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California Air Resources Board
Industrial Strategies Division
P.O. Box 2815
Sacramento, CA 95812

Re: Airlines for America® Comments on the 2022 Scoping Plan Update -- Draft Scenario Inputs

Dear Sir/Madam:

Airlines for America® (A4A), the principal trade and service organization of the U.S. airline industry,[1] appreciates the opportunity to comment on the California Air Resources Board's (CARB) September 30, 2021, technical workshop on the 2022 Scoping Plan Update, and in particular on the draft carbon neutrality scenarios and associated PATHWAYS scenario modeling assumptions that CARB staff presented during the workshop.[2] We appreciate that the draft scenarios "are not meant to inform any current regulatory activities at CARB," but provide these comments in the hopes they will assist staff in developing an accurate and realistic Climate Change Scoping Plan Update.[3] More specifically, we highlight that the Scoping Plan

[1] A4A's members are: Alaska Airlines, Inc.; American Airlines Group Inc.; Atlas Air, Inc.; Delta Air Lines, Inc.; Federal Express Corporation; Hawaiian Airlines, Inc.; JetBlue Airways Corp.; Southwest Airlines Co.; United Airlines Holdings, Inc.; and United Parcel Service Co. Air Canada, Inc. is an associate member.

[2] Posted at https://ww2.arb.ca.gov/sites/default/files/2021-09/carb_presentation_sp_scenarioinputs_september2021.pdf (Slide Presentation) and https://ww2.arb.ca.gov/sites/default/files/2021-09/Draft_2022SP_ScenarioAssumptions_30Sept.pdf (Draft Scenario Assumptions).

[3] Slide Presentation at 2. Even at this preliminary stage, we emphasize our understanding that any regulatory action or other measure intended to implement the Scoping Plan ultimately could not be finalized without further formal notice and opportunity to comment consistent with the State's Administrative Procedure Act. We underscore that these comments are not intended to constitute a comprehensive or final comment on the "carbon neutrality scenarios" analysis or any specific policy, project, action or measure that may be put forward to implement the Scoping Plan. A4A and our members expressly reserve any and all rights to comment on the results of the scenarios analysis and any regulatory measure or other action if and when it is formally proposed.

must comport with AB 32 by reflecting a scenario that is both technologically feasible and cost effective[4] as well as good for the economy, for workers and for health.[5]

For context, we first discuss below the extensive efforts A4A has undertaken and continues to undertake to demonstrate our member carriers' longstanding commitment to the environment and sustainability. Following this background discussion, we provide our comments on the four draft scenarios -- Alternatives 1 and 2 calling for carbon neutrality in California by 2035, and Alternatives 3 and 4 calling for statewide carbon neutrality by 2045 -- and the different modeling assumptions built into them.

BACKGROUND

The U.S. airlines have a very strong environmental record and remain committed to advancing environmental progress. Commercial aviation has been an indispensable pillar of our national, state and local economies for decades. Prior to the onset of the COVID-19 pandemic, commercial aviation helped drive over 10 million U.S. jobs and over 5 percent of U.S. Gross Domestic Product (GDP). In California, according to the most recent Federal Aviation Administration (FAA) analysis, civil aviation accounts for about 5 percent of jobs (over 1.15 million in 2016) and drives over 4 percent of State GDP ($109.1 billion in 2016).[6] Economic impact studies likewise have affirmed the critical importance to local economies of aviation activity at California's major airports.[7]

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[4] *See* California Health and Safety Code § 38561(a). The Legislature has also specifically provided that "[CARB] shall evaluate the total potential costs and total potential economic and noneconomic benefits of the plan for reducing greenhouse gases to California's economy, environment, and public health, using the best available economic models, emission estimation techniques, and other scientific methods." *Id.* § 38561(d).

[5] *See* Executive Order N-19-19 (noting "a bold climate agenda is good for the economy, for workers, for health and for our future as evidenced by our state having achieved record economic growth while reaching some of the strongest climate goals in the world" and calling on California "to redouble its efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change *while building a sustainable, inclusive economy"*) (emphasis added).

[6] *See* FAA, *The Economic Impact of Civil Aviation on the U.S. Economy –State Supplement* (November 2020), at 10, available at https://www.faa.gov/about/plans_reports/media/2020_nov_economic_impact_report.pdf.

[7] *See, e.g.*, *Economic Impact Analysis – Los Angeles International Airport in 2014* (620,610 jobs in Southern California, $37.3 billion in labor income, $126.6 billion in economic output and $6.2 billion in state and local taxes), available at https://laedc.org/wp-content/uploads/2016/04/LAWA_FINAL_20160420.pdf; *2019 Economic Impact Study – San Francisco International Airport* (direct impact of 188,111 jobs, $14 billion in labor income and 42.5 billion in total revenues; total impact of 330,215 jobs, $25 billion in labor income and $72.7 billion in total revenues), available at https://www.flysfo.com/sites/default/files/SFO_Economic_Impact_Report_2019.pdf; *San Diego International Airport Economic Impact Study – June 2018* (direct impact of 67,200 jobs, over $2 billion in payroll and $6 billion in economic output; total impact of 116,571 jobs, $3.9 billion in payroll and $11.7 in annual output), available at https://timesofsandiego.com/wp-content/uploads/2018/09/2017-01-06-economic-impact-study.pdf.

Our record demonstrates that our industry can grow and help the country prosper even as we continue to improve our environmental performance. For example, from 1978 to 2019, U.S. airlines improved their fuel efficiency (on a revenue ton mile basis) by over 135 percent, saving over 5 billion metric tons of carbon dioxide (CO_2) – equivalent to taking more than 27 million cars off the road on average *in each of those years*. Similarly, since 1975, even as we quintupled the number of passengers served in the U.S., we have reduced the number of people exposed to significant levels of aircraft noise by 94 percent. U.S. airlines have continually demonstrated their ability to contribute to the nation's economic productivity, while minimizing their environmental footprint.

Our environmental record is not happenstance, but the result of a relentless commitment to driving and deploying technology, operations, infrastructure and sustainable aviation fuel (SAF, or what CARB typically refers to as alternative jet fuel (AJF)) advances to provide safe and vital air transport as efficiently as possible within the constraints of the air traffic management system. Indeed, for the past several decades, airlines have dramatically improved fuel efficiency and reduced CO_2 and other emissions by investing billions in fuel-saving aircraft and engines, innovative technologies like winglets (which improve aerodynamics), and cutting-edge route-optimization software.

Building upon this foundation, the U.S. airlines are continuing our efforts to improve environmental performance. Since 2009, we have been active participants in a global aviation coalition that committed to 1.5 percent annual average fuel efficiency improvements through 2020, with goals to achieve carbon-neutral growth beginning in 2020 and a 50 percent net reduction in CO_2 emissions in 2050, relative to 2005 levels. On March 30, 2021, A4A announced a significant strengthening of its climate commitments.[8] A4A and its member carriers pledged to work across the aviation industry and with government leaders in a positive partnership to achieve net-zero carbon emissions by 2050. With consistent analyses showing that tremendous quantities of SAF must be deployed for the industry to meet its climate goals, A4A carriers also pledged to work with the government and other stakeholders toward a rapid expansion of the production and deployment of commercially viable SAF to make 2 billion gallons available to U.S. aircraft operators in 2030. On September 9, 2021, as a complement to the U.S. government's announcement of a SAF "Grand Challenge," A4A and its members increased the A4A SAF "challenge goal" by an additional 50 percent, calling for 3 billion gallons of cost-competitive SAF to be available to U.S. aircraft operators in 2030.[9]

The efforts our airlines are undertaking to further address emissions are designed to limit their fuel consumption and potential climate change and local air quality impacts responsibly and effectively, while allowing commercial aviation to continue to serve as a key contributor to the U.S., global and California economies. At the same time, we continue to build upon our strong record of reducing air pollutant emissions. Airlines' primary focus is realizing further fuel efficiency and emissions savings through new aircraft technology, increasing levels of SAF deployment, modernization and optimization of the air traffic management system, public-private

[8] *See* https://www.airlines.org/news/major-u-s-airlines-commit-to-net-zero-carbon-emissions-by-2050/.

[9] See https://www.airlines.org/news/u-s-airlines-announce-3-billion-gallon-sustainable-aviation-fuel-production-goal/.

research and development partnerships, and a vast array of additional operational and infrastructure initiatives being undertaken by airlines together with regulators, airports, manufacturers and other aviation stakeholders. Airlines have been particularly focused on developing low-carbon, sustainable fuel alternatives, understanding that deployment of SAF will play an important role in achieving our climate goals.

As drop-in fuel that can reduce lifecycle greenhouse gas (GHG) emissions by up to 80% while also helping to improve local air quality, SAF is particularly vital since, unlike the on-road transportation sector (cars, trucks, buses, etc.), the aviation sector cannot electrify in the near-term and therefore will remain reliant on liquid fuels for years to come. For well over a decade, A4A and its carriers have been working diligently to lay the groundwork for the establishment of a commercially viable SAF industry. In 2006, we were instrumental in creating the Commercial Aviation Alternative Fuels Initiative® (CAAFI), which seeks to facilitate the development and deployment of SAF. CAAFI has played an integral role in obtaining the certification of the 7 SAF/AJF "pathways" that are now recognized under the ASTM International specification for aviation turbine fuel from alternative, non-petroleum sources (ASTM D7566). Nearly all of A4A's member carriers, moreover, have entered into offtake agreements over the years with SAF producers in a concerted effort to spur the SAF industry and utilize the fuel. These offtakes include those of United Airlines, which has been procuring SAF from the World Energy facility in Paramount, CA for use at LAX since 2016, and Alaska Airlines, American Airlines, and JetBlue, which have been using SAF at SFO (and in JetBlue's case, also at LAX) since last (earlier this) year. It bears noting, too, that A4A was the original proponent and a key supporter of CARB's addition of AJF to the Low Carbon Fuel Standard (LCFS) in 2018 as a credit-generating fuel on a voluntary, opt-in basis.[10] In sum, we have been and remain deeply committed to the development of a commercially viable SAF industry in California (and elsewhere).

We also have long supported improvements to airport infrastructure and modernization of the country's air traffic management system on a business-case basis. For example, electrification of aircraft gates and installation of ground power units and pre-conditioned air units provide access to a clean central heating and cooling system for aircraft while at parking positions. This allows airlines to run aircraft systems on electricity provided to the airport rather than relying on jet fuel-powered aircraft auxiliary power units. In addition, airports may install charging stations that serve electric-powered ground support equipment (GSE). Improvements to airport power grids ensure the reliability of electric power needed to take advantage of these systems. An important source of funding for such improvements is the FAA's Voluntary Aviation Low Emissions Program, which makes funds generated by the aviation industry available to airports to support projects that achieve reductions in regulated air pollutants.[11] In addition, when necessary to improve efficiency of their operations, airlines also support major infrastructure

[10] *See* 17 CCR §§ 95482(b)(5), 95483(a)(1)(C). Since becoming creditable under the LCFS, almost 7.3 million gallons of AJF have been uploaded to aircraft in California. *See* https://ww3.arb.ca.gov/fuels/lcfs/dashboard/quarterlysummary/quarterlysummary_073121.xlsx.

[11] Funds come from two airport assistance programs, the FAA Airport Improvement Program (AIP) and the Passenger Facility Charges (PFC) program – AIP funds come from the Aviation Trust Fund, which is largely funded by taxes on airlines and airline passengers; PFCs are federally-approved taxes imposed on airline passengers by airports (airlines are required to collect the taxes and remit them to the airports).

projects such as upgrades to or reconfigurations of terminals and runway and taxi systems. We also have been supportive for many years of the federal government's effort to upgrade the nation's air traffic management system, known as NextGen, which is comprised of a suite of technologies and procedures to improve efficiencies in managing air traffic and reducing emissions. A4A and its members continue to work cooperatively with the FAA to implement elements of the plan that are supported by a sound business case.

In addition, we have strongly supported the development of policy tools to address aviation's impact on climate change, both within the International Civil Aviation Organization (ICAO) and the U.S. government. For example, we championed the ICAO agreement to adopt the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to serve as a complementary market-based measure to help "fill the gap" should we not be able to achieve carbon-neutral growth in international aviation through concerted industry and government investments in the other measures. Indeed, A4A continues to strongly support CORSIA and is committed to ensuring CORSIA's successful implementation.[12]

Similarly, airlines have strongly supported policy tools to help ensure that new emission-saving technologies continue to become available in the marketplace. This requires a sustained, substantial commitment of financial resources to research and development. This is particularly true with respect to aircraft and aircraft engine technologies, which can take decades from initial research to actual deployment, and which can only occur once the technology has attained readiness levels that ensure flight safety is maintained. As a result, A4A and its member airlines have recognized the need for and supported government funding of basic research and development for aircraft, aircraft engines and other innovative technologies, including, for example, the FAA's Continuous Lower Energy, Emissions & Noise program (49 U.S.C. § 47511). GSE faces different challenges, including the fact that GSE represents only a small portion of the marketplace for off-road equipment, with smaller subcategories representing even smaller niche markets. As such, it can be difficult to garner sufficient interest from engine manufacturers to invest in developing GSE engines. Accordingly, A4A has supported efforts to develop engines designed specifically for GSE, which today focus on applications in which long duty cycles and/or very high load requirements have proven difficult obstacles to the development of viable alternatives to diesel.

U.S. airlines also have a long history of supporting development and implementation of economically reasonable, technologically feasible standards as necessary and appropriate. Aviation is a global industry and as such, it is critical that aircraft and aircraft engine emissions standards be agreed at the international level and not imposed unilaterally by one country or set of countries (or individual states/localities within those countries). Accordingly, such standards are appropriately developed at the international level by the Member States of ICAO – with the full participation of the U.S. Environmental Protection Agency (EPA) and FAA and ultimately

[12] All A4A members have been complying with the emissions monitoring, reporting and verification provisions under CORSIA since they became applicable in 2019, and all A4A members have committed to complying with the offsetting obligations when they become applicable. U.S. aircraft operators with international operations covered by CORSIA represent more than 97% of total international emissions by U.S. operators.

incorporated into U.S. law consistent with our nation's treaty obligations[13] and in harmony with the international community (including participating environmental Non-Governmental Organizations). For decades, as part of the delegation of the International Air Transport Association, A4A and our members have participated as observers to ICAO's Committee on Aviation Environmental Protection (CAEP), devoting significant time and resources to provide the technical input crucial to developing and implementing standards to control aviation emissions.

Long-standing ICAO standards for emissions certification of aircraft engines cover hydrocarbons, carbon monoxide, nitrogen oxides (NOx) and particulate matter. ICAO/CAEP has focused a great deal of effort on NOx and we have strongly supported this effort – as CARB itself has noted, significant progress has been made and as a result of successive, increasingly stringent NOx standards, aircraft engines produced today must be about 50% cleaner than under the initial standard adopted in 1997.[14] CARB should also take note that in March 2020 the ICAO Council adopted emissions standards for non-volatile particulate matter (nvPM) for both mass and number applicable to both in-production and new type aircraft engines. This culminated a years-long process to supersede ICAO's smoke standard and set the foundation for continued progress in the future. A4A strongly supports the incorporation of the nvPM standards into U.S. law. Most recently, A4A filed comments with EPA strongly supporting the Agency's proposal[15] to adopt GHG emissions standards for certain aircraft engines pursuant to Section 231 of the Clean Air Act (CAA)[16] that are equivalent to the CO_2 Certification Standards for Aircraft adopted by ICAO in 2017.[17] EPA finalized these GHG standards early this year.[18]

As we recover from the current economic and social crisis induced by the COVID-19 virus, our commercial airlines look to the future with the belief that our sector will continue to thrive on the condition we continue to improve our environmental performance. It is in this spirit that we offer the comments below.

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[13] Convention on International Civil Aviation, commonly referred to as the "Chicago Convention," to which 191 countries, including the United States, are parties, or "Contracting States."

[14] CARB, *Draft 2020 Mobile Source Strategy (dated September 28, 2021)*, at 156, available at https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf.

[15] 85 Fed. Reg. 51556 (August 20, 2020).

[16] 42 U.S.C. § 7521.

[17] A4A's comments can be found in the rulemaking docket (EPA-HQ-OAR-2018-0276) at www.regulations.gov (document number EPA-HQ-OAR-2018-0276-0161).

[18] 86 Fed. Reg 2136 (January 11, 2021).

COMMENTS ON DRAFT SCENARIOS

Alternative 1

Alternative 1, described as the "[a]chieve[ment of] carbon neutrality by 2035, with complete phaseout of combustion and no reliance on engineered carbon removal," would entail, among other things, "[n]o combustion of any fuel including fossil, biomass-based fuels or hydrogen." Specifically with respect to aviation, CARB indicates that unless a non-combustion option has become available to it, the aviation sector "would be phased out in California,"[19] with the PATHWAYS model assuming that "25% of aviation fuel demand is met by electricity (batteries) or hydrogen (fuel cells) in 2030 and 50% in 2035," meaning that "50% of aviation fuel demand [is] not met in 2035" due to the lack of a non-combustion, zero emission alternative.[20]

From A4A's standpoint, the aviation-related inputs and assumptions for this scenario are wholly unrealistic and, importantly, legally impossible to implement. As a result, A4A urges that these aviation modeling inputs be eliminated from the Alternative 1 scenario.

As we have explained in other contexts, including most recently in our comments on CARB's *Draft 2020 Mobile Source Strategy* document, California, like every other state in the country, is preempted by the federal Clean Air Act (CAA) and federal aviation law from regulating aircraft operations, emissions, and the content of, and emissions related to aviation fuel.[21] Section 233 of the CAA explicitly preempts states and their political subdivisions from "adopt[ing] or attempt[ing] to enforce any standard respecting emissions of any air pollution from any aircraft or engine thereof unless such standard is identical to a standard" established by EPA.[22] Further, federal courts have long held that the Federal Aviation Act of 1958 creates a "uniform and exclusive system of federal regulation" of aircraft that preempts state and local regulation.[23] This pervasive federal regulatory scheme extends not only to aircraft in flight, but also to aircraft-related operations on the ground. In addition, the Airline Deregulation Act precludes states from "enact[ing] or enforc[ing] a law, regulation, or other provision having the force and effect of law

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[19] Slide Presentation at 11.

[20] Draft Scenario Assumptions at 2; Slide Presentation at 18.

[21] *See* A4A, *Airlines for America Comments on CARB Draft Mobile Source Strategy (dated September 28, 2021)* (October 18, 2021), expected to be posted shortly at https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy; A4A, *Airlines for America Comments on CARB Draft Mobile Source Strategy (dated November 24, 2020)* (December 7, 2020), available at https://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=mobilesourcestrat20&comment_num=1&virt_num=1.

[22] 42 U.S.C. § 7573.

[23] *Burbank v. Lockheed Air Terminal, Inc.*, 411 U.S. 624, 639 (1973); see also *American Airlines v. Department of Transp.*, 202 F.3d 788, 801 (5th Cir. 2000) (aviation regulation is an area where "[f]ederal control is intensive and exclusive") (quoting *Northwest Airlines, Inc. v. Minnesota*, 322 U.S. 292, 303 (1944)).

related to a price, route or service."[24] As a result, assumptions that contemplate actions the State has no authority to implement are simply not tenable and should be eliminated.

Not only would California have no lawful way of phasing out all but battery electric and fuel cell electric aircraft/flights, it bears emphasizing that every serious analysis of decarbonization of the aviation sector shows that only by the year 2050 is it "expected that electric-, hybrid- and hydrogen-powered propulsion will have the potential to serve regional, short-haul and perhaps some medium-haul markets," with "[t]raditional liquid fuels . . . expected to remain necessary for long-haul aircraft and for the remaining short and medium haul aircraft that have not shifted to electric or hydrogen, but with a transition towards 100% sustainable and low carbon sources."[25] Just last month, in fact, the White House launched the SAF "Grand Challenge" in an effort "to inspire the dramatic increase in the production of [SAF] to at least 3 billion gallons per year by 2030."[26] The federal government thus recognizes that while "electric and hydrogen-powered aviation may [one day in the future] unlock affordable and convenient local and regional travel," for long-distance travel "we need bold partnerships to spur the deployment of billions of gallons of [SAF] quickly."[27] In sum, CARB's assumptions of battery and fuel cell electric comprising 25% of aviation fuel demand in 2030 and 50% in 2035 are flawed because they are unduly aggressive and not grounded in technological reality; the assumption there will be no use of SAF in 2035 is not consistent with the current situation in California and does not reflect the intense effort, supported by U.S. policy, underway to exponentially grow the availability of cost-competitive SAF to airlines.[28]

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[24] 49 U.S.C. § 41713(b)(1).

[25] Air Transport Action Group, *Waypoint 2050* (Second Edition, Sept. 2021), at 4, available at https://aviationbenefits.org/media/167417/w2050_v2021_27sept_full.pdf; *see also* ICF, *Fueling Net Zero: How the Aviation Industry Can Deploy Sufficient Sustainable Aviation Fuel to Meet Climate Ambitions* (Sept. 2021), at 4 (stating that "[e]lectric and hydrogen propulsion systems will initially be deployed on smaller aircraft flying short routes. As the technologies improve, their range and power could increase, and by 2050 scenario[] 3 of the [Waypoint 2050] analysis expects hydrogen, electric or hybrid propulsion to be deployed on aircraft up to 150 seats, operating flights less than 120 minutes. These routes represent 27% of current industry CO_2 emissions, with the remaining 73% of emissions from larger aircraft flying medium and long-haul routes."), available at https://aviationbenefits.org/media/167495/fueling-net-zero_september-2021.pdf.

[26] *See* White House, *Fact Sheet: Biden Administration Advances the Future of Sustainable Fuels in American Aviation* (Sept. 9, 2021), available at https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/09/fact-sheet-biden-administration-advances-the-future-of-sustainable-fuels-in-american-aviation/.

[27] *Id.*

[28] We observe, too, that the "no biofuels consumption by 2035" assumption arguably conflicts with Executive Order N-79-20, which recognizes that "clean renewable fuels play a role as California transitions to a decarbonized transportation sector" and directs CARB, in consultation with other state agencies, to "develop and propose strategies to continue the State's current efforts to reduce the carbon intensity of fuels beyond 2030 with consideration of the full life cycle of carbon." *See also* CARB, "California's Greenhouse Gas Goals and Deep Decarbonization" (November 19, 2020) (anticipating that liquid biofuels will comprise 19 percent by volume of the transportation sector's overall fuel pool in 2045

As pointed out above, aviation drives 4 percent of the State's GDP, with millions of Californians taking to the skies each and every year for personal and business reasons, millions of tourists visiting the state and transportation of billions of dollars of air cargo representing a large percentage of the State's trade. We respectfully suggest that, given the critical importance of aviation to California's people and their economic and social well-being, even if it had the power to implement such a policy, not meeting 50% of demand for air travel is not a viable option for the State. To the extent CARB does not eliminate Alternative 1 or at the very least adjust the aviation-related inputs built into it, A4A observes that "economic impacts" will be quantified as part of the modeling approach.[29] We urge CARB to ensure that the economic and social impacts associated with 50% of California's aviation fuel demand not being met in 2035, as devastating as those impacts will be, are examined and quantified fully and robustly.[30] Putting aside that the state lacks legal authority to phase out certain types of aviation, it is completely unrealistic to assume the people of California would willingly accept being deprived of the ability to fly long, medium and even some shorter distances or to incur the extreme social and economic ramifications phasing out 50% of aviation services in California would bring.

Alternatives 2-4

Alternatives 2, 3, and 4, all assume the use of "biomass-based fuels," which would necessarily include biomass-derived SAF (and, presumably, other types of SAF like power-to-liquids SAF). All three scenarios also appear to assume some level of continued petroleum supply and usage (i.e., for aviation, some continued usage of conventional, petroleum-based jet fuel). Among the three scenarios, A4A is concerned that Alternative 2 is unrealistic insofar as it assumes "25% of aviation fuel demand is met by electricity (batteries) or hydrogen (fuel cells) in 2045." This 25% figure is overly aggressive. Likewise, Alternative 4 is unrealistic because, as described in the aviation decarbonization analyses referenced above, electricity and/or hydrogen are expected to garner at least some portion of aviation fuel demand in 2045. Ultimately, while CARB may opt to model all three scenarios, A4A encourages CARB to dismiss Alternatives 2 and 4 in favor of Alternative 3, which calls for carbon neutrality by 2045, as the scenario for detailed investigation in the 2022 Climate Change Scoping Plan.

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and that, by 2050 "CA's total population-weighted share of waste biomass [will be] utilized for diesel and jet fuel, as well as RNG") available at https://ww3.arb.ca.gov/board/books/2020/111920/20-12-5pres.pdf

[29] Slide Presentation at 5, 7.

[30] Notwithstanding the Slide Presentation's reference to the quantification of economic impacts, we are concerned that the PATHWAYS model cannot and will not adequately capture economic impacts. According to the presentation on PATHWAYS that was made during the August 17, 2021, Scenario Concepts Technical Workshop (available at https://ww2.arb.ca.gov/sites/default/files/2021-08/e3_presentation_sp_scenarioconcepts_august2021.pdf?utm_medium=email&utm_source=govdelivery), "structural/macroeconomic impacts" are not included in the model. If PATHWAYS cannot be used to assess the huge structural and macroeconomic impacts that would come with not meeting 50% of demand for air transportation services, we respectfully suggest that the resulting analysis would not be informative for policymakers.

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Thank you for your consideration of our comments. Please do not hesitate to contact us if you have any questions.

Sincerely yours,

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