

Mandating the use of sustainable aviation fuels in the UK

UKPIA Response

Introduction

Thank you for responding to our consultation your views will assist in us in creating a mandate for sustainable aviation fuels (SAF).

The closing date is 19 September 2021.

View all the questions

This survey provides questions based on user choice, a [full copy of the questions is available \[opens in a new window\]](#).

Print or save a copy of your response

When you get to the end of this questionnaire, you will be offered the chance to either print or save a copy of your response for your records. This option appears after you press 'Submit your response'.

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You have an option to 'save and continue' your response at any time. If you do that you will be sent a link via email to allow you to continue your response where you left off.

It's very important that you enter your correct email address if you choose to save and continue. If you make a mistake in the email address you won't receive the link you need to complete your response.

Accessibility statement

Read our [accessibility statement for SmartSurvey forms \(opens in a new window\)](#).

Confidentiality and data protection

This consultation by the Department for Transport, working with Department for Business Energy and Industrial Strategy (BEIS) and Department for Environment, Food and Rural Affairs (DEFRA), on creating a mandate for SAF.

In this consultation we're asking for:

- your name and email, in case we need to ask you follow-up questions about your responses (you do not have to give us this personal information, but if you do provide it, we will use it only for the purpose of asking follow-up questions)

If an organisation we are additionally asking for your organisation's:

- name, for identification
- size, to weight responses accordingly
- country of location, to gauge interest from international suppliers
- area of work, to understand your sector's attitude towards the topic

Your consultation response and the processing of personal data that it entails is necessary for the exercise of our functions as a government department. DfT will, under data protection law, be the controller for this information. [DfT's privacy policy \(open in new window\)](#) has more information about your rights in relation to your personal data, how to complain and how to contact the Data Protection Officer.

We will remove your personal details before we share your response with BEIS and DEFRA.

We will not use your name or other personal details that could identify you when we report the results of the consultation. Any information you provide will be kept securely and destroyed within 12 months of the closing date. Any information provided through the online questionnaire will be moved to our internal systems within 2 months of the consultation period end date.

You

1. Your (used for contact purposes only):

name?

email?

2. Are you responding: *

- as an individual? (Go to 'Proposals')
- on behalf of an organisation?

Organisation details

3. Your organisation's:

name is?

size is?

country of location is?

4. Your organisational area of work is:

- academia?
- airport?
- airline?
- fuel producer or supplier?
- feedstock producer or supplier?
- non-government organisation?

consultancy?

✓another type of organisation?

Trade association for the majority of UK fuel producers and aviation fuel suppliers.

Proposals

Sustainable Aviation Fuels (SAF) are one of the main levers available to government and industry to accelerate the transition to net zero aviation. These advanced fuels, obtained from a wide range of waste feedstocks or electricity, can be easily dropped into existing conventional jet fuel. They can achieve lifecycle emissions savings of over 70% compared with conventional jet fuel, when fully replacing kerosene.

As announced in the [Prime Minister's 10 point plan in November 2020 \(opens in a new window\)](#), we would like to introduce a UK SAF blending mandate. The proposed long-term obligation will generate demand for SAF, provide an incentive to SAF producers (in the form of a tradable credit) and signal to investors the vital role that we believe the technology will play in the UK.

We are seeking views on the:

- high-level ambition and design of the proposed SAF mandate
- eligibility criteria SAF will need to meet
- interactions between SAF and other domestic and international policy
- compliance, reporting and verification principles that will steer the subsequent development of the scheme, should it be introduced

Additionally we want views on how best a SAF mandate could be designed and how it could be complemented by additional interventions to foster SAF plants development in the UK.

SAF proposal

We recognise the need for SAF in the short, medium and long term to contribute to deliver net zero and the UK's carbon budgets. As a consequence, we are minded to mandate SAF supply in the UK. A mandate is our preferred option as it could deliver a number of outcomes altogether, which could likely not be achieved otherwise through an uncoordinated combination of multiple, individual interventions from government and industry.

To introduce the proposed obligation, we believe a standalone SAF mandate, outside the [Renewable Transport Fuel Obligation \(opens in a new window\)](#) (RTFO) will be easiest and fairest to implement. This proposal is also in line with the recommendation by the Climate Change Committee to introduce a bespoke SAF blending mandate.

We would prefer to implement the proposed SAF mandate as a greenhouse gas emissions scheme. Such a scheme would prescribe a reduction in the lifecycle carbon intensity of aviation fuel over time (defined as the amount of greenhouse gas emissions, on a lifecycle basis, per unit of energy and measured in gCO₂e/MJ) through the use of SAF. It would not mandate a certain percentage of aviation fuel to be SAF over time, which is what a fuel volume-based scheme, like the RTFO, would do.

Under the proposed mechanism, jet fuel with a carbon intensity below the target which meets the proposed eligibility criteria will be awarded a number of credits proportional to the amount of CO₂ saved. Jet fuel with a carbon intensity above the target or SAF which does not meet the proposed eligibility criteria will incur an obligation. It is proposed that the SAF mandate will entail

a tradable credit scheme which will allow obligated parties to meet the carbon intensity obligation in a flexible and cost-effective way.

We would like the proposed SAF mandate to fall on suppliers of jet fuel to the UK, where jet fuel refers to aviation turbine fuel (avtur) used in jet and turboprop aircraft. To ensure all aviation fuel, regardless of its use and its dutiable status, decreases its carbon intensity over time as a result of the proposed scheme, it is proposed that all avtur supplied to the UK will incur an obligation.

However, given aviation emissions primarily come from commercial flights, we welcome views on whether we should introduce, a threshold below which the avtur supplied is not obligated. In addition, we acknowledge a potential threshold may need to distinguish between dutiable fuel and non-dutiable fuel to avoid mandating small volumes of fuels or emergency services, for example.

For avtur under the RTFO, the assessment point under the RTFO has been set at the blending and certification point for example the point where renewable fuel is blended with fossil fuel and certified to meet the appropriate aviation fuel specifications and a refinery certificate of quality is issued. We welcome views on where the assessment point under the proposed SAF mandate should be placed to ensure only those who are supplying jet fuel, and SAF, to the country incur an obligation and can claim credits effectively.

5. Do you agree or disagree that a SAF mandate should be introduced in the UK?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

UKPIA and its members are committed to working with government to progress with the challenge of meeting net zero and contribute to this by lowering the carbon intensity of UK transport fuels. UKPIA's members have demonstrably delivered to this end¹ and support a fit-for-purpose regulatory framework to continue the blending of low carbon intensity fuels.

UKPIA agrees that a dedicated Sustainable Aviation Fuel (SAF) mandate is the most appropriate domestic policy mechanism to support the deployment of SAF in the UK and welcomes the opportunity to respond to the DfT's consultation on a SAF mandate. The downstream sector looks forward to working closely with government and broader industry to decarbonise aviation.

As identified by the consultation document, SAF is not cost competitive with fossil-derived kerosene on a cost of manufacture basis, and therefore requires targeted policy support to stimulate deployment. Such support is also a no-regret option for the UK as liquid fuels are the only technically feasible low carbon energy vector for long-haul aviation.²

UKPIA's *Future of Mobility in the UK* report³ highlights the broad range of measures needed in parallel to decarbonise commercial aviation. SAFs are one of many measures needed to decarbonise aviation including:

¹ Renewable Fuel Statistics, DfT, August 2021

² Sustainable Aviation Fuels Road-Map, Sustainable Aviation, February 2020

³ Future of Mobility in the UK, UKPIA, March 2021

- Improved ground operations efficiency⁴
- Improved use of airspace⁵
- The Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)⁶
- Development of alternative powertrains for short-range aviation⁷

It should be noted that achieving large scale SAF production in the UK is not without its challenges – even with a well-designed mandate. Significant government support and collaboration amongst a range of industries and sectors will be required to achieve meaningful volumes of fuel that realise impactful GHG emissions reductions. These volumes must then be deployable and resilient, with novel plants requiring financial support through their early production phases (such as Green Fuels Green Skies)⁸ to understand their full range of failure modes whilst providing dedicated airport supply.

The downstream sector has proactively sought to work with the wider aviation sector on decarbonisation by participating in the Clearing House Task Force, Jet Zero Council SAF Delivery Group, and assisting the COP26 SAF deployment SAF group. Recently, IAG were a guest speaker at the Downstream Energy and Fuels APPG, highlighting the close partnership enjoyed by suppliers and airlines in this sector and its importance in delivering SAFs in the UK.

Other challenges to consider will be in making sure SAFs have necessary approvals for use. The US government has provided precedent for championing SAF production – supporting the establishment of a US Clearing House and testing novel SAFs in military hardware. The UK government has made encouraging announcements in this area, such as the £3 million pledged to a new SAF testing and certification Clearing House, however funding must be backed-up with a clear and credible plan. Approving aviation turbine fuel (ATF) is a complex, costly, multi-year process and the swift establishment of a UK Clearing House can deliver some needed efficiencies and test resilience whilst supporting UK laboratories.

Just as crucially, a suitable pricing mechanism will be needed to reconcile the cost disparity between fossil-derived ATF and SAF. UKPIA would encourage the DfT to consult upon a suitable mechanism or business model as a matter of urgency.

Above all, the UK must ensure consistency and harmonisation with global and regional SAF policies. Whilst UKPIA is supportive of domestic SAF support, aviation is a global sector requiring global action (such as the ICAO-agreed CORSIA). The UK must ensure that any SAF policy does not inadvertently disadvantage domestic fuel producers, fuel suppliers, airports, airlines, or OEMs. Indeed, the UK should leverage its leading role in aviation, and its hosting of COP26, to agree a global SAF approach for international aviation.

6. Do you agree or disagree that an obligation to supply SAF in the UK should sit outside the Renewable Transport Fuels Obligation?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

⁴ Aircraft on the Ground CO₂ Reduction Programme, Sustainable Aviation, June 2018

⁵ Airspace Modernisation Strategy, Civil Aviation Authority, December 2018

⁶ https://www.icao.int/environmental-protection/pages/a39_corsia_faq2.aspx

⁷ Propulsion and Power Roadmap, Aerospace Technology Institute, August 2021

⁸ <https://www.gov.uk/government/publications/green-fuels-green-skies-gfgs-competition>

Your reasons are?

UKPIA agrees that SAF policy support should most suitably be structured separately to the Renewable Transport Fuel Obligation (RTFO). As outlined in the consultation document, ATF has been eligible for reward under the RTFO since 2018, however, no certificates have since been claimed for ATF.

The incorporation of a minimum SAF obligation under the RTFO would not be a suitable course of action because it would result in road and non-road mobile machinery (NRMM) fuels bearing (at least some of) the cost of the SAF obligation. Not only would this run counter to a policy objective which is that the 'polluter pays', but this would also significantly perturb the renewable transport fuel certificate (RTFC) market and risk disadvantaging the UK's competitiveness in the European regional biofuels market.

Any UK SAF policy must be consistent and harmonised with global and regional SAF policies to ensure a level playing field for UK industry.

7. Do you agree a greenhouse gas emissions scheme based on tradable credits should be preferable to a fuel volume scheme when designing a SAF mandate?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

The primary policy objective for the SAF mandate is to deliver GHG emissions reductions. Therefore, a greenhouse gas emissions reduction-based tradeable credit scheme is the most suitable target mechanism and should be the approach adopted for all renewable fuels policy in the UK. UKPIA has previously shared its support for road and NRMM renewable fuel policy adopting a GHG emissions reduction approach.⁹ A volumetric-based renewable fuel target is limited by incentivising carbon intensity reduction *to a point*, and therefore incompatible with a Net Zero emissions objective. Whereas a GHG emissions reduction target can be set on a trajectory to Net Zero.

A GHG emissions reduction approach provides further policy benefits such as:

- Greater investor certainty incentivising long-term plant design and operation.
- Consistency with the UK Emissions Trading Scheme (ETS) and CORSIA.
- Negates the need for multiple, evolving GHG emissions reduction thresholds.

The DfT must ensure a consistent GHG emissions reduction approach across all technologies with other energy vectors (such as electricity and hydrogen) subject to the same sustainability criteria and, ultimately, all transport regulated on a cradle-to-grave lifecycle GHG emissions basis. Such a framework would incentivise some rerouting of freight and passengers to lower carbon intensity transport such as rail and therefore optimise low carbon transport energy vector deployment.

⁹ https://www.ukpia.com/media/2510/attachment-1_ukpia-rtfo-buyout-consultation-response.pdf

8. Do you agree that the proposed obligation to reduce the carbon intensity of jet fuel through SAF use should be placed on fuel suppliers that supply aviation fuel (avtur) to the UK?

- Agree
- Neither agree nor disagree
- ✓ Disagree – fuel suppliers and airline operators should be obligated to supply and uplift respectively
- Don't know?

Your reasons are?

ATF is provided to the end-user under a different supply paradigm to road fuels – one which requires a more nuanced approach that also incorporates airline operators in the SAF obligation.

In the UK, ATF is often supplied as dual-purpose kerosene (DPK) meeting the quality requirements for both DEFSTAN 91-091 for aircraft and BS 2869 Class C2 for domestic heating. The fuel supplier cannot guarantee the end-purpose for which the fuel is utilised, therefore, the airline operator must be incorporated into the obligation to ensure only ATF is obligated and fulfilment against a SAF mandate verified. The SAF mandate policy should offer an exemption mechanism to airline operators in cases where SAF cannot be supplied.

For clarity, such a situation does not arise under the RTFO because the obligated fuels have a defined end-use. Petrol is solely supplied for road vehicles (with some negligible supply for small garden machinery) whilst the possible end uses for diesel (road vehicles, NRMM, domestic maritime) are all obligated under the RTFO. Post-SAF mandate implementation, DPK could be supplied to an obligated or non-obligated end-use.

9. Should the SAF obligation apply to all avtur supplied in the UK, regardless of whether it is subject to fuel duty?

- ✓ Yes
- No
- Don't know?

Your reasons are?

There is no technical reason why any sector should be exempt from the SAF mandate obligation. The supply chain for ATF used for personal recreational purposes is the same as for commercial purposes.

It should be noted that any change to the fuel duty levied on ATF would result in significant perturbation to the market and should not be considered without broader consultation on a pricing mechanism/business model and the impact on the SAF mandate trajectory. Such consultation would also require close partnership with HMT and HMRC.

10. If the obligation applies to all avtur supplied into the UK should:

	Yes	No	Don't know?
there be a threshold below which fuel is not obligated, in a certain obligated period?		✓	

	Yes	No	Don't know?
this distinguish between dutiable and non-dutiable fuel?		✓	

Your reasons are?

The supply landscape for ATF does not necessitate a threshold for obligation requirement.

It is not correct to distinguish between dutiable and non-dutiable ATF. All ATF is dutiable, however ATF for non-personal recreational purposes has a nil rate of duty. Therefore, the obligation should apply to all dutiable ATF (= all ATF).¹⁰

11. Where do you think the assessment point should be placed for jet fuel not subject to fuel duty, and how is this going to affect the definition of the proposed obligated party (aviation fuel suppliers to the UK)?

As per Q8, ATF is often DPK supplied for jet aircraft use. Therefore, any point of obligation must apply as close as possible to point of use to ensure appropriate end-use to be subject to the mandate. As ATF is quality tested at multiple points along the supply chain to ensure product integrity, the most practically suitable point of assessment would be the final point of sampling and testing. At this stage, end-use, supplying volumes, and product origin (including sustainability criteria, if needed) can be determined.

See clarification regarding duty as per Q10.

Fuel eligibility criteria

To count towards the mandate obligation, it is proposed that the SAF supplied in the UK meets the [Def Stan 91-091 specification \(opens in a new window\)](#), which refers to the American Society for Testing and Materials (ASTM) standards. This means that, to be eligible under the SAF mandate, SAF will need to be produced through one of the production pathways listed in the relevant [D7566 Annex \(opens in a new window\)](#).

We would like to introduce a SAF mandate which delivers fuels with the highest sustainability credentials. To receive credits under the proposed mandate, SAF will therefore need to adhere to strict sustainability criteria.

It is proposed that the fuels that contribute towards the SAF mandate obligation are only:

- waste-derived biofuels
- renewable fuels of non-biological origin (RFNBOs)
- SAF from nuclear origin
- recycled carbon fuels (RCFs)

As these fuels can deliver high carbon savings and do not typically present significant direct or indirect land use or wider environmental impacts. We are keen not to extend eligibility to crop-derived biofuels, which could lead to modest GHG emissions savings or, in some instances, to an increase in carbon emissions when taking into account their indirect land use change impact. We have [identified feedstocks that we anticipate could meet this requirement in Annex B of the consultation document \(opens in a new window\)](#).

¹⁰ Aviation turbine fuel (Excise Notice 179a), HMRC

Whilst we are keen not to support biofuels produced from agriculture, forestry, aquaculture or fisheries products, we recognise that wastes and residues from crops and forestry constitute a valuable biomass resource which could be used to produce SAF. However, to ensure these residues have not been sourced from areas of land with high biodiversity value or high carbon stocks, we propose to introduce land use criteria for such residues only. That is the feedstock must not be obtained from land:

- with high biodiversity value in or after January 2008 including land designated for nature protection purposes
- with high carbon stock
- that was undrained peatland in January 2008 unless the land's status remains unchanged when the raw material is obtained

Where hydrogen is used as an input which contributes to the fuel's energy content, it is necessary to assess the sustainability of the hydrogen production process. We propose that under a SAF mandate, hydrogen must be low carbon (for example derived from sustainable biomass, renewable energy or nuclear power sources). For instance, nuclear power is a low carbon energy source which can offer significant GHG savings.

12. Do you agree or disagree that only certified SAF that meets the Def Stan 91-091 should be eligible under the proposed SAF mandate?

- Agree
- ✓ Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

A SAF mandate is a policy requirement for ATF sustainability criteria – well-to-wing (WTW) GHG emissions. Sustainability regulation does not normally include quality requirements (such as the RTFO) and is not strictly necessary as it is the end-use that defines the obligation in the case of this policy. As all fuel supplied for jet aircraft in the UK will, in reality, be required to meet DEFSTAN 91-091 therefore the inclusion of meeting DEFSTAN 91-091 as a requirement in the policy is practicable should this be the DfT's preference.

13. Do you agree or disagree with the sustainability criteria set out?

- ✓ Broadly agree, however more detail and alignment with voluntary schemes is needed
- Neither agree nor disagree
- Disagree
- Don't know?

If you do not agree, what alternative or additional criteria would you recommend?

The majority of sustainability criteria set-out in the consultation document are appropriate high-level principles with further development required to clarify how specifically fuels will be assessed to meet these criteria. The sustainability of biomass-derived SAFs should be assessed in a manner consistent with CORSIA and, when agreed, a dedicated global SAF policy to ensure a level playing field and frictionless SAF/ATF trade.

Renewable fuel sustainability verification in the UK (and Europe) is reliant upon certification by voluntary schemes such as the International Sustainability and Carbon Certification (ISCC) System. It is essential that any SAF mandate is structured in such a way that voluntary scheme

certification provides suitable demonstration of sustainability. Certification by voluntary schemes recognised by ICAO/CORSIA should be considered suitable.

14. Do you agree or disagree with the feedstocks set out?

- Agree
- Neither agree nor disagree
- ✓ Disagree with some aspects
- Don't know?

If you do not agree, what alternative or additional feedstocks would you recommend?

The feedstocks outlined under section 3.15 of the consultation document for biomass appear consistent with non-crop derived feedstocks outlined under the Renewable Energy Directive (RED)¹¹. It is understood that the EU does not intend to cap the production of SAF derived from feedstocks listed under Annex IX Part B of the RED in their new SAF policy – the UK should avoid such a cap in parallel.

An area of inconsistency with the RTFO is the support of fuels generated from nuclear power without any additionality requirement. It is essential that, as with any fuel synthesis reliant on electricity as input energy, the electricity demand is demonstrably added renewable electricity (either via direct supply, a closed network, or renewable generation added to the grid). Without such a requirement, the manufacture of SAF from electricity could displace other demand and increase the overall carbon intensity of the grid.

It is understood from the government outcome to the recent consultation on amending the RTFO that policy support for recycled carbon fuels (RCFs) can only be implemented following amendment to primary legislation.¹² It is assumed that any support for RCFs under a SAF mandate would require the same legislative update. The parliamentary and administrative challenges associated with updating primary legislation for RCFs must not delay confirmation and legislative implementation of the SAF mandate.

The principle that SAF not meeting the feedstock, GHG reduction and sustainability criteria be treated as fossil-derived ATF and therefore subject to obligation will require careful consideration in how it is practically implemented. As outlined in Q8, ATF is often DPK and this could be no different for kerosene-type fuels produced via the same processes as SAF. Therefore, the point of assessment and obligation is key to ensure product not destined for aviation use – nor meeting the appropriate quality requirements – inadvertently increases a suppliers SAF obligation.

To accurately reflect the lifecycle emissions of jet fuel, we would like to use 89 gCO₂e/MJ as the baseline lifecycle carbon intensity, as internationally agreed by the [International Civil Aviation Organization \(ICAO\)](#) ([opens in a new window](#)). This figure will need to be used to calculate the minimum GHG emissions savings threshold (at least 60%) that we believe SAF should meet to be eligible under a SAF mandate. We welcome views on this threshold and whether it will be necessary to set out at this stage how it should change over time reflecting, particularly considering the impact of carbon capture, utilisation and storage (CCUS) technology development on carbon intensity.

¹¹ Directive 2018/2001/EU

¹² Targeting net zero – next steps for the Renewable Transport Fuel Obligation: government response, DfT, July 2021

Fuel suppliers must be able to demonstrate that their fuel achieves the minimum level of GHG saving through an assessment of the carbon intensities of:

1. Feedstock cultivation.
2. Fuel processing.
3. Fuel transport.

To ensure that suppliers are able to calculate carbon savings in an accurate and consistent manner, a SAF mandate require these savings to be calculated with a prescribed GHG emissions calculation methodology. The GHG emissions methodology prescribed by the SAF mandate could use or expand on existing methodologies developed under existing schemes. This has the advantage of reducing administrative burden for fuel suppliers operating under more than one scheme. Two schemes where existing methodologies have been set out in detail are the RTFO, which focuses on biofuels in general, and CORSIA, which focuses solely on SAF. It is important that the GHG emissions methodology takes into consideration the different:

- fuels
- feedstocks
- power sources
- production pathways

In this respect, it may be necessary to include separate methodologies for waste-derived biofuels, RFNBOs, SAF from nuclear energy and RCFs.

It is proposed that SAF that does not meet the feedstocks, carbon and sustainability criteria proposed is treated in the same way as conventional jet fuel and would therefore become subject to an obligation under the proposed scheme. This should minimise the risk such fuels may be supplied in the UK and result in increased emissions.

15. Do you agree or disagree that the baseline lifecycle GHG emissions intensity for aviation fuels for reporting purposes under a UK SAF mandate should be 89 gCO₂e/MJ?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

If you do not agree, what should the baseline emission be and how should it be calculated?

Agree, the SAF mandate should be consistent with CORSIA for alignment with the ICAO-agreed international aviation approach thereby seeking to avoid unintended consequences from deviations (such as disadvantaging the UK SAF market).

16. What should be the minimum GHG emissions intensity reduction SAF will need to meet to be considered eligible under the mandate (subject to the final GHG methodology used)?

The minimum GHG emissions reduction *to qualify* under the mandate should be 10%, consistent with CORSIA, however the policy should incentivise greater carbon intensity reductions by issuing credits for additional gCO₂/MJ saved. Any GHG emissions reduction mandate should be sufficiently ambitious such that lower carbon intensity SAFs are required to be blended to meet the mandate.

The UK SAF mandate being incorporated under UK ETS and CORSIA should also incentivise higher saving fuels to be manufactured and blended driven via a carbon market mechanism.

17. What are the, if any, land use (direct or indirect) or other implications associated with the feedstocks list that we should reflect in the:

eligibility
criteria?

As per CORSIA

minimum GHG
threshold?

As per CORSIA

Your reasons are?

Due to the evolving nature of indirect land use change (ILUC) emissions accounting, the UK should adopt best practice by conducting GHG emissions reduction modelling without ILUC and then layering ILUC at the final stage for clarity and transparency.

18. As more CCUS becomes available and the GHG emissions intensity of fuels decreases, should the envisaged minimum threshold be raised over time?

Yes, in a manner consistent with global SAF policy

No

Don't know?

Your reasons are?

It is essential that minimum threshold changes are consulted upon with industry and not updated in the UK in a manner inconsistent with EU or global SAF policy. Such updates should also ensure existing/live SAF plants are 'grandfathered'. Deviations in UK SAF GHG emissions savings thresholds could disadvantage UK producers and dissuade investment in UK plants therefore a clear process and transparent set of criteria before such a change is to be made should be agreed with industry and published.

19. How do you think our GHG methodology should calculate the carbon intensity of fuel?

The SAF mandate should utilise the ICAO-agreed GHG emissions calculation methodology that forms part of CORSIA.¹³ Many voluntary schemes, including the ISCC, have a certification system for CORSIA (known as ISCC CORSIA), therefore such a methodology is practically supportable as well as being consistent with the aviation sector globally.

20. How, in your view, should the GHG methodology vary to take into consideration the different:

The key principles have been outlined in the preceding questions, however brief summaries will be included here for convenience and clarity:

¹³ CORSIA Eligible Fuels – Life Cycle Assessment Methodology, ICAO, June 2019

fuels?	All aviation energy vectors, not just liquid fuels should be assessed, regulated, and rewarded under the same GHG emissions assessment methodology. No fuel should be 'picked' as a preference and unfairly rewarded/subsidised.
feedstocks?	Carbon intensity values should, where possible, be consistent with CORSIA's Default Life Cycle Emissions Values for CORSIA Eligible Fuels. ¹⁴ Improved carbon intensity values for waste feedstocks are included in this value set, thus, incentivising waste-derived SAFs. Some negative carbon intensity values have been included for dedicated energy crops during the CORSIA pilot-phase. As the pilot phase ends in 2023 ¹⁵ , the UK SAF mandate should utilise values consistent with the default CORSIA values post-2025.
power sources?	E-fuel manufacture from low/zero carbon electricity generation must demonstrably not displace demand nor increase the carbon intensity of the grid.
production pathways?	GHG emissions assessment must cover the whole lifecycle of the aviation energy vector and account for energy input from feedstock harvesting/acquisition, distribution, manufacture, and product supply. In due course, lifecycle emissions regulation should cover the entire aircraft from cradle-to-grave.

21. Do you agree or disagree that SAF that does not meet the proposed eligibility and sustainability criteria should incur an obligation?

- ✓ Agree provided end-use can be established with certainty (see Q14)
- Neither agree nor disagree
- Disagree
- Don't know?

Overarching trajectory

Choosing a level of ambition for SAF uptake which could be ambitious and deliverable comes with uncertainties and risks. We have reviewed data and feedback gathered from stakeholders and existing publications to determine high-level scenarios for SAF uptake in the:

1. short term
2. long term

The scenarios are only to be considered as indicative representations of the ambition we believe could be possible for SAF uptake on the back of certain:

- market conditions
- technology conditions
- policy conditions

These ambitions are subject to substantial uncertainty.

¹⁴ CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels, ICAO, November 2019

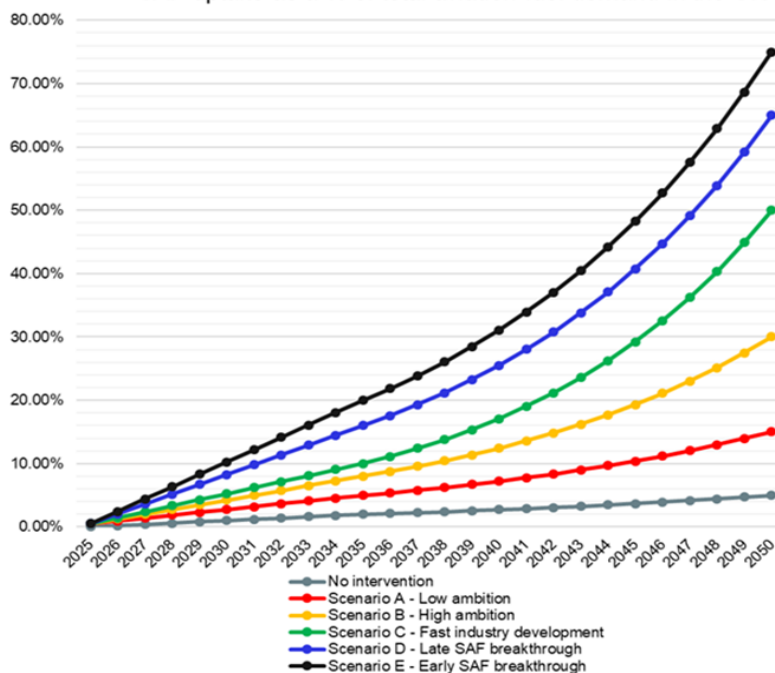
¹⁵ <https://www.icao.int/Newsroom/Pages/CORSIA-offsetting-kept-on-track-for-2021-pilot-phase.aspx>

All scenarios assume the proposed SAF mandate would start in 2025.

There are 6 potential scenarios of:

- no additional intervention scenario: in this scenario it is unlikely that all the existing SAF plants in the UK will develop to commercialisation nor will the existing policy framework secure additional SAF plants in the UK
- scenario A – low ambition: this assumes a low uptake of SAF in both the short and long term. Under this scenario, fuel production would be primarily optimised for road transport and the contribution of HEFA will likely be marginal in both short and long terms
- scenario B – high ambition: assumes approximately 30% SAF uptake in the long-term. It is expected all the (non-HEFA) SAF plants currently developing in the UK will become operative by 2030 and will continue to expand. More HEFA should become available at that point, as competing demand for feedstocks for renewable road transport fuel will reduce with higher uptake rates of electric vehicles, although HEFA availability in the long term will likely be limited by feedstock constraints
- scenario C – fast industry development: half of the UK aviation fuel demand in 2050 is met through SAF. This assumes a very high increase of plants post-2025, with approximately 6 to 8% of total 2035 fuel demand met by domestically produced (non-HEFA) SAF, and approximately a further 2 to 4% from HEFA. After 2035, total domestic supply of SAF could increase by approximately 11% per annum and could mean up to approximately 85 large-scale plants will be operational in the UK by 2050
- scenario D – late SAF breakthrough: this assumes a very high number of plants will develop post-2025 with a high success rate, with domestically produced (non-HEFA) SAF reaching approximately 8 to 10% of total aviation fuel in 2035 and an additional approximately 2 to 4% of aviation fuel demand to be met through HEFA. After 2035, it is expected that domestic SAF supply could increase by approximately 9% per annum, reflecting high growth rates seen in previous sectors and could mean over 100 large-scale plants will be operational in the UK by 2050
- scenario E – early SAF breakthrough: assumes a very high number of plants beginning to develop before 2025 with a very high success rate, with up to 20 large-scale plants already operational by 2030 and achieving up to 125 large-scale plants in 2050. Beyond 2035, supply across all pathways could increase by approximately 9% per annum, Under this scenario, SAF breakthroughs will primarily happen in the short term

SAF uptake as a % of total aviation fuel demand in the UK



Across all scenarios, the SAF uptake trajectory grows linearly from 2025 to 2035, to take into account the gradual:

- commissioning of SAF plants
- progress to the maximum or "nameplate" capacity

Once the market is more mature, it is expected more plants will become operational and will be able to reach nameplate capacity more quickly. As SAF costs are also expected to come down, an exponential trajectory from 2035 to 2050 is assumed.

These scenarios for SAF ambition have been translated into equivalent greenhouse gas emissions reduction trajectories, which represent the target aviation fuel suppliers would need to meet. These trajectories have been calculated based on the expected carbon savings eligible SAF could bring about and an approximate mix of SAF production pathways that could be expected in the UK.

	2025	2030	2035	2040	2045	2050
No additional intervention	89.00 gCO2e/MJ	88.40 gCO2e/MJ	87.72 gCO2e/MJ	87.28 gCO2e/MJ	86.73 gCO2e/MJ	85.96 gCO2e/MJ
A	88.71 gCO2e/MJ	87.32 gCO2e/MJ	85.67 gCO2e/MJ	84.25 gCO2e/MJ	82.39 gCO2e/MJ	79.71 gCO2e/MJ
B	88.71 gCO2e/MJ	86.35 gCO2e/MJ	83.67 gCO2e/MJ	80.81 gCO2e/MJ	76.71 gCO2e/MJ	70.36 gCO2e/MJ
C	88.70 gCO2e/MJ	85.79 gCO2e/MJ	82.41 gCO2e/MJ	77.85 gCO2e/MJ	70.48 gCO2e/MJ	57.88 gCO2e/MJ
D	88.70 gCO2e/MJ	83.92 gCO2e/MJ	78.66 gCO2e/MJ	72.64 gCO2e/MJ	63.49 gCO2e/MJ	48.75 gCO2e/MJ
E	88.70 gCO2e/MJ	82.64 gCO2e/MJ	74.72 gCO2e/MJ	68.89 gCO2e/MJ	58.56 gCO2e/MJ	42.37 gCO2e/MJ

We would like to introduce a carbon intensity target which is as ambitious as possible and that could create a world-leading UK industry.

Building on the potential scenarios set out, we welcome evidence on what SAF uptake trajectory you believe will best convey this ambition and what market, policy and technology circumstances will unlock such ambition.

We will review feedback and evidence and, should a SAF mandate be introduced, propose our preferred trade-off between ambition and feasibility in our next consultation.

22. Do you agree or disagree that a SAF mandate should start in 2025?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

If you disagree, when should it start and why?

UKPIA supports the SAF mandate commencing from 2025 as this is currently consistent with the EC's planned implementation of the EU SAF mandate. Should the EC delay implementation of their SAF mandate, the government must ensure the UK aviation sector is not disadvantaged by the SAF mandate.

It should be noted that the early years of the SAF mandate may still not result in significant SAF blending as there are only low volumes (~20 million litres) of SAF available globally.¹⁶ This is equivalent to <0.5% of UK ATF demand in 2020 – a year that saw a 60% decrease on usual demand¹⁷ – the scale of the supply challenge is significant. Therefore, DfT must be mindful that the cost of any fine/buy-out issued to obligated parties under the SAF mandate will likely eventually be passed on to the passenger.

However, a clear SAF trajectory will provide much needed assurance to investors. There are some parallels with the development fuel sub-target of the RTFO – whilst fewer dRTFCs have been issued than meets the target (for most obligated parties), the target has provided investment incentive into development fuel technologies.

Given the need to rapidly scale-up production, ensure suitable approvals, and maintain ATF supply resilience, close government-industry partnership is essential. The UK government will need to provide an effective and stable policy framework beyond the SAF mandate and provide support to evolve existing ATF-producing plants – such as refineries – as well as first of a kind (FOAK) plants beyond the Green Fuels Green Skies (GFGS) competition.

23. Do you agree or disagree that the targets should assume:

	Agree	Disagree	Don't know?
a linear growth up to 2035?		✓	
an exponential growth after 2035?		✓	

24. Which scenario do you think represents the best trade-off between ambition and deliverability?

- Scenario A
- ✓ Scenario B based on best available information but subject to review in 2023
- Scenario C
- Scenario D
- Scenario E
- None of the listed scenarios

25. What evidence can you provide to support your position?

Comments:

UKPIA is supportive of an ambitious yet feasible SAF mandate. As outlined in UKPIA's response to the consultation on amending the RTFO,¹⁸ the UK's renewable fuels target trajectory must appropriately balance the need for maximising decarbonisation with what can be feasibly blended (i.e. minimise buy-out which would not be in line with the policy objectives) – a SAF mandate target trajectory is no different.

¹⁶ Stocktaking results, ICAO, April 2020

¹⁷ Digest of UK Energy Statistics 2021, BEIS, July 2021

¹⁸ https://www.ukpia.com/media/2629/attachment-1_ukpia-rtfo-consultation-response.pdf

Given the interdependency of ATF on other sectors, modes, and markets, there are some key variables that must be well-understood in order to define such a target trajectory:

- Evolving road and off-road fuel demand in the coming decades;
- UK biomass availability prioritised by sector decarbonisation potential¹⁹;
- Resilience of UK renewable fuels policy amongst countries competing for finite feedstocks;
- Transparent and suitably resourced sustainability policing.

Encouragingly, the UK government is progressing crucial activity to develop this understanding via the recently announced low carbon fuel strategy²⁰ and planned refresh to the biomass strategy²¹. However, without this information – the absence of an impact assessment accompanying this consultation further highlighting this gap – it is not possible to agree a well-evidenced SAF mandate trajectory. Given the SAF mandate policy is in addition to mandated renewable fuel deployment under the RTFO, ensuring suitable feedstock supply – and ongoing UK competitiveness for these feedstocks – is critical.

In light of this, any SAF mandate trajectory that the DfT opts for in its consultation outcome must be reviewed as soon as any relevant evidence is published. UKPIA suggests that the DfT commit to even more frequent review periods than outlined under section 4.24 of the consultation document to ensure a suitable SAF mandate trajectory. There is precedent for such an approach, with multiple amendments to the RTFO trajectory made in recent years following periods of review and consultation.

The absence of the aforementioned information also means it is impossible to confirm whether linear or exponential growth in SAF availability may be reasonably assumed. It is likely that both relationships are an oversimplification as growth will be subject to significant investment decisions which will be based on an array of considerations including technology development and the evolving policy/legislative landscape – each presenting potential perturbations to growth.

Furthermore, with currently no plants or refineries in the UK currently producing SAF, there is no production baseline with which to model a suitable trajectory. As essential as SAF is to the decarbonisation of aviation and the UK's ambitions to meet Net Zero, it is still a nascent technology and therefore any mandate will need to be carefully designed to be adaptable to evolving market conditions.

Therefore, for the purposes of this consultation response, UKPIA may only comment on the scenarios as outlined by the DfT in the *current* SAF context and policy landscape. Under these circumstances, Scenario B – the 'High Ambition' scenario – appears to offer the best balance of ambition and feasibility. The trajectory is consistent with the best available UK aviation sector roadmap² and is based on SAF plants currently known to be under development. A more ambitious SAF mandate trajectory *may* be feasible, however this can only be concluded upon further quantitative modelling as outlined above.

It should be noted that the maximum volume of SAF that may be blended under ASTM D7566 is 50% (10% for some technologies)²² thereby introducing a technical limitation to SAF blending that must be considered an upper limit to any mandate (at least until the standard(s) are revised). Therefore, assuming the carbon intensity reductions modelled by the DfT in the

¹⁹ <https://www.ukpia.com/media/2711/ukpia-biomass-strategy-cfe-response.pdf>

²⁰ Decarbonising transport: a better, greener Britain, DfT, July 2021

²¹ Role of biomass in achieving net zero: call for evidence, BEIS, April 2021

²² ASTM D7566 - Standard Specification for ATF Containing Synthesized Hydrocarbons

consultation document are not improved upon, scenarios D and E cannot be considered technically feasible.

There are positive signs that the UK is developing a growing SAF production foundation. For example, Velocys has received further funding for development of the Altalto plant in Immingham²³ and Fulcrum BioEnergy have partnered with Essar to develop a SAF plant in the Merseyside area.²⁴ Both companies have significant commitments from the wider sector and suitable expertise – Fulcrum BioEnergy recently announced conclusion to the construction of its dedicated SAF plant in the US which should provide valuable learnings for their plant development in the UK.²⁵ The UK's refineries are also exploring how they may increasingly coprocess biomass with crude oil to produce SAF (with coprocessing currently capped at 5% for SAF by ASTM D7566)²².

In conclusion, as SAF production comes online, and HMG concludes key activities such as the biomass strategy refresh, low carbon fuels strategy, and review of renewable energy guarantees of origin (REGOs), the SAF mandate trajectory may be more definitively established – further consultation in 2023 is likely to be the most appropriate course of action.

It is our ambition to go further and faster and develop a strong SAF sector in the UK as quickly as possible. This means we are open to increasing the SAF uptake in 2050 should the market and the technology develop quickly and SAF costs and carbon abatement costs come down significantly. This is why we will introduce review points in:

1. 2030, for post-2035 uptake.
2. 2040, for post-2045 uptake, including beyond 2050.

26. Do you agree or disagree that we should include review points in (depending on initial mandate levels):

	Agree	Disagree	Don't know?
2030?	✓		
2040?	✓		

There should also be a review in 2023 following the conclusion of multiple HMG reviews/strategies (see Q25).

We acknowledge that SAF may need further technology and commercial development to confidently meet our proposed or higher ambition.

Currently Hydroprocessed esters and Fatty Acids (HEFA) is the only commercial SAF production, with existing facilities already supplying SAF to the:

- UK
- globally

This means a SAF mandate, in the short term, could drive an increased supply of HEFA. Relying on this fuel could also divert used cooking oil (the feedstock primarily used to produce HEFA) away from the renewable diesel also known as hydrotreated vegetable oil (HVO) production process. HEFA supply will be, to some extent, part of the UK fuel mix, but we welcome views on:

²³ <https://www.velocys.com/2021/09/01/grant-of-up-to-2-4m-awarded-for-altalto-project/>

²⁴ <http://www.essaroil.co.uk/sustainability/fulcrum/>

²⁵ <https://fulcrum-bioenergy.com/wp-content/uploads/2021/07/2021-07-06-Sierra-Construction-Completion-Press-Release-FINAL.pdf>

1. Whether HEFA should be capped.
2. How this potential cap should evolve over time as demand for HVO decreases in road transport.

We keen to capitalise on the opportunities that innovative fuels, such as power-to-liquid, can bring to the UK. Given the costs are significantly higher than the cost of SAF produced through any other pathway and that the production of these fuels is not expected to be widespread until the late 2030s, we welcome views on how to accelerate technological and commercial development of power-to-liquid fuels specifically. This could be obtained, for instance, through the use of a multiplier system within the mandate, similar to the double reward certain waste fuels obtain under the RTFO or through specific sub-targets that could push power-to-liquid technology over others. We are also keen to understand how the SAF mandate more in general can foster the development of SAF with the lowest greenhouse gas emissions intensity across all technologies.

27. In your view should the amount of HEFA able to be claimed under the SAF mandate be capped over time?

- Yes
- ✓ No (Go to 'Overarching trajectory')
- Don't know? (Go to 'Overarching trajectory')

UKPIA understands the DfT's considerations regarding the diversion of HVO feedstocks and stimulation of other SAF technologies. However, the mandate should be technology neutral with rigorous sustainability criteria to ensure GHG emissions savings are made at the lowest societal cost. An artificial cap of a technology may introduce bias into the market that is then difficult to reconcile as the SAF market matures.

HEFA capping

28. In this case:

how could the cap work,
given the scheme will be
based on carbon
emissions savings?

how should the cap be
calculated?

Overarching trajectory

29. How can power-to-liquid fuels innovation and roll-out be accelerated?

Power-to-liquids, or e-fuels, offers a potentially zero carbon – or even carbon negative – means of producing SAF. However, any power-to-liquids technology is only sustainable –

environmentally and economically – when the UK grid offers abundant (reliable and cheap) renewable energy. This is best stimulated via renewable energy generation support (likely to fall under BEIS policy areas) and additionality requirements in renewable fuels policy.

30. Should a:

sub-target be introduced?

multiplier be introduced?

something else be introduced?

None of the above at this stage

Your reasons are?

A policy mechanism based on GHG emissions/carbon intensity reduction – as the SAF mandate is proposed to be – will reward high gCO₂e/MJ saving fuels accordingly. Multipliers are generally utilised under volumetric-based policies (such as the RTFO) to increase policy reward for lower carbon intensity fuels (such as those derived from wastes) to incentivise their blending – such an approach is superfluous in a scheme that is based on carbon intensity. The introduction of a multiplier under a carbon intensity-based scheme would result in a policy that is no longer technology neutral.

As outlined under questions 14 and 29, additional renewable energy demand resulting from renewable fuels policy must not increase the carbon intensity of the grid nor displace existing demand met via renewable energy. Therefore, any e-fuels sub-target would require strict additionality requirements to meet the policy objective and would likely result in further costs passed on to the passenger as long as e-fuels remain more costly to manufacture relative to fossil- and biomass-derived fuels.

UKPIA would propose that any specific power-to-liquids support under the SAF mandate be avoided until BEIS has concluded its reviews and consultations related to the electricity market. This includes the aforementioned REGO review as well as the hydrogen business model and low carbon standard consultations which also rely on renewable energy generation. This aspect of the policy could form part of the proposed review in 2023.

31. How can SAF produced through pathways other than HEFA and power-to-liquid be accelerated?

SAF feedstocks such as non-recyclable wastes and municipal solid waste (MSW) present a societal problem that manufacture into fuels can resolve (i.e. the collection and removal of household/commercial/industrial waste). Therefore, the processing of these feedstocks provides sustainability benefits beyond GHG emissions reductions that should be rewarded under the policy accordingly.

In general, SAF manufacture from these wastes is more capital intensive (primarily due to pre-manufacture preparation requirements), therefore, the policy should provide some level of reward proportionate to the cost of an alternative low carbon/carbon neutral end of life fate for these wastes (such as UK-specific carbon intensity value for MSW).

Interactions with other domestic and international policy

In line with the approach set out in the government response to the RTFO consultation, we would like to require that any SAF supplied to meet the proposed standalone SAF mandate cannot be claimed under the RTFO, and the other way around. This is to ensure carbon emissions reductions are only accounted for once. Any SAF claimed under a SAF mandate would therefore not be able to receive a double reward under the RTFO, and the other way around, regardless of the party submitting the claim.

It is also proposed any emissions reductions claimed under a SAF mandate cannot also be claimed under another GHG scheme to ensure that they are only claimed once. We welcome views on how the UK ETS, CORSIA and proposed SAF mandate could be used together to continue to incentivise SAF uptake, while preventing double counting of emissions reductions.

It is proposed that any SAF produced from plants which have benefitted from government support, either in the UK or abroad, would count towards the proposed SAF mandate obligation and can still receive support under the SAF mandate. This would include plants which have benefitted from government support for:

- research and development
- feasibility studies
- front end engineering design (FEED)
- construction of commercial plants

To avoid double counting and double claiming between the SAF mandate and the RTFO, SAF suppliers will technically be able to choose between what scheme they would like to claim a certificate or a credit from, and will not be able to claim the same consignment of SAF under the other scheme. We would therefore like to make aviation fuel ineligible to receive certificates under the RTFO once a SAF mandate is in place, likely in 2025.

It is important that any SAF mandate introduced in the UK or elsewhere does not result in carbon leakage, to avoid an increase in carbon emissions outside the region where a SAF mandate is implemented. In particular, airlines may decide to take on additional fuel on inbound trips to the UK to cover the outbound trip from the UK by refuelling elsewhere – this is known as ‘tankering’. We welcome views on whether some additional provisions under the proposed SAF mandate may be needed to decrease the risk of tankering that mandatory SAF use could result in.

32. Do you agree or disagree that SAF GHG emissions reductions should be claimed only once under different schemes?

- Agree
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

One of the most significant challenges faced across decarbonisation policies is the risk of double-counting as multiple frameworks in potentially multiple markets of a product supply chain

may provide some level of GHG emissions reward/support.²⁶ Non-credible carbon accounting risks the environmental integrity of decarbonisation policies and the best way to avoid this is to ensure GHG emissions reductions are only claimed once – even if different parts of a product’s lifecycle are claimed separately.

33. How could the UK ETS, CORSIA and proposed SAF mandate be used together to continue to incentivise uptake, while preventing double counting of emissions reductions?

The approach the EC identified as having the lowest administrative burden in reconciling EU ETS and CORSIA was to implement a Monitoring, Reporting and Verification (MRV) database²⁷ – the CORSIA Reporting Tool.²⁸ This has enabled the sector to report under both schemes whilst pragmatically avoiding double counting/claiming.

Such an approach is likely to offer the least administratively burdensome route to reconciling emissions claims under UK ETS, CORSIA, and the SAF mandate. There have been calls for UK ETS to be linked to EU ETS by a consortium of business associations with the UK-EU Trade and Cooperation Agreement pledging consideration to linking their carbon pricing systems.²⁹ Therefore, the most pragmatic and future-proof approach for the UK is likely to be continued use of the EUROCONTROL CORSIA Reporting Tool.

34. Do you agree or disagree that SAF that has been produced on the back of industrial plants which have received competition funding from government can be claimed under the proposed UK SAF mandate?

- ✓ Agree
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

As outlined in this consultation document and the consultation on amending the RTFO, renewable fuels are generally more expensive than their fossil-derived counterparts. Therefore, there is an important role for well-designed funding/support schemes to stimulate renewable fuel deployment or market development in the UK that should not preclude reward under an obligation such as the SAF mandate.

Such an approach would be consistent with other leading renewable fuel policies where competitions and funds are offered to stimulate domestic renewable fuel production without preventing access to claiming under national schemes. For SAFs specifically, the US has recently announced \$4.3 billion of funding for SAF projects³⁰ whilst SAF produced by supported plants would still be eligible for claim.

²⁶ Double Counting in the Paris Agreement, Climate Focus, January 2016

²⁷ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2021:0603:FIN:EN:PDF>

²⁸ <https://www.eurocontrol.int/article/corsia-and-eus-emissions-trading-system-how-eurocontrol-supports-european-aviation-foster>

²⁹ <https://www.argusmedia.com/en/news/2205623-link-uk-eu-ets-ahead-of-cop-26-industry>

³⁰ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/09/fact-sheet-biden-administration-advances-the-future-of-sustainable-fuels-in-american-aviation/>

Above all, the UK should be guided by its obligations under the World Trade Organisation (WTO) and be transparent in any support for SAF plants it provides.

35. Do you agree or disagree that SAF should no longer be rewarded under the RTFO if a SAF mandate is in place?

- ✓ Agree with some overlapping transition period
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

UKPIA agrees with the DfT that a dedicated SAF mandate is the most suitable policy mechanism, however, there may be investment decisions for renewable aviation fuel that have already been made based on existing reward under the RTFO. Therefore, UKPIA would propose that there be a transition period following implementation of the SAF mandate that allows the claiming of RTFCs *instead* should a project be contingent upon this while the SAF mandate target is a small proportion of overall obligated fuel.

For clarity, distillate-type fuel produced by a SAF plant provided for use in road, off-road, or domestic maritime applications that meets the sustainability criteria of the RTFO should continue to be eligible for RTFC claims.

36. What provisions, if any, do you think should the UK SAF mandate include to reduce the risk of carbon leakage and tankering even further?

Carbon leakage is an increasing challenge for domestic producers as they are bound by the UK's strict environmental regulations where imported products face no such requirements – a source of carbon leakage. A carbon border adjustment mechanism (CBAM), such as currently under consideration by the EC³¹, could offer a route to simultaneously reducing carbon leakage whilst protecting UK production – and therefore jobs and supply resilience. Such a policy would require detailed consultation to ensure a robust and fit for purpose mechanism is put in place.

Tankering is primarily an economically or operationally-driven practice – normally utilised to take advantage of favourable ATF costs and/or ensure resilient aircraft operations (e.g. mitigate against fuel shortage/contamination at an airport).³²

Airlines seek to minimise their exposure to price volatility by entering multi-year supply agreements with airport fuel suppliers whilst airport fuel quality and handling practices are internationally agreed and cascaded (such as EI/JIG Standard 1530³³). In light of this, there is likely limited scope for UK government intervention beyond domestic aviation, however, the UK government could encourage an internationally agreed approach from airlines (such as at ICAO) to reduce tankering.

³¹ https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661

³² Fuel Tankering: Economic Benefits and Environmental Impact for Flights Up to 1500 NM (Full Tankering) and 2500 NM (Partial Tankering), EUROCONTROL, January 2021

³³ EI/JIG Standard 1530: Quality assurance requirements for the manufacture, storage and distribution of aviation fuel to airports

Providing SAF to the market

While a mandate would secure demand, it does not determine the price that a plant owner may receive for their finished fuel, as the value of both the fuel itself and tradable credits under a mandate may fluctuate over time. Alongside the high capital and operational costs faced by developers considering building commercial scale SAF facilities, revenue uncertainty adds additional risk to projects which may limit the attractiveness to investors and increase the overall cost of finance.

We are keen to understand how we can build investor confidence in UK plants and secure investment, allowing the UK to develop a world-leading domestic SAF sector. We therefore welcome views on what, if any, additional interventions may be needed to provide more certainty for developers and investors considering building plants in the UK.

We acknowledge future market developments or other external circumstances could mean fuel suppliers may not be able to produce sustainable fuel or buy credits, thus failing to meet (part of) their proposed obligation. It may be necessary for suppliers to pay a fixed sum for each litre of fuel for which they wish to 'buy-out' their obligation. Should suppliers fail to produce SAF, an equivalent buy-out under the SAF mandate would allow them to fulfil their obligation, but this would result in a loss of additional carbon emissions savings. We welcome views on what measures or penalties should be in place to deter suppliers from falling short of the proposed carbon intensity targets and whether buy-out should be allowed.

37. Do you agree or disagree that a more comprehensive policy framework beyond the SAF mandate is required to create a successful UK SAF sector?

- ✓ Agree
- Disagree (After giving reason go to 'Providing SAF to the market')
- Neither agree or disagree
- Don't know? (After giving reasons go to 'Providing SAF to the market')

Your reasons are?

As outlined in Q5 and Q25, the resilient manufacture and supply of SAF is dependent upon other sectors and best supported via a suite of policy interventions that adopt a holistic, systems-based approach. These policy approaches are outlined in UKPIA's [consultation responses](#)³⁴ and [publications](#)³⁵ with a selection of the main policy interventions summarised as follows:

- Cradle-to-grave transport lifecycle GHG emissions regulation
- Reward for recycled carbon fuels under the SAF mandate (and RTFO)
- Pricing support mechanisms for decarbonisation technologies such as CCUS and hydrogen
- Carbon border adjustment mechanism to level the playing field for domestic manufacturers
- Linking UK ETS to the EU ETS
- Embedding the downstream sector in domestic low carbon supply chains
- Ensuring suitable demand for the suite of a (bio)refinery's products to give the best possible chance of economic viability

³⁴ <https://www.ukpia.com/downstream-oil/ukpia-consultation-responses/>

³⁵ <https://www.ukpia.com/media-centre/publications/>

The UK must also continue the following principles in its journey to Net Zero:

- Maintain technology neutrality in its policy approach to allow opportunity for all low carbon technologies to form part of the solution.
- Seek international agreement to decarbonisation across sectors leveraging its leading role in low carbon technologies and presidency of conferences such as COP26.
- Long-term fiscal sustainability through the energy transition ensuring new policies are supportable and existing assets are evolved for a Net Zero UK as far as possible.

Additional support

38. How, in your view, can this policy framework be designed (provide any evidence you have)?

Comments:

See Q37; key reports include:

- [UKPIA's Future Vision \(2019\)](#)
- [Transition, Transformation, and Innovation \(2020\)](#)
- [The Future of Mobility in the UK \(2021\)](#)
- [UKPIA Consultation Responses](#)

Providing SAF to the market

39. Should a buy-out be allowed?

✓ Yes

No (Go to 'Providing SAF to the market')

Don't know? (Go to 'Providing SAF to the market')

Buy-out

40. How should we set the buy-out price set to encourage actual supply of SAF and delivery of carbon savings?

As outlined in UKPIA's response to the RTFO buy-out consultation, a buy-out price is an essential balance of being high enough to encourage economic renewable fuel blending whilst low enough to ensure any necessary use does not carry unnecessarily significant societal cost. The buy-out price for the SAF mandate should be set according to the same principles also

mindful of remaining competitive with neighbouring markets also implementing a SAF incentivisation policy.

A buy-out mechanism should be considered an essential part of a SAF mandate policy to ensure ATF supply resilience in cases of unavoidable SAF supply disruption. The option of buy-out has been offered in the RTFO for many years, successfully incentivising the policy objective with minimal levels of buy-out to date.¹

41. How should the buy-out evolve over time?

UKPIA suggests that DfT define a set of criteria that triggers the question of buy-out price review with key industry stakeholders (such as via the Jet Zero Council SAF Delivery Group) depending on specific SAF market evolutions. These criteria could include:

- Neighbouring market SAF policy updates
- Sustained periods of the cost of gCO₂e/MJ saved via SAF greater than the buy-out price
- Significant ATF (fossil-derived or sustainable) UK supply chain disruption

Industry experts can then provide a view to the DfT on whether the buy-out price should be paused, temporary altered, or consulted upon to implement a longer-term change to maintain a competitive SAF mandate policy in the UK.

Providing SAF to the market

42. What penalties should be introduced either in addition or alternatively to a buy-out to ensure sustainable SAF, that meets the proposed criteria, is supplied?

A well-designed buy-out mechanism should provide suitable investment incentive for SAF to be blended. The downstream sector is motivated to continue to deliver decarbonisation via fuels with a buy-out a suitable economic 'pressure relief valve' should SAF supply experience unforeseen or unavoidable interruption.

As stated in Q5, SAF deployment may further be economically incentivised via a suitable pricing support mechanism.

Scheme practicalities, reporting and verification

We are proposing that a mass balance approach should be the only chain of custody system permitted as part of the SAF, where a chain of custody is defined as the system that allows to link the final product with the raw materials used to produce it. Such a system ensures that, for each unit of biofuel claimed, an equivalent amount of feedstocks with the same sustainability characteristics of the final biofuel has been effectively used in the fuel market, even if those feedstocks have not been physically separated during the production process.

To ensure the fuel delivered under a mass balance approach is truly sustainable, there is a need to track sustainability data throughout the supply chain and back to the original source of the fuel. To allow this information to be verified, credible and adequate evidence must therefore be in place at each stage of the supply chain and this needs to flow smoothly from the owner of the feedstock used to produce a sustainable fuel to the obligated party that incurs an obligation.

For an effective and smooth delivery of the proposed SAF mandate, it is envisaged a reporting requirement on all aviation fuel (SAF and conventional) will need to be introduced so that the proposed obligation on aviation fuel suppliers can be calculated accurately.

Data to meet the proposed annual reporting obligations will be collected on top of the information SAF suppliers will need to submit to the Department for Transport to claim credits under the proposed SAF mandate. It is proposed that aviation fuel suppliers can apply for credits how often they choose, at any time within the given reporting period.

It is proposed that obligated fuel suppliers will need to show that the SAF supplied meets the proposed SAF sustainability standards and will need to have their claim data independently verified before submitting an application for credits. We are minded to allow certifications from voluntary schemes that show the SAF supplied under the proposed UK SAF mandate meets its prescribed sustainability criteria. It is not proposed that reliance on voluntary schemes will be mandatory, so that fuel producers can have flexibility to bring their preferred evidence to show compliance with the sustainability criteria.

On top of the proof of sustainability supplied by a voluntary scheme or the provision of evidence deemed acceptable, it is proposed that independent verification or assurance is also needed for fuel suppliers submitting claims under the SAF mandate. As we introduce a standalone SAF mandate, with an aim to:

- reduce risks
- improve the credibility and effectiveness of the new scheme

Under the RTFO, this needs to be conducted by a qualified and competent party in line with the [International Standard on Assurance Engagements \(opens in a new window\)](#) to at least the 'limited' assurance level defined by this (or another equivalent) standard. When aviation fuel became eligible under the RTFO in 2018, respondents to a previous government consultation highlighted the proposed 'reasonable' assurance would create disproportionate administrative burden.

We welcome again views on whether verification should be conducted to a 'reasonable' or 'limited' assurance.

We [regularly release reports \(opens in a new window\)](#) with information provided under the GHG Reporting Regulations and the RTFO. We are keen to continue to provide transparent access to information collected as part of the proposed SAF mandate, where this information is not commercially sensitive.

43. Do you agree or disagree that a mass balance approach should be the only chain of custody system permitted under the proposed SAF mandate?

- Agree
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

A mass balance approach is the only practical system implementable for SAFs as the majority of ATF is supplied via pipeline to comingled storage and, as outlined in Q8, often enters the supply chain as DPK. Even ATF supplied by road is ultimately delivered to an on-site comingled tank farm – there is very limited scope for segregating ATF in the supply chain. Indeed, a key advantage of SAFs is that they can be blended with fossil-derived kerosene and be chemically indistinguishable from fossil-derived ATF.

A mass balance approach is robust from a sustainability perspective, and consistent with the chain of custody approach under the RTFO: [a mass balance approach “ensures for every unit of sustainable biofuel sold, the corresponding sustainable feedstock has been produced.”³⁶

44. Where do you think the chain of custody should end?

Comments:

Under the RTFO, the chain of custody ends at the fuel duty point, this appears a suitable approach to also adopt for SAF. In practice, this will normally mean at the point of entry into a pipeline or loading onto a rail or road tanker.

45. Do you agree or disagree that obligated suppliers will need to report annually information on the aviation fuel supplied to the Department for Transport, regardless of whether they claim SAF credits?

- ✓ Agree provided the administrative burden is low
- Neither agree nor disagree
- Disagree
- Don't know?

Your reasons are?

For the DfT to appropriately monitor the deployment of the policy, it will require some relevant information (see Q46). ATF volumes and densities are already provided to BEIS and HMRC.

46. What, if any, views do you have on:

what information

obligated fuel suppliers should report? Carbon intensity (as per the ICAO-agreed CORSIA GHG methodology – see Q19), volume or mass supplied, lower heating value, country of origin.

the reporting calendar?

Annual reporting by calendar year, consistent with the RTFO.

47. What, if any, views do you have on what the required:

³⁶ RTFO Guidance Part Two: Carbon and Sustainability, DfT, January 2021

timescale for submitting claims should be?

As often as a fuel supplier chooses within a reporting year as per the RTFO.

information or evidence for this process should be?

Certification via CORSIA recognised voluntary schemes.

48. Should certification provided by voluntary schemes count as evidence of compliance with the sustainability criteria of the SAF mandate?

Yes

No (After giving reasons go to 'Scheme practicalities, reporting and verification')

Don't know? (After giving reasons go to 'Scheme practicalities, reporting and verification')

Your reasons are?

As outlined in Q13.

Evidence of compliance

49. Should, in your view, this evidence step be mandatory?

Yes

No

Don't know?

Your reasons are?

Whilst recognised voluntary schemes offer a practical and robust means of demonstrating sustainability criteria are met, certification via voluntary schemes should not be mandatory under the SAF mandate – as per the RTFO. Fuel suppliers should be afforded to option to evidence fulfilment of the sustainability criteria via other robust, auditable methods if they so choose.

Scheme practicalities, reporting and verification

50. What, if any, additional information should, in your view, the obligated party provide to demonstrate compliance with the sustainability criteria?

Information additional to what is certified by a CORSIA recognised voluntary scheme should not be needed.

51. Do you agree or disagree that claims for credits under the SAF mandate should be verified?

- ✓ Agree
 - Neither agree nor disagree
 - Disagree (After giving reasons go to 'Scheme practicalities, reporting and verification')
 - Don't know? (After giving reasons go to 'Scheme practicalities, reporting and verification')

Your reasons are?

Claims should require verification to the same level of assurance as the RTFO.

Verification

52. Do you think should these be verified to a:

- 'limited' assurance?
- ✓ 'reasonable' assurance?
- different level of assurance?

UKPIA cannot comment on the relative merits and risks associated with 'reasonable' vs lower levels of assurance, however, a verification level consistent with the RTFO seems suitable and proportionate given the policy's success.

Scheme practicalities, reporting and verification

53. What, if any, data on the related to the SAF mandate should Department for Transport make publicly available?

GHG emissions saved and blended volumes should form part of DfT's renewable fuel statistics.

54. How often do you think this should this information should be published?

- ✓ Quarterly – as per the renewable fuel statistics
- Annually
- Biannually
- Another time period:

Final comments

55. Any other comments?

There are many elements of this policy that will require update/evolution as international SAF policies develop and further analysis conducted by UK government is published. UKPIA would

encourage to continue with a flexible and pragmatic approach to this important policy and welcomes further engagement and consultation to support the development of a robust regulatory framework for SAFs.

Glossary:

ATF	Aviation Turbine Fuel (aka avtur)
CBAM	Carbon border adjustment mechanism
CCUS	Carbon Capture Utilisation and Storage
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DPK	Dual Purpose Kerosene
ETS	Emissions Trading Scheme
FOAK	First of a Kind
GFGS	Green Fuels Green Skies
GHG	Greenhouse Gas
HEFA	Hydroprocessed Esters and Fatty Acids
HVO	Hydrogenated Vegetable Oil
ILUC	Indirect Land Use Change
ISCC	International Sustainability and Carbon Certification (System)
MSW	Municipal Solid Waste
NRMM	Non-Road Mobile Machinery
RCF	Recycled Carbon Fuel
RED	Renewable Energy Directive
REGO	Renewable Energy Guarantee of Origin
RTFC	Renewable Transport Fuel Certificate
RTFO	Renewable Transport Fuel Obligation
SAF	Sustainable Aviation Fuel
WTW	Well-to-wing