

ReFuelEU Aviation: boosting production and uptake of sustainable aviation fuels

Introduction

Outline of the questionnaire for the Open Public Consultation for a possible legislative initiative “ReFuelEU Aviation” announced in the Commission Work Programme 2020 as part of the implementation of the European Green Deal

In its Communication on the European Green Deal, the European Commission set the ambition for the EU to reach climate neutrality by 2050. In order to reach this goal, transport would need to reduce its emissions by 90% by 2050 (compared to 1990 levels). Boosting the production and use of sustainable alternative transport fuels was identified as a necessary measure for achieving this significant decarbonisation of the transport sector.

To tackle still growing greenhouse gas emissions (GHG) from aviation, a comprehensive set of measures is necessary. It consists of market-based measures (e.g. the EU Emissions Trading System and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) of the International Civil Aviation Organisation - ICAO), improved air traffic management operations, research on more efficient aircraft design and technology, as well as the increased use of sustainable aviation fuels (SAF).

The potential of sustainable aviation fuels to reduce aviation’s GHG footprint and to improve air quality around airports is largely untapped. Indeed, the current use of SAF in the EU is estimated close to 0.05% of total jet fuel consumption. For sustainable aviation fuels to contribute to decarbonising the aviation sector, a significant ramp up of their production is necessary in a very short period of time.

EU policy providing incentives for production and use of SAF already exists. The EU Emissions Trading System, CORSIA and the recast Renewable Energy Directive contain provisions encouraging the production and use of sustainable aviation fuels. However, while recognising that CORSIA will start in 2021 and the recast Renewable Energy Directive has not yet been implemented, the impact of these policy frameworks on the share of sustainable fuels in aviation is uncertain.

This public consultation invites citizens and organisations to contribute to the assessment of how to boost the production and uptake of sustainable fuels in the aviation sector.

Although there is no recognised definition of Sustainable Aviation Fuels (SAF) at European level, for the purpose of this open public consultation, SAF means liquid advanced biofuels (made from waste and residues) or electro-fuels (made from renewable electricity, hydrogen and CO₂ ideally captured from the air) as defined in the recast Renewable Energy Directive (EU) 2018/2001¹. While other energy sources may be relevant in the future for the decarbonisation of aviation, such as hydrogen, solar energy or electric batteries, this Open Public Consultation focuses only on advanced biofuels and electro-fuels.

This initiative was announced in the 2020 Commission Work Programme. It will also be part of the Sustainable and Smart Mobility Strategy, and part of a concrete follow up to the Strategy on Smart Sector Integration, both due to be adopted by the Commission by the end of 2020.

¹ Directive (EU) 2018/2001 of The European Parliament and of the Council on the promotion of the use of energy from renewable sources

Please note that to participate in the public consultation you are not obliged to respond to all questions, e.g. the ones in section D are of more technical nature, investigating options on how to improve the design of specific policies, thus more tailored to professionals/stakeholders.

If you have questions and remarks, please contact: move-refueleuaviation@ec.europa.eu.

About you

*Language of my contribution

English

*I am giving my contribution as

Company/business organisation

*First name

X

*Surname

Y

*Email (this won't be published)

X.Y@total.com

*Scope

International

*Organisation name

Total SE

*Organisation size

Large (250 or more)

Transparency register number

NNN

*Country of origin

France

*Publication privacy settings

The Commission will publish the responses to this public consultation. You can choose whether you would like your details to be made public or to remain anonymous.

Anonymous

Only your type of respondent, country of origin and contribution will be published. All other personal details (name, organisation name and size, transparency register number) will not be published.

Public

Your personal details (name, organisation name and size, transparency register number, country of origin) will be published with your contribution.

I agree with the personal data protection provisions

A. General information about respondents

*Please specify which interests you (the organisation on behalf of which you respond) represent

- National public authorities (transport ministries, agencies)
- International public organisation
- Regional or local public authorities
- Airline industry
- Airport industry
- Aircraft manufacturing industry
- Other organisation in aviation
- Investment and financing
- Energy producers and fuel supply (advanced / synthetic biofuel)
- Energy producers and fuel supply (mainly crop based biofuel)
- **Energy producers and fuel supply (mainly fossil fuel sources)**
- Sustainability certification bodies
- Technical standardization bodies
- Interest organisations representing societal interests, particularly on
- environmental and social topics
- Academic
- Other

If other, please specify:

B. General assessment and policy context

1. The European Union has adopted a comprehensive approach to reducing emissions from the aviation sector, comprising a broad set of measures, among which is promoting the use of sustainable aviation fuels. In spite of the potential of sustainable aviation fuel to achieve emissions reductions, the production and use of such fuels is still negligible.

In your view, how relevant is the use of sustainable aviation fuels for achieving the decarbonisation of the aviation sector?

- **Very relevant**
- Relevant
- Somewhat relevant
- Less relevant
- Not relevant
- No opinion

2. In your view, how relevant is it to boost the use of sustainable aviation fuels in order to improve air quality around airports?

- Very relevant
- Relevant
- Somewhat relevant
- **Less relevant**
- Not relevant at all
- No opinion

3. In your view, what type of liquid sustainable aviation fuel is the most promising to decarbonise the aviation sector and contribute towards reaching climate neutrality by 2050?

- Advanced biofuels (made from wastes and residues)
- Synthetic fuels (made notably from renewable electricity, CO2 captured ideally from the air)
- **Other**

If other, please specify:

SAF solutions will be a mix of technological development for both types of fuels

4. Sustainable aviation fuels are technologically ready and compatible with today's aircraft engines. However, while there is a growing interest from the aviation sector to start using these fuels in more significant volumes, the quantity of sustainable aviation fuels produced and used is currently still negligible.

What are your expectations concerning the uptake of sustainable aviation fuels in the near future, i.e. by 2025 (under the current conditions)?

- It will increase
- **It will remain the same**
- It will decrease
- No opinion

5. The European Green Deal set the objective of achieving climate neutrality by 2050. The air transport sector should contribute to this decarbonisation effort. The more widespread use of sustainable aviation fuels is expected to enable the aviation sector to contribute to the ambition of the European Green Deal, alongside other measures.

In your view, by when should a significant uptake of SAF take place in order to achieve this goal?

- **It should take place before 2030**
- It should take place between 2030 and 2040
- It should take place between 2040 and 2050
- Only after 2050

- No opinion

6. EU legislation provides incentives for the production and use of sustainable aviation fuels, through provisions under the recast Renewable Energy Directive (a multiplier allowing EU member States to claim towards their renewable energy target the use of 20% more sustainable aviation fuels than actually used) and under the EU Emissions Trading System (a zero rating exempting airlines from surrendering allowances when using sustainable aviation fuels). However, the impact of these incentives on sustainable aviation fuels supply and demand are expected to be limited so far, keeping in mind that the recast Renewable Energy Directive has not yet been implemented.

In your view, how relevant is it to reinforce the existing EU regulatory framework on sustainable aviation fuels in order to achieve higher production and further uptake of these fuels ?

- **Very relevant**
- Relevant
- Somewhat relevant
- Less relevant
- Not relevant at all
- No opinion

7. The development and deployment of sustainable aviation fuels is a complex matter that requires coordination among different economic actors (e.g. airlines, airports, fuel producers, fuel suppliers, aircraft manufacturers, public authorities, sustainability certification bodies, etc.). It also requires a consistent approach to allow availability of the fuel and guarantee the functioning of the EU's internal market.

Against this background, in your opinion, which level of regulatory intervention is best suited to address these objectives?

- **The objectives would be best addressed at EU level**
- The objectives would be best addressed at Member States level
- The objectives would be best addressed at regional level
- The objectives would be best addressed at the international level (ICAO)
- The objectives would be best addressed by businesses and the industry with no public intervention
- No opinion

C. Barriers to the uptake of sustainable aviation fuels

8. According to the data collected and made available by Eurostat, the vast majority of the 57 million tonnes of fuel consumed in 2018 by the aviation sector were conventional fossil jet fuel. Despite the existing framework for supporting their deployment, SAF represented only a negligible fraction of the fuel consumed. In your view, what are the reasons for this situation?

Please rate the potential barriers listed in the table below from 5 (most important) to 1 (least important). Not all options need to be rated.

	1	2	3	4	5
Lack of clarity of the regulatory framework for SAF	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of technically mature SAF technologies	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of commercially mature SAF technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Shortage of feedstock available to produce SAF	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shortage of renewable electricity for synthetic fuel production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Excessive production cost of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Lack of cooperation between actors across the EU SAF value chain (energy producers, aviation sector)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Lack of certainty on the environmental added value of SAF	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient supply of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Insufficient demand for SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Competition from other transport modes to access SAF feedstock and production capacity, due to national policies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Price of conventional kerosene relative to the price of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Lack of relevant infrastructure	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other reasons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If "other reasons", please specify:

9. In your opinion, which of the below-mentioned barriers should be addressed as a matter of priority?

Please rate the items in the table below from 10 (highest priority) to 1 (lowest priority). Not all options need to be rated.

	1	2	3	4	5	6	7	8	9	10
Lack of clarity of the regulatory framework for SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
High investment risk in SAF production plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Lack of technically mature SAF technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of commercially mature SAF technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Shortage of feedstock available to produce SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shortage of renewable electricity for synthetic fuel production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excessive production cost of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of cooperation between actors across the EU SAF value chain (energy producers, aviation sector)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Lack of certainty on the environmental added value of SAF	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient supply of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient demand for SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Competition from other transport modes to access SAF feedstock and production capacity, due to national policies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Price of conventional kerosene relative to the price of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of relevant infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other reasons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If "other reasons", please specify:

10. From you experience, can you give an example of a successful introduction of SAF in air transport?

- Yes
- No

If yes, can you identify the main reasons that proved to be essential to succeed?
Can you identify the main challenges to overcome?

Norway has implemented a roadmap with mandatory incorporation of SAF, which has allowed the market to develop.

11. From your experience, can you give an example of a failed attempt to introduce SAF in air transport?

- Yes
- No

If yes, can you identify the main reasons for the failure? Can you share any lessons learned from that experience?

Voluntary initiatives are in place for a decade, but have not managed to allow the market to take off. An example is the Flight Path Initiative that was supposed to lead to 2 Mt of SAF incorporation in 2020...

D. Possible policy options

12. The table below presents possible policy measures – both regulatory and non-regulatory, general or targeted – which could be taken at EU level to boost SAF in air transport. These measures are not mutually exclusive; combinations of measures could also be envisaged, and the list is not exhaustive.

Please rate them in the table below from 5 (most important) to 1 (least important). Not all policy measures need to be rated.

	1	2	3	4	5
Encourage investments and make use of public financial instruments to help overcome the high investment risk of SAF production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Impose an obligation on the fuel industry to produce a certain share of SAF, and/or an obligation on airlines to use a certain share of SAF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Provide specific incentives to use SAF, such as multipliers (a multiplier allows e.g. an EU member State to claim towards its renewable energy target the use of a larger percentage of sustainable aviation fuels than actually used)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Set up a European auctioning system for SAF volumes (under such a system, SAF producers would be invited by a central auctioning authority to bid at the lowest price to supply a certain volume of SAF to the aviation market over a certain period)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Set up a European trading system for fuel carbon credits across transport modes	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prioritise the use of feedstock for the production of sustainable aviation fuels	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support voluntary SAF purchase agreements between producers and airlines by establishing a coordination platform	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accelerate research and innovation in new SAF technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Support and facilitate SAF approval processes for fuel producers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Establish a process to monitor SAF production and use in Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Environmental labelling or an accreditation scheme for "green airlines"	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other measures, please specify:

13. In the EU, due to policies implemented at national level, renewable transport fuels are currently mainly intended for use in the road transport sector. The share of renewable transport fuels produced for use in the aviation sector is negligible. Would you agree to give a degree of priority to aviation for the access to feedstock (including renewable electricity) and production capacity for the production of sustainable aviation fuels (including synthetic fuels)?

- Fully agree
- Somewhat agree
- **Neither agree nor disagree**
- Somewhat disagree
- Completely disagree
- No opinion

14. If an obligation were to be imposed on the production/uptake of SAF, in your view, who should be the obligated party?

- It should be an obligation on the fuel production/supply side
- **It should be an obligation on the aviation demand side**
- It should be an obligation on both the fuel production/supply and the aviation demand sides
- No opinion
- Other

If other, please specify:

15. In your view, would it be relevant to set sub-targets for the production/use of certain categories of SAF such as advanced biofuels or sustainable Power-to-Liquid fuels (also called electro-fuels)?

- Very relevant
- Relevant
- Somewhat relevant
- **Less relevant**
- Not relevant at all
- No opinion

16. The sustainability framework of the recast Renewable Energy Directive (sustainability framework and emissions saving criteria as well as limitations to use

certain fuels) ensures that SAF would achieve significant emissions savings compared to conventional jet fuel):

- Fully agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Completely disagree
- No opinion

17. The table below outlines a number of funding instruments or mechanisms. In your view, which of these instruments or mechanisms could be used to help reduce the investment risk of SAF production or to help bridge the price gap between SAF and conventional jet fuel, or incentivise the production and use of SAF?

Please rate them in the table below from 5 (most important) to 1 (least important). Not all mechanisms or instruments need to be rated.

	1	2	3	4	5
EU Emissions Trading System Innovation Fund	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Horizon Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Connecting Europe Facility (CEF)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Just Transition Fund	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
InvestEU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NextGenerationEU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Important Project of Common European Interest (IPCEI)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Fossil kerosene taxation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
An environmental levy on aviation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
A strategic industrial alliance bringing together all actors in the sustainable aviation fuels value chain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Modulation of airport charges to create a fund for sustainable aviation fuels	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modulation of air traffic control charges under the Single European Sky to create a fund for sustainable aviation fuels	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify:

18. The price gap between conventional fossil kerosene and SAF is caused by various factors (e.g. the market price of crude oil, the type of SAF considered, the

tax exemption on kerosene etc). It is generally acknowledged that SAF are between 2 to 5 times more expensive than conventional fossil kerosene. Even if policy measures manage to bridge this price gap over time, it is likely that a price difference will remain for some time. In your view, by whom should this price gap be borne?

- Air passengers
- Tax payers
- Airlines
- Fuel producers
- Public authorities
- No opinion
- Other option

If other option, please specify:

19. As the availability of SAF may increase at EU airports in the coming years, the logistics and infrastructure of SAF supply will need to be fit for purpose. In your view, to what extent is it relevant for policy action at EU level to take into account the logistics and infrastructure of SAF supply?

- Very relevant
- Relevant
- Somewhat relevant
- Less relevant
- Not relevant at all
- No opinion

E. Additional information

20. Are there other key aspects which you did not find reflected in the questions and you would like to comment upon?

Feel free to upload documents, such as additional evidence supporting your responses, such as a policy brief or a position paper. Please do note that the uploaded document will be published alongside your response to the questionnaire which is the essential input to this open public consultation. The document is an optional complement and serves as additional background reading to better understand your position.

1500 characters maximum

Advanced biofuels and electro-fuels still require technological development and will not be affordable in sufficient quantity for many years. One decision we would expect from EU authorities is whether the priority for aviation is to wait for advanced biofuels availability, or to start with sustainable biofuels mostly based on RED's Annex IX-B (including for instance Used Cooking Oil and Industrial Waste), or even with 1G biofuels, that would already produce immediate emission reductions and prepare the sector for the future uptake of SAF.

Please upload your file (optional)

The maximum file size is 1 MB

Only files of the type pdf,txt,doc,docx,odt,rtf are allowed

21. Please provide references to any studies, reports or other documents that you think are relevant for this consultation, with links for online download where possible.