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Cheryl Laskowski
Chief, Transportation Fuels Branch
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Comments submitted electronically

RE: Comments Related to the November 9th Low Carbon Fuel Standard Scenarios Modeling Workshop

Dear Dr., Laskowski,

Air Products is pleased to provide comments in support of the California Air Resources Board (CARB) planned rulemaking for the Low Carbon Fuel Standard (LCFS). We support California's climate goals and believe that Air Products can help California with the energy transition needed to meet these challenges. Hydrogen will play a key role in the energy transition, and it is important that the LCFS provide the necessary and appropriate technology-neutral framework to incentivize hydrogen decarbonization to assist in this transition.

Air Products is the only U.S.-based global industrial gas company and the world's largest hydrogen producer and supplier for use in numerous markets, including transportation. Within California, the company safely operates nine hydrogen production facilities, approximately 27 miles of hydrogen pipeline and currently supplies and operates a network of light-duty and heavy-duty hydrogen fueling stations facilitating the transition to carbon-free transportation. In fact, to date, Air Products has cumulatively supplied a majority of the hydrogen used in the growing California mobility market.

We are committed to rapidly scaling and decarbonizing global hydrogen supplies to support decarbonization efforts internationally. On July 25, 2022, Air Products announced[1] that it will spend or commit at least $4 billion in additional new capital for the transition to clean energy over the next five years. In the two years proceeding this announcement, Air Products had announced approximately $11 billion in clean energy investments.

Program Stringency

We believe that the drop in credit prices over the past year is an indication of the near-term success of the program in driving alternative fuel growth and fossil-based transportation fuel

[1] Air Products Announces Additional "Third by '30" CO2 Emissions Reduction Goal, Commitment to Net Zero by 2050, and Increase in New Capital for Energy Transition to $15 Billion

transition. Projects coming on-line now were based on stronger credit price signals in the past and we need, once again, to send strong signals to prompt future reduction projects. To send a strong future market signal to incentivize the lowest carbon fuels and more conventional fuel displacement, we urge CARB to target the most stringent 2030 target that CARB's internal analysis indicates is technically feasible and appropriately promotes innovation. Air Products supports evaluating the scenario at the 35% carbon intensity (CI) reduction proposed for 2030 and if the scenario indicates that low carbon fuel availability and related credit generation is sufficient without strain, then a sensitivity analysis at an even lower carbon intensity target in 2030 should be run.

We urge CARB to be aggressive in setting this CI reduction target, as the existing cost-containment provisions in the regulation are sufficient should the low-carbon fuel supply not develop as quickly as anticipated. If there are underlying concerns about cost, then CARB can revisit and enhance the cost containment provisions – but this should not inhibit setting stronger targets.

We also suggest that the 2024 target be set appropriately to help the credit demand rebound and to support increased near-term credit prices. The model should evaluate a more stringent starting point than just a linear progression from the current 2024 target to the different 2030 targets.

For the regulation target setting, we propose carbon intensity regulatory levels set over a time horizon of at least 15 years (rounded to nearest five-year increment). As an example, this planned update implemented in 2024 should, at a minimum, include carbon intensity reduction targets to 2040. The 15-year time horizon is helpful for longer-term planning required for large project execution and to provide the credit price certainty needed to realize a return on investment to execute these projects.

Ratcheting Mechanism

We are intrigued by the possibility of an automatic stringency 'ratcheting' mechanism being included in the amended regulation and are generally supportive of the concept. The LCFS program is most effective when the credit pricing is at a level that incentivizes the necessary decarbonization of the transportation sector and enables the program to do this automatically without waiting for a full rule amendment process. We believe that such a mechanism will be needed even more in the future as many policies and funding streams outside of the LCFS will contribute to decarbonization of transportation and may further depress LCFS credit values. As the details of the trigger mechanism and proposed stringency mechanisms will be key to the success of such a mechanism, we look forward to considering this concept more at the future workshop where CARB intends to share more details.

Scenario Input

Air Products supports the ranges of scenarios that CARB is modeling and understands that individual model parameters selected do not necessarily represent CARB's preferred approach, but we do want to comment on our preferred regulatory outcomes based on the model scenarios presented.

First, the use of renewable natural gas (RNG) for the production of hydrogen, including through the use of a book and claim crediting approach, can substantially lower the carbon intensity of the hydrogen produced – even creating negative carbon intensity hydrogen. Given the projected need for low, zero, or negative carbon hydrogen in the scoping plan, including in transportation, along with the carbon neutrality target, negative carbon hydrogen will be important in helping California advance its decarbonization plans. Allowing all the current crediting opportunities to produce low carbon hydrogen with RNG should continue for the foreseeable future in the regulation – consistent with Scenario C as proposed. We do not believe that limiting book and claim to only hydrogen produced with landfill gas, or geographically limiting the sources of biogas to only those in the Western Natural Gas Network is prudent while the low carbon hydrogen market is still developing. In fact, the ability to utilize book and claim RNG to produce hydrogen should be extended from solely what is needed for feedstock to include all demand for process energy in the production of low carbon hydrogen. This includes both the thermal (combustion) energy required in hydrogen production processes; as well as downstream energy demands including the thermal cracking of ammonia which will be an important long-distance hydrogen carrier and storage vector in the future. The LCFS has and will continue to be an important and successful decarbonization policy which spurs carbon reducing opportunities nationally – including recovery and productive use of RNG. Now is not the time to limit the program's ability to do this as the LCFS helps drive the low carbon hydrogen market.

We also continue to support the proposed Medium and Heavy-Duty Hydrogen Refueling Infrastructure (HRI) credit cap at 2.5% of the previous quarter deficits, and that this credit cap of 2.5% must be in addition to the Light Duty Vehicle HRI cap of 2.5% and stations offering both should have a combined cap of 5%. We understand that CARB is concerned that the concept of allowing a cap of 5% for HRI credits, in addition to a 5% cap for electric vehicle (EV) Fast Charging Infrastructure (FCI) credits, could enable too many of these credits to enter the market at a combined cap of 10% as outlined in Scenario alternatives B and C. However, setting stringent annual CI targets coupled with a ratcheting mechanism is the best way to protect against too many credits entering the market from good provisions like HRI credits. If after setting stringent targets, the modeling still indicates that a deficit cap of less than 10% is desirable, we suggest that you eliminate or curtail the 2.5% FCI credits allocated for light-duty vehicle charging. Electricity-based credits significantly outpace hydrogen-derived credits in the program despite only 1% of them being from EV charging credits. Based on the level of support that non-capacity-based crediting affords electricity in the regulation, along with many other policy supports and incentives for charging infrastructure in California, providing charging credits for the established light-duty battery-electric market is not needed. If this crediting is eliminated, this would reduce the cap for both EV FCI charging and HRI credits to 7.5% (5% combined for HRI of all vehicle classes, and 2.5% for MHD vehicle charging infrastructure).

Technical Questions on Modeling Inputs

We appreciated the recent discussion we had with staff regarding the modeling which helped us better understand the general parameters and function of the model, we thought we would still submit our original questions along with some new ones to foster additional discussion in future workshops.

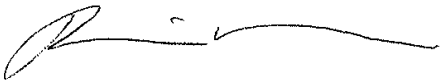
- General questions/suggestions
  - We understand that CARB plans to incorporate data on vehicle inventories from the recently adopted 2022 Scoping Plan but suggest updating vehicle counts with the latest data. As an example, we note that the Scoping plan assumes around 5,500 light-duty fuel cell vehicles in 2022 when in fact there are already around 11,000.
  - We understand that CARB is utilizing 90% carbon intensity reduction target for 2045. However, given the carbon neutrality target for 2045, we suggest using a target of 100% carbon intensity reduction for 2045 to understand how the LCFS could individually meet this target.

- From the Fuel Production Tab of the CATS Summary Inputs Workbook
  - Does the value in cell E10 of $18/MWh represent the cost of a REC?
  - What are the main components of the difference in cost between the LDV-H2 values in cells E30/31 ($56/MM BTU) and the CNG cost value in cells E6 and E7 ($11.4/MM BTU) when both are eligible for book and claim credits?
  - What are the main components of the difference in cost between the HDV-H2 Electricity values in cells E44/45 ($86/MWH) and cells E42/E43 ($137/MWh)?
  - Why is there such a large efficiency difference between EVs and FCVs in cells G42/43 (3600 MJ/MWh) and cells G44/45 (2066 MJ/MWh), respectively.

- From the Energy Demand Tab
  - Why is data for 2020 and 2021 not included for fuels except jet fuel?
  - Is there a way to translate these energy consumption numbers into numbers of vehicles?

Air Products appreciates the opportunity to provide this feedback and we would like to meet with CARB to discuss further and specifically discuss the modeling information. Please feel free to contact me by phone (916-860-9378) or email hellermt@airproducts.com.

Respectfully,



Miles Heller
Director, Greenhouse Gas Government Policy