

Sustainable Alternative Fuels for Aviation: Assessing the True Environmental Footprint

INTRODUCTION

The International Civil Aviation Organization (ICAO), a United Nations agency, is hosting a Conference on Aviation and Alternative Fuels (CAAF/2) on October 11 to 13, 2017 in Mexico City. The conference's aim is to agree to an ICAO Vision on Aviation Alternative Fuels for international aviation.^{1, 2} CAAF/2 will also encourage countries to advance national and international policies to develop and deploy sustainable aviation fuels (SAF).

Ahead of the conference, the ICAO Secretariat released its proposed Vision calling for extensive use of SAF in international aviation and setting goals for SAF use in 2025, 2040, and 2050—with a goal of producing 285 million metric tons per year in 2050, equivalent to meeting 50% of international aviation's annual fuel demand. Though ICAO's goals might look good on paper, the environmental reality is starkly different.

While some alternative fuels have the potential to help reduce aviation's carbon pollution, the amount of carbon different feedstocks reduce varies dramatically, and there are significant risks and uncertainties inherent in producing alternative fuels at scale. Therefore, in the early phases of SAF development, quality rather than quantity should be prioritized to ensure that these emerging fuels deliver the greatest environmental benefit with the least amount of unintended negative consequences. The international aviation sector would benefit from taking a precautionary approach to sustainable alternative fuel production and deployment that is rooted in greater levels of research, analysis, and pilot projects. Furthermore, if SAF is to help meet ICAO's and the international aviation sector's climate objectives, then smart policies and financing approaches from a number of aviation stakeholders would need to be put in place to expand SAF production.

ICSA assesses in detail many of the questionable claims made by the draft ICAO Vision on Aviation Alternative Fuels is below, highlighting problems in the analysis used by ICAO Secretariat to set SAF use goals for 2025, 2040 and 2050. Given these shortcomings, ICSA urges countries at CAAF/2 to reject the proposed ICAO Vision.

Category	ICAO Vision Claim	Environmental Reality
Emissions reductions	If SAF were to meet 2% of international aviation’s demand by 2025, international aviation’s CO ₂ emissions would decline by 0.9%. Similarly, if SAF were to meet 50% of the sector’s demand by 2050, emissions would decline by 33%.	The ICAO Vision greatly overestimates the emissions reduction potential of alternative fuels. The modeling and assumptions underpinning these estimates do not account for the full lifecycle emissions of alternative fuels, including those from indirect land use change (ILUC) and other indirect effects. If not properly produced and accounted for, alternative fuels may actually result in higher emissions than fossil jet fuel.
Sustainability considerations	“ICAO Member States will reach international agreement on SAF sustainability criteria as part of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) Standard development process.” It is implied that extensive global SAF production can be achieved while respecting these sustainability safeguards.	SAF development should only be done if and when a robust sustainability assurance framework is in place to avoid unintended negative consequences, like food insecurity and human rights violations. The analysis underpinning the proposed ICAO Vision only accounts for a fraction of sustainability safeguards highlighted in ICAO’s General Assembly Resolution A38-18. ³ More analysis is needed to properly estimate the potential contribution of SAF that meet the full scope of the sustainability criteria to be adopted by ICAO.
Indirect land use change (ILUC) ⁴	It is implied that ICAO’s forecasts for global SAF production can be achieved without ILUC being a serious issue.	Extensive SAF production would have significant ILUC impact, but the proposed ICAO Vision does not mention ILUC, and the analysis underpinning the proposed goals does not account for ILUC. The Vision grossly overestimates the environmental benefits and underestimates the environmental and social risks of extensive SAF production.
Rapid and sustained growth of SAF industry	The proposed goals for SAF production “would mean an estimated rate of 70 new biorefineries coming into operation per year, which is a rate of growth that has been as observed in the global ethanol and biodiesel industries recently.”	This level of growth cannot reasonably be sustained for more than 20 years. What’s more, experts fear that “when improperly planned and implemented, rapid large-scale expansion of bioenergy or biofuels could exacerbate emissions from land-use change and pose food security risks.” ⁵
Displacement of biofuels from road transport	In order to achieve the ICAO Vision, the “transition to electrification for ground transportation will need to have largely occurred, along with effectively re-tooling refineries and other industrial facilities for SAF production.”	The heavy-duty vehicle sector is projected to maintain a substantial residual fuel demand through 2050, regardless of light-duty electrification. Further, it is unlikely that the alternative fuels used for road transport would be used by the aviation sector in the short-term. ⁶
Land availability	It is implied that it would be feasible for global SAF production to reach 285 million metric tons per year by 2050 without land availability being an issue.	The projections of land availability are unrealistic and are at odds with competing land uses, like food production, and the global endeavour to tackle climate change. Article 5 of the Paris Agreement recognizes the need to conserve greenhouse gas reservoirs, like forests, which could be converted into cropland for biofuel production without the proper sustainability safeguards in place.

ENDNOTES

¹ The entire Proposed ICAO Vision on Aviation Alternative Fuels is available here: <https://www.icao.int/Meetings/CAAF2/Documents/CAAF2.WP.013.4.en.pdf>

² ICSA's formal submission to CAAF/2 is available here: <https://www.icao.int/Meetings/CAAF2/Documents/CAAF2.WP.021.2.en.pdf>.

³ The Assembly Resolution requests that ICAO Member States “recognize existing approaches to assess the sustainability of all alternative fuels in general, including those for use in aviation which should: i. achieve net GHG emissions reduction on a lifecycle basis; ii. respect the areas of high importance for biodiversity, conservation and benefits for people from ecosystems, in accordance with international and national regulations; and iii. contribute to local social and economic development, and competition with food and water should be avoided.” Source: <https://www.icao.int/Meetings/GLADs-2015/Documents/A38-18.pdf>.

⁴ Indirect land use change (ILUC) occurs when the increased demand for a biofuel feedstock results in the conversion of land elsewhere for agricultural production. This is distinct from direct land use change (DLUC), which occurs when areas like forests and grasslands are converted to cropland for biofuel production. For more information, please see <https://www.worldwildlife.org/blogs/on-balance/posts/airlines-biofuel-ambitions-must-not-increase-emissions>.

⁵ Uwe R. Fritsche et al., “Global Land Outlook Working Paper: Energy and Land Use,” United Nations Convention to Combat Desertification and the International Renewable Energy Agency, September 2017, <https://static1.squarespace.com/static/5694c48bd82d5e9597570999/t/59ce3cb68fd4d2da17339c3c/1506688188502/Fritsche+et+al+%282017%29+Energy+and+Land+Use+-+GLO+paper-corr.pdf>.

⁶ Road transportation currently consumes about 5 million metric tons of HEFA-diesel alternative fuel annually. The HEFA-diesel currently produced for road transport would not necessarily qualify as sustainable, as it heavily relies on feedstocks with high risks of indirect land use change or high risks of indirect effects, such as palm oil and soybean oil. And in most cases, fuels made from these feedstocks would result in greater CO₂ emissions than conventional jet fuel.

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The International Coalition for Sustainable Aviation (ICSA) works to reduce pollution from air travel. As a network of nonprofit organizations representing millions of members, ICSA is the only environmental civil society group accredited as an observer by the International Civil Aviation Organization (ICAO), the UN standard-setting body for international air travel. www.icsa-aviation.org