



March 15, 2023

Cheryl Laskowski, Ph.D.  
California Air Resources Board (CARB)  
1001 I Street  
Sacramento, California 95814

**RE: Electrify America comments on February 22, 2023 LCFS Workshop**

Dear Dr. Laskowski:

Electrify America appreciates the opportunity to comment on the February 22, 2023, Low Carbon Fuel Standard (LCFS) Public Workshop: Potential Regulation Amendment Concepts. Electrify America is the nation's largest open DC fast charging network for electric vehicles, with over 3,500 ultra-fast chargers across more than 800 locations around the country, and over 1,000 chargers across 245 locations open to the public in California. We offer the following summary comments, which are expanded upon below:

- CARB should align modeling assumptions and final LCFS carbon intensity reduction targets with the Final Scoping Plan. We expect doing so would lead to targets of no less than 35% in 2030 and likely greater than 100% in 2045.
- We support a step down in carbon intensity in 2024 to correct for the current oversupply in credits, and support development of a one-way ratchet mechanism to automatically strengthen the program to avoid similar credit oversupply issues in the future.
- CARB should not make changes to existing pathways without a very clear justification basis that is foreseeable through an established process.
- Any changes to pathways should prioritize greenhouse gas reductions and support equitable treatment between biomethane-to-electricity and other biomethane-based pathways, including biomethane-to-hydrogen.
- CARB should expand capacity crediting for hydrogen refueling and DC fast charging for medium- and heavy-duty vehicles (MHDV).
  - However, Electrify America strongly opposes proposed regulatory language that restricts the use of settlement funds for projects generating capacity credits, particularly with regard to ZEV infrastructure built to serve MHDV fleets. This only serves to limit infrastructure development to support MHDV and CARB's Advanced Clean Fleets regulation.
- The CATS model includes several assumptions that consistently appear to be overly conservative and push in the direction of lower targets. We are surprised to see costs at

levels presented in the workshop, and encourage CARB to release additional details on the modeling, including outputs in Excel or another accessible format (i.e., non-Python files). We think this may be partially explained by some of the following assumptions:

- The fuel pool demands do not align with the Final Scoping Plan, and consistently err on the side of very conservative assumptions that do not align with California's climate change goals and vastly overestimate California's fossil fuel use, compared to the objectives and findings in the Final Scoping Plan. In particular, the LCFS (CATS) modeling:
  - Assumes 32% more gasoline demand in 2030 and over twice as much gasoline demand in 2045 than the Final Scoping Plan.
  - Assumes increasing diesel demand, which is a significant departure from the assumptions presented at the November workshop, and which results in the assumption that California uses *four times* as much diesel in 2045 than included in the Final Scoping Plan.
  - Assumes other fossil fuel demands, including jet fuel, are also higher than represented in the Final Scoping Plan, and the discrepancy between other fossil fuel demands and the Final Scoping Plan have also increased since the November workshop.
  - Significantly underestimates demand for ZEV fuels compared to the Final Scoping Plan (which itself underestimates at least electricity demand in for transportation in the near term), including electricity by about 30% in 2030 and hydrogen by more than 80% in every year from 2023-2045.
- The Final Scoping Plan and CATS modeling assume about half as many electric cars are on the road than currently exist today, and likely significantly underestimate near-term electric car sales through at least 2030.
- The CATS modeling does not represent the anticipated adoption of the Advanced Clean Fleets rule and the transition to zero emission MDHV vehicles.
- Updated assumptions in the CATS modeling assumes carbon intensity of the electricity grid *increases* over the next five years, despite the State's commitment to decarbonizing the electricity grid, and is 36% higher in 2030 than assumed in the November CATS modeling assumptions
- The CATS modeling caps renewable diesel supplies at less than one-third of the assumed diesel fuel pool demand.
- Although it is difficult to confirm, we anticipate that the CATS modeling does not represent compliance with the Governor's targets for carbon dioxide removal, as represented in the Final Scoping Plan, including the significant application of carbon capture and sequestration on refineries before 2030 and for biomass-derived hydrogen pathways.
- Although it is difficult to confirm, the modeling appears to eliminate biomethane from the credit pool before 2030, despite its significant role in the market today, and may not include biomethane-to-electricity pathways or biomethane-to-hydrogen pathways (i.e., negative carbon ZEV fuels) before 2040.
- A wide array of transportation fuel pathways that are likely to serve the California market before 2045 do not appear to be represented, including

biomethane (and its application to electricity or hydrogen pathways) from wastewater or diverted organic waste, carbon capture and sequestration applied to biomethane or other non-ethanol and non-hydrogen pathways, or additional credits from petroleum projects and other sources, beyond what is built into the model (which is not indicated).

### **Carbon Intensity Reduction Targets Should Align with Scoping Plan, California Climate Targets**

As we have previously shared, Electrify America has submitted comments that included an initial analysis of targets in-line with the Draft 2022 Scoping Plan Update (Draft Scoping Plan) and letter from the Governor to CARB Chair Liane Randolph, regarding additional targets to include in the Final Scoping Plan.<sup>1,2</sup> That analysis, which by our estimate is conservative, finds that targets of 35% in 2030 and more than 90% in 2045 are minimally appropriate to align with California’s greenhouse gas goals. We expect a complete analysis of the Final Scoping Plan and current and expected future market trends, including around electric car sales that are far outpacing regulatory requirements and the Scoping Plan modeling, would suggest that carbon intensity reduction targets more in-line with California and CARB’s 2030 goals (40-48% reduction) and the objective of net-zero emissions (100% or greater reductions) by 2045, to be appropriate.

### **Maintain a Strong Market for Low Carbon Fuels, ZEVs, with a Step-Down in Program Stringency in 2024 and a One-Way Ratchet Mechanism**

Electrify America strongly supports proposals described in the workshop to further strengthen program stringency and support a consistent and strong market for low carbon fuels and ZEVs. In particular, we encourage CARB to adopt a step down in carbon intensity in 2024 to correct for the current oversupply in credits, and we strongly support development of a one-way ratchet mechanism to automatically strengthen the program and avoid similar credit oversupply issues in the future.

The LCFS already has a cost containment mechanism built in, which should give CARB comfort in setting the strongest possible targets to reduce greenhouse gas emissions and drive innovation most quickly and deeply in the low carbon transportation fuels sector. Stepping down program stringency in 2024 and incorporating a one-way ratcheting mechanism will provide additional certainty on both ends of the market – and contribute to a stronger LCFS to support the State’s climate change goals. We strongly encourage CARB to consider such a mechanism as a separate and additional element to the program, rather than a substitute for increased program stringency in line with the State’s climate change goals.

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<sup>1</sup> See Electrify America’s comments in response to the July 2022 LCFS workshop:  
<https://www.arb.ca.gov/lists/com-attach/126-lcfs-wkshp-jul22-ws-UmAANldkAGEHLAk5.pdf>

<sup>2</sup> See Electrify America’s comments in response to the November 2022 LCFS workshop:  
<https://www.arb.ca.gov/lists/com-attach/132-lcfs-wkshp-nov22-ws-VDFWMQNdv2cEbVQ5.pdf>

## **Avoid Changes to Pathway Eligibility without Established Process**

The workshop presented changes to several fuel pathways, including biomethane crediting, crediting for electric forklifts, and changes to crediting for liquid biofuels and petroleum-based projects. In general, Electrify America does not have specific comments on liquid biofuel or petroleum-based crediting pathways, however we note that changes to each pathway seem to include a different rationale and include different timelines, scopes and parameters for change.

To the extent that CARB feels changes in eligibility for various pathways is needed now, or will be in the future, we urge CARB to develop a clear and consistent rationale that it will apply and can telegraph for the current market, and potential future regulatory changes. As a broad principle, changes that serve to cut out allowable sources of low carbon fuels from the program without a very clear justification basis that is foreseeable through an established process will serve to reduce investment in low carbon fuel pathways and make project development more risky and costly. We discourage CARB from eliminating currently eligible pathways until it has clear set of rules to do so.

We are also concerned with proposals to incorporate dynamic energy efficiency ratios (EER), including for electric forklifts. CARB should not begin penalizing sectors for their success in converting to ZEVs, which will set a dangerous precedent and introduce uncertainty into ZEV crediting pathways. Instead, CARB should continue a fair accounting of the comparative lifecycle emissions impacts of various vehicle-fuel combinations, and adjust program stringency to account for successful transitions to ZEVs among on-road and off-road fleets.

## **Ensure Equal Treatment between Biomethane Used for Hydrogen and Electricity Production**

In particular, regarding biomethane accounting and eligibility, we urge CARB to further enable biomethane-to-electricity pathways and ensure at least equal treatment between biomethane-to-electricity pathways and biomethane used in hydrogen applications.

Generating electricity from biomethane sources reduces methane emissions and is therefore the least greenhouse gas emissions-intensive source of electricity for electric vehicle charging. CARB can advance its greenhouse gas emissions reduction goals by continuing the practice of avoided methane crediting for facilities that produce electricity from biomethane, which recognizes and accounts for the climate change benefits produced by using biomethane to produce electricity as a transportation fuel. If CARB were to proceed with phasing out eligibility from existing biomethane-to-electricity pathways and ceasing the certification of new biomethane-to-electricity fuel pathways with avoided methane crediting, as proposed, this would send a clear market signal discouraging investment in biomethane-to-electricity facilities.

CARB has also proposed to phase out avoided methane crediting for both renewable natural gas (RNG) and electricity in order to encourage the “long-term deployment/use of biomethane

for hydrogen.”<sup>3</sup> Electrify America strongly encourages CARB to reconsider whether to apply this phase out equally across RNG and electricity. As the U.S. EPA noted in a recently proposed regulation, electricity is “an even lower GHG-emitting means of using available biogas resources for transportation” than RNG, because “converting the biogas to electricity at the same location where the biogas is produced tends to be the lowest GHG and lowest cost means of using it for transportation since it avoids the additional expense and energy consumption associated with cleaning up the gas, transporting it in a pipeline, and compressing/liquifying it prior to fueling a vehicle.”<sup>4</sup>

Applying this phase out to biomethane-to-electricity pathways is also unlikely to result in the intended effect on hydrogen, as the sources of biomethane used for electricity production are not likely to be available for hydrogen facilities, which typically depend on pipeline access for RNG delivery or hydrogen export, or both. As the U.S. EPA observed in its recently proposed fuels regulation, numerous factors prevent potential biomethane production facilities from producing RNG, while these same facilities are able to produce electricity from biomethane that otherwise would be emitted. EPA explained: “the costs of biogas cleanup to the quality needed for injection into common carrier pipelines and use in CNG/LNG vehicles can be prohibitive, and many existing landfills and digesters are located a significant distance from the natural gas commercial pipeline system and cannot cost effectively connect. Enabling biogas to be used to generate renewable electricity ... would open up not only a lower cost option for many biogas production facilities, but also enable an even lower GHG-emitting means of using available biogas resources for transportation.”<sup>5</sup>

The environmental benefits of biomethane-to-electricity pathways are substantial, and the biomethane used in electricity production is unlikely to be available for hydrogen and other priority uses. We therefore strongly encourage CARB to continue certifying fuel pathways with avoided methane accounting for biomethane-to-electricity facilities in its final regulations.

### **Expansion of Capacity Crediting to MHDV Should Not Exclude Electrify America**

As we have previously commented,<sup>6</sup> Electrify America supports CARB incorporating similar capacity credit generating opportunities for MHDV that currently exists for hydrogen refueling and DC fast charging for light-duty vehicles. MHDV charging infrastructure is subject to similar up-front investment constraints as light-duty charging, and therefore would similarly benefit from capacity crediting. Early support for the build out of MHDV charging infrastructure is needed until heavy-duty electric vehicle deployments reach critical mass to support fleets, just as was the case for light-duty electric vehicles.

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<sup>3</sup> Slide 30 of November workshop slides: <https://ww2.arb.ca.gov/sites/default/files/2022-11/LCFSPresentation.pdf>

<sup>4</sup> <https://www.epa.gov/system/files/documents/2022-12/rfs-set-rule-nprm-2022-11-30.pdf>

<sup>5</sup> <https://www.epa.gov/system/files/documents/2022-12/rfs-set-rule-nprm-2022-11-30.pdf>

<sup>6</sup> <https://www.arb.ca.gov/lists/com-attach/126-lcfs-wkshp-jul22-ws-UmAANldkAGEHLAk5.pdf>

However, as CARB considers adjustments or expansion to capacity crediting mechanism for ZEV infrastructure under the LCFS, CARB should not prohibit capacity credits for projects that include investment made under a California or federal settlement, particularly with regard to ZEV infrastructure built to serve MHDV fleets. As far as we know, this prohibition applies to investments from only one company – Electrify America. Maintaining this prohibition would limit the potential benefits and scope of settlement-related investments, and it would create an undue hindrance against Electrify America’s ability to build ZEV infrastructure that serves public transit agency, school bus fleet, and drayage fleet operator charging needs through our \$800 million investment in California.

The California Air Resources Board has explicitly and directly urged and supported Electrify America investments serving such fleets through the Green City Initiative in Long Beach and Wilmington, as well as in other parts of the state. However, prohibiting such investments from qualifying for capacity credits would limit Electrify America’s ability to serve these fleets and make investments in CARB’s priority communities, consistent with CARB’s direction. Electrify America respectfully encourages that CARB establish fast charging infrastructure crediting for MDHV charging infrastructure without restriction on use of settlement funds, to ensure that electric vehicle service providers are equally able to benefit from this important incentive for decarbonizing MHDV fleets in the State.

### **Comments on the LCFS Scenario Modeling and Updated CATS Modeling Assumptions**

Finally, we were surprised by the costs presented in the workshop for a scenario achieving 30% carbon intensity reductions in 2030. We have previously commented in detail on our own assessment of appropriate targets (no less than 35% reduction by 2030)<sup>7</sup> and of the assumptions in the CATS modeling, as presented in November.<sup>8</sup> Among other items, those comments included the following:

- The CATS model and assumptions, including fuel pool demands and carbon removal targets, should align with the Final Scoping Plan, at a minimum
- That said, the Final Scoping Plan underestimates current ZEVs on the road, and likely near-term sales, which continue to outpace projections. LCFS scenario modeling and the CATS tool should reflect current ZEVs on the road and best estimates of future ZEV sales
- CATS excludes several fuel pathways that will likely generate credits and deliver additional emissions reductions under the LCFS
- Cost modeling should include appropriate federal and other incentives, including through the Inflation Reduction Act and e-RINs, for all fuel pathways

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<sup>7</sup> See Electrify America’s comments in response to the July 2022 LCFS workshop:  
<https://www.arb.ca.gov/lists/com-attach/126-lcfs-wkshp-jul22-ws-UmAANldkAGEHLAk5.pdf>

<sup>8</sup> See Electrify America’s comments in response to the November 2022 LCFS workshop:  
<https://www.arb.ca.gov/lists/com-attach/132-lcfs-wkshp-nov22-ws-VDFWMQNdV2cEbVQ5.pdf>

We appreciate that CARB has noted that it has updated the CATS model assumptions to account for stakeholder feedback, including adjusting federal incentive assumptions. However, many of the adjustments appear to make an already conservative analysis even more conservative, and take the modeling further away from desired outcomes included in the Final Scoping Plan.

While we appreciate the documentation and input assumptions that have been released, we also note that it is difficult to fully understand the complete set of assumptions and their impact on the results, without more clear access to the model results and complete input assumptions. We respectfully request that CARB release additional information regarding the modeling assumptions and outputs in an accessible format (besides Python). Still, the information that has been released provides insight into the assumptions that drive the surprising cost results presented in the workshop. Some of the potential assumptions and methods driving these outcomes are explained further below.

**Fuel pool demands in CATS do not align with Final Scoping Plan, and are further out of alignment than the assumptions presented in November**

The CATS model documentation describes a wide array of differing assumptions and methods for estimating the fuel demand pool that consistently serve to over-estimate fossil fuel demand and under-estimate ZEVs, compared to the Final Scoping Plan. For example, while the CATS model aligns CNG demand with the Proposed Scoping Plan scenario,<sup>9</sup> it uses different methods to estimate gasoline and diesel fuel demand. This fundamentally misaligns the LCFS modeling In with the Final Scoping Plan and state objectives.

We also note that, in cases where the assumptions do correlate to the Scoping Plan, the model still relies on the Draft Scoping Plan Scenario, rather than the Final Scoping Plan. We encourage CARB to update the CATS model to reflect the Final Scoping Plan scenario and align transportation fuel demand pools in the modeling with the Final Scoping Plan (with the exception of electric vehicles, as described below).

In our comments following the November workshop, Electrify America compared fuel demand pools in CATS with those from the Final Scoping Plan. Here, we have added the new fuel demands from the CATS sample inputs, shared as part of the February workshop. Specifically, the set of figures below compares fuel demand for the fuel pools defined in CATS pursuant to

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<sup>9</sup> Note there appears to be a discrepancy in the Final Scoping Plan modeling results for CNG in the years ~2024-2028.

both the November 2022 and February 2023 workshops to those from the Final Scoping Plan, including both renewable and fossil fuels.<sup>10,11,12,13</sup>

Among other observations regarding fuel pool assumptions in the updated CATS modeling as presented in the February workshop, we note the following:

- It assumes 32% more gasoline demand in 2030 and over twice as much gasoline demand in 2045 than the Final Scoping Plan.
- It assumes *increasing diesel demand*, which is a significant departure from the assumptions presented at the November workshop, and which results in the assumption that California uses *four times* as much diesel in 2045 than included in the Final Scoping Plan. Diesel fuel demand in the CATS model changed from mirroring the Draft Scoping Plan in the November workshop<sup>14</sup> to following EMFAC in the February workshop.<sup>15</sup> The result is an assumption that is clearly out of line with the Final Scoping Plan and state policy pursuant to Governor Newsom’s Executive Order N-79-20<sup>16</sup> and the forthcoming Advanced Clean Fleets regulation.
- It assumes other fossil fuel demands, including CNG and jet fuel, are also higher than represented in the Final Scoping Plan, and the discrepancy between other fossil fuel demands and the Final Scoping Plan have also increased since the November workshop.
- It significantly underestimates demand for ZEV fuels compared to the Final Scoping Plan (which itself underestimates at least electricity demand in for transportation in the near term, as described below), including electricity by about 30% in 2030 and hydrogen by more than 80% in every year from 2023-2045.

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<sup>10</sup> Energy demand for transportation fuel pools in the Final Scoping Plan can be found in the ‘Energy Demand’ worksheet of the “AB 32 GHG Inventory Sectors Modeling Data Spreadsheet” found at:

<https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

<sup>11</sup> Energy demand for transportation fuel pools in CATS from the November 2022 workshop can be found in the ‘Energy Demand’ worksheet of the “CATS Summary Inputs” spreadsheet provided with the workshop materials, and found at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>

<sup>12</sup> Energy demand for transportation fuel pools in CATS from the February 2023 workshop can be found in the ‘Energy Demand’ worksheet of the “scenario\_inputs\_30x30\_90x45” spreadsheet provided in the “CATS Example Inputs” folder as part of the workshop materials, and found at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>

<sup>13</sup> The fuel pools represented in the figures include the following:

Gasoline: Conventional Gasoline/Conventional Ethanol (Scoping Plan), Gasoline (CATS)

Diesel: Conventional Diesel + Renewable Diesel (Scoping Plan), Diesel (CATS)

Electricity: Electricity (Scoping Plan), LDV-e + HDV-e (CATS)

Hydrogen: Hydrogen (Scoping Plan), LDV-H2 + HDV-H2 (CATS)

CNG: Natural gas + Biogas (Scoping Plan), CNG (CATS)

Jet Fuel: Conventional Jet Fuel + Renewable Jet Fuel (Scoping Plan), Jet Fuel (CATS)

<sup>14</sup> See page 5 of the CATS Technical Documentation, modified November 2022:

<https://ww2.arb.ca.gov/sites/default/files/2022-11/CATS%20Technical.pdf>

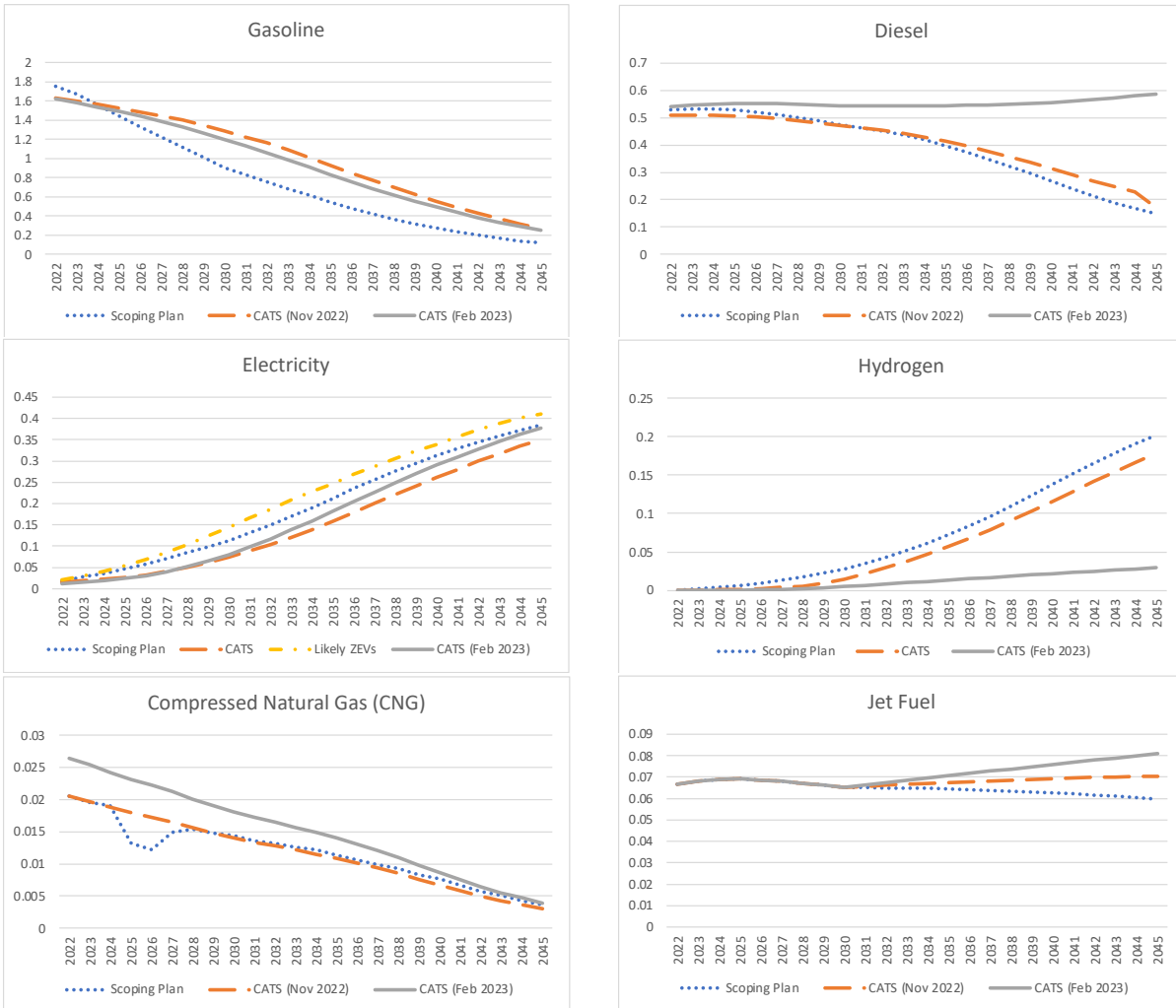
<sup>15</sup> See page 5 of the CATS v0.2 Technical Documentation, modified March 2023:

<https://ww2.arb.ca.gov/sites/default/files/2023-03/CATS%20Technical%20v0.2.pdf>

<sup>16</sup> <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf?emrc=9f8f26>



## Comparison of fuel pool demands in CATS and Final Scoping Plan (EJ)



These assumptions alone put the LCFS scenario analysis well out of alignment with the Final Scoping Plan, and serve to make compliance with a given carbon intensity reduction target look far more costly than it would otherwise for a fixed set of low carbon fuel supply curves. Looked at another way, it also serves to significantly reduce the expected carbon intensity reductions that would otherwise come from a given set of assumed penetrations of alternative fuels. Either way, these assumptions significantly underestimate the role the LCFS should play in achieving the State’s climate objectives, including its potential role as a backstop measure to achieve expected greenhouse gas reductions should other measures, such as reductions in vehicle miles travelled, not materialize at expected levels.

### **The CATS model (and Final Scoping Plan) underestimate current and likely near-term electric car sales**

As described below and in our previous comments, the Final Scoping Plan and CATS also underestimate current and expected near-term ZEV sales. For example, the Final Scoping Plan

includes 743,930 light-duty ZEVs as of 2022,<sup>17</sup> while the California Energy Commission pegs the number nearly twice as high – at 1,399,913 cumulative ZEV sales through the end of 2022.<sup>18</sup> As a result, CATS may underestimate current electricity demand for transportation by about 40%.

We have also previously estimated a more likely ZEV sales forecast, based on analysis of automaker ZEV sales commitments over the next several years and CARB modeling of a “slow turnover” scenario for automakers switching conventional vehicle models to ZEVs through 2030, as presented in CARB’s Advanced Clean Cars II rulemaking.<sup>19</sup> Using this – presumably conservative – scenario as an indicator of likely near-term sales, electricity demands in the Likely ZEV case are twice as high on average, and cumulatively, from 2024-2030 than as currently represented in the CATS model.

Finally, the CATS model clearly does not include representation of the proposed Advanced Clean Fleets rule or a transition to zero emission vehicles in the MHDV sector. We strongly encourage CARB to update these assumptions for MHDV to align with state policy priorities, especially if/when the Board adopts the Advanced Clean Fleets regulation in the spring.

### **Updated CATS modeling assumptions assume increasing carbon intensity of the electricity grid**

We were surprised to see carbon intensity numbers for the electricity grid updated significantly in CATS v0.2 documentation, and especially surprised to see that CARB now assumes *increasing* carbon intensity of the electricity grid in the near-term, and doesn’t project grid carbon intensity to start declining from current levels until about 2030. The impact of the change from the November CATS assumptions is that grid carbon intensity is now assumed to be 36% higher in 2030 than previously assumed (see Table below). Further, the Technical Documentation provides no explanation for the difference, as the description of the methods (following Draft Scoping Plan scenario) is identical in both the November 2022 and March 2023 versions of the CATS documentation.<sup>20</sup> As with other assumptions, we encourage CARB to update the CATS modeling to reflect analysis in the Final Scoping Plan, which based on our analysis, suggests grid carbon intensity that is about 50% lower than the current CATS model assumptions in 2024, about 60% lower in 2030, and 70% lower in 2045.<sup>21</sup>

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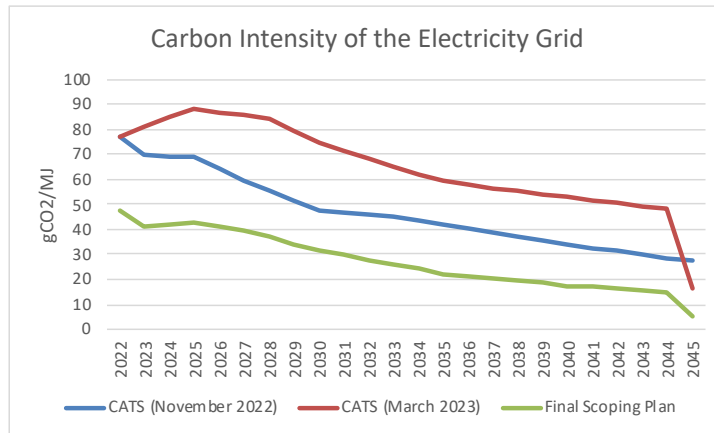
<sup>17</sup> See ‘LDV Stocks’ worksheet of the “AB 32 GHG Inventory Sectors Modeling Data Spreadsheet” found at: <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

<sup>18</sup> <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-zev-sales>

<sup>19</sup> See Electrify America’s comments in response to the July 2022 LCFS workshop: <https://www.arb.ca.gov/lists/com-attach/126-lcfs-wkshp-jul22-ws-UmAANldkAGEHLAk5.pdf>

<sup>20</sup> Compare Table 10 and surrounding discussion the CATS Technical Documentation, modified November 2022 (<https://ww2.arb.ca.gov/sites/default/files/2022-11/CATS%20Technical.pdf>) with that of the CATS v0.2 documentation modified March 2023 (<https://ww2.arb.ca.gov/sites/default/files/2023-03/CATS%20Technical%20v0.2.pdf>)

<sup>21</sup> Carbon intensity for the electricity grid in each year in the Final Scoping Plan was estimated by dividing Electric Power emissions on the ‘Emissions’ worksheet by the sum of electricity demands across sectors in the ‘Energy



Finally, we note that state energy modeling has often demonstrated a temporary increase in electricity sector emissions around the previously anticipated 2024-2025 closure of the Diablo Canyon nuclear power plant. While that assumption always was questionable, given the binding commitment between PG&E and stakeholders to replace the plant with zero carbon resources and avoid emissions increases,<sup>22</sup> it is further inapplicable now, given the state’s interest in extending operation of the plant through 2030. If anything, given direction in SB 846 (Dodd, 2022) for energy planning to exclude the ongoing operation of Diablo Canyon, its ongoing operations should only serve to further reduce electricity sector greenhouse gas emissions beyond expected levels through 2030.

**Several fuel pathways and state goals are not represented, or are severely constrained**

Finally, while much of this is difficult to confirm without greater details on the modeling and results, several pathways appear to be constrained or excluded from modeling, without clear explanation for why that might be the case. In particular:

- The CATS modeling caps renewable diesel production at  $1.74 \times 10^{11}$  MJ, or less than one-third of assumed diesel fuel pool demand ( $5.41 \times 10^{11}$  MJ in 2022, increasing to  $5.87 \times 10^{11}$  MJ in 2045).
- The modeling likely does not include the Governor’s targets for carbon dioxide removal, as represented in the Final Scoping Plan, including the significant application of carbon capture and sequestration on refineries before 2030 and for biomass-derived hydrogen pathways. Costs for carbon dioxide removal are assumed to be higher than cost outputs from the scenario modeling, and crediting for petroleum projects, presumably including carbon capture and sequestration at refineries, are explicitly excluded “beyond what is automatically added,”<sup>23</sup> which is not defined. For context, the Final Scoping Plan

Demand’ worksheet of the “AB 32 GHG Inventory Sectors Modeling Data Spreadsheet” found at: <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

<sup>22</sup> <https://www.pge.com/includes/docs/pdfs/safety/dcpp/JointProposal.pdf>

<sup>23</sup> See cell M154 of ‘Fuel Production’ workseet in “scenario-inputs-30x30\_90x45” spreadsheet provided in the “CATS Example Inputs” folder as part of the workshop materials, and found at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>

assumes 20 MMTCO<sub>2</sub>e/year of carbon removal in 2030, including 12.3 MMTCO<sub>2</sub>/year from petroleum refining and 3 MMTCO<sub>2</sub>e/year from biomass-based hydrogen production that would likely generate credits under the LCFS.<sup>24</sup>

- The modeling appears to eliminate biomethane from the credit pool before 2030, despite its significant role in the market today.<sup>25</sup>
- The modeling assumes diesel demand declines by 2030, then increases again beyond 2035, while renewable diesel demand fluctuates (increasing and decreasing) over time.<sup>26</sup> We expect this is a function of the methods of the modeling, but it seems to be an unlikely result to materialize in reality.
- The model does not appear to allow biomethane-to-electricity pathways or biomethane-to-hydrogen pathways (i.e., negative carbon ZEV fuels) before 2040.
- A wide array of transportation fuel pathways that are likely to serve the California market before 2045 do not appear to be represented, including biomethane (and its application to electricity or hydrogen pathways) from wastewater or diverted organic waste, carbon capture and sequestration applied to biomethane or other non-ethanol and non-hydrogen pathways, and as described above, additional credits from petroleum projects and other sources.

## Conclusion

The LCFS is one of the State's most powerful tools for supporting clean transportation in California, including electric vehicles and charging infrastructure, and we encourage CARB maximize its effectiveness by adopting strong targets in line with the State's stated climate change goals and objectives, along with a step down in carbon intensity in 2024 and a one-way ratchet mechanism to automatically strengthen the program over time.

We hope CARB will update modeling assumptions to align with the Final Scoping Plan, reflect all state goals, including those related to carbon removal and heavy-duty ZEVs, and reflect likely fuel pathways and market realities, including around current and likely near-term electric car sales. Ultimately, we hope CARB will explore a wider array of scenarios aimed to deliver the most significant greenhouse gas reductions practical, and no less than envisioned by the Final Scoping Plan.

Thank you again for the opportunity to comment on this workshop, and for the materials shared. We look forward to continuing to work with CARB through the LCFS amendment process in order to identify the best targets and program structure to align with the State's climate goals. Please do not hesitate to reach out with any questions.

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<sup>24</sup> See 'Carbon Removal Target' and 'CCS By Fuel' worksheets of the "AB 32 GHG Inventory Sectors Modeling Data Spreadsheet" found at: <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

<sup>25</sup> See slide 50 of workshop presentation.

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs\\_meetings/LCFSpresentation\\_02222023.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf)

<sup>26</sup> Ibid.

Sincerely,

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