October 22, 2018

Dear ARB Board Members and staff,

Thank you for the opportunity to comment on the proposed cap-and-trade regulations implementing AB 398 (Stat. 2017, Chap. 135). Our comments today focus on three issues: (1) the serious risk that excess allowances in the program will frustrate its ability to deliver the emission reductions called for in the 2017 Scoping Plan, (2) a potential loophole in the proposed definition of "direct environmental benefits" for carbon offsets that should be eliminated in the final regulation, and (3) the need to work toward a science-based policy strategy. In addition, we incorporate by reference an extensive set of public studies and comment letters previously submitted to ARB that are attached here as an appendix.

1. ARB has not shown how the proposed market design will keep emissions below California's legally binding limit in 2030.

We begin with what should be a straightforward observation, but which in the present rulemaking has seemingly become an overarching controversy. The Board is legally obligated to demonstrate that its portfolio of climate regulations is consistent with the economy-wide greenhouse gas emission limits set by AB 32 and SB 32. Moreover, the Board bears the burden of showing how its proposed regulations are consistent with state law.

The burden of evidence is critical because the Board has put forward specific assertions about the role and performance of the cap-and-trade program in overall state climate strategy that appear to be inconsistent with the proposed regulations. ARB and stakeholders engaged in a process to develop the 2017 Scoping Plan, which identified a comprehensive strategy for lowering emissions to the 2030 limit set by SB 32. Under the 2017

Scoping Plan, ARB calls for the cap-and-trade program to deliver the single largest share of cumulative emission reductions over the period 2021-2030 (236 $MMtCO_2e$) and nearly 50% of the annual emission reductions required in 2030 (60 $MMtCO_2e$).[1]

We would have preferred to reverse the sequencing of the 2017 Scoping Plan and cap-and-trade rulemaking processes to ensure that the Plan reflects the actual market design ARB adopts in the current rulemaking. Given that AB 398 required the Scoping Plan's completion on an accelerated timeline, however, we recognized in a previous comment letter that ARB did not have much choice in the matter:

> Because AB 398 requires ARB to finish the 2030 Scoping Plan by the end of 2017, ARB will need to select its preferred portfolio of policy measures for reaching the state's 2030 climate target more than a year before the Board completes its post-2020 cap-and-trade market design process. As a result, the 2030 Scoping Plan could identify a role for the cap-and-trade program, but any such quantitative role might not reflect the final market design ARB later adopts in implementing AB 398.
>
> We appreciate that ARB's statutory deadlines preclude any other outcome with respect to timing. Nevertheless, we call on ARB to commit to integrating its AB 398 implementation regulations with the 2030 Scoping Plan environmental analysis. Specifically, ARB should commit to directly and quantitatively evaluating how its AB 398 regulations will deliver the annual emission reductions expected from the cap-and-trade market in the final 2030 Scoping Plan, consistent with the SB 32 target for 2030.[2]

In other words, we asked for ARB to ensure that the cap-and-trade regulations it adopts in the present rulemaking process are consistent with the analytical basis and expected emission reductions from cap-and-trade underpinning the 2017 Scoping Plan.

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1 ARB, California's 2017 Climate Change Scoping Plan: The strategy for achieving California's 2030 greenhouse gas target (Nov. 2018) (hereinafter "2017 Scoping Plan") at 28, 30.

2 Near Zero, comment letter to ARB (Oct. 27, 2017) at 2.

Unfortunately, ARB has not offered any analysis to indicate the proposed regulation will deliver the reductions the 2017 Scoping Plan calls for from cap-and-trade. What little analysis the Board has provided on the stringency of the market design is based on a factual error that calls into question the ability of the proposed market design to deliver emission reductions consistent with the 2017 Scoping Plan.

At the same time, the Board's proposed regulations include a profound shift in emphasis about the role of carbon pricing that diverges from nearly every public statement the Board has previously made about cap-and-trade's functional role in state climate strategy. Previously, the Board assumed that the cap-and-trade program would ensure a particular quantity of reductions, supplying sufficient reductions to keep emissions below the state's mandated limits—but in the present rulemaking process the Board has shifted to describing the role of cap-and-trade as ensuring a "steadily increasing carbon price."[3]

Furthermore, because the proposed market design is unlikely to limit emissions as called for in the 2017 Scoping Plan, it is important to emphasize that the state's overall climate strategy may need reform. At this point, it is clear that the proposed market design bears little relationship to the strategy identified in the 2017 Scoping Plan. Should the Board finalize the market design proposed in the current rulemaking, the 2017 Scoping Plan will no longer serve as a reasonable representation of overall state climate policy strategy. Additional policy efforts would then be needed to put the state on track to achieving its 2030 climate goal.

Near Zero takes no ideological position on the appropriate balance of regulatory and market-based climate policies. We are fundamentally agnostic about policymakers' choices between reasonable alternatives. Nevertheless, we will point out when a given strategy appears likely to fail to deliver on its own terms. A weak cap-and-trade market design with

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[3] *See, e.g.,* ARB, Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Staff Report: Initial Statement of Reasons (Sept. 4, 2018) at 15, 171, 192.

excess allowances is inconsistent with the large reductions anticipated from cap-and-trade in the 2017 Scoping Plan. This disconnect calls for either reforms to the cap-and-trade program, significant new regulatory efforts, or an admission that the state policy portfolio is not on track to limit emissions in 2030 as required by SB 32.

a. ARB has not shown how the proposed market design will achieve the emission reductions identified as necessary in the Board's 2017 Scoping Plan.

Cap-and-trade programs can be effective mechanisms to reduce greenhouse gas emissions, but only if the supply of allowances (and offset credits) is appropriately balanced in relation to the emissions covered under the program. If the supply of allowances is too generous, emissions won't fall in line with program expectations; conversely, if the supply is too restrictive, emissions will be forced to decline more rapidly, and likely at higher cost, than policymakers intended. With or without a binding supply of allowances, market prices will also induce some level of emission reductions, but the extent of this price-induced mitigation would need to be analyzed carefully. ARB has not analyzed this issue during the AB 398 implementation process.

Reflecting mounting concerns that California's program has too many allowances, AB 398 instructs ARB to "Evaluate and address concerns related to overallocation in the state board's determination of the number of available allowances for years 2021 to 2030, inclusive, as appropriate."[4] The Board's response to that instruction is factually and analytically deficient, as explained further below.

i. The Board's only analysis of allowance overallocation is based on a factual error that, once corrected, shows how excess allowances banked from the market period through

[4] Cal. Health & Safety Code § 38562(c)(2)(D) (as added by AB 398).

2020 will frustrate the program's ability to reduce greenhouse gas emissions in later years.

In April 2018, ARB staff released a report to address AB 398's instruction on allowance overallocation. The staff report purported to show that with a bank of up to 150M allowances at the end of 2020, the post-2020 cap-and-trade program would still achieve the cumulative emission reductions called for in the 2017 Scoping Plan.[5] These findings are incorporated into Appendix D to the Initial Statement of Reasons in the proposed regulation.[6]

ARB's report is based on a factual mathematical error that Near Zero identified and a staff report from the Joint Legislative Committee on Climate Change Policies affirmed.[7] Once this error is corrected by the same method ARB employed in the original 2010 cap-and-trade regulation, ARB's analysis indicates the cap-and-trade program will fall well short of the greenhouse gas emission reductions called for in the 2017 Scoping Plan.[8] In other words, a corrected analysis shows that the proposed program's instrument supplies won't sufficiently constrain emissions to deliver the necessary emission reductions.

Since then, ARB staff have offered a series of non-sequitur responses about the cap-setting process that do not respond to the error Near Zero identified. Even if taken as true, ARB's responses do not establish that the program has been designed to achieve the emission reductions called for in the 2017 Scoping Plan.[9]

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5 ARB, Supporting Material for Assessment of Post-2020 Caps (Apr. 2018).

6 ARB, ISOR Appendix D: AB 398: Evaluation of Allowance Budgets 2021 through 2030 (Sept. 4, 2018) (hereinafter "ISOR Appendix D") at 7-11.

7 Mason Inman et al., Ready, fire, aim: ARB's overallocation report misses its target. Near Zero Research Note (May 7, 2018); Joint Legislative Committee on Climate Change Policies, Informational Hearing: Cap-and-Trade, Background Document (May 24, 2018).

8 Inman et al., *supra* note 7.

9 Letter from Dr. Danny Cullenward to Hon. Eduardo Garcia and Sen. Henry Stern (May 30, 2018), https://www.ghgpolicy.org/s/2018-05-30-Cullenward-letter-to-JLCCCP.pdf; Near Zero, comment letter to ARB (July 5, 2018), https://www.arb.ca.gov/lists/com-attach/29-ct-6-21-18-wkshp-ws-WzUHZFc3ACEFXFIo.pdf.

It has now been over five months since Near Zero identified this fundamental factual error. Despite public discussion of this issue in the media,[10] at a legislative oversight hearing,[11] and in multiple comment letters in response to ARB workshops,[12] ARB's proposed regulations dismiss Near Zero's criticism without a substantive response:

> In response to the initial staff analysis, one commenter stated there was an error in the CARB analysis. Staff evaluated the assertion and found that no error existed. The proposed adjustment by the commenter would have actually introduced an error.[13]

Since Near Zero released our report identifying ARB's error in May, we have had dozens of conversations with program stakeholders, policymakers, and independent researchers. Not a single individual or organization has disputed our calculations. ARB's reaction is, we believe, a regrettable attempt to marginalize an accurate criticism by dismissing it.

Furthermore, we note that the Independent Emissions Market Advisory Committee (IEMAC)—on which one of us (Dr. Cullenward) serves—elected not to address this factual question in its subcommittee on Managing Allowance Supply.[14] If ARB is confident in the accuracy of its approach, then the Board should request that the IEMAC evaluate whether or not

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10 *See, e.g.,* Julie Cart, Checking the math on cap and trade, some experts say it's not adding up, CALmatters (May 22, 2018), https://calmatters.org/articles/checking-the-math-on-cap-and-trade-some-experts-say-its-not-adding-up/.

11 Testimony of Dr. Danny Cullenward before the Joint Legislative Committee on Climate Change Policies (May 24, 2018), https://www.ghgpolicy.org/s/2018-05-24-Cullenward-testimony.pdf.

12 Near Zero, comment letter to ARB (May 10, 2018), https://www.arb.ca.gov/lists/com-attach/1200-ct-4-26-18-wkshp-ws-Uz1RMlw8BSQKU1Qu.pdf; Near Zero, comment letter to ARB, supra note 9.

13 ARB, ISOR Appendix D, *supra* note 6, at 10-11, footnote 11.

14 IEMAC, 2018 Annual Report of the Independent Emissions Market Advisory Committee, Chapter 6: Managing Allowance Supply (Oct. 22, 2018) (hereinafter "2018 IEMAC Report"); *Id.* at Appendix A (Dr. Cullenward's dissenting statement) (noting that this subcommittee could not reach consensus on whether to evaluate the technical validity of ARB's calculations). The IEMAC subcommittees operate on a consensus basis, such that consensus between subcommittee members is a prerequisite for a subcommittee to address a given topic.

ARB made a factual error in its April 2018 staff report and in Appendix D to the Initial Statement of Reasons in this rulemaking.

ii. Even if ARB's analysis were not factually incorrect, empirical evidence and credible estimates suggest allowance banking will be much larger than ARB projects.

ARB's April 2018 analysis and Appendix D to the current ISOR both assume that no more than 150M allowances will be banked in private accounts at the end of 2020.[15] But multiple credible lines of evidence indicate that the likely amount of allowance banking over this period will be much larger than what ARB expects.

- **Empirical banking metric.** Near Zero has published a method for calculating the bank of compliance instruments held in private accounts, which we define as the total number of allowances and offset credits held beyond the number needed for compliance obligations that have been incurred, but not yet satisfied. In other words, the metric measures the excess instruments held beyond what is needed for program compliance through any given point in time. Our metric is based on public market data and indicates that at the end of 2017, the private bank was 108.1M (±11.3M) compliance instruments.[16]

  Furthermore, emissions under the program through 2016 have been consistently far lower than annual program caps. As a result, the private bank has grown and is likely to grow for years to come, until such time as either emissions rise to meet the cap or the cap falls to reach where covered emissions actually are. In the first three auctions in 2018, current vintages have sold out—despite offering not only more allowances from the 2018 budget than covered entities likely need for this year's obligations, but also an additional 44 million allowances that

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15 ARB, Post-2020 Caps Report, *supra* note 5; ARB, ISOR Appendix D, *supra* note 6.

16 Mason Inman et al., Tracking banking in the Western Climate Initiative cap-and-trade program. Near Zero Research Note (Sept. 12, 2018). We intend to update our metric once ARB releases official data on 2017 emissions covered by the cap-and-trade program in November 2018.

went unsold in the 2016-17 auction collapse.[17] This evidence strongly indicates that the 2018 bank is likely to be much larger than in 2017, unless a catastrophic auction failure occurs at the fourth quarterly auction in November 2018.

- **Legislative Analyst's Office projections.** The non-partisan Legislative Analyst's Office has published multiple studies on the question of allowance overallocation, including an estimate that ARB adjusted downward to make its official projection for the April 2018 staff report.[18] At a recent IEMAC hearing, LAO's Dr. Ross Brown indicated that his office continues to project that the private bank of allowances is most likely to be in the range of 200M to 250M at the end of 2020—and that this projection takes into account methodological changes ARB proposed in its April 2018 staff report (which reduce the estimate), as well as newer data showing that covered emissions remain far below annual program caps (which increase the estimate).[19]

- **Energy Innovation's projections.** Dr. Chris Busch from Energy Innovation LLC estimated that the private bank of allowances is likely to be 270M (±70M) at the end of 2020.[20]

- **Environmental Commissioner of Ontario's projections.** Finally, the independent Environmental Commissioner of Ontario has estimated

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17 Mason Inman et al., California's "self-correcting" cap-and-trade auction mechanism does not eliminate market overallocation. Near Zero Research Note (May 23, 2018).

18 Legislative Analyst's Office, Letter to Hon. C. Garcia (June 16, 2017) (offering a central estimate of 200M allowances banked at the end of 2020).

19 September 2018 IEMAC meeting, morning session, timestamp 48:18, https://youtu.be/PGTeMUlUsiM?t=2898; *see also* Legislative Analyst's Office, Handout for the Joint Legislative Committee on Climate Change Policy hearing on Cap and Trade (May 24, 2018).

20 Chris Busch, Oversupply grows in the Western Climate Initiative carbon market: An adjustment for current oversupply is needed to ensure the program will achieve its 2030 target. Energy Innovation LLC Report (Dec. 2017).

that the private bank of allowances will be greater than 300M at the end of 2020.[21]

The ARB and independent analyses listed above, as well as Near Zero's banking metric, look only at allowance banking in private entities' accounts. In addition to private allowance banking, though, there are also additional allowances held in program reserves (*i.e.,* government-controlled accounts) that could later enter the market. ARB is also proposing, per AB 398, to transfer an additional 160.8M allowances from the market's pre-2021 reserve accounts into the post-2020 reserve accounts.[22] If sold to private actors, these allowances would enable higher emissions and therefore would contribute to overallocation conditions. The lower the prices at which ARB makes these surplus allowances available for purchase, the greater the likely extent of allowance overallocation.[23]

iii. Near Zero's preliminary modeling results suggests that any reasonable scenario for emissions will produce banking in excess of 150M compliance instruments at the end of 2020.

Near Zero has developed an open-source model of supply and demand in the Western Climate Initiative (WCI) cap-and-trade program.[24] As we stressed in an October 11 webinar releasing the initial model, the purpose of our effort is to accurately represent the cap-and-trade regulations as they are proposed in California and as they currently exist in Quebec, as well as the program's historical performance to date. The model takes as input from

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[21] Environmental Commissioner of Ontario, Ontario's Climate Act: From Plan to Progress, Appendix G: Technical Aspects of Oversupply in the WCI Market (Jan. 30, 2018).

[22] ARB, ISOR, *supra* note 3 at 44 (Table 8).

[23] Because the reserve allowances will be made available at different price points, reflecting the level at which ARB establishes the two "price containment points" and "price ceiling" accounts pursuant to AB 398, their sale to private entities is contingent on market price outcomes.

[24] Mason Inman et al., An open-source model of supply and demand in the Western Climate Initiative cap-and-trade program. Near Zero Software (Oct. 10, 2018), available at http://www.nearzero.org/wp/2018/10/10/an-open-source-model-of-supply-and-demand-in-the-western-climate-initiative-cap-and-trade-program/.

users three types of projections of the future: (1) covered emissions subject to the program, (2) outcomes of quarterly allowance auctions, and (3) the supply of offset credits. Critically, it does not assume what emissions will be, but rather allows users to explore the supply and demand implications of scenarios of their choosing.

We have been collecting feedback from model users and program stakeholders but have not yet received any input from ARB. We very much welcome ARB's feedback because it is essential to us to ensure that the model accurately depicts market rules. Given that the model is new and not all key stakeholders have offered their comments, we emphasize that the results shown here should be taken as preliminary. Nevertheless, because we have conducted extensive review of the program regulations and have been able to accurately reproduce historical market outcomes with our model, we believe that our projections offer some additional evidence to explore the question of whether or not the supply-demand balance is set appropriately in the current regulatory proposal.

Our model of the WCI program suggests that it would take very specific assumptions to produce a private bank of only 150M allowances along with a post-2020 program cap budget that is cumulatively binding on post-2020 emissions.[25] For example, if California's and Quebec's covered emissions increased 3% per year each year from 2017 through 2020, but then decreased 5% per year through 2030, the model shows that the private bank would peak at close to 180M compliance instruments in 2019 and fall to just under 150M at the end of 2020 (see Figure 1), consistent with ARB's assertions. Due to the rapidly falling emissions trajectory assumed thereafter, the private bank would be used up and program caps would be binding by 2030, without requiring sales from reserve accounts.

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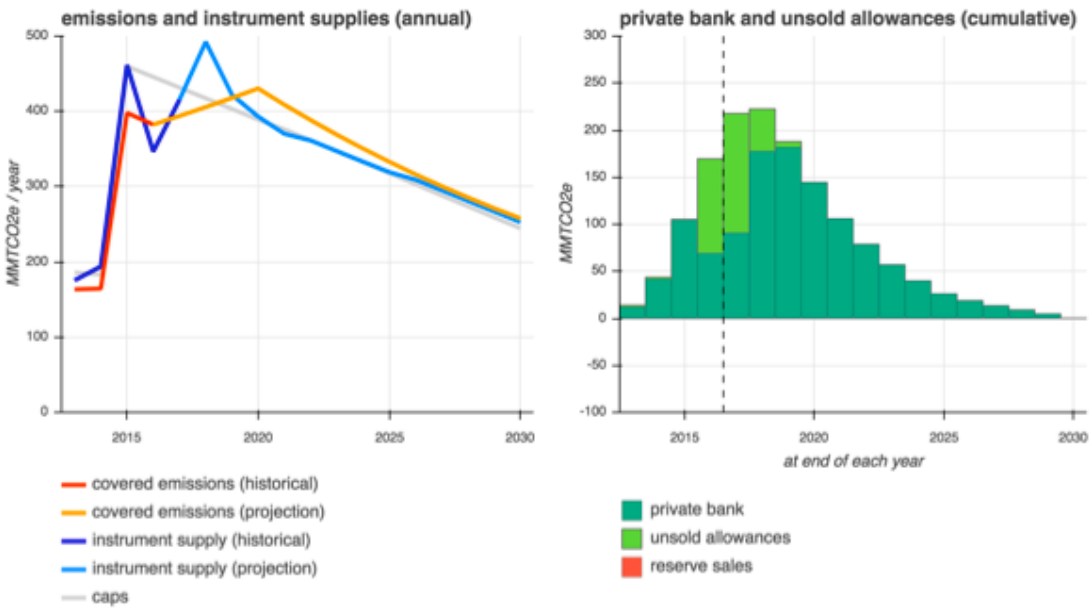
[25] Both of the scenarios discussed here use the model's default settings for offsets supplies and auction outcomes. Under these settings, offsets supplies are equal to the projections ARB makes in its projections in the current rulemaking. ARB, Post-2020 Caps Report, *supra* note 5. The auctions are assumed to sell all available allowances.

Figure 1: WCI cap-and-trade banking of 150M instruments in 2020



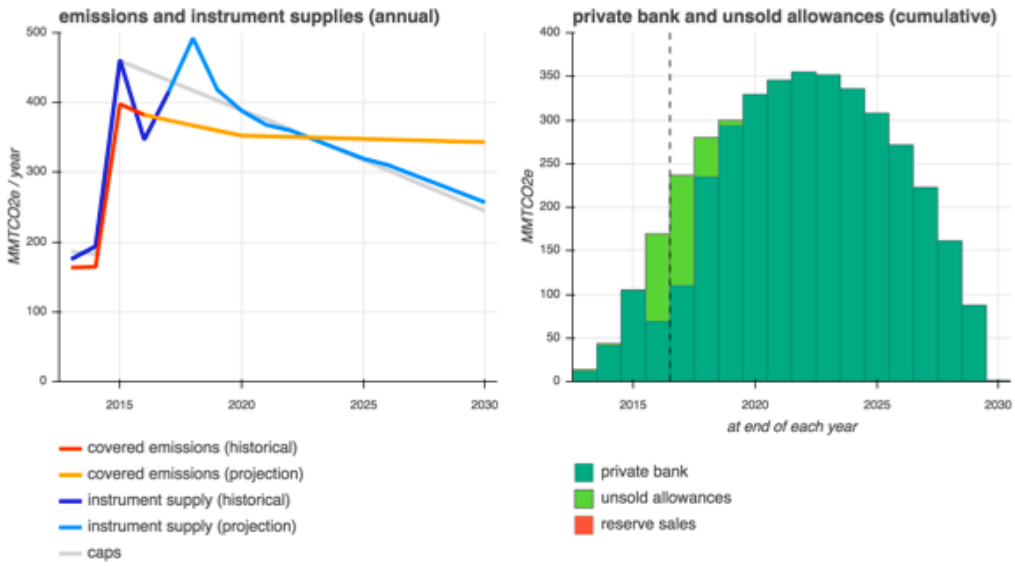
While these assumptions would make it possible to reach ARB's low estimate for allowance banking at the end of 2020 and also result in program caps that are binding through 2030, they are not particularly plausible in our view. Such an emissions trajectory would be a reversal in California's climate progress, but ARB has not indicated such a reversal is likely. In addition, this scenario would require an increase in covered emissions through 2020 that would likely cause California's total statewide emissions to exceed the state's 2020 limit mandated by AB 32.

To give a sense of how alternative assumptions can generate larger allowance banks at the end of 2020 that interfere with the ability of the program to limit emissions in line with 2030 goals, we consider a second scenario. Here, California's and Quebec's emissions are assumed to fall at 2% per year through 2020, consistent with the 2017 Scoping Plan Scenario[26], but then are held constant at 2020 levels through 2030. In this relatively pessimistic post-2020 scenario, the program caps are likewise binding

[26] The 2017 Scoping Plan Scenario, which represents the effects on California emissions of prescriptive measures (but not the WCI cap-and-trade program), has "covered sector" emissions that decline about 2%/year 2015-2030.

through 2030 on a cumulative basis, even though annual 2030 emissions greatly exceed program caps (see Figure 2). The bank of compliance instruments at the end of 2020 is about 325M, much larger than ARB's worst-case scenario of 150M. Given the overshoot of covered emissions above program caps through 2030, it is unlikely that this scenario is consistent with California's total emissions declining enough to be below the 2030 limit.

Figure 2: Banking implications from flat post-2020 emissions



Although these results are only preliminary and explore only two possible scenarios, we suggest they indicate a significant concern with respect to ARB's assumption that only 150M allowances will be banked by the end of 2020. These results also demonstrate the serious risk that excess allowances in the program will frustrate its ability to deliver the emission reductions called for in the 2017 Scoping Plan to limit California's 2030 emissions as required by SB 32. We encourage ARB and other interested stakeholders to explore the model using their own assumptions, and to review the model documentation and code. We would be glad to brief ARB staff and/or to receive ARB's feedback.

b. ARB's emphasis on a "steadily increasing carbon price signal" does not address the statutory requirement to address allowance overallocation nor the underlying concern that the program is insufficiently stringent to "close the gap" between California's prescriptive measures and its 2030 emissions limit.

The proposed regulations mark a fundamental shift in the way ARB describes the role of the cap-and-trade program. In every Scoping Plan and cap-and-trade regulation to date, ARB has described the program as a "backstop" or "insurance" type of mechanism that acts to ensure that California achieves its climate goals. In each scoping plan, prescriptive measures are expected to produce the majority of needed emission reductions, and therefore reduce demand for allowances in the cap-and-trade program; meanwhile, the fixed quantity limit on allowances is intended to ensure the state's goals are achieved no matter what emission reductions the state's prescriptive measures accomplish.

The 2017 Scoping Plan retains this conceptual and rhetorical framing. Not only does the Plan contain multiple references to the cap-and-trade program as a backstop,[27] but the Scoping Plan quantitatively assumes that cap-and-trade will "close the gap" between the 2030 emissions limit and projected emissions after considering the effects of California's prescriptive climate

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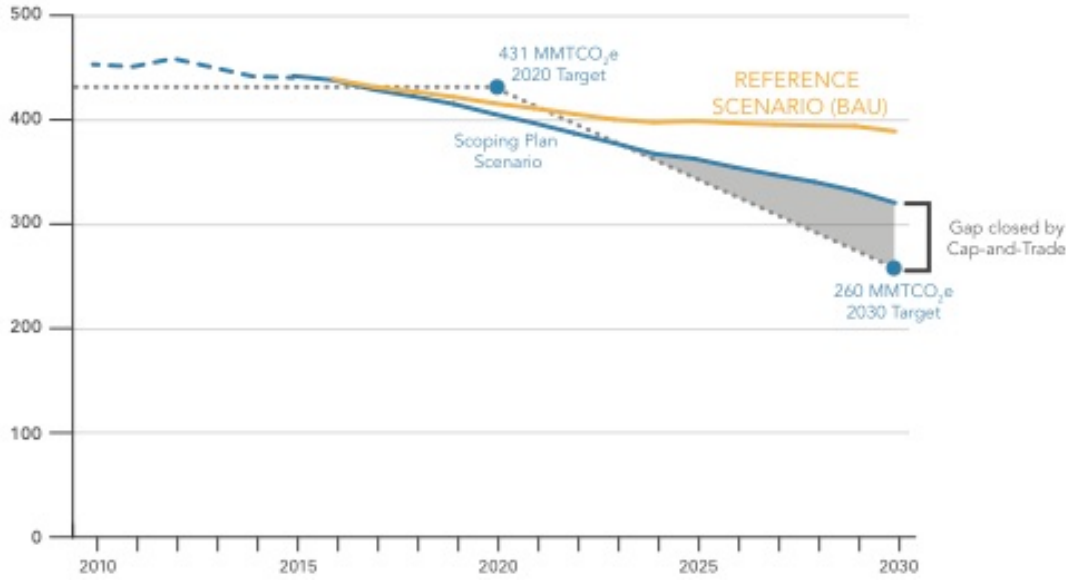
[27] *See, e.g.,* 2017 Scoping Plan at 25 (stating the Final Scoping Plan's strategy to "Continue the existing Cap-and-Trade Program with declining program caps to ensure the State's 2030 target is achieved"); *id*. at 26 (describing the cap-and-trade program's capability to deliver additional reductions if planned measures are delayed or ineffective, "to ensure the 2030 target is achieved"); *id*. at 30 (describing the final Scoping Plan Scenario and cap-and-trade's projected backstop role to "ensure the 2030 target is achieved); *id*. at 34 (Table 4) (noting under the criterion "Ensure the State Achieves the 2030 Target" that the cap-and-trade program "scales to ensure reductions are achieved," despite uncertainty in projected emissions and emission reductions); *id*. at 52 ("Flexibility allows the Cap-and-Trade allowance price to adjust to changes in supply and demand while a firm cap ensures GHG reductions are achieved"); *id*. 53 ("The aggregate emissions cap of the Cap-and-Trade Program ensures that the 2030 target will be met—irrespective of the GHG emissions realized through prescriptive measures"); *see also* ARB, Responses to questions at the Joint Hearing of the Senate Environmental Quality Committee and Senate Budget and Fiscal Review Subcommittee No. 2 (Jan. 17, 2018) at 2-3 (describing the cap-and-trade program's ability to achieve certain reductions with prices determined by the market), http://senv.senate.ca.gov/sites/senv.senate.ca.gov/files/arb_responses.pdf.

regulations. Specifically, the Plan assumes that the cap-and-trade program will generate whatever reductions are needed in the mid- to late-2020s (see the shaded area in Figure 3).

However, as discussed below, the proposed regulations abandon this approach of assuming cap-and-trade will serve as a backstop, without offering a sufficiently rigorous alternative.

Figure 3: Scoping Plan Scenario GHG Reductions[28]



i. ARB has not shown what range of carbon prices the Board expects from the proposed market design, nor what prices are needed to keep emissions below the 2030 limit.

In contrast to every Scoping Plan and cap-and-trade regulation to date, the current rulemaking pivots away from the idea that the cap-and-trade program is designed to guarantee the state achieves its climate goals.

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[28] 2017 Scoping Plan at 30 (Figure 9).

Instead, Board staff now suggest that the primary purpose of the program is to "support a steadily increasing carbon price signal."[29]

We agree that price-based policies (such as a carbon tax) can be perfectly effective as a climate strategy, but emphasize that their expected emission reductions are uncertain. As a result, careful analysis is needed to set prices at levels that are consistent with a specified emission reduction goal.

Unfortunately, the Board has not offered any analysis of the price levels that are expected from the proposed regulations, nor what price levels would be required to ensure that statewide emissions will fall below the 2030 limit. In the current SRIA, for example, the Board acknowledged that:

> CARB cannot estimate when allowance prices might significantly deviate from the Auction Reserve Price [i.e., the price floor], nor can CARB estimate when, if ever, allowance prices might reach the two price containment points or the price ceiling.[30]

Staff have released "a preliminary assessment of abatement opportunities that could become cost-effective for industrial facilities," including some opportunities that might be available at prices below the price ceiling.[31] However, there is no connection between these data points—a set of cost estimates for various technologies—and the likely quantitative emission reductions expected at different market prices. Therefore, there is no serious basis in the proposed regulation for establishing ARB's reasoned view on likely or necessary market prices.

Earlier this year, ARB indicated that it is very difficult to establish the right price level and used this observation to justify a preference for a binding cap-

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[29] ISOR Appendix D at 4-7; *id*. at 7 ("Conclusion: Historical performance of the Program demonstrates it is designed to support a steadily increasing carbon price signal.").

[30] ARB, ISOR Appendix C: Updated Standardized Regulatory Impact Analysis (Sept. 4, 2018), at 71.

[31] *Id*. at 70 (Table 22) (reporting a range of technology costs from –$25/tCO$_2$e to $500/tCO$_2$e). We note, however, that the bulk of the range for projected technology costs exceed ARB's proposed price ceiling, suggesting that the relevance of this table to establishing expected mitigation quantities is smaller than it at first appears. Significant additional analysis and new data would be required to estimate a quantitative abatement cost curve that is based on this information.

and-trade program.[32] Given the Board's reluctance to model price-induced mitigation, ARB's sudden interest in justifying the proposed market design on its ability to produce a "steadily increasing carbon price signal" is not without irony.

We note that the most important price level in the market today is the price floor, which was set at $10 in 2010 and rises at 5% per year plus inflation. That price level was determined in the 2010 rulemaking process and has not been re-evaluated in the context of the state's ambitious 2030 climate law. ARB has provided no evidence in the proposed rule to indicate that prices at or near the floor would be consistent with the statewide emission limits; indeed, ARB's price-induced mitigation assumptions in the 2017 Scoping Plan suggest that the program would not deliver the necessary reductions if prices remain at the floor.[33]

Because the proposed regulations contain no analysis of either the expected or needed prices, the Board's reliance on a "steadily increasing carbon price signal" does not address AB 398's instruction to evaluate and address concerns about allowance overallocation. The problem of a slack market with excess allowances and low prices does not go away simply because there is an auction floor price that increases modestly each year.

ii. The 2017 Scoping Plan's assumptions about price-induced mitigation are not based on any evidence or analysis.

The 2017 Scoping Plan contains a number of assumptions about the extent to which carbon prices are expected to produce emission reductions.[34]

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[32] ARB Response to SEQ Questions, *supra* note 27, at 6-7 (question 6).

[33] *See* Figure 4 and Section 1.b.ii, *infra*.

[34] ARB, 2017 Scoping Plan, Appendix E: Economic Analysis (Nov. 2017), at 65, 90. Curiously, despite changing projections for the total quantity of emission reductions expected at various points in the development of the final 2017 Scoping Plan, ARB staff consistently projected that these reductions would be achieved at an average price halfway between the price floor and the pre-2020 Allowance Price Containment Reserve price (ceiling price). For example, Appendix E1 was published when ARB expected cap-and-trade to need to deliver 179 $MMtCO_2e$ in cumulative reductions through 2030; ARB assumed this would be possible at prices halfway between the floor

Specifically, the Plan assumes that the cumulative emission reductions called for from cap-and-trade—236 MMtCO2e over the period 2021-2030—can be achieved at prices halfway between the program's floor price and pre-AB-398 APCR ceiling price.[35] We interpret this to mean at about a price in 2030 of approximately $54 per tCO_2e (in 2015 USD).[36]

Critically, this assumption is not based on any public data or modeling. ARB provides no citation to support these claims. As discussed at two IEMAC meetings, ARB believes these assumptions to be reasonable because they were put forward in the 2017 Scoping Plan process and received no public comments suggesting they were in error.[37] But there is no empirical or model-based rationale for these assumptions in the public record. As a result, we believe that these assumptions do not provide a reasoned basis for establishing that the program will deliver the necessary reductions if prices reach the levels ARB assumed, without analysis, to be sufficient in the 2017 Scoping Plan. Even if these assumptions do provide such a basis, ARB has not analyzed whether the market is likely to produce those prices given the large bank of surplus allowances building up in private accounts.

Finally, we note that ARB's views in the Scoping Plan were far more optimistic about the degree of price-induced mitigation than the results of an influential report on likely market prices through 2030 by UC Berkeley Professor Severin Borenstein and his colleagues.[38] ARB has claimed that no adjustment to allowance supplies is warranted, supporting their argument by

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and ceiling levels. *Id.* at 65. When ARB subsequently revised its projections to call for 236 $MMtCO_2e$ in cumulative reductions through 2030, staff assumed these reductions would be available at the same price in Appendix E2. *Id.* at 90. No justification was provided. See Figure 4 for a visual comparison of how ARB's assumptions shifted to accommodate the cap-and-trade program's changing role in the Scoping Plan Scenario.

35 *Id*. at 90.

36 We assume that the halfway point is calculated with respect to ARB's assumed 2030 floor and ceiling prices, prior to the beginning of the current rulemaking process. At the time, ARB calculated the floor price in 2030 at $25.20 and the ceiling price in 2030 at $81.90 (both in 2015 USD). *Id.* at 11 (Table 5). The halfway point would be $53.55.

37 September IEMAC meeting, morning session, timestamp 29:36, https://youtu.be/PGTeMUlUsiM?t=1776.

38 Severin Borenstein et al., California's Cap-and-Trade Market Through 2030: A Preliminary Supply/Demand Analysis. UC Berkeley Energy Institute @ Haas Working Paper #281 (July 2017).

referring to a blog post from Professors Borenstein and Jim Bushnell[39] that is based on their earlier report.[40] ARB's reliance on this analysis is misplaced for two important reasons.

First, while it is true that an intervention to remove excess allowances will increase market prices, reducing the supply of allowances will also significantly reduce pollution.[41] Professors Borenstein and Jim Bushnell argue that the effect on emissions of a supply adjustment would be small, but in so doing, discount the requirements state law places on ARB's market design.[42] They assert that the primary impact of a reduction in allowance supplies would be to increase the chances of the market reaching the price ceiling, at which point the authors believe no further emission reductions would occur. Implicitly, they appear to be skeptical of the requirement in AB 398 that revenue from any "price containment units" sold at the price ceiling be used to fund mitigation outside of the cap. While this skepticism may be warranted on policy grounds or political pragmatism, AB 398 requires ARB to achieve at least an equal quantity of emission reductions for every price ceiling unit sale.[43] It is therefore inconsistent with state law for ARB to rely on an argument that assumes when market conditions reach the price ceiling, no additional greenhouse gas reductions will follow.

Second, there are significant inconsistencies between the price-induced mitigation assumptions in ARB's official 2017 Scoping Plan analysis and the model developed by Professor Borenstein and his colleagues, which is contingent on a pessimistic interpretation of what might be possible from

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39 Severin Borenstein and Jim Bushnell, California's Carbon Cap is Not in Jeopardy, Because It's Not Really a Cap. UC Berkeley Energy Institute @ Haas Blog (Jan. 2, 2018), https://energyathaas.wordpress.com/2018/01/02/californias-carbon-cap-is-not-in-jeopardy-because-its-not-really-a-cap/.

40 ISOR Appendix D, at 14-15 (citing Borenstein and Bushnell, *supra* note 39).

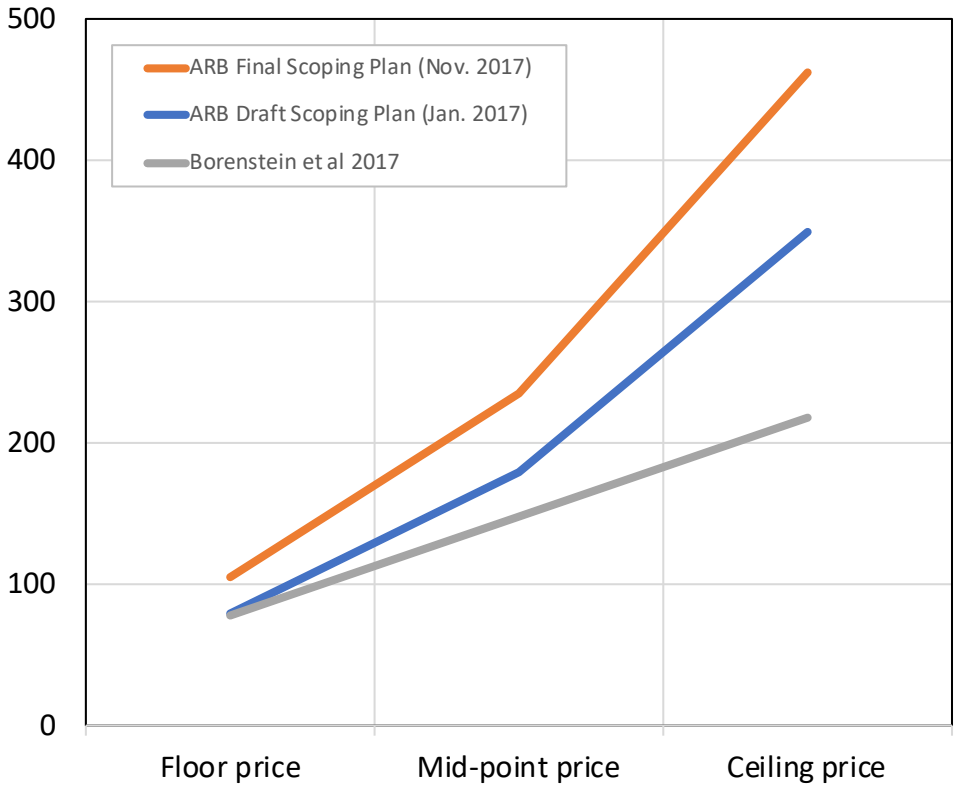
41 Danny Cullenward et al., Removing excess cap-and-trade allowances will reduce greenhouse gas emissions: A response to Severin Borenstein and Jim Bushnell. Near Zero Research Note (Jan. 11, 2018).

42 Borenstein and Bushnell, *supra* note 39

43 Cal. Health & Safety Code § 38562(2)(A)(ii)(II) (as added by AB 398); *see also* Cullenward et al., *supra* note 41, at 8-9 (sympathetically reviewing criticisms of the environmental integrity provision of AB 398's price ceiling revenue requirements).

price-induced mitigation.[44] As Figure 4 illustrates, ARB's Scoping Plan assumptions are much more optimistic: according to ARB, the cap-and-trade program will cause more than twice the reductions at the market price ceiling than does Professor Borenstein's model.[45]

Figure 4: Comparison of price-induced mitigation assumptions (cumulative MMtCO$_2$ through 2030)[46]



Indeed, even without addressing the price ceiling issue, updating their assumptions to reflect ARB's price-induced mitigation would cause a supply intervention to produce 106.8 MMtCO$_2$e in benefits—more than twice the

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[44] *See also* Chris Busch, Technical Appendix to Blog Post "Analyzing the Likely Impact of Oversupply on California's Carbon Market Must Consider State's 2030 Emissions Goal and Potential for Clean Tech Breakthroughs," Energy Innovation LLC (Jan. 10, 2018).

[45] *See also* Cullenward et al, *supra* note 41, at 11.

[46] Based on *id*. at 11 (Figure 1) (reporting assumptions from the final 2017 Scoping Plan and Borenstein et al. analysis); *see also* ARB, *supra* note 34 at 65 (reporting assumptions for the January 2017 draft 2017 Scoping Plan).

projection by Professors Borenstein and Bushnell of only 42 $MMtCO_2e$, and just under half of the cumulative reductions ARB calls for from cap-and-trade in the final 2017 Scoping Plan.[47] Again, this calculation assumes, contrary to AB 398, that no additional reductions will be delivered from revenue generated at the market's price ceiling; including those effects would significantly increase the environmental benefit of a supply adjustment.

Whatever one's views of these two factors, the argument presented by Professors Borenstein and Bushnell makes assumptions that are contrary to the requirements of state law and inconsistent with ARB's assertions in the Scoping Plan about price-induced mitigation. It is therefore inappropriate for ARB to refer to Professors Borenstein and Bushnell's argument as a rationale for not acting on allowance overallocation.

Prior to the present rulemaking process, ARB's rationale for implementing a cap-and-trade program has always been that higher prices will induce more mitigation, and that prices will adjust as needed to induce sufficient mitigation to achieve the state's climate goals. However, in the present rulemaking process, ARB has expressed pessimism about the extent of additional mitigation as prices rise above the floor, and thus has cast doubt on the basic premise of the cap-and-trade program. We do not consider the studies by Professors Borenstein and colleagues a sufficient basis for abandoning the basic premise of the program.

c. Multiple lines of credible evidence indicate that the cap-and-trade program has too many allowances and that these excess allowances call into question the program's ability to deliver

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[47] Following the same method identified separately by Cullenward et al., *supra* note 41, and Busch, *supra* note 44, the calculated reductions are determined by multiplying the change in likelihood of being at the price floor and ceiling, respectively, by the price-induced mitigation assumptions for each outcome and adding them together. Thus, the calculated mitigation for ARB's 2017 Scoping Plan assumptions is (–30% * 106) + (30% * 462) = 106.8 $MMtCO_2e$. Per the Borenstein et al. framework, and contrary to the requirements of AB 398, this calculation assumes no mitigation at the price ceiling.

emission reductions sufficient to keep California's emissions below the 2030 limit.

As reviewed above in Sections 1.a.ii and 1.a.iii, multiple lines of empirical evidence and model-based projections indicate that the cap-and-trade program features a significant allowance overallocation problem. The actual private bank of allowances as of 2017 is more than two-thirds of ARB's projected worst-case outcome in 2020, and multiple studies from the non-partisan LAO and independent research organizations have concluded that the likely bank will be substantially higher than what ARB projects.

ARB has not analyzed what impact larger allowance banks will have on the post-2020 market. Most important, ARB has never actually analyzed whether its proposed market design will lead to annual emissions in 2030 that are consistent with the 2017 Scoping Plan and SB 32's limit. The lack of an annual analysis, as opposed to a cumulative analysis, is striking because even a market with no cumulative oversupply through 2030 could enable emissions in later years to exceed the program caps (see Figure 2, above). In turn, this outcome would put at risk the state's ability to keep emissions below the 2030 limit.

d. California's Independent Emissions Market Advisory Committee calls for a comprehensive study of market supply-demand balance. This study should be done as an input into the present rulemaking process, not an afterthought.

Acknowledging the debate between independent researchers and ARB's internal analysis, the IEMAC calls for a comprehensive study of program allowance supplies.[48] We endorse this recommendation wholeheartedly but believe that such a study should be done as an input to the current regulatory process, not as an afterthought.

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[48] 2018 IEMAC Report, *supra* note 14, at Chapter 6.

2. The proposed definition of "direct environmental benefits" for carbon offsets contains a potential loophole that should be closed.

Finally, we address a separate topic related to carbon offsets. AB 398 sets new limits on offset use in the post-2020 market period, with no more than half of the limit coming from projects that do not produce a "direct environmental benefit" (or DEB) to California air or water quality.[49]

As noted by the IEMAC, the proposed regulatory text contains an ambiguity that could potentially allow any offset project to claim a DEB on the basis of its project-level avoided greenhouse gas emissions or project-level greenhouse gas emission reductions.[50] The proposed definition clearly forecloses this option with respect to claiming a DEB to California air quality, but the path for claiming a DEB to California water quality via climate impacts remains ambiguous with respect to greenhouse gas emissions. Because every offset project could make this argument, any such interpretation would render AB 398's DEBs language superfluous and effectively eliminate this statutory provision—contrary to clear legislative intent behind AB 398's limits on post-2020 offset use.

Equally troubling, such an interpretation would be inconsistent with basic scientific accounting because offsets produce no net climate benefits anywhere, no matter where they are located.[51] Project-level greenhouse gas reductions or project-level avoided greenhouse gas emissions that are recognized under offset protocols generate offset credits. Regulated entities use these credits to emit an equally sized and corresponding increase in greenhouse gas emissions, resulting in no net change in greenhouse gas emissions. Any interpretation of the DEBs language in AB 398 that leaves open an argument for offset projects to claim a DEB on the basis of the greenhouse gas emission reductions or avoided greenhouse gas emissions

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[49] Cal. Health & Safety Code § 38562(c)(2)(E) (as added by AB 398).
[50] 2018 IEMAC Report, *supra* note 14, at Chapter 5.
[51] Danny Cullenward et al., Interpreting AB 398's offset limits. Near Zero Research Note (Mar. 15, 2018).

that are the basis for the offset credits they generate is not only inconsistent with clear legislative intent, but also basic environmental science.

Accordingly, we join the IEMAC in urging ARB to specifically foreclose this interpretation by revising the DEB definition to make clear that offset projects cannot claim a DEB on the basis of greenhouse gas emissions reductions or avoided greenhouse gas emissions that are credited under the offset protocol.

3. Working toward a science-based policy strategy

We are mindful that this letter is critical of the analytical basis staff present for California's flagship climate policy. And we are mindful that some Board staff have not appreciated our comments in the past. We hope that despite our different perspectives, there are those at ARB who find our analysis useful in evaluating strategies for successfully achieving California's ambitious climate policy goals.

Our goal is to evaluate the scientific basis for California's critically important climate policy strategies. Near Zero remains agnostic as to how policymakers decide to accomplish their climate goals, but is firmly committed to evaluating the plausibility of any proposed strategy on the basis of the available evidence. Our strong preference is to work collaboratively with Board members and staff to help ARB carry out its essential work; we look forward to that opportunity and to focusing on the question of how to solve California's climate policy challenges, rather than dwelling on analytical shortcomings in the past. But where the facts don't support a particular choice—for example, inaction on addressing an obvious allowance oversupply problem—it is our goal to evaluate and communicate these findings in public policy processes.

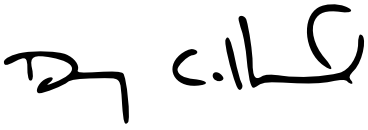
We respect that climate mitigation policy is, even in the best of circumstances, a difficult endeavor. ARB and other state policymakers face complicated choices in determining the balance of competing policy strategies while meeting increasingly ambitious statutory mandates. That is why a clear accounting of the facts and a consistent analytical basis for

action are so critical. ARB's opponents can and will challenge the Board's ability to deliver on California's climate laws. A clear basis for action that respects state law and builds an evidentiary record for action will be essential, in our view, to support the state's deep decarbonization agenda. It is also a prerequisite to a cost-effective strategy across policy instruments, a goal that will only become more important over time as California pursues deeper emission reduction targets.

Carbon pricing as a mitigation tool has proven to be more difficult to implement than originally thought. We count ourselves among those who, like ARB, understand that the economic efficiency of carbon pricing comes with additional challenges that make it difficult to rely on programs like cap-and-trade to deliver deep greenhouse gas emission reductions. Nevertheless, the Board determined in its 2017 Scoping Plan to rely on cap-and-trade for the single largest share of cumulative emission reductions in the 2020s and nearly half the required annual emission reductions in 2030.

We respectfully urge the Board to consider tightening the market design in the current proposal, which cannot reasonably be said to deliver on the role ARB identified for this program in last year's Scoping Plan. If the Board is unwilling or unable to do so, however, we request the Board to (1) call for a future rulemaking to address allowance overallocation, and (2) begin a process for revising the Scoping Plan to reflect the actual market design adopted in the current process.

Sincerely,



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