



# SUSTAINABLE AVIATION FUELS: WILL COVID-19 LEAVE A LASTING NEGATIVE IMPACT ON SUSTAINABILITY?

Commercial aviation accounts for about 2% of global carbon emissions, while about 12% of all CO<sub>2</sub> emissions come from the transportation sector. Within these figures, business and general aviation (B/GA) are accounted for, but it has always been a challenge to calibrate just how much these sub-sectors contribute globally versus the scheduled commercial sector.

In 2019, the commercial aviation sector accounted for 915 million tonnes of CO<sub>2</sub>. CO<sub>2</sub> emissions from commercial aircraft, excluding airports and the related supply chain industries, were on pace to triple by 2050 (prior to the COVID-19 outbreak), as both passenger air travel and air freight have surged worldwide, with the latter seeing a notable increase consistent with the growth of e-commerce and digital trade. As cars and trucks become more fuel-efficient, aviation's share of transportation-sector emissions is now ballooning. Any serious attempt to combat the problem of climate change must include aviation.

And, carbon emissions are not the only environmental challenge posed by a growing aviation sector. Nitrogen oxides, particulates, noise, and lead pollution are also major contributors to climate change, often affecting disadvantaged communities living near airports which have resulted in more communities weighing in to challenge their rights with airport authorities and Governments.



The Covid-19 outbreak has, in the short term, upended the sector with the implementation of travel restrictions and border closures to contain the spread of the virus which has resulted in many airlines being forced to ground their fleets. Europe and the US have now become the new epicenters of the ongoing crisis, which are also two of the biggest markets globally for the aviation sector.

While we are now seeing newsworthy statistics on the decline of CO<sub>2</sub> in correlation to aviation due to COVID-19, the question to ask now aimed at the viability (in the medium-term) of Sustainable Aviation Fuel (SAF) and other sustainability measures, including tax breaks – at a time when airlines and operators are now in survival mode.

## Is Decarbonization In Aviation Possible?

In February 2020, the UK Sustainable Aviation coalition committed to net-zero carbon emissions by 2050, grabbing headlines around the world. However, as is normally the case these days, China was a few months ahead of the UK.

Produced by international think-tank Energy Transitions Commission (ETC) in partnership with the Rocky Mountain Institute (RMI), the China 2050: A Fully Developed Rich Zero-Carbon Economy report was released in November 2019. The report, which includes analysis of the transportation and aviation sector claims it is technically

## Battery-Powered Flight

While road transport can be decarbonized with battery or fuel-cell electric vehicles powered by renewable energy or green hydrogen, it will not be so easy for gravity-defying airplanes. The ETC claims that the energy density of batteries would need to improve by five to 10 times as much to make electrification feasible for long-distance aviation; something that would require “fundamental changes in battery chemistry”.

But despite the problem with the energy-to-weight ratio, it is widely agreed that battery-powered planes charged using renewable energy, will be used in the B/GA sectors, as well as some commercial sectors for short-haul flights within the next few decades.

and economically feasible for China to simultaneously become a fully developed economy and reach net-zero carbon emissions by mid-century.

“China has the institutional, financial and technological advantages of ‘concentrating resources to accomplish large undertakings,’ which makes it well placed to stimulate long-term and large-scale investment once setting up strategic goals,” says Jules Kortenhorst, CEO of RMI. “This helps lay a solid foundation for China to pursue zero-carbon objectives by 2050 and gain the economic and environmental advantages which would result.”

To achieve this objective, the ETC argues that fossil jet fuel (refined kerosene) can be replaced with carbon-neutral technology by 2050. The ETC highlights four options, all of which are powered by renewable

energy: electric batteries and green hydrogen (both for short-haul flights only); synthetic fuels produced from green hydrogen (made from splitting water molecules into hydrogen and oxygen using renewable electricity) also known as electrofuels or e-fuels; and biofuels.

## Green Hydrogen

A European Commission-funded project called ENABLEH2 -- ENABLING cryogenic Hydrogen -- is investigating the use of liquid hydrogen (LH2) as an aviation fuel, intending to provide “comprehensive roadmaps for the introduction of LH2 for civil aviation” by 2021 (subject to delay due to Covid-19).

However, airlines can only fly with fuels that have been approved by the industry under the auspices of US-based standards organization ASTM International -- formerly known as the American Society for Testing and Materials. So far, these have been limited to biofuels and e-fuels that match kerosene almost molecule for molecule. Fossil aviation fuel “Jet A-1” and “Jet A” also contain aromatic hydrocarbons such as benzene (due to their presence in crude oil), which biofuels and e-fuels do not have.

According to reports by the German Aerospace Centre, for novel fuels to be approved for commercial use, ASTM would require up to 235,000 gallons (890,000 liters) of the fuel to be tested; a questionably large amount to be produced for research and development purposes. However, producing 890,000 liters of liquefied hydrogen would require only 63 tonnes of hydrogen, per industry expert’s calculations. 69 million tonnes of grey hydrogen (derived from unabated fossil fuels) are currently being produced every year; this grey H2 is seen as a potential for use over green hydrogen for R&D testing as they are chemically identical.



## What will the future bring?

To fully decarbonize the aviation industry, the value chain and production process used to manufacture Sustainable Aviation Fuel needs to be 100% carbon-free. The International Civil Aviation Organization has confirmed that by 2050, "it would be physically possible to meet 100% of international aviation jet fuel demand with sustainable aviation fuels (SAF)". However, this level of fuel production can only be achieved with large capital investments in SAF production infrastructure and substantial policy support.

So, it does seem that a fully decarbonized aviation system propelled by renewable energies is possible by 2050 using existing solutions. Like many other green technologies, it is merely a case of bringing down costs with the help of government policy and then increasing volumes as quickly as possible.

## Governments and Traditional Energy Suppliers

Government incentives should aim to bring down costs while scaling-up production to make sustainable aviation fuels commercially viable. We also need help from our traditional energy suppliers, as they have the expertise, distribution networks, and finances to make a real difference. There are investments in SAF production, but so far these have been only small steps. This must change, and fast.

These requirements will only gain momentum if passengers can see the value of what we are doing. Transparency in the industry's past and present actions is essential so that the public has the facts needed to make the right choices on mobility. I believe that aviation's track record and targets should reassure passengers that they can fly proudly and sustainably.

As we move into the second quarter of 2020, let us remind ourselves that in the climate change battle, carbon is the enemy. And we can defeat it with SAF and other technologies so future generations will live in an even more connected world than we have today.

Environmental experts say the planet is getting a breather from the constant output of pollution by humans as Covid-19 puts many activities by individuals and businesses on hold. Smog levels in China were reduced after factories shuttered during the outbreak, and satellite images show a significant drop in air pollution in Italy while the country remains in a nationwide lockdown.

However, China is now getting back to full output capacity and smog levels have increased again. Similar declines are being witnessed in the U.S., where half of all car trips are to and from work or school. But while this pandemic could disrupt daily routines for most of 2020, experts say the drop in heat-trapping emissions, while beneficial, will likely amount to just a blip in trend lines that show the world is moving

toward unsustainable levels of carbon dioxide, or CO<sub>2</sub>, emissions. The damage from CO<sub>2</sub> just accumulates, so every ton we don't release is not inflicted on the environment. However, if everything goes back to business as usual when the pandemic comes to an end, it won't have much of an impact.

As soon as the aviation starts to recover from the Covid-19 impact, green aviation should finally start to take off.



**MICHAEL WALSH**  
CEO of Aer Mobi &  
PBEC – Pacific Basin  
Economic Council

*PBEC – Pacific Basin Economic Council is by invitation ONLY a members-based institution, that supports connectivity and cross-border regulatory standardisation efforts within APAC for all technological advancements, through dialogue, engagement and collaborative efforts. PBEC's focus is to continual attain recognition as the most comprehensive multilateral platform for APAC business leaders to engage with, advocating key trade issues of importance under a fair rules based system, thus promoting cooperation amongst member States to achieve inclusive, sustainable economic and social development in Asia and the Pacific. [www.pbec.org](http://www.pbec.org) email: [pbec@pbec.org](mailto:pbec@pbec.org)*

*Aer-Mobi offers aviation consultancy services with over 25 years' experience in aerospace, government relations, and business development within Asia and Global Markets. We focus on the viability of projects and business plans, providing market research, data and analytics to unlock your potential. We provide representation, advocacy services and market penetration advise in order to create momentum for your product/service offering and brand recognition enhancement.*

*Business Potential, Realised.  
[www.aermobi.aero](http://www.aermobi.aero) email: [info@aermobi.aero](mailto:info@aermobi.aero)*