

To: California Air Resources Board (CARB)
From: Jack Lucero Fleck
Re: Advanced Clean Cars II Regulation
Date: 5/30/22

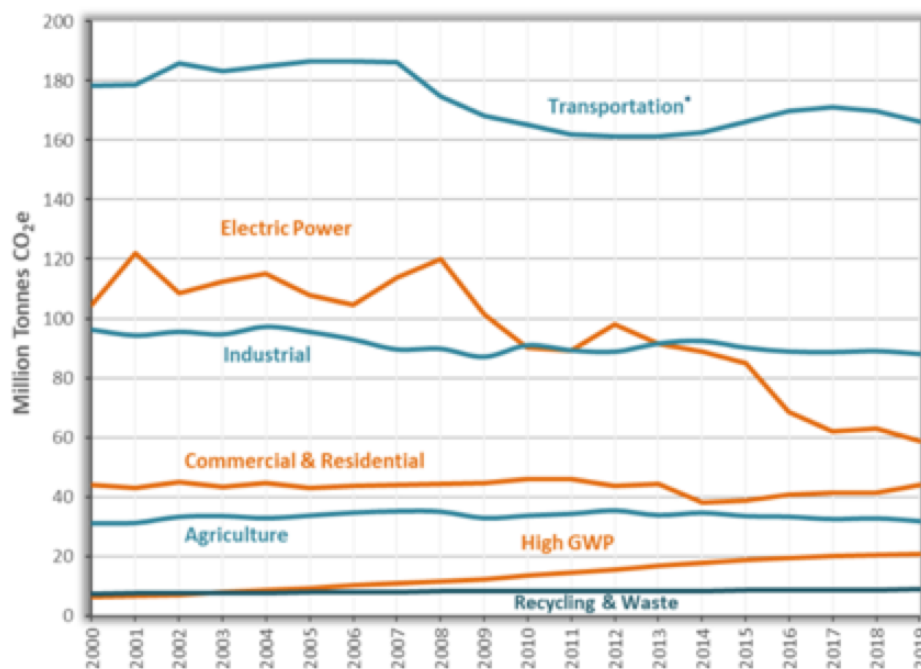
This letter is to comment on CARB's Advanced Clean Car II Regulations (ACC) for CARB's hearing on June 9, 2022.

The ACC regulations will be a major component of the CARB's [Scoping Plan](#) which was released for public comment on May 10.

Unfortunately, the ACC rules as proposed will not enable California to achieve its climate goals as proposed in its draft Scoping Plan.

The graph below shows how reductions in emissions from the Transportation sector (and others) have not been on track to achieve California's goals of 40% reduction by 2030 and 100% net zero emissions by 2045.

Figure 3. Trends in California GHG Emissions.



This figure shows changes in emissions by Scoping Plan sector between 2000 and 2019. Emissions are organized by the categories in the AB 32 Scoping Plan.,

*The transportation sector represents tailpipe emissions from on-road vehicles and direct emissions from other off-road mobile sources. It does not include emissions from petroleum refineries and oil extraction and production, which are included in the industrial sector.

Source:

https://ww2.arb.ca.gov/sites/default/files/classic/cc/ca_ghg_inventory_trends_2000-2019.pdf

To its credit, the Scoping Plan does provide numbers showing what reductions must be reached to achieve these goals. However, the Scoping Plan must rely on regulations like ACC II to achieve its numbers.

The draft Scoping Plan includes an [Inventory Sectors Modeling Spreadsheet that can be downloaded here](#). This spreadsheet, based on the PATHWAYS model, includes numerous tabs showing numbers projected by year through 2045 for numbers of electric vehicles, gasoline and diesel emissions, Vehicle Miles Traveled, and more.

Table 1 below shows that the Scoping Plan's ambitious aim is to reduce Transportation emissions from 152 Million Metric Tons (MMT) to 86 MMT by 2030, ie. a cut of 77 MMT. However, based on the calculations shown in this letter, the assumptions of the Scoping Plan and the proposed ACC are only likely to achieve 47 MMT reductions for a likely total of 116 MMT emissions. Note that California's SB 32 goal is to reduce emissions 40% below the 1990 level by 2030; but Table 1 shows that Transportation emissions went up from 152 to 163 MMT from 1990 to 2019, so achieving the SB32 goal will be challenging.

Table 1—California Transportation Emissions (Units are MMT)

	1990	2019	Scoping Plan Goal for 2030	Scoping Plan Cuts proposed from 2019	2030 Cuts likely with Scoping Plan	2030 emissions likely with scoping plan
Transportation (including TCU*)	152	163	86	77	47	116

*TCU—Transportation Communications and Utilities—about 5 MMT in 2020

How many EVs is CARB predicting for 2030?

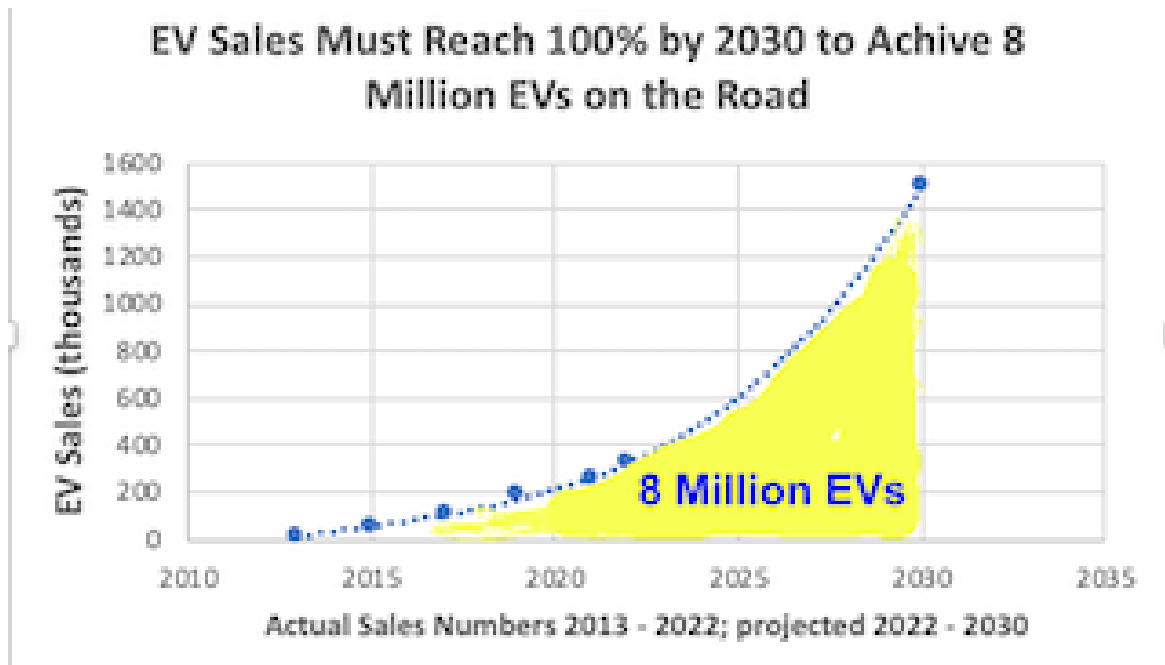
This is an important question. The ability of CARB to reach its climate goals depends on getting this right.

The [Mobile Source Strategy](#) dated October 28, 2021 estimated that there would be 8 million EVs on the road in 2030. (page 95) This number is also shown in the slides prepared for [CARB's presentation on June 10, 2021](#). I'm not aware that CARB backed off from that number in any written document.

However, the spreadsheet for the Scoping Plan is only showing 4.8 million Battery EV (BEV) + Plug in Hybrid EV (PHEV) + Fuel Cell EV (FCEV). And the Scoping Plan itself references the 5 million EVs (page 29), but doesn't specify any goal.

Based on the calculations shown below, **California cannot reach it's climate goals without reaching 8 million EVs on the road in 2030.**

Note that in order to reach 8 million EVs by 2030, the state would have to increase the rate of EV adoption to 100% of new sales by 2030. This is precisely the demand that a large coalition is making to the CARB board at its June 9 hearing. See graph below:



Area under the curve = total EVs on the road = 7.6 million EVs. In other words, to reach 8 million EVs by 2030, the state should phase out sale of ICEVs by 2030. Here is a [more detailed calculation](#).

How can this reduction be achieved? Calculations for Table 2 likely reductions:

The four ways the 77 MMT reduction could be achieved are

- Conversion to Electric Vehicles (EVs) and Zero Emission Vehicles (ZEVs)
- Reduction in Vehicle Miles Traveled (VMT),
- Biofuels (diesel only)
- Fuel Efficiency

The numbers in Table 2 are based on calculations shown below, which compute the likely Transportation emission reductions from the Scoping plan assumptions. Table 2 also shows possible reductions if the ACC II rules are strengthened.

**Table 2: Summary of Transportation reductions by 2030 comparing
Scoping Plan with calculations in this letter**

	Scoping Plan likely reductions (MMT)	Possible reductions (MMT) with additional ACC II actions
EV Light Duty Vehicles	13	35
ZEV Trucks	3	3
VMT	10	20
Biofuels	3	3
Fuel Efficiency – LDV	18	18
Totals	47	79

Conversion to EVs/ZEVs

The PATHWAYS spreadsheet shows a drop in Internal Combustion Engine Vehicles (ICEVs) by 3 million by 2030 (LDV tab). This would reduce about 13 MMT of GHGs (calculation: 3 million cars x 13000 miles each / 25 mpg x 19lbs CO₂/gal / 2200 lbs/MMT = 13 MMT)

The MDV and HDV stocks tabs (Medium and Heavy Duty Vehicles) show about 200,000 fewer ICEV trucks. This is about 10% of the 2 million trucks. 10% x 28 MMT emitted by trucks (from the spreadsheet) = 3 MMT reduction.

This number could be increased significantly by increasing adoption of EVs, including required phase out of ICEV sales by 2030. CARB's Mobile Source Strategy estimated 8 million EVs by 2030 compared to the PATHWAYS spreadsheet total of 4.8 million. An extra 3 million EVs replacing ICEVs would add another 13 MMT reduction. This is discussed more below.

Vehicle Miles Traveled (VMT)–The Scoping Plan assumes, “VMT per capita reduced 12% below 2019 levels by 2030” –page 58. If we assume a slow 0.5% per year population growth, (I don't see a number in the Scoping Plan or the PATHWAYS spreadsheet for their estimate of population growth), a 12% per capita VMT reduction over 11 years results in about 6% decrease in *total* VMT, i.e 6% x 165MMT = 10MMT. The PATHWAYS spreadsheet shows a more aggressive reduction in VMT for Alternative 3–17% for light duty vehicles from 2021 - 2030 (I'm using 2021 instead of 2020 since 2020 was impacted by Covid, and is not representative of VMT trends). Again, if we assume about 0.5% population growth for 2021- 2030 , then the actual VMT reduction would be 17-5=12%. This would give a total reduction in GHGs of 165 x 12% = 20 MMT.

What about fuel efficiency? The Scoping Plan is silent on this topic. However, the [federal CAFE standards are proposing that new cars improve MPG by about 10 mpg by 2026](#). This would bring the average for new cars up to about 36 mpg, but doesn't affect all the existing cars on the road. In other words, even if all new cars average about 36 mpg from now to 2030, that only improves the overall average by about 5 mpg.

If half of the cars average 36 mpg (.028 gal/mile) and the other half average 25 mpg (.04 gal/mi), the overall average would be .034 gal/mi = 29 mpg. This would be a fuel reduction of $(.04 - .034)/.038 = 16\%$. $16\% \times 112 = 18\text{MMT}$

If California is able to adopt stronger fuel efficiency regulations, this number could be improved.

Biofuels--These only apply to MDV and HDV. According to the [Mobile Source Strategy](#) (page 137), the Low Carbon Fuel Standard program aims for 20% reduction in Carbon Intensity of truck fuels. Using 28MMT for diesel emissions, this would be 6 MMT reduction, but this includes 3 MMT from the ZEV trucks discussed above, so the biofuels actually contribute 3 MMT reduction. Also, critics have pointed out that such large scale biofuel production will seriously strain production of soybeans—is it realistic? And bio-diesel is still a pollution problem—both in production and combustion.

Here is a summary of these reductions, which are shown in Table 2 above:

• Fewer ICEVs (including cars & trucks)	16 MMT
• VMT reductions	10 MMT
• Fuel efficiency	18 MMT
• Biofuels	<u>3 MMT</u>
Total	47 MMT

47 MMT in likely reductions is 30 MMT short of the 77 MMT shown in Table 1 for reductions from Transportation. Note that the VMT reduction is based on numbers in the Scoping Plan; the PATHWAYS spreadsheet number is 10MMT more aggressive than the number in the Scoping Plan and matches the 20 MMT shown in column 3 of Table 2.

In spite of this shortfall in reductions, if additional steps are taken as proposed in this paper, the State can achieve the necessary cuts in GHGs from Transportation as shown in column 3 of Table 2 and discussed below.

What needs to be done? Calculations for Table 2 Possible Reductions

The intent of this paper is not to say that it is impossible for California to achieve its necessary GHG reductions. Rather, the intent is to urge adoption of concrete plans to achieve the reductions. CARB's ACCII regulations can do just that.

Here are some of the actions needed in the Transportation sector:

1. Phase out the sale of ICEVs by 2030. This would mean 8 million EVs on the road (see Appendix 2 below) in 2030 and, as calculated in Appendix 1, would add another 13 MMT in GHG reductions.
2. Support individuals and companies in working from home, including subsidies for home offices or workspaces near home. 2020 showed that VMT could be seriously reduced if people work from home. [This calculation](#) shows that a 10% per capita VMT reduction is possible with continued working from home. Combined with funding for transit and active transportation, this could make the high VMT reduction estimate from the spreadsheet valid—i.e. 20 MMT reduction instead of 10 MMT as projected by the Scoping Plan..
3. Incentivize heavy gasoline users to convert to EVs (e.g. AB 2816). [This calculation](#) shows that making sure that heavy users receive priority in subsidies to convert to EVs could be the equivalent of 2 million more EVs, i.e. another 9 MMT reduction. Even though AB 2816 stalled this year, CARB could make this regulatory change without legislation.
4. Make sure that high speed chargers are plentiful along all major highways and in older urban areas near housing without off-street parking. This will eliminate one of the main concerns that deters EV purchases. Caltrans should consider such installations as part of infrastructure improvements, i.e. part of the its \$17 billion budget.
5. Provide low cost loans, financed by revenue bonds, using Tariff-on-bill-financing (SB 1112) to ensure that anyone buying an EV will have a place to charge at their home, including multi-family dwellings.
6. Simplify subsidy and incentives delivery (SB 1230) and generally promote EVs in a very public way.

Steps 1 - 3 would add $13 + 10 + 9 = 32$ MMT reductions bringing the total for EV plus VMT reductions to 45 MMT

Steps 4 - 6 and more like them will help spur the market to achieve rapid adoption of EVs, potentially increasing the reductions from steps 1 - 3.

These steps would overcome the 30 MMT shortfall in reductions shown in Table 2.

The scientific reality is that the 40% reduction by 2030 is too slow to avoid catastrophic climate disruption. The IPCC estimates that we need at least 50% reduction by 2030. And many scientists are calling for 80% reduction by 2030. With this in mind, achieving the 40% goal in the Scoping Plan is only a step in the right direction, not a complete solution.

Conclusion

This paper takes some specific assumptions from the Scoping Plan and PATHWAYS spreadsheet and uses them to calculate projected emissions for the Transportation sector. The calculations show that the assumptions in the Scoping Plan mean that the Transportation sector will not achieve the reductions needed to achieve California's climate goals. However, accelerating the transition to EVs, along with other measures to reduce Vehicle Miles Traveled can overcome this shortcoming.

The Scoping Plan is an ambitious and important document. It lays out what California would need to achieve in terms of GHG reductions to meet State goals. What is missing is a concrete plan with calculated projections to achieve the goals. This is where the ACC II regulations need to step up to fill that need.