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By email to lowcarbonfuel.consultation@dft.gov.uk

SAF Mandate: crop derived SAF Call for Evidence

Dear Sir or Madam

Fuels Industry UK represents the six main oil refining and marketing companies operating in the UK. The Fuels Industry UK member companies – bp, Essar, Esso Petroleum, Phillips 66, Shell, and Valero – are together responsible for the sourcing and supply of product meeting over 85% of UK inland demand, accounting for over a third of total primary UK energy[1].

The refining and downstream oil sector is vital in supporting UK economic activity. It provides a secure supply of affordable energy for road and rail transport, aviation, and marine applications, as well as for commercial and domestic heating. It also supplies base fluids for use in lubricants, bitumen for use in road surfacing, and graphite for use in electric vehicle batteries and as electrodes in steel and aluminium manufacture.

Fuels Industry UK welcomes the opportunity to respond to the call for evidence on the inclusion of crop-derived SAF in the UK SAF Mandate.

[1] Based on the Department of Energy Security and Net Zero Digest of UK Energy Statistics 2024

Our responses to the consultation questions are given in Attachment 1, with further information on reference sources of available biomass provided in Attachment 2.

Yours sincerely

Chris Gould

Energy Transition Lead, Fuels Industry UK

Attachment 1: Fuels Industry UK Response

Question 1: How much feedstock is likely to be available for each of the crop types and at what cost could SAF be produced from these crops and using which technologies? Please provide evidence and consider how this may vary between current day and 2040, considering policies relating to biomass production and availability, land availability and land-use impacts. Please also consider how much feedstock is available in the UK specifically, in addition to a global scale.

A number of studies have been conducted in recent years assessing biomass availability, and we have listed those known to us in Attachment 2.

There has been a notable increase in publicly available publications over the past decade, reflecting growing attention from governments, industry, and research communities. Biomass availability estimates vary significantly across studies due to methodological differences and uncertainty in long-term feedstock projections. These assessments also indicate that not all future potential is as yet fully understood. Improvements in agricultural practices, land-use efficiency, and technological innovation may expand biomass availability beyond what current analyses capture.

We note a recent study by Imperial College [2], in partnership with Concawe, on this topic and suggest that it could be used to inform the discussion.

The study assesses the availability and mobilisation potential of the most important Annex IX-A solid bio-feedstocks under RED II, covering around 80% of the total sustainable biomass considered in Concawe's 2021 Imperial College London (ICL) assessment. Key findings include:

- Europe's domestic sustainable biomass is sufficient to meet the projected demand for advanced biofuels and competing sectors in both 2030 and 2050 scenarios.
- By 2050, optimal supply chains will increasingly rely on advanced technologies such as Gasification and Fischer-Tropsch (GFT) and Hydrothermal Liquefaction (HTL).
- Refineries will be a cornerstone of economically efficient supply chains. Their existing processing and storage infrastructure makes them ideal sites for integrating future biorefineries at the lowest possible cost, with between 47 and 64 large-scale biorefineries across Europe estimated to be integrated with existing refinery sites by 2050, according to the optimisation modelling results. Geography is a decisive factor in shaping optimal supply-chain configurations

[2] https://www.concawe.eu/wp-content/uploads/Sustainable-Biomass-Availability-in-the-EU-Part-I-and-II-final-version.pdf

and technology choices. For example, Scandinavia could develop into a major hub for decentralised biomass supply and a supplier of biocrude to European areas with limited bioresources but high biofuel demand, such as North-Western Europe. Thanks to its strong port and refinery network, North-Western Europe could, in turn, emerge as a central upgrading hub for producing drop-in biofuels.

- Innovations in agricultural and forestry management and novel energy crops deployment, along with the integration of green hydrogen in biorefineries, will enhance biomass use efficiency and enable Europe to meet biofuel demand with reduced pressure on bio-feedstock availability.

We would also recommend a very recent study [3] on advanced lower carbon fuels (LCFs), commissioned by Concawe in collaboration with Utrecht University and TNO, which presents a comprehensive, cost-optimised analysis of sustainable bio feedstock supply chains for advanced biofuel production across the EU-27 + UK for 2030 and 2050.

The study focuses on the main lignocellulosic feedstocks listed under Annex IX of the Renewable Energy Directive. It applies a spatially explicit supply chain optimisation model (based on Mixed-Integer Linear Programming), which integrates high-resolution biomass availability data, geospatial transport modelling, and spatially explicit information on EU industrial and transport infrastructure. The modelling framework also incorporates techno-economic data for two representative conversion process technologies, Gasification and Fischer–Tropsch (GFT) and Hydrothermal Liquefaction (HTL), evaluated under centralised and decentralised configurations.

We also believe that current UK policies could be improved by following international examples and distinguish more clearly between existing crop types like "food and feed crops" and other types of crops like intermediate crops that deliver additional environmental and other co-benefits without resulting in indirect land use change (ILUC). Intermediate crops are highly scalable both in the UK and globally (if intermediate crops would be grown on just 5% of world's cereal land they could potentially cover about 70-100% of projected global SAF demand for 2030) [4] and could be used in existing HEFA production facilities with limited additional costs. Land availability would depend on crop rotation but there would be no negative land use change impacts. Allowing intermediate crops to contribute to SAF targets above the HEFA cap will help expanding the feedstock base and may offer a safety net should insufficient non-capped SAF be available on the market, preventing a situation in which both buy-out and the revenue certainty mechanism are being passed on to consumers without delivering emission savings.

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[3] https://www.concawe.eu/wp-content/uploads/Rpt_25-10-2.pdf

[4] This assumes an oilseed yield of 1 t/ha, 40% oil content, and 80% conversion efficiency, which on an area of around 36.6 million hectares (i.e. the world's cereal land) could theoretically produce around 14–15 billion litres of SAF per year (≈11.7 million tonnes). While such levels cannot realistically be reached within the next five years, this estimate provides a useful sense of the potential magnitude.

Question 2: What competing uses and emerging/future uses exist for crop feedstocks? Please comment on specific crops where possible.

We note that the 2021 Concawe / Imperial College study discussed in our response to Q1 identifies competing areas for dedicated energy crops and advanced biofuels.

Crop-based feedstocks face cross-sector demand overlap across food, feed, biofuel, and an increasingly across industrial, material, and chemical applications.

A number of the studies referenced in our response to Q 1 also examine the overlapping uses of biomass across different sectors. In particular, we recommend the following Concawe reports:

- Sustainable Bio feedstock Supply Chains for Advanced Biofuels in Europe and towards 2050.
- Sustainable Biomass Availability in the EU to 2050 (Parts I & II).
- Availability Potential of the New Bio-feedstocks in Annex IX in the EU - Phase 1: Intermediate/cover crops (publication imminent).
- Availability Potential of the New Bio-feedstocks in Annex IX in the EU - Phase 2: non-food/feed crops grown on severely degraded land [5].

These reports analyse sustainable biomass availability across all markets and explicitly incorporate overlapping demand mapping into their modelling frameworks, showing how non-energy sectors, power and heat applications, and advanced biofuel production draw on the same biomass resource.

Generally, crops may have the following (competing) uses:

- Food Uses: Many crops suitable for biofuel production are also primary food crops, including corn, wheat, sugarcane, sugar beet, and cassava.
- Feed Uses: Livestock production uses many of the same cereals and oilseeds. Grains such as corn, wheat and barley make up part of livestock dry matter intake, while oilseed meals from soy and rapeseed are commonly used as protein feeds. These shared uses contribute to demand across livestock feed and other sectors.
- Energy Uses: Corn, wheat, sugarcane, sugar beet, and cassava are also ethanol feedstocks, while soybean, rapeseed and palm oil are used as inputs to biodiesel and renewable diesel.
- Industrial, Material and Chemical Applications: Biomaterials, chemicals, and construction materials are emerging as additional uses for agricultural biomass, with demand in these sectors expected to continue evolving.

[5] Wageningen University & Research, Centre for Renewable Energy Sources, and Concawe (publication expected mid 2026)

The following uses represent areas where biomass is utilised alongside biofuels:

- Fibres and textiles, including bio-based polymers, man-made cellulosic fibres, and other textile feedstocks.
- Pulp, paper and packaging, including applications that rely on agricultural fibres and residues.
- Bio-based chemicals, where sugars, starches and vegetable oils are used as feedstocks for solvents, plastics, and platform chemicals.
- Construction materials, where biomass can substitute for high-emissions materials in insulation, panels, and composites.
- Other biomaterials, including bioplastics and engineered composites.

To help ease this demand overlap with food systems, alternative non-food energy crops can be deployed. Cover crops, intermediate crops, dedicated energy crops, and crops grown on degraded and/or marginal land can provide substantial additional sustainable biomass for energy. These pathways reduce dependence on land and biomass needed for food systems, while contributing to long-term net-zero ambitions.

While there is clear cross-sector demand for agricultural biomass, these adjacent needs can be effectively managed through well-designed policy frameworks that guide sustainable resource allocation and also provide a framework focused on growing the overall biomass that can be made available for all these uses.

We advocate for the responsible use of resources, with a strong emphasis on safeguarding food security, at the same time as promoting the growth of the overall availability of sustainable biomass that becomes increasingly important to enable effective and affordable pathways to decrease GHG emissions in different sectors.

With appropriate governance in place, food production, industrial demand, and energy uses can coexist without creating unsustainable pressures on land or feedstock markets. A coherent policy approach is essential to ensure that these sectors develop in a balanced and mutually reinforcing way, supporting both sustainability objectives and long-term net-zero ambitions.

Question 3: What are the potential impacts of crops on a UK SAF production industry? Please consider any potential benefits or risks to advanced technology development.

As a general principle, expanding the list of feedstocks that SAF producers can use has the potential to reduce costs by providing a greater availability of sustainable biomass. If an appropriate ILUC approach is used, then this can mitigate potential sustainability concerns.

We would encourage the UK government to look in particular at including intermediate crops (certified against relevant sustainability requirements) or those grown on marginal or degraded land that could expand the feedstock base without triggering ILUC. Being used in existing HEFA plants they could contribute to SAF Mandate targets above the HEFA cap, minimising the risk of buy-out once the cap on segregated wastes and oils comes into place in 2027. Amendments to the HEFA cap could potentially also be considered, given that it allows for aviation decarbonisation with a greater range of potential feedstocks. As HEFA plants will not be able to profit from additional support under the Revenue Certainty Mechanism (RCM) [6], we also see very limited risk for advanced technology development in the immediate future.

Question 4: If there are risks to advanced technology development, are there any policy options to mitigate these? Please consider short- and long-term measures.

Any changes that have the potential to undermine investor confidence for advanced technology development must be carefully considered.

However, as a general principle, existing policies already contain measures to encourage the uptake of advanced technologies. This includes the SAF RCM. Provided feedstocks meet the required sustainable criteria, there should be no further restrictions on them.

[6] https://www.gov.uk/government/consultations/saf-revenue-certainty-mechanism-approach-to-industry-funding/sustainable-aviation-fuel-revenue-certainty-mechanism-approach-to-industry-funding

Question 5: What are the impacts of crop use in SAF production on the wider UK supply chain? Please consider UK competitiveness compared to other regions, including potential agronomic practices that could be adopted to ensure the UK is competitive.

As a general note, SAF production in the UK is still limited and therefore not only the impact on the UK supply chain but also interactions with wider global supply chains for feedstocks and fuels need to be considered.

In terms of food and feed crops, we note that the UK both imports and exports various crops such as wheat [7]; the impact of adding these crops as a feedstock for SAF production is therefore not clear cut. The net position depends on many factors, including the economic incentives for farmers planting appropriate crops and related yields (we note that 2024 suffered from poor UK harvests [8]). Risks include for example that the UK becomes more reliant on imports to meet food and feed demand, and the wider socio-economic impacts of this need to be considered (as they have been since the start of the RTFO in 2008).

More generally, we also note that climate change may have an impact on crop yields, and this also needs to be duly considered in future government policy [9].

We are unable to comment in detail on potential agronomic practices that could be adopted, with other stakeholders such as the NFU [10] being better placed to comment.

In terms of intermediate crops, allowing them as a compliance option in the SAF Mandate will offer UK industry access to a cost-effective decarbonisation option that can be used in existing HEFA facilities and is already eligible for support e.g. in the European Union (EU) and under CORSIA. It would also allow an additional income stream for farmers and support the scale-up of the deployment of sustainable agricultural practices (use of intermediate crops in the UK has been limited, with average use in EU double the figure, i.e. 8% [11]). Intermediate crops can add potential value in Regenerative Agriculture Practices by improving soil structure, retaining soil moisture, reducing nematodes, acting as a pollinator or improving soil organic content (SOC) and as such can also contribute to yield increases and improvements. [12]

[7] https://oec.world/en/profile/bilateral-product/wheat/reporter/gbr
[8] https://eciu.net/media/press-releases/2025/england-has-second-worst-harvest-on-record-comment
[9] https://sustainability.stanford.edu/news/climate-change-cuts-global-crop-yields-even-when-farmers-adapt
[10] https://www.nfuonline.com/
[11] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_soil_cover#Analysis_at_EU_and_country_level
[12] https://www.ceh.ac.uk/sites/default/files/2022-11/sip-Note-3-Cover-Crop.pdf

Question 6: Please provide data on the carbon intensity of crop-derived SAF production, taking into account different types of crop and production pathways.

We note for example the International Civil Aviation Organisation (ICAO) work [13] on this subject, which sets out default values, while also allowing for producer-submitted LCA data using ISO 14067:2018 [14] when available, to ensure that actual project-level performance is reflected. We intentionally reference the 2018 edition, as ongoing revision work has not yet produced a final, approved update.

Enabling the use of verified producer LCA values is critical for incentivizing continuous optimization of GHG reductions, rather than forcing producers to rely on conservative default values that may not reflect improvements achieved in practice. However, in the absence of producer-submitted LCA data, ICAO's default values provide the necessary methodological consistency with other jurisdictions. We note the recent publication by the International Council on Clean Transportation (ICCT) on this subject [15] which also based on the ICAO and CORSIA [16] figures and methodology. This suggests a higher carbon intensity for some crop derived SAF. However, exact figures may vary depending on the modelling used and the underlying assumptions, given also that ILUC can only be modelled and not measured.

We would encourage the DfT to carefully consider the full LCA emissions and treat them consistently with SAF derived from other sources to ensure a level playing field for all SAF suppliers.

In terms of intermediate crops, the table below sets out how HEFA from these crops may compare to HEFA from other feedstocks and alcohol-to-jet (AtJ) from residues in terms of lifecycle emission savings, once its potential environmental benefits are factored in. The table is based on the default lifecycle emission values agreed under CORSIA, taking brassica carinata and camelina as an example for intermediate crops [17]. It is important to note that greenhouse gas emission savings from intermediate crops have the potential to further improve over time as more R&D is taking place on genetics and as the agronomic management is further refined and productivity improves. ILUC risk will not apply to intermediate crops that do not trigger demand for additional land as they are grown between main crop cycles (and could even improve the productivity of the main crops).

[13] https://www.icao.int/environmental-protection/saf-lifecycle
[14] https://www.iso.org/standard/71206.html
[15] https://theicct.org/understanding-the-ghg-emissions-of-different-saf-pathways-sept25/
[16] https://www.icao.int/CORSIA
[17] For CORSIA default core LCA and ILUC values see https://www.icao.int/environmental-protection/CORSIA/Documents/CORSIA_Eligible_Fuels/ICAO%20document%2006%20-%20Default%20Life%20Cycle%20Emissions%20-%20October%202024.pdf.

CORSIA lifecycle emission value (in gCO_2e/MJ)	Default LCA Value	Default ILUC value	Combined lifecycle emission value
HEFA -UCO	13.9	0	**13.9**
HEFA - Brassica carinata oilseeds	34.4	-21.4 (USA) to -12.7 (global)	**13.0 to 21.7**
HEFA - Camelina oilseeds	42.0	-13.4	**28.6**
HEFA - Tallow and animal fats	22.5 (tallow) to 33.7 (poultry fat)	0	**22.5 to 33.7**
AtJ (ethanol conversion process) - agricultural residues	24.6 (integrated conversion); 39.7 (standalone)	0	**24.6 to 39.7**
HEFA – rapeseed/ canola oils	47.4	24.1 (EU); 26.0 (global)	**71.5 or 73.4**

Question 7: What are the sustainability risks that exist for each of the crop types? Please consider how these risks vary between different crop types and regions.

This is a highly complex area and must be carefully considered before any policy changes are made.

We note the significant sustainability requirements already in place under the RTFO and SAF mandate [18] . The RTFO has operated successfully over many years, with limited evidence of sustainability related issues.

We note the intention to publish a government wide biomass sustainability framework [19] and have responded to the recent consultation on this subject [20].

We note work recently published in "Nature" on this subject [21], including an analysis of the variation of risks between feedstock types.

We encourage the DfT to continue to use the existing sustainability requirements and frameworks in place to manage the sustainability risks for all feedstocks, including those derived from crops.

In terms of intermediate crops - unlike existing feedstock categories like 'dedicated energy crop' or 'food and feed crop' – their definition needs to be related to how the feedstock is produced rather than the type of crop grown i.e. these feedstocks need to be part of a sustainable crop rotation that provides environmental benefits and does not trigger additional land demand. Similar to waste and residues, the main sustainability risk therefore relates to feedstocks being identified as intermediate crops

[18] https://www.gov.uk/government/publications/rtfo-and-saf-mandate-technical-information
[19] https://assets.publishing.service.gov.uk/media/6932bc27cdec734f4dff42df/common-biomass-sustainability-framework-consultation.pdf
[20] https://www.fuelsindustryuk.org/media/rs0jht0c/biomass-framework-fuels-industry-uk-response-final.pdf
[21] https://www.nature.com/articles/s41893-025-01528-6

that do not actually qualify as such and do not deliver the same benefits. A clear definition (see response to Q13) and practical and credible verification process (see Q10) would help address certain key sustainability concerns. This will be an important tool to provide independent reassurance where these feedstocks deliver the expected benefits comparable to waste and residues.

Question 8: To what extent does ILUC exist for different crops? How can ILUC most robustly and accurately be accounted for?

ILUC risk will differ across different feedstocks and as per response to previous questions will not apply to intermediate crops that do not trigger demand for additional land as they are grown between main crop cycles (and could even improve the productivity of the main crops). Addressing ILUC is not solely a UK issue; we note the consultation document discusses the approach taken in the EU (for example under RED II [22]) and the ICAO CORSIA approach.

A risk-based qualitative approach seeks to promote feedstocks with lower ILUC risks over those with higher ILUC risks. This avoids the uncertainty of ILUC models in a quantitative approach, but risks excluding feedstocks solutions that, subject to further improvements, could deliver benefits. Most programs that implement the risk-based approach also include a process to identify and certify "low-risk" feedstocks, but this process has not been practical and has not resulted in large volumes of "low-risk" crop-based biofuel feedstocks. Experience in the RTFO suggests that a qualitative approach combined with reporting on ILUC can be used in practice, provided that suitable guidance and tools on how it can be calculated are provided.

Given the international nature of aviation, we would encourage a consistent approach to addressing ILUC across multiple jurisdictions. In particular, the UK should not "gold plate" these measures by imposing additional requirements. Making UK requirements more onerous is highly likely to add additional costs to the UK aviation industry, reducing its competitiveness. The UK should work with international bodies such as ICAO COSIA on global improvements where required, rather than introducing them on a unilateral basis.

We note that ILUC concerns have been stated as one of the principal reasons for not transitioning the RTFO into a GHG-based scheme (from its current volume-based scheme). Fuels Industry UK is strongly in favour of this transition [23,24.] which would make the RTFO consistent with the SAF Mandate. This consistency should also extend to ILUC treatment, to allow crop-based feedstocks to be recognised on an equitable basis, regardless of whether the LCF is supplied to fuels covered by the RTFO or SAF mandate.

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[22] https://eur-lex.europa.eu/eli/dir/2018/2001/oj/eng
[23] https://www.fuelsindustryuk.org/media/ibug5mbm/rtfo-statutory-review-and-future-of-the-scheme.pdf
[24] https://www.fuelsindustryuk.org/media/sqxjqqo4/policy-position-paper-low-carbon-fuels-short-version-2-april.pdf

Question 9: To what extent can policy frameworks for crop-based biofuels be designed to minimise the impact of crop-based feedstock use on international market volatility? Are there any regulatory measures that could help mitigate any impact on potential price spikes?

Fuel suppliers and investors in UK SAF plants need certainty in which to operate and invest. Equally market volatility is a natural part of any commodity business and is already well managed by competent participants (for example through price hedging [25]).

Introducing regulatory uncertainty to intervene where natural market volatility exists is therefore both unwelcome, and unnecessary. It should be avoided.

Existing policy frameworks such as the SAF mandate are market based and already allow for different feedstocks and technologies to compete. This means that in case of shortages (and consequent price hikes) in one commodity, market players may choose to make use of alternative feedstocks/ pathways. In addition, the SAF mandate also contains a buy-out mechanism to manage the impact of feedstock price rises and protect consumers from excessive compliance costs. The reasons for the price rises can be evaluated and appropriate action on the SAF mandate taken as these can vary. For example, rises caused by crop failures may need a different response to those of say changing US related tariffs. More generally, we see no evidence that biofuel feedstocks are a driving force in international commodity pricing, which will rather be influenced by weather conditions or geopolitical events.

Question 10: What agronomic practices and management measures could be applied to mitigate against any sustainability risks identified?

We note the significant sustainability requirements already in place under the RTFO and SAF mandate. The RTFO has operated successfully over many years, with no published evidence of sustainability related issues. We encourage the DfT to continue to use the existing requirements and frameworks in place to manage the sustainability risks for all feedstocks, including those derived from crops.

We also note the intention to publish a government wide biomass sustainability framework and have responded to the recent consultation on this subject.

Given the international nature of aviation, we would encourage a consistent approach to addressing sustainability risks across multiple jurisdictions. In particular, the UK should not "gold plate" these measures by imposing additional requirements. Making UK requirements more onerous is highly likely to add additional costs to the UK aviation

[25] https://stxgroup.com/strive/latest-news/glossary-price-hedging/

industry, reducing its competitiveness. The UK should work with international bodies such as ICAO CORSIA on global improvements where required, rather than introducing them on a unilateral basis.

As per our response to Q7 for intermediate crops, it will be important that compliance with key criteria is certified in a manner that is robust but also practical to use. In line with the definition put forward in Q13, this includes certifying that intermediate crop use does not lead to land use change. This could be done by using a Dynamic Land Utilisation Approach to prove the intermediate crops are only grown on land that would have been otherwise left fallow, idle or would have been used to grow an unproductive intermediate crop. Furthermore, to prove that intermediate crops maintain or improve the soil content adoption of specific, agricultural management practices that are well known to improve soil quality should be demonstrated (i.e. use of no-/zero-tillage or minimum-/low- tillage practices or leaving residues on the field) [26]:

To minimise any administrative burden for businesses, the government should also consider in how far the certification criteria and guidance being developed at EU level may prove to be appropriate for verifying UK requirements.

Question 11: Are the current sustainability criteria sufficient to mitigate against risks identified? If not, what sustainability criteria would be required?

We note the significant sustainability requirements already in place under the RTFO and SAF mandate. The RTFO has operated successfully over many years, with no published evidence of sustainability related issues. We encourage the DfT to continue to use the existing requirements and frameworks in place to manage the sustainability risks for all feedstocks, including those derived from crops.

We also note the intention to publish a government wide biomass sustainability framework and have responded to the recent consultation on this subject.

Given the international nature of aviation, we would encourage a consistent approach to addressing sustainability risks across multiple jurisdictions. In particular, the UK should not "gold plate" these measures by imposing additional requirements. Making UK requirements more onerous is highly likely to add additional costs to the UK aviation industry, reducing its competitiveness. The UK should work with international bodies such as ICAO COSIA on global improvements where required, rather than introducing them on a unilateral basis.

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[26] https://www.studiogearup.com/sgu-recommendations-for-practical-certification-guidelines-intermediate-crops/

As per response to Q7, Q10 and Q13 specific certification requirements would need to be introduced for intermediate crops as a new feedstock category.

Question 12: What assurance measures are required to evidence these crops protect against risks identified?

We note the significant sustainability assurance requirements already in place under the RTFO and SAF mandate [27]. The RTFO has operated successfully over many years, with no published evidence of sustainability related issues. We encourage the DfT to continue to use the existing assurance requirements and frameworks in place to manage the sustainability risks for all feedstocks, including those derived from crops.

We also note the intention to publish a government wide biomass sustainability framework and have responded to the recent consultation on this subject.

Given the international nature of aviation, we would encourage a consistent approach to addressing sustainability risks including appropriate assurance measures across multiple jurisdictions. In particular, the UK should not "gold plate" these measures by imposing additional requirements. Making UK requirements more onerous is highly likely to add additional costs to the UK aviation industry, reducing its competitiveness. The UK should work with international bodies such as ICAO COSIA on global improvements where required, rather than introducing them on a unilateral basis.

It is also important that existing sustainability measures embedded in other countries' biofuel regulations are considered when evaluating the introduction of additional policy requirements. For example, Canada's Clean Fuel Regulation includes Land Use and Biodiversity protocols designed to manage potential environmental impacts from crop and forestry feedstocks, while the US Renewable Fuel Standard allows biomass only from land that was already in use before 2008. Aligning requirements and measures as much as considered appropriate by regulators can help simplify compliance and assurance for industry and minimise administrative burden and ensures a coherent approach to managing sustainability risks across international supply chains [28].

For intermediate crops see also our response to Q10.

[27] https://www.gov.uk/government/publications/rtfo-and-saf-mandate-third-party-assurance
[28] https://www.law.cornell.edu/uscode/text/42/7545

Question 13: How could cover crops and crops on degraded or marginal land be defined? Please provide evidence of the availability, as well as the risks and benefits of growing crops on this degraded or marginal land.

Given the international nature of aviation, we would encourage a consistent approach to the treatment of cover crops and crops grown on degraded or marginal land. In particular, the UK should not "gold plate" these measures by imposing additional requirements. Making UK requirements more onerous is highly likely to add additional costs to the UK aviation industry, reducing its competitiveness.

We note that the EU promotes using intermediate or cover crops (such as camelina and carinata) for SAF by classifying them as "advanced" feedstocks under Annex IX of the Renewable Energy Directive (RED) [29]. The UK should look to adopt a similar approach, including using the same definitions, as far as possible and allow SAF from intermediate crops to contribute to SAF Mandate targets above the HEFA cap. The DfT may also wish to include intermediate crops in the RTFO, which is different to the current EU approach (the EU putting them as a 9B feedstock in the RED).

For intermediate crops, the recent EU definition of them may be a good starting point for the UK.

"Intermediate crops, such as catch crops and cover crops that are grown in areas where due to a short vegetation period the production of food and feed crops is limited to one harvest and provided their use does not trigger demand for additional land and provided the soil organic matter content is maintained".

However, the UK may want to consider some simplifications to the EU definition cited above. Based on the initial EU discussions, the requirement for cover crops to be "grown in areas where due to a short vegetation period the production of food and feed crops is limited", has proven difficult to operationalise. Defining "short vegetation period" across multiple regions worldwide, for example, is difficult and risks the involuntary exclusion of some viable and sustainable farming practices.

We understand the wording was originally included to ensure that in regions where more than one crop could be grown in a harvest cycle (e.g. soybean followed by safrinha corn), the second crop could not qualify as an intermediate crop.

We believe there are simpler ways to address this, e.g. by referencing that intermediate crops are to be grown "before and after main crops" (as already done in existing UK legislation) and making sure that intermediate crops are only grown on land that would otherwise be idle, fallow or used for an unproductive intermediate crop (for Q10 above).

[29] https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewable-energy-recast-2030-red-ii_en

We understand there are concerns that the category of “intermediate crops” can cover a wide range of feedstocks with potentially differing sustainability characteristics, including ILUC risks. It is therefore important that the definition of “intermediate crops” contains a clear requirement that the use of these crops does not and will not trigger additional demand for land whilst maintaining soil organic matter and that they are certified accordingly.

For information on availability and risks for intermediate crops please see responses to previous questions.

In terms of defining marginal land, marginal land is land constrained by biophysical factors (such as poor soil quality, salinity, steep slopes) or economic limitations (low yield, high input costs), leading it to produce much less than its biophysical potential [30]. Such land is typically being withdrawn from conventional productive uses and becomes marginalised. Land with SOC levels below 2%, high salinity or heavily eroded can be utilised for growing intermediate crops during any time of the year as it will not impact ILUC, and it will help improve soil health over time. [31]

[30] Policies for Sustainable Agriculture and Livelihood in Marginal Lands: A Review | MDPI

[31] https://www.sciencedirect.com/science/article/pii/S0301421525005506?via%3Dihub

Attachment 2: Biomass Availability Studies

	Title	URL	Year	Type
1	Mobilisation of Industrial Capacity Building for Advanced Biofuels – EC	https://biofutureplatform.org/wp-content/uploads/2026/02/2026_EC-DG-Research_Mobilization-of-industrial-capacity-building-for-advanced-biofuels.pdf	2026	Governmental
2	"Balancing Growth in connectivity with a comprehensive global air transport response to the climate emergency" 3rd edition	https://aviationbenefits.org/media/4eajfrrm/aw_waypoint2050-digital-29012026.pdf	2026	Aviation Industry
3	Sustainable Biofeedstock Supply Chains for Advanced Biofuels in Europe towards 2050 -— Utrecht University, TNO Innovation for Life, and Concawe	https://www.concawe.eu/wp-content/uploads/Rpt_25-10-2.pdf	2025	Fuels Industry
4	Benefits of intermediate crops, and bottlenecks to their development – Studio Gear Up B.V	https://www.studiogearup.com/wp-content/uploads/2025/09/2025_sGU_Benefits-of-intermediate-crops-and-bottlenecks-to-their-development_FINAL.pdf	2025	Fuels Industry
5	CORSIA Eligible Fuels – Life Cycle Assessment Methodology	https://www.icao.int/sites/default/files/environmental-protection/CORSIA/Documents/CORSIA%20Eligible%20Fuels/CORSIA_Supporting_Document_CORSIA-Eligible-Fuels_LCA_Methodology_V7.pdf	2025	Governmental
6	Delivering Sustainable Fuels Pathways to 2035 – IEA	https://iea.blob.core.windows.net/assets/77a8c816-dc61-4668-b501-b1793a3ab2c7/DeliveringSustainableFuels.pdf	2025	Governmental
7	Biomass for Marine 2025 – OGCI	https://www.ogci.com/biomass-for-marine-2025/	2025	Fuels Industry
8	Mapping and Synthesis of International Biomass Supply Assessments – Oak Ridge National Laboratory	https://bioenergykdf.ornl.gov/sites/default/files/2025-02/Mapping-and-Synthesis-of-International-Biomass-Supply-Assessments.pdf	2025	Governmental
9	Is there Enough Biomass to Defossilise the Chemicals and Derived Materials Sector by 2050? – BIC & RCI	https://biconsortium.eu/sites/biconsortium.eu/files/publications/Is%20there%20enough%20biomass%20to%20defossilise%20the%20chemicals%20and%20derived%20materials%20sector%20by%202050.pdf	2025	Chemicals Industry
10	Availability of biomass feedstocks in the EU to meet the 2035 ReFuelEU Aviation SAF target – ICCT	https://theicct.org/publication/low-risk-biomass-feedstocks-eu-refueleu-aug24/?gad_source=1&gad_campaignid=22639629046&gclid=EAIaIQobChMIv87nmpvUkgMVG5lQBh1UjBQ8EAAYASAAEgKLAfD_BwE	2024	NGO
11	Development of outlook to build industrial capacity for drop-in advanced biofuels – EC	https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/development-outlook-necessary-means-build-industrial-capacity-drop-advanced-biofuels-2024-02-07_en	2024	Governmental
12	The European Biomass Puzzle – EEA	https://www.eea.europa.eu/en/analysis/publications/the-european-biomass-puzzle#:~:text=This%20report%20looks%20at%20how%20biomass%20can%20help,the%20use%20of%20biomass%20for%20different%20policy%20objectives.	2023	Governmental
13	Sustainable Biomass Availability in the EU, to 2050 (Parts I & II) – Imperial College Consultants for Concawe	https://www.concawe.eu/wp-content/uploads/Sustainable-Biomass-Availability-in-the-EU-Part-I-and-II-final-version.pdf	2021	Fuels Industry
14	ENSPRESO – EU-28 database of wind, solar and biomass energy potentials – ED-JRC	https://publications.jrc.ec.europa.eu/repository/handle/JRC116900	2019	Governmental
15	Research and innovation perspective of the mid/long-term potential for advanced biofuels in Europe – EC	https://op.europa.eu/en/publication-detail/-/publication/448fdae2-00bc-11e8-b8f5-01aa75ed71a1/language-en	2017	Governmental