2023 Amendments: Standardized Regulatory Impact Assessment" (California Air Resources Board, September 8, 2023), https://perma.cc/688G-278V.

18 Todd Myers, "Will LCFS Raise Gas Prices? California, Oregon, and WA Budget Agency Say 'Yes,'" (Washington Policy Center, January 19, 2021), https://perma.cc/GCQ7-2NZW; "Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality, June 17, 2024), https://perma.cc/G8C3-D553.

Endnotes (cont.)

19 "North America already has 5 Clean Fuel Standards" (Clean Fuel Standard Coalition), https://perma.cc/X4X7-G384.

20 "2020 Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality), https://perma.cc/KD32-WMTQ.

21 "2020 Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality), https://perma.cc/KD32-WMTQ.

22 "2023 Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality), https://perma.cc/9LL5-S5CT.

23 "2023 Annual Cost of the Clean Fuels Program" (Oregon Department of Environmental Quality), https://perma.cc/9LL5-S5CT.

24 "Monthly Credit Transaction Report" (Oregon Department of Environmental Quality), https://perma.cc/S27N-9N35

25 Tyler P. VanHuyse, Jonah Houtz and Bobby Canell, "Clean Fuel Standards Act; Create (S.B. 275: Summary of Introduced Bill in Committee)" (Michigan Senate Fiscal Agency, June 21, 2023), https://perma.cc/3QGS-6V7G.

26 "Senate Bill No. 275" (State of Michigan, April 19, 2023), https://perma.cc/9QJJ-ZW7P.

27 "Michigan Clean Fuel Standard Coalition Praises Legislation Introduced in Michigan House" (Clean Fuels Michigan, October 3, 2023, https://perma.cc/42RB-4EVG.

28 "Senate Bill No. 275" (State of Michigan, April 19, 2023), https://perma.cc/9QJJ-ZW7P.

29 "U.S. Renewable Diesel Fuel and Other Biofuels Plant Production Capacity" (U.S. Energy Information Administration, August 7, 2023), https://perma.cc/YSN2-NN6F.

30 "Clean Fuel Standards: A proven approach to fuel a low-carbon future" (Union of Concerned Scientists, November 2020), https://perma.cc/7KFC-VQN4.

31 "2023 LCFS Reporting Tool Quarterly Data Summary: Report No. 4" (California Air Resources Board, April 30, 2024), https://perma.cc/NFS4-3CS7.

32 Jeff Beach, "World's Largest Carbon Capture Pipeline Aims to Connect 31 Ethanol Plants, Cut Across Upper Midwest," (Ag Week, December 6, 2021), https://perma.cc/TAE5-RRQ8.

33 "Breaking the Cycle: S1E8 Greenwashing and the False Promises of CCS and LNG, Transcript" (Sierra Club), https://perma.cc/NVS3-9HTT.

34 "Electric Vehicles" (Sierra Club), https://perma.cc/U8RC-5X6U

35 "Gov. Whitmer Launches 'MI Vehicle Rebate' Plan to Lower Vehicle Prices, Boost Sales in Michigan" (State of Michigan, December 13, 2023), https://perma.cc/C8VV-VCXF.

36 "Governor Whitmer Announces Step Forward in Expanding Michigan's Electric Vehicle Infrastructure" (State of Michigan, May 4, 2023), https://perma.cc/QL8F-MGG2.

37 "Fact Sheet: Clean Power Plan" (U.S. Environmental Protection Agency, May 9, 2017), https://perma.cc/6MVQ-KJYS.

38 Patrick Michaels and Paul Knappenberger, "Spin Cycle: EPA's Clean Power Plan" (Cato Institute, August 5, 2015), https://perma.cc/X4ZY-EMXT.

39 This number takes carbon-dioxide emissions into account. "Energy-Related CO2 Emission Data Tables, Table 3: State energy-related carbon dioxide emissions by sector" (U.S. Energy Information Administration, July 12, 2023), https://perma.cc/6JLW-EPQS; "Transportation Carbon Dioxide Emissions, All Fuels for Michigan" (FRED Economic Data, September 19, 2023), https://perma.cc/73ZZ-8AG5.

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ISBN: 978-1-942502-83-8 | S2024-08 | Mackinac.org/s2024-08

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