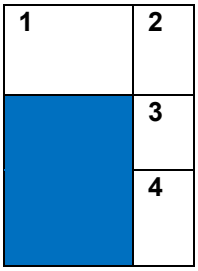
Department for Transport

Supporting the transition to Jet Zero: Creating the UK SAF Mandate

Government response to the second consultation on the SAF Mandate

April 2024

Cover images



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Foreword from the Secretary of State for Transport: We are committed to using sustainable aviation fuel to decarbonise aviation

This Government is committed to delivering net zero and will support the technology that will tackle climate change while avoiding putting burdens on working people.

Reducing transport emissions has been important to the UK's achievement of halving its emissions between 1990 and 2022[1], the first major economy to do so. But I recognise that more needs to be done to decarbonise hard to abate sectors like aviation. In 2022, we published our Jet Zero Strategy, setting out how the UK will achieve net zero emissions from aviation by 2050. The Jet Zero Strategy identifies sustainable aviation fuel (SAF) as one of the key technologies required to reach net zero: it achieves a 70% greenhouse gas emission (GHG) saving, on average, when replacing fossil kerosene.

In July 2022, the government announced it would introduce a SAF Mandate from 2025, requiring at least 10% of UK aviation fuel to be from sustainable sources by 2030. The

[1] https://assets.publishing.service.gov.uk/media/65c0d15863a23d0013c821e9/2022-final-greenhouse-gas-emissions-statistical-release.pdf

Mandate will drive UK demand for SAF, securing carbon savings and providing investor confidence. The final SAF Mandate scheme represents one of the most ambitious frameworks to drive SAF demand in the world, delivering a reduction in UK aviation carbon emissions of 2.7 MtCO2e in 2030 and 6.3 MtCO2e in 2040. The Mandate will incentivise the production of SAF in the UK, and we are now consulting on a complementary Revenue Certainty Mechanism, as committed to in the 2023 Energy Act.

The Mandate is adopting world-leading sustainability standards and incentivises production from wastes and advanced SAF which avoid issues including deforestation, reduction in biodiversity and competition with food production. We will support SAF production that harnesses feedstocks including black bin bag waste, carbon captured from the air and from industrial processes, and agriculture and forestry wastes. SAF produced from crops is not currently eligible for support under the scheme.

We have seen major progress in the global transition to SAF. In November 2023, the UK took a leading role at the International Civil Aviation Organisation's Third Conference on Aviation Alternative Fuels (CAAF/3), securing a global agreement to reduce emissions from aviation fuel by 5% by 2030. This is a major step forward, but we recognise that we must go further.

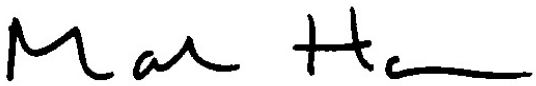
The aviation sector's speed of progress continues to amaze. I was proud to be on board the first transatlantic flight on a commercial airliner powered completely by SAF in November 2023, operated by Virgin Atlantic. The flight which resulted from a UK government competition was testament to what can be achieved when government and industry come together to push the boundaries of what is possible. It demonstrated that SAF can be used today to reduce emissions, proving that a sustainable future for aviation lies within our grasp.

I am committed to supporting the industry and making sure that together we can both decarbonise transport and enable passengers to keep flying when and where they want. There are those that think you should deal with sustainability by reducing people's ability to fly – that is not the view of this government. As we demonstrate through our Jet Zero Strategy, we can achieve net zero by focussing on new fuels and technologies, and SAF is the most immediate solution we have for cutting emissions.

Thank you to the Jet Zero Council and the many other voices from the public, industry, civil society, and academia who have supported the development of the Mandate by providing evidence and feedback.

Rt Hon Mark Harper MP

Secretary of State for Transport



Executive summary

Our vision

The 2021 *Net Zero Strategy* set the country on an ambitious path to net zero by 2050. In the same year, the *Transport Decarbonisation Plan* set out how the government intends to decarbonise the transport sector, the largest greenhouse gas (GHG) emitting sector. In 2022, the *Jet Zero Strategy*, set out our plan for achieving net zero aviation by 2050. It was a product of close collaboration between government and industry focussed on rapid development of technologies, maintaining the benefits of air travel and seizing the opportunities that decarbonisation provides the UK. The strategy identified six key measures to achieve net zero, of which SAF is one.

The government's vision is for the UK to be a global leader in the development, production and use of SAF. The UK's SAF programme is already one of the most comprehensive in the world. In the 2023 consultation on the SAF Mandate, we set out the three pillars of our SAF programme;

1. drive demand for SAF in the UK;
2. kickstart a UK SAF industry; and
3. work in partnership with industry and investors to build long term supply.

The Mandate will help realise this vision and support our SAF programme by providing a long-term incentive to supply SAF through a guaranteed level of demand. It will also provide an incentive and clear signal to investors to develop SAF production facilities and more advanced SAF technologies in the UK and globally.

The primary objective of the Mandate is to deliver GHG emissions reductions contributing to our 2050 net zero target and in line with the 2022 Jet Zero Strategy. The policy set out in this document is forecast to reduce aviation emissions by 2.7 MtCO2e[2] in 2030 and 6.3 MtCO2e in 2040[3].

[2] Carbon dioxide equivalent (CO2e) is a measurement of the total amount of greenhouse gas emissions expressed in terms of the equivalent measurement of carbon dioxide.

[3] Under international GHG inventory guidelines and GHG accounting rules consistent with whole economy reporting on net zero, SAF is reported as delivering 100% direct CO2e emissions savings for the aviation

The Mandate will also bring broader benefits alongside the reduction of GHG emissions. It creates an opportunity for a new UK industry that can provide green growth and jobs. It is also an opportunity to highlight the UK's ambition through the setting of targets and through providing support to those novel SAF production methods with the greatest potential to reduce emissions.

This document sets out how the mandate will deliver this vision and objectives through the design of its key parameters. In setting the parameters, we have aimed to set an ambitious framework that sets clear signals to drive investment but also reflects the realities of the current state of the market. This includes balancing competing objectives such as the need to decarbonise the aviation sector – in a way that does not cause adverse cost or competitiveness implications for the aviation industry – as well as other sectors, such as the road fuels market.

The SAF Mandate will deliver carbon savings by setting annual targets on fuel suppliers to blend in a proportion of SAF into their fuel supply. It will operate as a tradeable certificate scheme where the supply of SAF is rewarded in proportion to its GHG emissions reductions. These certificates can be used to discharge a supplier's obligation or be sold to other suppliers. In order to be eligible for certificates, SAF must meet strict sustainability criteria, including that it must be a residual (i.e. non-recyclable) waste or residue derived biofuel, recycled carbon fuel (RCF), low carbon hydrogen or power to liquid (PtL) fuel. We confirm each of these design elements in more detail below.

Targets, buy-out prices, and review points

We are now building on our previous commitment to achieve at least 10% SAF in the UK aviation fuel mix by 2030 by setting targets for 15 years, that is, from 2025 to 2040. This will provide certainty to SAF producers and investors and demonstrates the UK's world-leading commitment to SAF uptake.

We have set ambitious but deliverable targets. In 2025, the overall SAF trajectory will be set at 2% of the total fossil jet fuel supplied, which is approximately equal to 230,000 tonnes of SAF. This will increase annually to 10% in 2030 and 22% in 2040. These targets ensure alignment with the trajectory for SAF set out in the high ambition scenario in the *Jet Zero Strategy*.

A successful and resilient SAF industry will need a range of technologies and feedstocks to meet increasing demand. We will therefore create space for more advanced fuels by setting a cap on hydroprocessed esters and fatty acids (HEFA)[4] that becomes more stringent over time, starting at allowing HEFA to contribute a maximum amount (100%) of SAF demand in 2025 and 2026, decreasing to 71% in 2030 and 35% in 2040.

We recognise that HEFA will play an important role in the global SAF sector and in the UK given it is the only SAF commercially available right now. We welcome the current investments that have been made here in the UK to produce HEFA SAF and have

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sector. The emissions associated with the production of the SAF are captured in other sectors. Here, as in the Jet Zero Strategy, we have presented the life cycle emission savings delivered by SAF in absolute tonnes of CO2e assuming SAF achieves 70% reduction in emissions relative to fossil kerosene on average.

[4] The cap will be placed on SAF production using segregated oils and fats as a feedstock, rather than the HEFA production pathway. Please see question 19 for further information.

provided support to this SAF under the Renewable Transport Fuel Obligation (RTFO). We cannot rely on this technology alone given the feedstocks they use are finite but welcome the continued development of this industry in the UK alongside the more advanced technologies. There is no cap on the amount of HEFA that can be produced in the UK and the HEFA cap on suppliers seeking support under the Mandate will still allow around one million tonnes of HEFA derived SAF to be supplied in the UK each year from 2035.

In recognition of the need to accelerate the development of power-to liquid fuels, which have reduced risk of feedstock competition and other negative environmental impacts, a power-to-liquid (PtL) obligation will be introduced from 2028 at 0.2% of total jet fuel demand. This will reach 3.5% of total jet fuel demand in 2040; should market conditions allow, we will seek to increase this level when the policy is reviewed.

A buy-out mechanism will be included for both the main obligation and the PtL obligation, which will provide a method of compliance where suppliers are unable to secure a supply of SAF. The buy-out prices will be set at the equivalent of £4.70 and £5.00 per litre for the main and PtL obligations, respectively. These buy-out prices represent a significant incentive to supply SAF into the UK market. They are set at a level to encourage the supply of SAF over the use of the buy-out and sets a maximum cost for the scheme, thereby delivering GHG emissions reductions at an acceptable cost.

We recognise SAF may be more expensive than traditional jet fuel, and that any costs of decarbonising should be borne by those who produce the emissions. We do not, however, expect this to have a large impact on costs for airline passengers. Providing sufficient SAF is available, increases in average air fares will fall within the range of annual variations in average air fares seen historically.

In a scenario where there is a shortage of available SAF leading to significant unexpected increases in its price, and potential buyout, there could theoretically be more significant increases in consumer costs. In order to prevent this, the government would immediately review the Mandate. Government could alter key parameters to ensure price rises do not happen, and consumers are not adversely affected. The final position on the Mandate set out in this document is specifically designed to drive decarbonisation at an acceptable cost.

We will monitor developments in SAF technologies and feedstocks and, noting developments in the EU, keep under review whether we need to broaden the list of eligible fuel types and feedstocks. As electrification scales up in the road transport sector more feedstocks will be available that could be used for SAF. Building on the forthcoming LCF Strategy we will consider the role they might play in SAF. Given the potential benefits, we will shortly consult on the use of cover crops, taking into consideration competing demand across other sectors and food production, environmental and economic impacts.

To ensure the design of the SAF Mandate reflects the latest technological and commercial developments of SAF, there will be continuous monitoring of trends and formal reviews conducted and published at least every five years, with the first review carried out by 2030. Reviews will take into account the need to continue to align with wider government policy and strategies including the Net Zero Strategy, Jet Zero Strategy and the Biomass Strategy. They will be an opportunity to keep pace should the market to develop quicker than expected. Any proposed changes will be subject to consultation and will consider implications for the RTFO, given the desire from stakeholders to maintain consistent rules on sustainability, fuel

eligibility and how the schemes operate. We will continue to use the Jet Zero Council forum for stakeholder engagement, feedback and discussion.

Eligible fuels and sustainability criteria

The government has always been clear that the SAF Mandate must deliver fuels with the highest sustainability credentials. We are therefore imposing strict sustainability criteria that SAF must meet in order to be eligible under the Mandate:

- SAF must be made from sustainable, non-recyclable wastes or residues (e.g. used cooking oil or forestry residues), recycled carbon fuels (RCFs) (e.g. unrecyclable plastics), PtL fuels made using low carbon (renewable or nuclear) electricity. SAF produced from food, feed or energy crops is not currently eligible for support under the scheme. We will monitor developments in SAF technologies and feedstocks and keep under review broadening the list of eligible fuel types and feedstocks, for example, to include sustainable crops and cover crops;
- SAF must meet the relevant technical specification (e.g. Jet A1) for aviation turbine fuel (avtur), aviation gasoline (avgas) or hydrogen;
- SAF must achieve a minimum GHG emissions reductions of 40% with our intention to increase this minimum threshold in future years of the Mandate;
- PtL fuels will be subject to additionality criteria for energy use to ensure they deliver genuine GHG emissions reductions;
- where hydrogen is used as a fuel precursor or is the final fuel, it must be biohydrogen derived from residual wastes or residues, RCF hydrogen or hydrogen derived from low carbon (renewable or nuclear) energy; and
- hydrogen used in hydroprocessing will be considered a process input and will not be subject to the hydrogen eligibility criteria - its use must, however, be accounted for in the carbon emissions of the final fuel.

Meeting the obligation with tradeable certificates

Certificates will be issued to jet fuel suppliers for the supply of SAF in proportion to GHG emissions reductions delivered. This will therefore provide greater support for SAF with the best GHG emissions reductions and act as an incentive to invest in low carbon processes and technologies. The SAF mandate will include a certificate trading scheme to ensure it can be met cost effectively.

Any fossil avtur or SAF that does not meet the technical and sustainability standards of the UK aviation market will incur two obligations – the main obligation and the PtL obligation – determined on the basis of energy supplied. At the end of each annual obligation period, each individual supplier will be required to discharge their obligation by redeeming certificates equivalent to the amount of SAF needed to meet their obligation (or target). There will be three types of certificates – PtL certificates, standard certificates and HEFA certificates – to identify which fuels are eligible for the obligations or subject to the HEFA cap. This means that those suppliers that invest in SAF and supply beyond their obligation level can sell their excess certificates to those that have a shortfall.

Further details how the obligation is determined and how the supply of SAF will be rewarded is found in Section 4.

Administering the scheme

It is very important that the SAF Mandate is administered in a manner that is consistent and straightforward to fuel suppliers. Therefore, the administration of the Mandate will align with the RTFO where possible given fuel suppliers are also subject to obligations to supply low carbon fuels under that scheme. This includes appointing the Secretary of State as the Administrator, with responsibility delegated to a Department for Transport (DfT) administration unit. Other design features that follow current practice under the RTFO include operating the same obligation period, following the same process for reporting information and submitting claims for certificates and allowing certificates to fulfil up to 25% of an obligation in the following year.

Enforcement

Achieving reductions in GHG emissions through the Mandate is dependent on the government's ability to robustly enforce it; however, this must be implemented in a fair and transparent manner.

To ensure all relevant parties are compliant with the requirements of the Mandate and that the system is not undermined, the Administrator will have the right to apply proportionate sanctions. The department has a long history of working with obligated parties and carrying out compliance checks to ensure that any problems are addressed before further enforcement is required. However, if necessary, the Administrator will revoke certificates or issue civil penalties.

Interactions with other domestic and international policy

It is critical that the Mandate operates effectively alongside existing and future policy. To ensure that a level playing field is maintained for suppliers across domestic schemes, we will align the SAF Mandate eligibility rules for fuels that have been in receipt of other incentives with those in the RTFO as much as possible. Our policy will operate alongside the UK Emissions Trading Scheme (ETS), so that airlines can continue to make emissions reduction claims under the UK ETS for eligible SAF.

We recognise that there are a number of policy changes that will affect airlines in a similar timeframe to the Mandate, including from the UK ETS, when free allowances are withdrawn in 2026. We are mindful of the combined impact on the UK domestic aviation sector and are particularly conscious of the importance of air connectivity to communities in isolated areas with few other viable means of transport. We will continue to work with industry to ensure there is appropriate provision for routes that are in danger of being lost, thus maintaining vital connectivity across the United Kingdom.

We recognise that SAF is a global market and have considered international policy when making the decisions contained in this document. This includes the EU mandate, the US SAF production incentive scheme and the decisions, guidance and policies of the International Civil Aviation Organization (ICAO), particularly its Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). We will continue to play a leading role internationally, including working closely with policymakers in other states, to ensure that our policy works effectively to support global decarbonisation.

The SAF Mandate in numbers

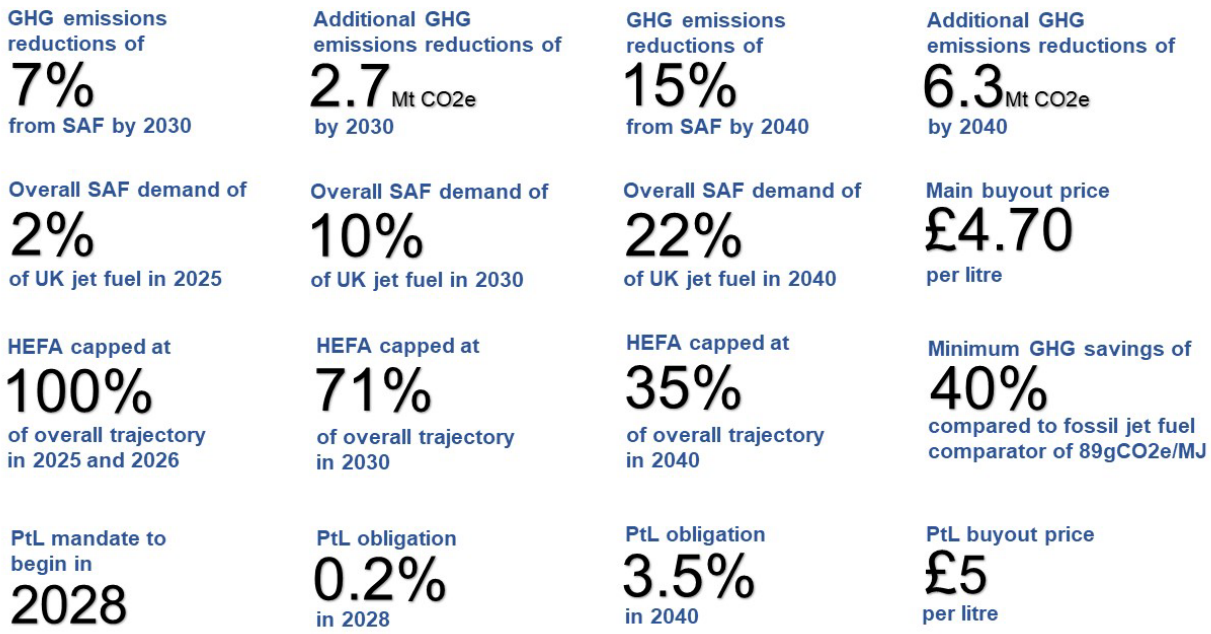


Figure 1 The SAF Mandate in numbers

Introduction

SAF is a key part of the UK's aviation decarbonisation strategy

The role of SAF in achieving net zero aviation

The air transport and aerospace sectors contribute significantly to the UK economy, directly employing around 230,000 people[5] and contributing around £20 billion to GDP[6]. Aviation provides essential domestic and international connectivity for people and businesses and plays a key role in supporting trade and investment. The success of the aviation sector means that, while other sectors decarbonise as part of the UK's journey towards net zero emissions by 2050, GHG emissions from aviation will represent an increasing share of total UK emissions. Without a reduction in emissions from aviation, the UK is unlikely to meet its upcoming carbon budgets. There is therefore an urgent need to decarbonise this sector.

To address these challenges, the Jet Zero Strategy was published in July 2022[7]. This set out our plan for achieving net zero aviation by 2050 through five key policy measures - system efficiencies, sustainable aviation fuels, zero emission flight, markets and removals, and influencing consumers – plus a sixth key policy measure addressing the non-CO2 impacts of aviation. Central to the Strategy is the UK's commitment to global leadership in the development, production, and use of SAF. The High Ambition scenario in the strategy outlined that 50% uptake of SAF by 2050 would deliver 9 MtCO2e savings per annum by 2050, as well as potentially additional non-CO2 emissions improvements.

SAF can bring both environmental and economic benefits

SAF can be derived from a wide range of sources which achieve carbon savings relative to fossil fuel in different ways:

- where biomass is used to produce biofuels, carbon absorbed from the atmosphere during the lifecycle of the biomass is equal to that emitted upon fuel combustion. The biomass is then replaced with new biomass, which absorbs carbon and starts the cycle again. This achieves emissions savings compared to fossil fuel which

[5] DfT analysis of Office for National Statistics (ONS) Business Register and Employment Survey data
[6] DfT analysis of ONS low-level aggregates of UK output gross value added (GVA).
[7] https://www.gov.uk/government/publications/jet-zero-strategy-delivering-net-zero-aviation-by-2050

permanently release carbon into the atmosphere that would otherwise be locked in the ground. Feedstocks include used cooking oil and agricultural residues;

- where fossils wastes are used to produce recycled carbon fuels (RCFs), such as residual municipal solid waste or industrial waste gases, carbon savings are achieved when it is more efficient to process these into fuels instead of disposing or treating them via conventional means such as energy from waste. Feedstocks include unrecyclable plastic and industrial flue gas; and
- where hydrogen is combined with non-biomass CO2 using low carbon (renewable or nuclear) power to produce power-to-liquid fuels (PtL), emissions savings are achieved through utilising carbon that would otherwise be emitted to, or is already in, the atmosphere.

SAF may also have the potential to reduce non-CO2 impacts of aviation, including contrails, by reducing particulate emissions. Studies indicate that non-CO2 emissions account for over half of climate impacts from aviation [8], however, there continues to be significant uncertainties around the magnitude of non-CO2 impacts on climate. The government is therefore providing funding to undertake further R&D in this area to better develop our understanding of aviation's non-CO2 impacts and to identify and develop potential mitigating options.

Alongside the emissions reducing potential of SAF, there are significant economic benefits associated with the development of a domestic SAF industry. Industry research estimates that such development could generate 60,000 new jobs by 2050, adding £10bn gross value add per annum[9]. The SAF plants that are currently in development are located across regions that will benefit most from industrial regeneration. Moreover, the development of domestic SAF production capacity will reduce the risk of dependence on other nations for our fuel supply, especially if it utilises a range of SAF feedstocks and production techniques.

SAF therefore provides a means of delivering cost-effective emissions reductions for a hard to decarbonise sector while driving UK industry, creating green jobs, and supporting greater fuel resilience. As a result, the UK government recognises the importance of SAF uptake and this has formed a central part of the UK aviation decarbonisation strategy.

Low Carbon Fuels Strategy

DfT's forthcoming Low Carbon Fuel Strategy, which is due to be published in Spring 2024, aims to set a vision for the deployment of low carbon fuel (LCF) across transport modes, including aviation, in the period up to 2050 to support further investments in the sector. It will help build on the UK's success as an international leader in LCF and ensure the benefits their use offers are fully harnessed.

LCF plays an integral part in our efforts to reduce greenhouse gas (GHG) emissions from the transport sector, support green growth and enhance fuel security by providing a flexible alternative to fossil fuels. To date the majority of LCF supplied in the UK has been through the Renewable Transport Fuel Obligation (RTFO), primarily for the use in road vehicles. In

[8] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813342/non-CO2-effects-report.pdf

[9] https://www.sustainableaviation.co.uk/wp-content/uploads/2023/04/SA9572_2023CO2RoadMap_Brochure_v4.pdf

the medium to long term LCF will need to increasingly be prioritised across transport modes, especially where there are limited alternatives to liquid and gaseous fuels such as aviation and maritime.

Biomass Strategy

The Biomass Strategy[10], published in August 2023, set out the role biomass can play in reaching net zero, what government is doing to enable that objective and where further action is needed. The strategy recognises that sustainable biomass is a limited resource and future availability to the UK is uncertain, and its use should be prioritised where it offers the greatest environmental, economic, and social benefits.

The Strategy identifies that LCF made from biomass will play an important role in transport decarbonisation such as aviation where limited alternatives to the use of liquid fuels exist. The Strategy provides an assessment on the amounts of sustainable biomass that could be used in the UK. The assumptions underpinning the Strategy have informed the analysis for the SAF Mandate.

Delivering additional carbon savings

The main monetised benefits of the SAF Mandate are the GHG savings associated with switching from kerosene to SAF. However, a key assumption underpinning this calculation relates to the extent to which reductions in aviation sector emissions resulting from the use of SAF represent a net reduction in emissions across the UK.

We would expect the Mandate to lead other UK ETS participants to increase their demand for UK ETS allowances relative to the counterfactual, as emission reduction options become less cost-effective under a lower carbon price. This suggests that other UK ETS participants will reduce their own emission reduction activities. Based on this causal link it can be argued that reductions in emissions from flights in scope of the UK ETS will not lead to a change in total UK economy emissions, unless the ETS cap is tightened in parallel, due to what is called the ‘waterbed effect’. This describes how, in the context of a cap-and-trade scheme for emissions (like the UK ETS), where the cap remains fixed, any reductions in emissions by one participant leads to offsetting increases in emissions by other participants, with the overall impact that net emissions remain at the level of the cap.

There remains a chance that the direct impact of the Mandate on aviation emissions is partially offset by the indirect impact on emissions amongst some participants of the UK ETS scheme. This particularly applies for periods in which the UK ETS cap is already set (up to 2030).

[10] https://www.gov.uk/government/publications/biomass-strategy

Supporting the development, production and use of SAF in the UK

The UK government has a world-leading programme of support for SAF based on three pillars:

- **Creating secure and growing demand** for SAF in the UK through the introduction of the SAF Mandate;
- **Kickstarting a UK SAF industry**: through providing £171m of grant funding to support the development of advanced fuels since 2014, including £135m in support to domestic SAF projects to support our ambition to see five UK plants under construction by 2025; and
- **working in partnership with industry and investors to build the long-term conditions** for SAF supply in the UK: through understanding barriers to investment and actions to overcome these, including committing to introduce a revenue certainty mechanism by the end of 2026.

Updates since the consultation

Since the consultation was published, we have continued to progress our SAF programme.

To create the longer-term conditions to support the development of a UK SAF industry, in September 2023, the government committed to introduce a revenue certainty mechanism by the end of 2026. The Energy Act commits the government to consult on options to design and implement such a mechanism by 26 April 2024. The government is working with the SAF industry and aviation sector through the Jet Zero Council and its delivery groups to understand what other measures could be put in place in the interim period while the government consults on the design of a revenue certainty mechanism.

To permit support for RCFs and nuclear derived fuels into renewable transport fuel obligation schemes (such as the RTFO and SAF Mandate), the government tabled an amendment through the Energy Security Bill to amend the Energy Act and allow these fuels to be supported. The bill achieved Royal Assent on 26 October 2023.

In November 2023, the UK government announced a further eight projects to receive grant funding under the Advanced Fuels Fund (AFF). This scheme is now supporting 13 plants with investment of £135m. Through such investment, we are on track to deliver the Jet Zero commitment to have five commercial SAF plants under construction by 2025.

The government has also launched the UK SAF Clearing House, to provide advice, guidance and funding to support the testing and approval of new SAF products, which will help accelerate their path to market.

Most recently, in November 2023, supported by up to £1m of grant funding from the government, Virgin Atlantic operated the first transatlantic flight on a commercial aircraft using 100% SAF. This flight generated important data and learnings to support increased use of SAF in aircraft.

Creating secure and growing demand through the SAF Mandate

There is broad consensus on the need for a SAF mandate to create secure and growing demand for SAF in the UK, throughout the fuels industry, the aviation industry and wider society. The SAF Mandate will obligate fuel suppliers to supply SAF in the UK and therefore will create the necessary demand to incentivise the supply of SAF to the aviation industry. Removing support for SAF from the RTFO will better adhere to the polluter pays principle so that the obligation falls on the jet fuel supply chain rather than the road fuel supply chain. It will also send a clear message to investors regarding the long-term viability of the UK SAF market, thereby encouraging greater levels of investment into domestic production capacity.

Previous consultation and what has been confirmed to date

Between July and September 2021, the government consulted on the creation of a SAF Mandate to drive UK demand for SAF. In July 2022, we published our response to the consultation confirming that the UK government will introduce a SAF Mandate that will take effect on 1 January 2025. After this date, SAF will no longer be eligible for support under the RTFO given it will be incentivised under the SAF mandate. The response also confirmed the headline ambition of the SAF Mandate: by 2030, fuel suppliers will be obligated to ensure that SAF comprises 10% of the UK aviation fuel mix.

The principal mechanisms that make up the SAF Mandate were also confirmed in the government response:

- SAF will be rewarded with tradeable certificates in proportion to the GHG emissions reductions they achieve to promote fuels with cost-effective carbon savings;
- a buy-out price will allow suppliers to comply with the obligation in situations where eligible SAF cannot be supplied and protect consumers from spikes in SAF prices;
- SAF must be made from residual wastes or residues (biomass, RCFs) or low carbon electricity (renewable or nuclear). SAF produced from crops is not currently eligible for support under the scheme;
- SAF must meet strict performance, safety, and sustainability criteria;
- PtL fuels will be promoted via a specific obligation to drive its production; and
- fuel made from HEFA will be capped to incentivise the development of new technologies and diversify the feedstock mix.

The second consultation and government decisions

The second consultation on the SAF Mandate ran between 30 March and 22 June 2023, seeking views on the detailed design of the SAF Mandate across the following policy areas:

- the trajectory to 2030 and beyond, the PtL obligation and the level of the HEFA cap;
- how the scheme provides price support;
- the level of the buy-out price – which determines the maximum potential incentive for supplying SAF and helps drive price support for SAF;
- eligible fuels and sustainability criteria;

- the design of the certificate system including how certificates will be issued, traded and used for compliance;
- the Administrator of the scheme and enforcement;
- who the obligation applies to and how it is discharged; and
- interactions with other domestic and international policy.

This document provides the government's response. We received 104 responses from a range of organisations and individuals concerning the government's proposals. We would like to thank all stakeholders for their time and contribution in responding to the consultation. Since the conclusion of the consultation period, we have carefully considered all responses and evidence provided to each question.

This document provides an overview of the proposals included in the second consultation, a summary of the responses to each question and the government's decision on each of the policy proposals. It is important to emphasise that we consider a broad set of evidence when making decisions that shape the UK SAF Mandate. This includes academic literature, data analysis and modelling, and consideration of domestic and international policy alongside stakeholder input.

Alongside this document, we have published an updated cost-benefit analysis (CBA) that sets out the quantitative analysis and modelling that has underpinned the government decisions. This analysis has been informed by a wide range of sources including; the government's Biomass Strategy, analytical tools commissioned from the Aviation Impact Accelerator team, led by Cambridge University's Whittle Laboratory and the Cambridge Institute for Sustainability Leadership, and evidence submitted by stakeholders during the consultation.

Next steps

The Mandate will be implemented as an affirmative statutory instrument using the powers granted by the Energy Act 2004 – the same primary legislation that allows the RTFO to prescribe an obligation on fuel suppliers. We will undergo the parliamentary process to enter the Mandate into UK legislation in 2024 so that the Mandate can commence from 1 January 2025.

In parallel to drafting the legislation, the Department has been developing the IT system which will function as the principal tool for both the Administrator implementing the requirements of the Mandate as well as suppliers complying with the scheme. The IT system is being developed as an extension to the existing RTFO Operating System (ROS) to simplify compliance with the Mandate for existing users of ROS and those that will be involved with both the RTFO and SAF Mandate. Once developed, the Department will undergo a series of user testing sessions ahead of the Mandate commencing to receive feedback and refine the IT system as needed.

The Department is also developing guidance on the Mandate aimed at all interested parties including obligated jet fuel suppliers, renewable fuel suppliers, verifiers acting on the behalf of suppliers, relevant trade associations and other interested parties. The guidance will set out how obligated suppliers will comply with the upcoming legislation. This will include practical instruction on submitting required information to the Administrator, demonstrating compliance with sustainability criteria, third party assurance and verification processes, and

any other information relevant to the implementation of the Mandate. The Department will share the guidance ahead of the Mandate commencing to provide opportunity for stakeholders to familiarise themselves with it, provide feedback and ask any questions to the Administrator if needed.

We will continue to update stakeholders as each of these elements develop over the course of 2024 through the Jet Zero Council, stakeholder workshops and other engagement activities. In the meantime, should any stakeholders have questions on the design and implementation of the SAF Mandate, they should contact saf@dft.gov.uk.

Responses received

We received 104 responses from a range of organisations and individuals concerning the government's proposals. The following table provides a breakdown of those that provided a response to the consultation.

Stakeholder group	Number of respondents
Airline	9
Airport	4
Campaign groups / environmental NGO	12
Fuel producer or supplier	24
Fuel technology licensor or supplier	7
Public body	2
Individual	18
Nuclear or power industry	5
OEM	4
Trade association	13
Other	6
Total	**104**

Figure 2 Responses Received.

1. Targets and price support for SAF

2025 target and trajectory to 2030

Consultation proposal

In the government response to the first consultation on the SAF Mandate, we confirmed our target of at least 10% SAF in the UK jet fuel mix by 2030. In the second consultation, we presented several possible trajectories to reach this target. Each was a linear trajectory and assumed that the mandated UK SAF mix will be made from a combination of domestically produced and imported SAF.

In the second consultation we noted that setting the 2025 target too high could lead to buy-out, while setting the target too low could lead to difficulties for UK industry scaling up production capacity. We sought views from respondents on which trajectory to 2030 strikes the right balance between having a high ambition and providing demand certainty, whilst avoiding being overambitious and increasing costs without GHG emissions savings through high levels of buyout.

	2025	**2030**
0 – BAU	0.5%	2%
1 - Low	0.5%	10%
2 – Medium	2%	10%
3 - High	4%	10%

Table 1 Target trajectories from 2025 to 2030 as a percentage of UK aviation fuel demand.

Question 1

Which 2025 target option strikes the right balance between ambition and deliverability? Do you have any evidence to support your position?

Summary of responses

Total	Option 1	Option 2	Option 3
57	9	23	6

Figure 3 Question 1 summary of responses.

This question was answered by respondents in an open answer format. Fifty seven responses were received, but most did not provide evidence on a specific trajectory. For the 38 responses that did mention a trajectory, the figures are shown in Figure 3 above.

Most respondents who set out a preferred trajectory agreed that 2% (option 2) should be the Mandate target for 2025. The main reasoning provided for this choice was to align with similar schemes in other regions to avoid any market distortions (in particular with other European countries) and to continue to attract investment into the UK SAF industry. A few respondents also suggested targets which were outside of the options provided or were content with more than one of the proposed trajectories.

Several respondents mentioned the HEFA cap when setting out their proposed option, stating that the level of the HEFA cap will have an impact on the deliverability of targets, particularly in the early years of the Mandate.

A few respondents stated that to meet any of the targets set out in the consultation, the government needs to provide additional revenue support to enable the growth of a UK SAF industry. Additionally, several respondents suggested that the Mandate should contain a mechanism to allow government to quickly alter trajectories if there is an excess supply of SAF compared to demand.

Government response

We have responded to questions one and two together - see government response below.

Question 2

Would you find it acceptable if the trajectory from 2025 to 2030 was set at an ambitious level and this led to high levels of buy-out and increasing costs to consumers?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
49	12	6	31	0

Figure 4 Question 2 summary of responses.

Most respondents stated that they would not find it acceptable if the trajectory from 2025 to 2030 was set at an ambitious level that led to high levels of buy-out and increasing costs. The main reasoning provided for this view was that buy-out does not achieve emissions savings, so a high rate of buy-out simply increases costs with no emissions reduction. Many respondents also felt that a trajectory that is too high, leading to high buy-out and increasing costs, would damage the competitiveness of UK aviation when compared with other similar regions. Several respondents additionally highlighted that the SAF market will still be in the early stages of development during the period of 2025-2030 and suggested that, during this time, targets should be ambitious but not unrealistic, again to avoid high levels of buy-out

and increasing costs to consumers. A small number of respondents also suggested that if the government decided to legislate for an ambitious target that could lead to high levels of buy-out, it would need to communicate this to consumers.

On the other hand, several respondents highlighted that ambitious targets could send the right signals to investors and producers, potentially leading to increased long-term investment in the production of SAF. Others suggested that high ambition in early years could be possible without high levels of buy-out if additional policy/revenue support was available to industry. A small number of respondents noted that in the early years of the Mandate, all the target options set out are quite low and suggested that even in the case of high levels of buy-out, only a small additional cost would be placed on passengers. A small number of respondents proposed that buy-out funds should be reinvested into SAF or other aviation decarbonisation measures.

Government response

The 2025 target and trajectory to 2030 must balance the need to deliver emission reductions by utilising SAF that is readily and commercially available, while also creating the environment for new technologies to develop and start contributing to a more diverse SAF mix that will secure the medium and long-term supply of SAF. It must also recognise the overall constraints on feedstock availability and the demand from other transport modes and other sectors of the economy. The decision on the overall trajectory has therefore been taken alongside the HEFA cap, the PtL obligation and the buy-out prices.

Government decision: in 2025, the obligation will be set at 2% of jet fuel supplied, which is approximately equal to 230,000 tonnes of SAF. Targets will increase linearly on an annual basis to reach 10% in 2030.

This overarching trajectory will be comprised of the main obligation and PtL obligation. The complete set of targets between 2025 and 2030 are shown in Table 2 below.

This ambitious trajectory in the initial years of the Mandate sets the UK on the path to be a global leader in SAF uptake and reaffirms our commitment to at least 10% SAF in 2030; the most ambitious 2030 SAF obligation in the world. This builds on the success of the RTFO, which has already seen 48 million litres[11] of SAF supplied in the UK in 2022 (equivalent to 0.4% of jet fuel supplied), which is over double the volume supplied in 2021. In 2023, this increased to 81 million litres[12]. Based on a continuation of this trend, forecasted global production capacity and the impact of a comprehensive SAF programme in the UK, we are confident that this 2025 target and trajectory to 2030 strike the right balance.

Year	Overall trajectory expressed as percentage of SAF of total jet fuel supply

[11] https://www.gov.uk/government/collections/renewable-fuel-statistics
[12] Based on provisional data.

2025	2.0%
2026	3.6%
2027	5.2%
2028	6.8%
2029	8.4%
2030	10.0%

Table 2 Trajectory of % SAF in total jet fuel supply over time.

Setting increasing targets into the future

The SAF market is currently in its early stages of development. As a result, there is considerable uncertainty in the evidence and data reaching out to 2050. For this reason, the second consultation **proposed to only set out increasing targets in legislation up to 2040.** This does not mean that targets end in 2040 but that they will continue at the 2040 level until they are reviewed and updated. We proposed that targets be kept under continuous assessment and are formally reviewed at least every five years (see section on Mandate review points).

In the consultation we set out three trajectories for the period 2030 to 2040, all starting at 10% SAF uptake in 2030 and increasing at different rates, as well as a business-as-usual trajectory. We also showed the potential level SAF supply could meet if trends continued to 2050. In 2050, the medium trajectory could meet 50% of aviation fuel demand, in line with the Jet Zero Strategy High Ambition scenario.

We noted that if there is insufficient feedstock availability to produce the SAF needed to meet the target, suppliers will need to buy out of their obligations, potentially increasing costs for consumers. Conversely, if targets are set too low, the Mandate will not drive enough demand for SAF or provide a strong enough incentive for suppliers and emission reductions may be lower. This could also lead to the UK failing to secure domestic production facilities if producers decide to locate in countries with stronger incentives. We sought views from respondents on which targets are both ambitious and deliverable.

	2030	**2035**	**2040**
0 – BAU	2%	3%	4%
1 - Low	10%	13%	17%
2 – Medium	10%	15%	22%
3 - High	10%	18%	32%

Table 3 Increasing target trajectories from 2030 to 2040 as a percentage of UK aviation fuel demand.

Question 3

Do you have any comments on the post 2040 proposal to legislate for targets continuing at the 2040 level, with the plan to update these when better data is available?

Summary of responses

This question was posed in an 'open answer' format, with 52 responses received. Of the 52 responses, 42 responses stated whether they agreed or disagreed, with 62% agreeing and 38% disagreeing with the proposal to legislate for targets continuing at the 2040 level until better data is available.

Some of the reasoning provided by respondents who agreed with this proposal included that it is sensible to not set longer-term targets (i.e. beyond 2040) without data to back up these decisions, it is consistent with the RTFO, and the timeframe to 2040 provides sufficient certainty to industry and investors. A small number of respondents suggested that if we decide to go ahead with this proposal, a timeframe for setting the 2050 target should be outlined to provide greater future certainty. Similarly, a small number of respondents suggested that we should make clear in any SAF Mandate guidance that targets will continue after 2040, but will not increase after that date until they are updated. This concern has come from previous misconceptions regarding RTFO targets ending in 2032 when in fact the scheme has targets which remain at the same level post-2032.

Conversely, those who disagreed with the proposal suggested that a 2050 target would provide more certainty to investors and demonstrate the UK's long-term ambition for SAF uptake, even if targets only increased slightly over this period. Several respondents suggested that we should align with similar schemes in other regions, where targets have been set out to 2050. A few respondents argued that a non-increasing target will dampen investment appetite.

Several respondents suggested that whatever option is chosen, producers, suppliers and investors should be given enough time to prepare for future targets.

Government response

One of the main objectives of the Mandate is to provide long-term certainty of SAF demand in the UK. We therefore recognise the importance of ensuring that targets extend far enough into the future to allow all parties, including producers, suppliers, and investors, to plan accordingly. However, we must balance this with uncertainty around the long-term development of the SAF market and the need to use feedstocks in the most effective way across the economy to deliver net zero.

Government decision: we confirm that we will set increasing targets to 2040 with targets beyond 2040 remaining at the same level until they are reviewed, and the legislation is updated.

Our engagement with the finance industry indicates that setting increasing targets up to 2040 provides sufficient certainty to make investment decisions. Beyond 15 years, there is

increased likelihood that targets would not be set at an appropriate level which could lead to unintended consequences such as high levels of buy-out. Our decision to not set increasing targets beyond 2040 therefore reduces the risk of undermining the industry by having to reduce targets, should they prove to be too ambitious in the future. The Jet Zero Strategy already demonstrates the role SAF will play in achieving net zero aviation by 2050. We will monitor the technological and commercial development of the SAF market as part of our review process (see response to questions 15 and 16). This will allow us to update the post-2040 targets as soon as we have sufficient evidence to do so.

Question 4

What increasing trajectory to 2040 do you think strikes the right balance between ambition and deliverability? Do you have any evidence to support your position?

	2030	2035	2040
0 – BAU	2%	3%	4%
1 - Low	10%	13%	17%
2 – Medium	10%	15%	22%
3 – High	10%	18%	32%

Table 4 Increasing target trajectories from 2030 to 2040 as a percentage of UK aviation fuel demand.

Summary of responses

Total	Option 1	Option 2	Option 3	None	Don't know
45	2	3	30	10	5

Figure 5 Question 4 summary of responses.

Of those who responded to this question, most believed that option three, our high trajectory option, strikes the right balance between ambition and deliverability. This trajectory would reach 32% by 2040. The main reasoning provided for this choice, as with the choice of trajectory in question one, was to align with similar schemes in other regions. This would avoid any market distortions or issues with competition (particularly with EU countries) and send a strong signal to the market and drive SAF production.

Many respondents who chose option three also suggested that to meet the targets within this trajectory, additional policy support would be required, particularly revenue support to make UK SAF prices competitive with those in other countries. Similarly, several respondents proposed that, to meet such ambitious Mandate targets, further polices are required that unlock access to feedstocks for SAF production and increase the production of low-carbon electricity.

Several respondents suggested that a linear progression of targets would be preferable to an exponential progression, with the reasoning being that this allows producers to gradually scale up their production to meet demand.

A few respondents again mentioned the impact of the HEFA cap on the availability of SAF when setting out their proposed option, stating that the level will have an impact on the competitiveness of the UK SAF market in comparison with those in other regions.

A small number of respondents suggested that the Mandate should aim for the highest ambition possible to achieve the greatest emissions reductions.

Government response

We have considered the responses to questions four, five and six together - see government response following question six.

Question 5

Do you have an alternative trajectory option you would prefer to see, and do you have evidence to support this?

Summary of responses

This question was asked in an open answer format and received 34 responses. Of these, most suggested that Mandate trajectories should align with, or be higher than, those in other regions to ensure the UK market remains competitive.

Many respondents suggested that a higher trajectory option should be provided, with some proposing that government should have the highest ambition possible and legislate a 2040 target of 100% SAF in jet fuel. It was proposed that within this ambition, only feedstocks with the highest sustainability standards should be allowed. Many responses repeated that a linear trajectory would be preferable to an exponential one as it allows producers appropriate time to ramp up their production capacity gradually.

Several respondents suggested that additional policy support is required to ensure the SAF market is suitably scaled to meet targets post-2030. Some of the options proposed included capital investments, tax credits, revenue certainty mechanisms, and the reinvestment of UK ETS revenues into the SAF sector.

Several respondents raised the HEFA cap as a potential inhibitor of SAF availability to the UK market and suggested that government should be technology neutral if the UK wants to meet its SAF targets.

A small number of respondents proposed that any alternative trajectories would need to be based on sound science and shown to be achievable.

Government response

We have considered the responses to questions four, five and six together - see government response following question six.

Question 6

Would you find it acceptable if the trajectory from 2030 onwards was set at an ambitious level and this led to high levels of buy-out and increasing costs to consumers?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
54	16	6	32	0

Figure 6 Question 6 summary of responses.

Most respondents stated that they would not find it acceptable if the trajectory from 2030 onwards was set at an ambitious level, and this led to high levels of buy-out with increasing costs. Like responses to question two, the main reason provided by these respondents was that high levels of buy-out would represent a policy failure, in that either targets have been set too high and are unachievable or the right policy support has not been provided to allow ambitious targets to be met. Similarly, it was highlighted that buy-out does not achieve emissions reductions, and simply increases costs.

Again, several respondents felt that an overly ambitious trajectory that leads to high buy-out and increasing costs would damage the competitiveness of UK aviation and the UK SAF industry when compared with other regions. A few respondents highlighted that although the SAF market will be more mature than during the 2025-2030 period, it will still be developing in the period from 2040 onwards, and that targets should still be ambitious but not unrealistic, to avoid high levels of buy-out and increasing costs to consumers. A small number of respondents suggested that if the government does legislate for ambitious targets and this leads to high levels of buy-out, they have a responsibility to communicate this to consumers. Similarly, a few respondents suggested that UK airline passengers should not be unfairly burdened with increased costs due to buy-out compared with passengers in other countries.

On the other hand, several respondents highlighted that ambitious targets could send the right signals to investors and producers. This could potentially lead to increased long-term investment in and production of SAF. Others suggested that a high ambition trajectory could be possible without high levels of buy-out if additional policy/revenue support was available to industry. A few respondents also highlighted that since supply should be higher post-2030, the risk of buy-out should also be lower. Due to this assumption, some respondents felt that buy-out should be replaced with penalties in later years of the Mandate.

A few respondents suggested that buy-out funds should be reinvested into SAF or other aviation decarbonisation measures.

Government response to questions on the overarching trajectory

In the Executive Summary, we set out our vision for the UK SAF sector, in which setting ambitious long-term targets is pivotal. However, as noted in response to the question Three, the uncertainties associated with the development of the SAF sector increase over time. This includes technology ramp up, feedstock availability, low carbon energy and hydrogen availability both domestically and worldwide.

Government decision: for the targets from 2030 to 2040, to adopt the medium trajectory consulted on. In 2030, SAF must comprise 10% of UK aviation fuel. This will increase to 15% in 2035 and 22% in 2040. This overarching trajectory will comprise of the main obligation and PtL obligation. The full set of targets are set out in Table 5.

This trajectory will cement the UK as one the leading SAF markets and encourage investment. From 2030 onwards, we expect the production of SAF from second-generation technologies to rapidly increase and the production of PtL to accelerate. The targets set out here, in conjunction with the HEFA cap and PtL obligation, will create the market space for all these technologies to develop. We will deliver the carbon savings necessary to help keep us on track to meet the UK's carbon budgets and net zero, with annual GHG emissions from aviation reducing by 6.3MtCO2e[13] on average by 2040.

The confirmed trajectory provides sufficient flexibility to raise targets in the future should the market and the technology develop more quickly and/or SAF costs come down significantly. The Mandate review process is set out in response to questions 15 and 16.

We recognise that two thirds of respondents to the consultation question preferred a more ambitious trajectory. At the same time, most respondents would not find it acceptable if the targets led to high levels of buy-out. An overly ambitious post-2030 trajectory may lead to high levels of buy-out which would represent a policy failure. This would therefore necessitate the revision of targets downwards, which could undermine confidence within industry.

Year	Overall trajectory expressed as percentage of SAF of total UK jet fuel supply
2030	10.00%
2031	10.75%
2032	11.75%
2033	12.75%
2034	13.75%
2035	15.00%

[13] On a lifecycle basis.

2036	16.40%
2037	17.80%
2038	19.20%
2039	20.60%
2040	22.00%

Table 5 Trajectory of % SAF in total jet fuel supply over time.

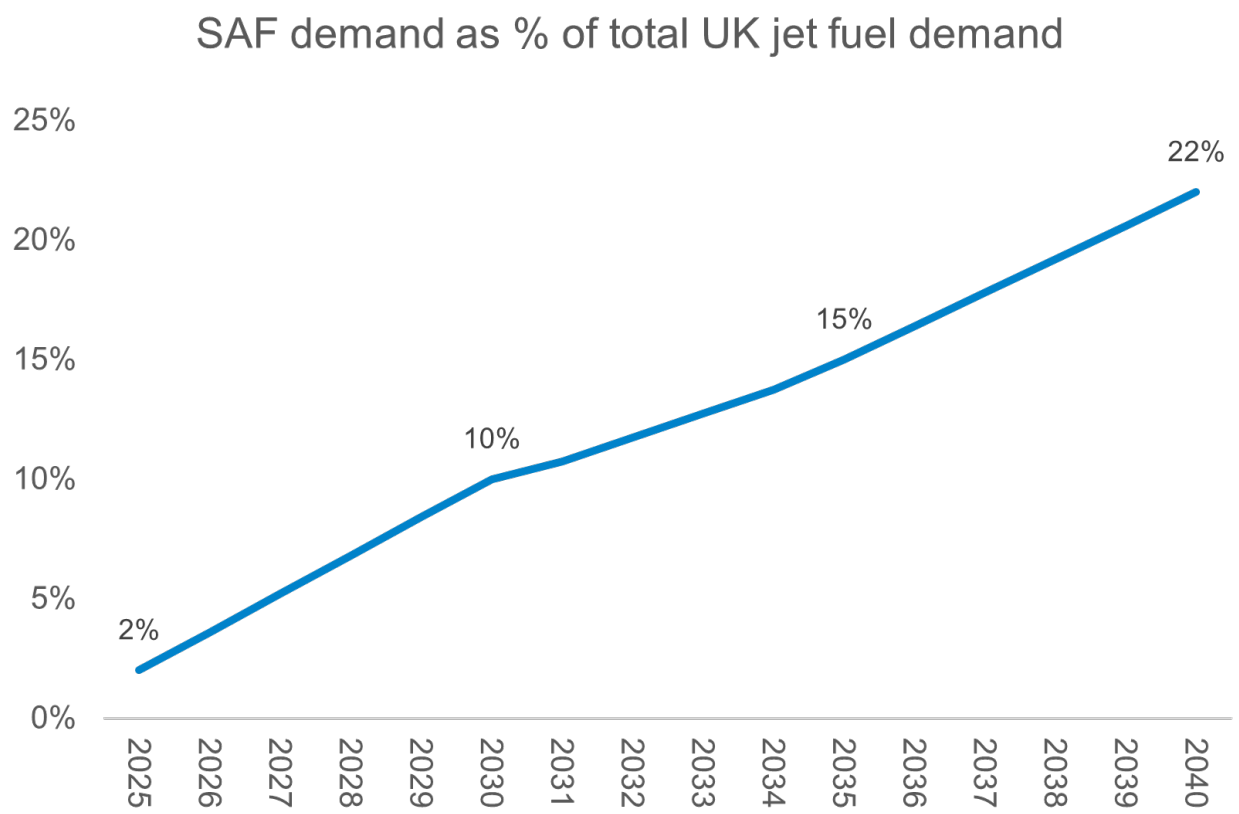


Figure 7 SAF demand as % of total jet fuel demand.

HEFA cap

What is HEFA?

HEFA is the only pathway that is producing on a commercial scale today. It is made from oily feedstocks – the key feedstocks which would be eligible for the SAF Mandate are the waste materials used cooking oil (UCO) and tallow.

The need for a HEFA cap

In the 2022 Mandate government response, we confirmed that we would introduce a cap on the amount of HEFA that would be eligible for incentives under the Mandate. The purpose of a HEFA cap is to create space for the development of new advanced SAF technologies and encourage investment in these. A diverse portfolio of SAF will also help provide a secure supply to meet the Mandate targets.

HEFA will play an important role in decarbonising jet fuel; however, HEFA alone will not fulfil the UK's SAF demand. The HEFA feedstocks that are most relevant for use under the SAF Mandate, in particular UCO, are a finite resource and there are competing demands across the globe from other modes of transport, particularly road fuel use. Going forwards, there will be increasing competition for their use in SAF as other countries' mandates and targets kick-in. New technology pathways will need to be developed that can unlock new feedstocks to supply SAF at scale and help us meet our decarbonisation goals.

The HEFA cap will reduce the risk of diverting used cooking oil and tallow from road transport prematurely. The UK's RTFO relies heavily on these feedstocks – UCO comprised 42% of renewable fuel in 2022 and ~75% of biodiesel[14]. There are limited alternative feedstocks for road biodiesel, so diverting them from the RTFO, could lead to suppliers needing to buy-out from their RTFO obligations. HEFA feedstocks that are not used extensively in road transport are excluded from the cap e.g. tyre pyrolysis oil from advanced conversion technologies.

The cap will also help place the UK as a leader in advanced SAF technologies. All 13 of the projects supported under the Advanced Fuel Fund (AFF) are non-HEFA based and deploy a range of technologies and feedstocks. These include: Fischer-Tropsch/ gasification of municipal black bin bag waste; alcohol-to-jet using industrial waste gases or forestry/ agricultural residues; and power-to-liquid using low carbon hydrogen and CO2 as inputs. The UK will have the advantage of being a first mover on these technologies, harnessing opportunities for green growth and jobs.

Information on how the HEFA cap will be defined under the Mandate can be found in Chapter 3.

Consultation proposal

In the consultation, we presented a range within which the HEFA cap could fall, without a preferred option, due to uncertainty around future feedstock availability and demand for UCO and tallow (from road transport).

[14] https://www.gov.uk/government/statistics/renewable-fuel-statistics-2022-final-report

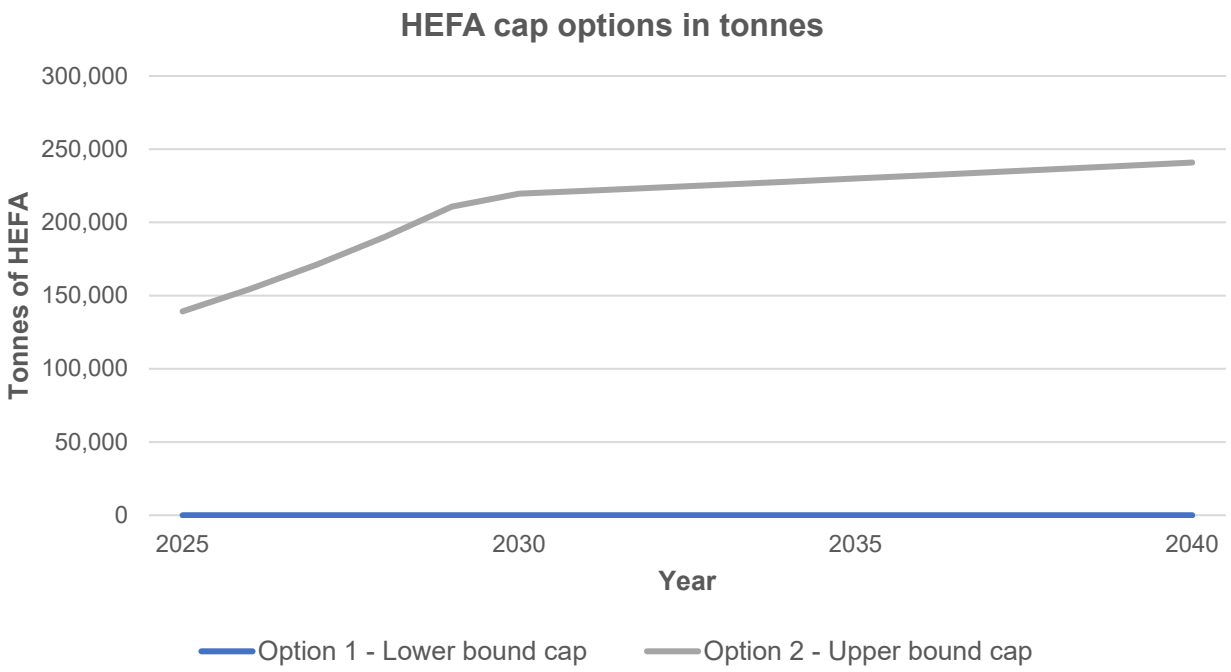


Figure 8 HEFA cap options in tonnes.

The lower bound capped HEFA uptake at 0% of mandated SAF uptake. This would minimise the risk of UCO and tallow being diverted from use under the RTFO, although there would still be competition for these finite feedstocks with schemes in other nations.

The upper bound HEFA cap option was set at the maximum level of HEFA modelled in the Aviation Impact Accelerator (AIA) model scenarios, which calculated the most economic fuel mix each year to meet the proposed mandate level, given the relative cost-effectiveness of the emissions reductions associated with the use of SAF, and constrained by the assumed availability of feedstocks. We sought views from respondents on where within this range the HEFA cap should be set.

Question 7

Do you agree with where we have set our HEFA cap upper and lower bounds (upper bound is highest HEFA uptake modelled under the Mandate, lower bound is no HEFA in the Mandate)? Do you have any evidence to support this?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
36	14	6	15	1

Figure 9 Question 7 summary of responses.

Respondents were evenly split on whether they agreed or disagreed with where the HEFA cap upper and lower bounds were set in the consultation.

Of those that disagreed with the lower band, they largely noted that HEFA is the only commercially viable and cost-effective type of SAF, and that this will be the case until around 2030. A HEFA cap of 0% would significantly limit the ability of suppliers to meet their obligations – either forcing them to supply more expensive low carbon fuels, or if not available, leading them to a high level of buy-out. This would increase prices for consumers without delivering emission reductions, especially if the UK pursued an ambitious target trajectory.

Some respondents disagreed with the lower band based on its deviation from the policy of other regions that are trying to develop SAF industries, particularly the EU. These regions will have greater access to higher volumes of cheaper SAF which may place the UK at a competitive disadvantage. This may also create a situation where UK HEFA SAF suppliers must export HEFA while there is buy-out in the UK. In addition, some pointed towards the impact of EU policy on the diversion of HEFA feedstock away from the RTFO's biofuels.

Many of these respondents felt that the HEFA cap should be set at or near to 100% of the obligation in the early years. Many respondents also suggested that a HEFA cap should be deferred until there is greater availability of second-generation fuels.

Some respondents did not agree with the inclusion of a cap. They suggested that the government should be technology neutral, and that rather than building a cap into the Mandate, they should instead focus on reducing net carbon emissions.

Some of the respondents disagreed with the level of the upper bound. They referenced the impact on road fuels that the SAF Mandate would have if it did not include a HEFA cap. They stated that the use of UCO and animal fats in producing biodiesel represents the most cost-effective and efficient emission reductions, so feedstocks should not be diverted from this until road transport is electrified.

Other respondents that disagreed based with the higher bound level cited the need to allow space for other fuels to develop. They emphasised that the HEFA cap should be used to send a signal to industry that second generation SAF will be critical to delivering net zero. They stated that, a HEFA cap below the higher bound level, combined with the GHG emissions basis of the Mandate, would incentivise the early development of these fuels, which could give the UK a competitive advantage in the long-term.

Some respondents suggested a HEFA cap of 0% due to the high fraud and sustainability risks associated with significant increases in HEFA demand.

Government response

We have responded to questions seven, eight and nine together – see government response following question nine.

Question 8

Do you agree that we should try to limit the diversion of feedstocks from difficult-to-decarbonise road transport modes as much as possible?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
57	24	8	25	0

Figure 10 Question 8 summary of responses.

Respondents were evenly split on whether they agreed or disagreed that we should try to limit the diversion of feedstocks from road transport as much as possible. The main reasons provided for this were that road transport already has clear options for decarbonisation, including electrification, and that aviation is more difficult and expensive to decarbonise. A few respondents proposed that instead of limiting the amount of feedstock aviation can use to avoid diversion from the road sector, the government should instead focus on finding additional pathways to decarbonise the road sector.

It was also suggested that as other countries with similar SAF schemes have not included a HEFA cap in their policies, the HEFA cap will have no real impact on a global scale, and feedstock will continue to be diverted from road by aviation sectors in other countries. Respondents suggested that this would therefore likely influence the UK industry's competitiveness, as other countries will have access to higher volumes of cheaper SAF. For this reason, several respondents proposed that the government should be technology neutral and let the market decide where feedstocks go. Several other respondents suggested that if a HEFA cap is implemented, the government will need to provide additional policy support to the second generation SAF sector to ensure it can compete internationally.

On the other hand, those who agreed that the government should limit the diversion of these feedstocks noted that less energy is required to produce biodiesel from the same feedstocks and that biodiesel achieves better GHG emission reductions than HEFA SAF, meaning that the best use of UCO and tallow for emissions reductions is in road transport applications. Several respondents argued that a HEFA cap will also encourage the development of other SAF pathways, as without a cap the entire main Mandate obligation would be met by HEFA at the lowest cost, but with potential negative environmental and sustainability impacts.

Government response

We have responded to questions seven, eight and nine together – see government response following question 9.

Question 9

At what level do you think a HEFA cap should be set to balance Mandate deliverability with road transport decarbonisation?

Summary of responses

Total	Lower bound	Higher bound	Higher than upper bound	No cap
55	5	5	5	4

Figure 11 Question 9 summary of responses.

This question was asked in an open-answer format and received 55 responses. Many respondents did not specify what level they would like the HEFA cap to be set at, but the breakdown of the 19 respondents who did is shown in Figure 11 above. From the responses shown in Figure 11 and from others who did not specifically state a HEFA cap level, there was generally a preference for a cap close to the upper bound or no cap at all. In particular, several respondents suggested there should be a high cap at least at the beginning of the Mandate. The reasoning provided for this was that HEFA will be the most available form of SAF when the Mandate begins in 2025 and will remain so until other technologies mature and scale. A few respondents proposed that the availability of non-HEFA SAF should inform decisions on the Mandate HEFA cap level. One respondent also commented that high ambition targets and trajectories cannot be met with a mechanism that caps HEFA at low levels.

As with the previous questions on a HEFA cap, a few respondents highlighted that there is no cap on waste based HEFA in similar policies in other regions, which could potentially put the UK industry at a competitive disadvantage and have a negative impact on sector growth. A few of these respondents also suggested that a HEFA cap in the UK and none in surrounding markets would not stop the production of HEFA or the diversion of feedstocks but would simply lead to the exporting of UK produced HEFA SAF to other countries. A small number of respondents suggested that the government should be technology neutral and should allow the market to decide the best use of feedstocks and technologies. Additionally, several respondents again highlighted that road transport has more technology at its disposal to decarbonise than aviation does currently, so feedstocks should instead be prioritised for SAF production.

On the other hand, several respondents proposed that no UCO or tallow should be allowed into the SAF Mandate, and therefore HEFA derived from these feedstocks should be capped at 0%. These respondents argued that UCO has been produced fraudulently in the past, could cause displacement emissions, and that the small amount that is produced in the UK is better used in road transport decarbonisation. It was suggested that the government should focus on a frequent flyer levy or demand management to reduce emissions from aviation.

One respondent suggested that the UK should allow the use of crop feedstocks in the Mandate as long as they do not create indirect land use change (ILUC) concerns.

Government response to questions on the HEFA cap

The government remains committed to a HEFA cap within the Mandate for the reasons set out above. However, we recognise that HEFA is currently the only type of SAF that is commercially available and that HEFA will be needed to help decarbonise jet fuel, especially in the early years of the SAF Mandate.

The decision for the level of the HEFA cap has been taken alongside decisions on overall SAF targets and the level of the buy-out price.

Government decision: the HEFA cap, as proportion of the overall trajectory, will be set at 100% in 2025 and 2026 decreasing to 71% in 2030 and 35% in 2040.

The annual HEFA cap for each year in the period of 2025-2040 is included in Table 6 below. This cap will apply to fuels that are made from segregated oils and fats. Further information on this definition is found in response to question 19.

It is evident that HEFA will play a critical role in the UK SAF sector, particularly during the early years where there is limited production of alternative SAF. We want to avoid placing undue burden on the SAF production industry; we welcome the current investments that have been made here in the UK to produce HEFA SAF and have provided support to this under the RTFO. We cannot rely on this technology alone, given the finite nature of feedstocks such as UCO, but welcome the development of this industry in the UK alongside the more advanced technologies. There is no cap on the amount of HEFA that can be produced in the UK, while the HEFA cap on suppliers seeking support under the Mandate will still allow around 1 million tonnes of HEFA derived SAF to be supplied in the UK from 2035 onwards. This will reduce the risk of buy-out and ensure that the UK aviation sector can continue to operate competitively while still securing emission reductions.

However, for the reasons set out above, it is not feasible to continue a reliance on HEFA if we are to meet the 2030 target and continue to increase ambition thereafter as set out earlier in this section. Technology pathways will need to be developed that can unlock new feedstocks, such as residual municipal solid waste and agricultural residues, to supply SAF at scale. From 2027, the cap will provide a dedicated space in the market for technologies other than HEFA to sell into. This reaffirms the UK's commitment to develop these advanced technologies and will encourage further investment into non-HEFA SAF production. The inclusion of the cap, in combination with supporting 13 projects through to Final Investment Decision with £135m awarded under the Advanced Fuels Fund and the introduction of a Revenue Certainty Mechanism by the end of 2026, will give the UK first mover advantage on these technologies, harnessing opportunities for green growth and jobs and cementing our position as a world-leader of second-generation SAF.

The cap will also help ensure that the biodiesel sector is able to access UCO and tallow. There are limited alternative feedstocks for biodiesel so diversion of these feedstocks from the RTFO could lead to buy-out and increase GHG emissions from road transport should there be insufficient feedstock[15]. It should be noted that there will be competition for UCO and tallow from international schemes including the EU SAF Mandate.

We recognise that there are concerns that increased demand for UCO could lead to increased sustainability and traceability risks. The UK is a world- leader in setting and enforcing strict sustainability requirements and we will continue to do so in the SAF Mandate. We will monitor the situation closely as the SAF Mandate is introduced, with the ability to amend the Mandate at the review points confirmed in response to question 15. Furthermore, we are working closely with voluntary schemes to identify ways that supply chain certification can be improved.

Year	HEFA cap as % of jet fuel demand	HEFA cap as % of overarching SAF trajectory
2025	2.00%	100%

[15] In 2022, UCO comprised 42% of renewable fuel and 75% of biodiesel supplied in the RTFO.

2026	3.60%	100%
2027	4.80%	92%
2028	5.80%	85%
2029	6.60%	79%
2030	7.10%	71%
2031	7.50%	70%
2032	7.60%	65%
2033	7.70%	60%
2034	7.70%	56%
2035	7.80%	52%
2036	7.80%	48%
2037	7.80%	44%
2038	7.80%	41%
2039	7.80%	38%
2040	7.80%	35%

Table 6 HEFA cap as percentage of jet fuel demand and of overarching trajectory over time.

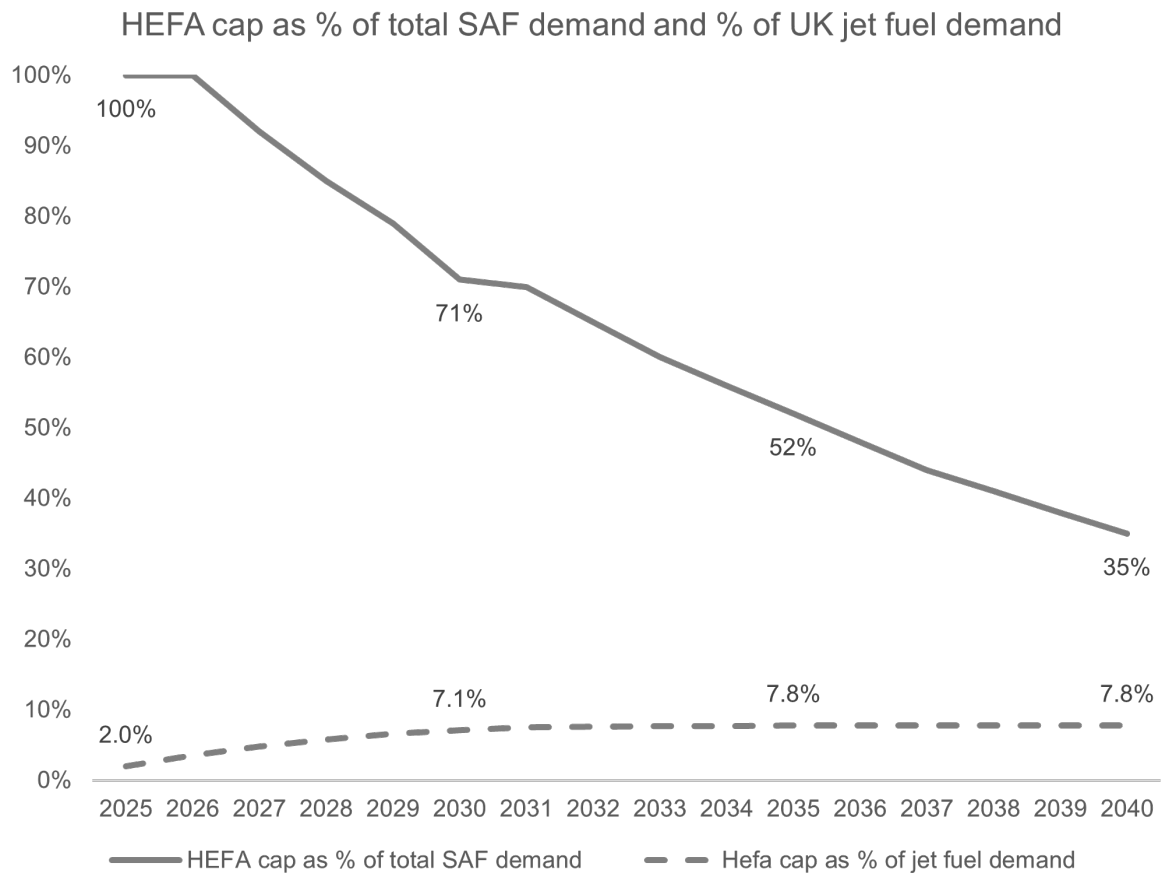


Figure 12 HEFA cap as a percentage of total SAF demand and percentage of UK jet fuel demand over time.

Power-to-liquid (PtL) obligation

In 2022, we confirmed that the Mandate would include an obligation to supply power-to-liquid (PtL) fuels to specifically incentivise the supply of these fuels given their high GHG emissions reduction potential and low risk of environmental impacts including land use change. The PtL obligation will have a separate, higher, buy-out price to account for the higher costs of producing the fuel compared to SAF.

PtL is defined as low carbon avtur for which the energy content of the fuel is derived from renewable (excluding bioenergy) or nuclear energy sources. Further information on this definition can be found in response to question 20.

We consulted on potential trajectory options for a PtL obligation out to 2040. In these options, we noted the balance between the need to provide a high enough incentive for PtL whilst also recognising the likely costs of high ambition.

As PtL production relies on the use of low carbon electricity, low carbon hydrogen and a source of CO2, we also asked respondents to consider the low carbon energy, hydrogen and CO2 requirements PtL production could have, and how the availability of, and access to these could impact on production capacity.

	2025	2030	2035	2040
1- Low	0%	0.05%	0.25%	1.5%
2- Medium	0%	0.10%	0.50%	3 %
3- High	0%	0.20%	1%	6%
4- Very High	0.05%	1%	3%	8%

Table 7 PtL obligation range as a percentage of total jet fuel demand.

Question 10

At what level do you think a PtL mandate should be set to strike the right balance between ambition and deliverability? Do you have any evidence to support your choice, in particular considering low carbon electricity and hydrogen production, as well as carbon capture requirements?

Summary of responses

Total	Medium	High	Very high	Higher than options provided
59	2	12	7	4

Figure 13 Question 10 summary of responses.

This question was asked in an open-answer format and received 59 responses. Many respondents did not specify which level they would like the PtL obligation to be set at, but the breakdown of the 25 respondents who did is shown in Figure 13 above.

Respondents who felt the PtL target should be set at a high, or very high, level, or higher than the options provided, suggested that an ambitious target will send a strong signal to investors that there will be future demand for PtL SAF. They also highlighted the emission reduction potential of PtL alongside the benefit of not requiring biomass feedstocks in their production. Additionally, several of these respondents suggested that we should align with similar schemes in other regions, to ensure our PtL targets are not substantially lower than others.

Many respondents, regardless of their view on the level of the PtL obligation, highlighted that growth is required in the renewable electricity, hydrogen and carbon capture usage and storage (CCUS) sectors before PtL will be available in large quantities. In particular, it was noted that renewable electricity prices in the UK are much higher than in neighbouring regions, which would increase PtL production prices and impact on the competitiveness of any future UK PtL market if not addressed. Several respondents proposed that the government needs to do more work to ensure that there will be suitable capacity to allow aviation to decarbonise alongside the many other sectors who will be competing for renewable energy as the UK aims to reach net zero by 2050. Stemming from these views,

several respondents argued that system level impacts of the proposed PtL targets should be included in our analysis.

A few respondents highlighted that Direct Air Capture (DAC) is not the only carbon source available for the production of PtL, and that other forms such as industrial point source carbon are also available and should be eligible under the Mandate. Additionally, a small number of respondents highlighted the potential role of small modular nuclear reactors within PtL production.

Several respondents suggested that additional policy support is required if PtL supply is to reach the levels needed for UK aviation. Some of the support mentioned included research and development funding for the technology, funding for plants and a 'Contracts for Difference mechanism' for revenue certainty.

Respondents who advocated for slightly lower targets, a slower ramp up of the PtL obligation, or did not know which option to pick, highlighted that PtL technology does not yet exist at scale. Several respondents suggested that setting out a PtL obligation too early, or too high would lead to high levels of buy-out at an even higher cost than for the main target, leading to increased costs and no emissions savings. For this reason, some respondents found it difficult to choose a trajectory option, particularly in the early years of the Mandate, with several suggesting that we keep targets low or have no targets for the first few years.

Respondents who did not agree with a PtL obligation suggested that government should be technology neutral and not try to pick winning technologies. A few of these respondents suggested that PtL will already be incentivised and positively rewarded as the Mandate is a GHG emissions scheme.

Government response

We have responded to questions 10 and 11 together – see government response following question 11.

Question 11

In which year do you think it would be most appropriate for a PtL obligation to start and how quickly do you think ambition should ramp up?

Summary of responses

Total	2025	2026	2027	2028	2030	2032	2035
47	4	4	3	2	20	1	4

Figure 14 Question 11 summary of responses.

This question was asked in an open-answer format and received 47 responses. Some respondents did not specify which year they thought the PtL obligation should start in, but the breakdown of the 38 respondents who did is shown in Figure 14 above. Out of the respondents who did pick a year, most chose 2030, with the main reasoning being that the technology is still in development and is yet to be demonstrated at scale, therefore volumes

may not be available before this point. Several respondents also outlined that a 2030 start date would be in alignment with similar schemes in other regions and urged for the same start date to create harmonisation between policies. Additionally, several respondents suggested that a scale-up of renewable electricity is required before PtL will be available in high quantities, and this will take time to achieve.

A few respondents suggested that the PtL target and its implementation date should be developed in alignment with other government schemes focussed on the availability of CCUS, low carbon hydrogen and low carbon electricity to ensure economy-wide decarbonisation policies are consistent. A small number of other respondents proposed that when targets begin and how quickly they ramp up should be based on an assessment of the readiness of industry and should be reviewed frequently.

Several respondents suggested that if the PtL obligation began in 2030, ambition should ramp up very quickly after this point, with targets increasing rapidly due to expected industry growth in the 2030s. A few respondents also highlighted that this quick ramp-up in targets would be necessary due to the high level of competition for waste feedstocks and current limited alternatives to waste-based SAF.

As with most of the previous questions, several respondents suggested that additional policy support is required to ensure PtL SAF production is feasible in the UK. Some of the options proposed include stacking of incentives such as the hydrogen and industrial carbon capture business models; provision of grant funding; and the use of UK ETS revenues. Additionally, as with previous questions on PtL, a few respondents have suggested that the government should be technology neutral, and therefore a separate PtL target should not be included in the Mandate.

One respondent suggested that rather than having a separate PtL obligation, we should instead include a PtL multiplier which rewards PtL SAF with double credits. It was argued that this would mean the start date of PtL reward would not be an issue because of the lack of a separate obligation and therefore a lack of a need to buy out of this obligation. Another respondent who proposed that the PtL obligation should begin in 2030 suggested that in order to incentivise early adoption of PtL before 2030, we should allow suppliers to generate PtL certificates from 2028 and bank these for use once the PtL obligation starts in 2030.

Government response to questions on the PtL obligation

The government has already set out its commitment to the development of PtL fuels by confirming in the 2022 response to the first consultation that there would be a specific PtL obligation in the Mandate. These fuels can achieve close to 100% GHG emissions reductions on a lifecycle basis and have a low risk of environmental impacts including land use change. Furthermore, the obligation will further diversify the SAF available to meet net zero aviation, deliver the Mandate targets and contribute to a secure supply of SAF. However, there is significant uncertainty around the technological and commercial development of PtL and the demands of low carbon energy across the economy.

Government decision: The PtL obligation will be introduced in 2028 where it will be set at 0.2% of total jet fuel demand. This will increase to 0.5% in 2030 and 3.5% in 2040.

This trajectory will enable a market for these fuels to be established whilst balancing the uncertainty associated with their development.

The overarching trajectory comprises the main obligation and the PtL obligation.

The PtL obligation for each year is presented in Table 8. The fuels that will qualify for PtL certificates is confirmed in response to question 20.

Starting the PtL obligation before 2030 demonstrates the UK's commitment to advanced fuels and reflects its role as a global leader in this area. There is significant investment being directed into this technology globally, including projects in the UK being supported by the government's Advanced Fuels Fund. In Europe, PtL plants are expected to start producing SAF prior to 2030[16]. The UK will be an early mover in mandating PtL fuels compared to other regions and the PtL obligation will set a clear signal for investors. However, recognising the uncertainty around this new technology, we have combined the early start date with a relatively low obligation level to mitigate the risk of buy-out if there is limited PtL SAF available.

Between 2030 and 2040, our confirmed trajectory broadly aligns with the medium option we consulted on. During this timeframe there is less certainty regarding international production capacity as well as the availability of CCUS, low carbon energy and low carbon hydrogen that these plants rely on. However, by showing ambition and establishing a market, we will encourage investment to accelerate the development of PtL and capitalise on the environmental benefits it offers.

We recognise that imported PtL will likely play an important role in meeting our ambitious PtL obligation. Indeed, SAF imported from parts of the world with very low renewable energy costs may offer cost-effective emission reductions and diverse supply sources can help provide a secure supply of SAF.

Year	PtL obligation as % of jet fuel demand
2028	0.20%
2029	0.20%
2030	0.50%
2031	0.50%
2032	0.75%
2033	1.00%
2034	1.25%

[16] https://www.transportenvironment.org/discover/e-fuels-for-planes-with-45-projects-is-the-eu-on-track-to-meet-its-targets/

2035	1.50%
2036	1.90%
2037	2.30%
2038	2.70%
2039	3.10%
2040	3.50%

Table 8 PtL obligation as a percentage of jet fuel demand over time.

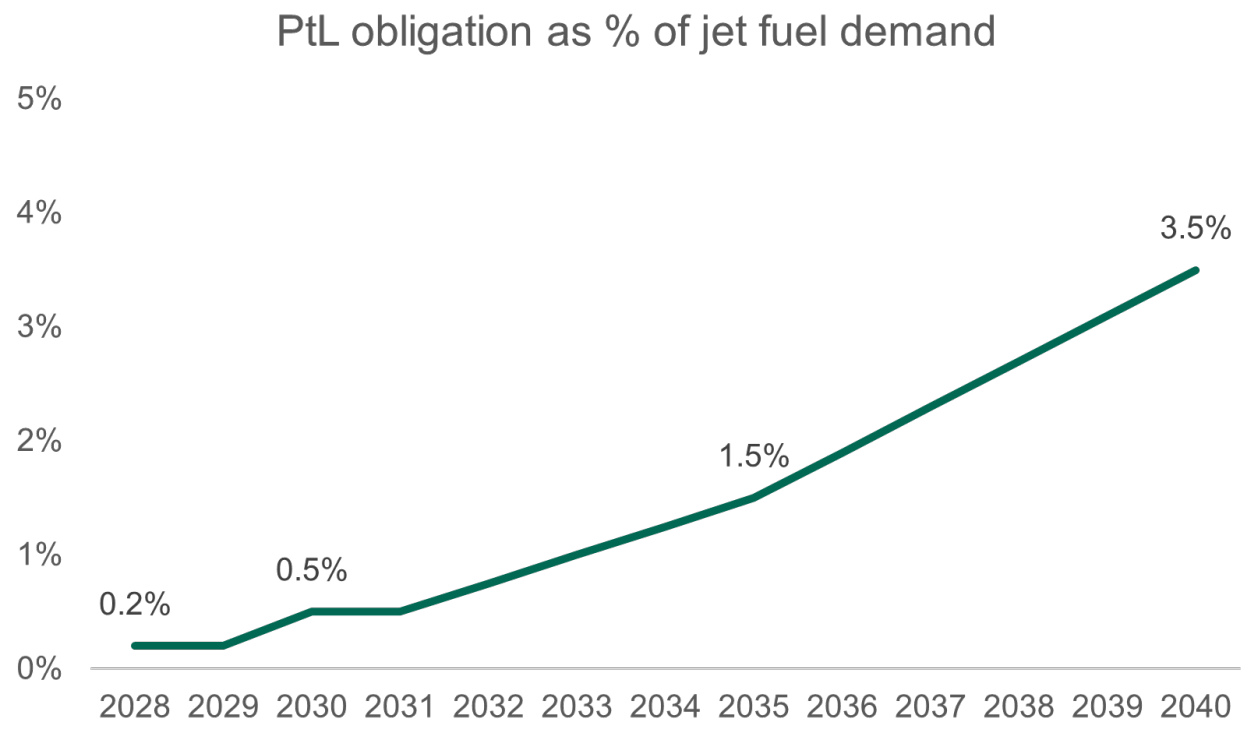
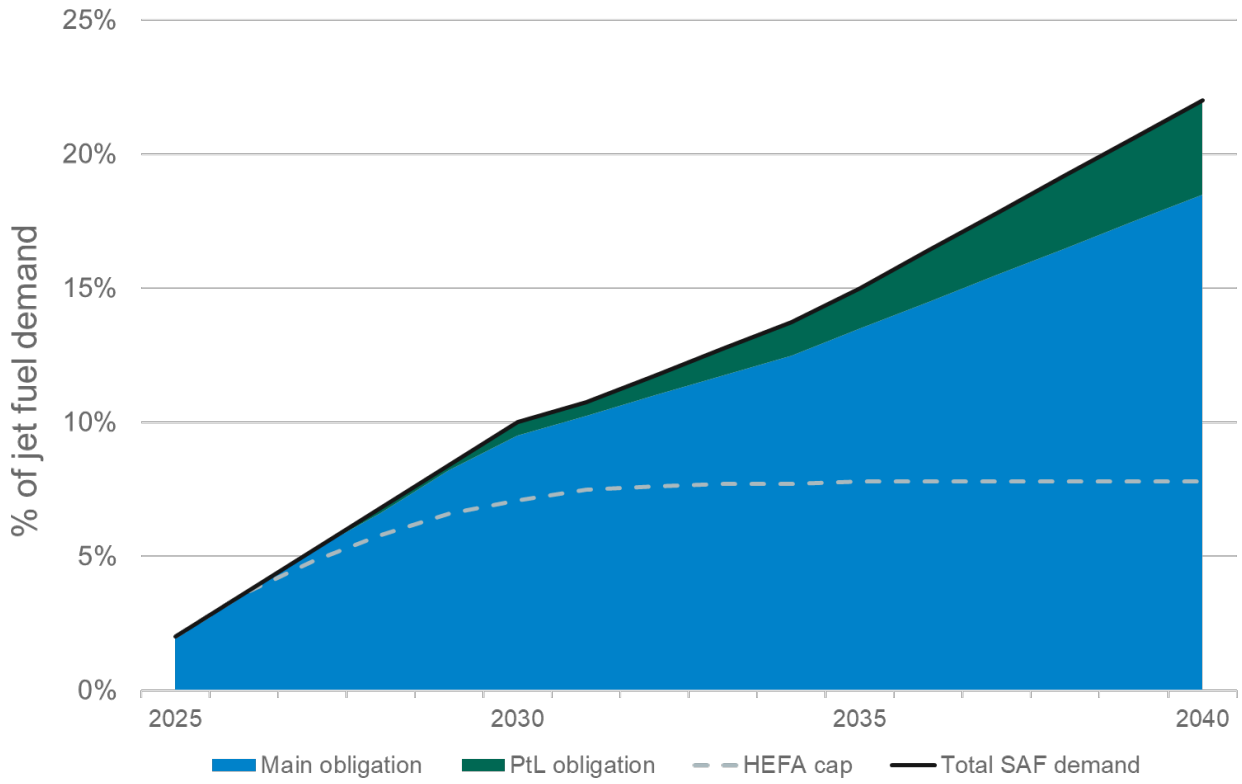


Figure 15 PtL obligation as a percentage of jet fuel demand over time.

Final policy parameters

The chart below illustrates how the main and PtL obligation combine to meet the total SAF demand. We have included select years in the table below to illustrate how each of the main obligation, PtL obligation and HEFA cap interact.



Year	Main obligation	PtL obligation	HEFA cap	Total SAF demand
2025	2%	0%	2%	2%
2030	9.5%	0.5%	7.1%	10%
2035	13.5%	1.5%	7.8%	15%
2040	18.5%	3.5%	7.8%	22%

Figure 16 The main obligation, PtL obligation and HEFA cap expressed a percentage of total jet fuel demand.

Buy-out price

In the government response to our first Mandate consultation, we confirmed that a buy-out mechanism will be included in the UK SAF Mandate. The purpose of a buy-out mechanism is to provide a way for suppliers to discharge their Mandate obligation in cases where they are unable to secure a supply of SAF, preventing excessive costs being passed on to consumers. It is not intended to be a long-term form of compliance given that it does not lead to emission reductions. The buy-out price also effectively sets the maximum price for Mandate certificates, as it is assumed that a supplier will choose to pay the buy-out price rather than supply eligible fuel or purchase certificates at a higher cost.

In the consultation, we set out a range of options for the main buy-out price and PtL buy-out price to seek views from respondents which price would be appropriate. We considered that a low buy-out price would increase the likelihood that suppliers will buy out of their obligations, and therefore the possibility that emission reductions from the scheme would be

reduced, while a high buy-out price would not protect consumers against disproportionately high costs.

Our evidence suggested that the medium buy-out price option of £2 per litre, or £2,567 per tonne, should cover the pessimistic production costs of all SAF types included in the main Mandate and was therefore proposed to be used as the main Mandate buy-out price. Similarly, we proposed that the PtL buy-out price should be set at £2.75 per litre, or £3,525 per tonne. We proposed that these buy-out prices remain in place for the duration of the Mandate, but are kept under continuous review, and will also be formally reviewed every five years.

Option	Explanation	£/tonne	£/litre
Low	RTFO development fuel buy-out price	£2,051	£1.60[17]
Medium	Pessimistic production costs	£2,567	£2.00
High	Pessimistic production costs plus margin	£3,846	£3.00

Table 9 Main buy-out price options considered.

Option	Explanation	£/tonne	£/litre
Low	Medium option proposed for main obligation	£2,567	£2.00
Medium	Pessimistic production costs	£3,525	£2.75
High	Pessimistic production costs plus margin	£5,320	£4.15

Table 10 PtL buy-out price options considered.

Question 12

Do you agree or disagree with the proposed use of the medium buy-out price of £2 per litre or £2,567 per tonne for the main mandate, and do you have any evidence to support your response?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
47	6	20	21	0

Figure 12.1: Question 12 summary of responses.

[17] The buy-out price for development fuels under the RTFO is £0.80 per litre, but as qualifying fuels are rewarded with double certificates, this equates to £1.60 per litre, or £2,051 per tonne in the case of qualifying SAF.

Responses to this question were split with many respondents either disagreeing or not expressing a preference with the use of the medium buy-out price for the main mandate. The main reasoning provided for this was that the price was too low, with many respondents suggesting the high option should be used, and a few proposing we use a price higher than the options provided. Several respondents suggested that a higher price would better support investment in and production of SAF, as the buy-out effectively sets the maximum price for Mandate certificates. Other respondents proposed that the buy-out price should align with the price in similar schemes in other regions, in order to avoid negative impacts on the competitiveness of the UK SAF and aviation industries.

Many respondents suggested that additional revenue support is required for the UK SAF industry and highlighted that it is difficult to make a decision on a buy-out price when there is no clarity on whether this additional support will be provided. Several respondents set out that if there is no additional revenue support, then the buy-out price will need to increase even further to take this into account. A few respondents suggested that a margin is needed, because the pessimistic cost of production is not actually covered by the medium buy-out price.

In terms of what the buy-out price should be based on, or how it should be benchmarked, a few respondents suggested that the buy-out price should not be significantly higher than the cost of production. On the other hand, a similar number of respondents suggested that the buy-out price should be based on evidence from producers and ensure the price is high enough to allow their projects to secure the investment they need (producers/suppliers). One supplier suggested that the RTFO buy-out price should be set at the same level as the Mandate buy-out, to ensure that feedstocks are not taken from the road transport fuel market to produce SAF.

Several respondents suggested that a fixed buy-out price is not ideal in a moving market and that instead the buy-out price should be linked to a credible market index. A few other respondents suggested that the buy-out will need to be kept under review and updated if it is found to be too low or too high.

Several respondents proposed that the Mandate should include legislation to ensure that suppliers cannot pass any additional costs that come from buying out onto airlines, with one of these respondents suggesting that the additional cost could be addressed via free UK ETS allowances. A few respondents suggested that buy-out revenue collected should be reinvested back into SAF through grants or through a revenue support mechanism.

Finally, a small number of respondents proposed that suppliers who buy-out should have to pay the buy-out price as well as making up their obligated shortfall in following years.

Government response

The buy-out price should encourage the supply, and trading, of certificates over the use of buy-out to secure emissions reductions, future-proof against price fluctuations in the fuels market and set a maximum cost of the scheme.

Government decision: the main obligation buy-out price will be set at the equivalent of £5,875 per tonne, or £4.70 per litre. Given that the obligation is determined in energy (see question 40), the buy-out price will be expressed as £0.137 per MJ in legislation.

This buy-out price represents a significant incentive to supply SAF into the UK market. It is high enough to capture a wide range of SAF technologies that are expected to come online in the coming years. It will also allow some margin to accommodate price fluctuations that could arise due to plant performance in the early years of operation. This will help support investor confidence in SAF.

A range of sources of evidence informed this decision. Following the second consultation, DfT commissioned AIA to update the assumptions on the costs, GHG emissions savings, and feedstock demands of SAF types eligible for the SAF Mandate. This work expanded the scope of fuels and technologies for which we had cost data and revealed that some had greater costs than the first commission had identified. DfT has also considered the evidence provided through the consultation responses and data received through the administration of the Advanced Fuels Fund. As a result of this research, the preferred buy-out price set out in the consultation (£2.00 per litre) is no longer considered sufficient to cover the maximum costs of SAF production. It is therefore no longer considered a strong enough incentive to suppliers to produce SAF.

A higher buy-out price works alongside the mid-trajectory and HEFA cap to deliver cost-effective emission reductions. Together, these minimise the risk of widespread buy-out due to over-ambitious targets while a high buy-out price maximises the incentive to suppliers to meet the targets. This strikes the right balance of ambition and deliverability, maximising emissions savings with setting a maximum cost for the scheme, ensuring emission reductions at an acceptable cost.

Question 13

Do you agree or disagree with the proposed use of the medium buy-out price of £2.75 per litre or £3,525 per tonne for the PtL obligation, and do you have any evidence to support your response?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
50	6	15	29	0

Figure 17 Question 13 summary of responses.

Twenty nine of 50 respondents to this question disagreed with the use of the medium buy-out price for the PtL obligation. The main reasoning provided for this was that the price was too low to cover the additional cost of producing PtL SAF and that the high option, or an option higher than those provided should be used instead. As with the main obligation buy-out price, several respondents suggested that a higher price would better support investment in and production of SAF.

A small number of respondents again suggested that the government should be technology neutral and a separate PtL target should not be included in the Mandate. Additionally, two respondents argued that PtL is the least productive use of renewable energy. On the other hand, several respondents recognise the renewable electricity needs of PtL and suggest

that the government needs to focus on the scaling of this renewable electricity capacity to allow for the development of a PtL SAF industry.

The remaining points raised in response to this question align with the responses to the previous question on the main target buy-out price.

Government response

The same principles for setting the buy-out price for the main obligation apply to setting the buy-out price for the PtL obligation. However, PtL is projected to be more costly and there is greater uncertainty around setting the price owing to the lower maturity of this pathway.

Government decision: the PtL obligation buy-out price will be set at the equivalent of £6,250 per tonne, or £5.00 per litre. Given that the obligation is determined in energy (see question 40), the buy-out price will be expressed as £0.145 per MJ in legislation.

As with the main obligation buy-out price, the updated information from AIA and information submitted by stakeholders in response to the second consultation has shown that the costs of producing PtL are greater than first anticipated. The preferred consultation buy-out price of £2.75 per litre would not cover the costs of production and, therefore, would not adequately incentivise suppliers and producers to produce PtL. The higher buy-out price also reflects the need to provide greater incentive to accelerate the development of this technology and bring it to commercial scale in line with the targets.

Question 14

Do you agree or disagree with the proposal that a buy-out mechanism should be a permanent feature of the mandate?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
49	29	10	10	0

Figure 18 Question 14 summary of responses.

Twenty nine of 49 respondents agreed with the proposal for a buy-out mechanism to remain a permanent feature of the Mandate. The main reasoning provided for this choice was that the buy-out provides a safety net for suppliers in the event that there is no or low access to SAF, for example in the case of supply chain issues. A few respondents also highlighted that the option of buy-out has continued to remain available to suppliers within the RTFO and this has been an effective policy since the RTFO started in 2008. A small number of respondents stated that they had no issue with the buy-out mechanism remaining throughout the course of the mandate as long as the price was high enough to encourage supply of SAF.

On the other hand, several respondents suggested that while buy-out will be needed in the early years as supply will be low and the SAF sector will not yet be fully established, there will be no need for a buy-out mechanism in a functioning market as there should be no

reason for suppliers to not supply SAF. A small number of respondents suggested that rather than having a buy-out mechanism, the Mandate should instead issue fines if a supplier does not meet their obligation. A few respondents suggested that not only the price of the buy-out, but also its existence should be subject to periodic review.

Finally, a small number of respondents again suggested that buy-out funds should be redirected back into the SAF industry in the form of grants or contracts for difference schemes.

Government response

The buy-out mechanism ensures that suppliers are able to discharge their obligation in cases where they are unable to secure a supply of SAF. Even as the market develops and more SAF becomes available, there is still the chance that unexpected spikes in the SAF market price will occur, or that unforeseen supply chain issues or feedstock shortages may arise in later years. We therefore view the buy-out as an effective safeguard by setting a maximum cost of the Mandate should such an exceptional circumstance occur.

Government decision: the buy-out mechanism will be a permanent feature of the SAF Mandate.

For the mechanism to remain effective, the buy-out price must be set at an appropriate level (see the responses to Questions 12 and 13), to prevent suppliers using buy-out as a frequent compliance mechanism. This approach is consistent with the RTFO and has been positively received by those involved in the scheme.

We do not think it is proportionate to issue fines for suppliers that do not meet their obligation due to unforeseen circumstances, particularly as it may be out of the obligated party's control. However, we have proposed to issue civil penalties for intentional non-compliance (see responses to questions 60 and 61).

Regarding the suggestion to repurpose buy-out funds to support the SAF industry, the Mandate will take the same approach as the RTFO; whereby payments go into The Consolidated Fund, but this will be kept under review. The government is directly supporting the UK SAF industry in many ways, including through the Advanced Fuels Fund, which has awarded £135 million to 13 UK SAF projects, and we have committed to designing and implementing a Revenue Certainty Mechanism for UK SAF projects by the end of 2026.

Mandate review points

In the government response to our first consultation, we indicated that we would include a regular review process within the Mandate. Building on this, the second consultation included information that could be in scope of the reviews, including level of supply against targets; the levels of targets, HEFA cap, PtL obligation and buy-out prices; fraud/non-compliance; feedstock and energy availability; sustainability criteria and GHG emissions threshold; costs and benefits; industry updates; and progress of other decarbonisation modes for aviation. Any formal review would include a consultation process to gather stakeholder views.

Government decision: we will keep the information above under continuous review, and official reviews will be conducted and published at least every five years. This means that a formal review may be carried out before the five-year point, but not after.

Question 15

Do you agree or disagree with the information we could include in our reviews? Is there anything you feel we haven't considered but should?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
41	33	8	0	0

Figure 19 Question 15 summary of responses.

Thirty three of 41 respondents agreed with the information that could be included in SAF Mandate reviews. Most respondents did not provide a reason for why they agreed with the proposal, but many did provide additional information they believe should be included in reviews. Some of the additional aspects respondents thought should be reviewed included:

- Data on the proportion of SAF supplied under the Mandate produced in the UK;
- Data on the use of Mandate rewarded SAF to meet UK ETS and CORSIA obligations;
- Impact of the HEFA cap on the decarbonisation of other sectors;
- Available feedstocks and feedstocks used to produce SAF under the Mandate, including impacts of the Mandate on other sectors using waste feedstocks;
- Impact of the Mandate on connectivity and competitiveness, including passenger demand;
- The timeframe for compliance and whether this works in practice, or causes any adverse administrative issues;
- International developments;
- Potential negative impacts such as displaced emissions;
- Amount of tankering as a result of the Mandate; and
- LCA emissions of feedstocks, as the calculations of these figures depend on changeable assumptions and variables.

Government response

Given the nascent status of the SAF industry, the design of many of the Mandate's parameters have been reliant upon modelling and analytical evidence. We have already underlined the importance of having a review mechanism within the Mandate to amend its design, should the SAF sector develop in a different way to projected.

Government decision: to ensure that we can maintain a flexible approach to reviews, we will not set out what information will be included in reviews in legislation.

We need to ensure that we keep a broad set of factors under review such that the Mandate can be revised to effectively meet its objectives.

As the Mandate is implemented and the market develops, we will ensure that all relevant factors that impact policy design will be reviewed.

Flexibility in the review process has been central to arriving at the policy positions set out in this government response; however, to ensure industry and investor confidence in the UK SAF market, a high bar must be met for concerns to require a review to one or more parameters.

The following considerations will influence whether we decide to make any changes following a review:

- Level of supply against targets
- Level of buy-out and the reasons for this
- Costs and benefits including carbon savings delivered and costs to industry and consumers
- Scale and pace of development of the UK and global SAF industry
- Feedstock and energy availability and future forecasts, including the impacts of or on other decarbonisation policies
- Fraud and non-compliance plus effectiveness of penalties
- Progress of other decarbonisation options for aviation
- Wider government policies and strategies

Question 16

Do you agree or disagree with our proposed flexible approach to review timelines?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
41	29	3	9	0

Figure 20 Question 16 summary of responses.

Twenty nine of 41 respondents agreed with our proposed approach to keep information under continuous review but conduct and publish official reviews at least every five years. Some of the reasoning provided for agreement with this approach was that it is similar to the current approach under the RTFO and that it would allow the government to be reactive to market changes and align with the emergence of new information in the industry.

Many respondents did however suggest that there should be more frequent reviews in the early years of the Mandate with a few proposing reviews every one, two or three years.

Several respondents suggested that the government should provide a place for stakeholder feedback and take this into account as part of the review process, with a small number of respondents suggesting the Jet Zero Council SAF Delivery Group: Mandate Subgroup as a potential forum for useful discussion.

Several respondents also mentioned the need for certainty to provide investors with confidence that there will be a market for SAF. While these respondents felt that there should

be regular reviews, they also outlined that regular major changes to the policy are likely to lower investor confidence and risk plant investments. Conversely to this, a few respondents suggested that the government needs to be prepared to quickly make changes to the policy based on findings from reviews, particularly if it is found that an aspect of the Mandate is not functioning as planned.

Government response

Our approach to reviews seeks to balance the need to be structured, to avoid unnecessary policy uncertainty for industry, particularly investors, with flexibility to allow for the amendment of policy parameters, guidance and/or the legislation once it is evident there is a need for change. Whenever changes are made to either guidance or legislation, we will consult stakeholders.

Government decision: we will have a formal review at least every five years, with the first review to be carried out by 2030.

The first official review must be carried out before 1 January 2030. Meanwhile, we will continue to monitor all information relevant to the Mandate. The government has also committed to review the Jet Zero Strategy every five years, with the first in 2027. This process will also consider the operation and progress of the SAF Mandate, alongside the formal five yearly process.

We acknowledge that some respondents prefer more frequent reviews during the early years of the mandate and that, given the industry is growing quickly, unforeseen trends may emerge that are unprecedented. Given that we will continuously monitor the implementation of the Mandate and the development of the SAF market, the government will be able to review as necessary.

Reviews will take into account the need to continue to align with wider government policy and strategies including the Net Zero Strategy, Carbon Budget Delivery Plan and the Jet Zero Strategy. Any proposed changes will be subject to consultation and will consider implications for the RTFO given the desire from stakeholders to maintain consistent rules on sustainability, fuel eligibility and how the schemes operate. Alongside the formal review process, we will continuously monitor all relevant information.

The Jet Zero Council has played an important role in supporting the design of the mandate and the government views it as a key forum for engaging with stakeholders. This includes testing new ideas, refining policy proposals and seeking feedback. We will continue to use this forum once the Mandate is implemented, giving stakeholders regular opportunities to provide feedback. The continuous collaboration will provide a forum for all those involved in the SAF Mandate to provide feedback on its implementation, regardless of whether a formal review is being conducted or not.

2. Eligible fuels and sustainability criteria

Eligible fuel types and definitions

To ensure that all aviation fuels are covered by one policy instrument and given that we will be providing support to SAF under the Mandate, we confirmed in the government response to the first consultation that no SAF will be eligible for support under the RTFO once the SAF Mandate is in place. It is therefore necessary that the Mandate legislation accurately defines the scope of aviation fuels. This section sets out which aviation fuels are subject to an obligation or eligible for certificates when supplied to the UK as well as the definitions for types of SAF that will receive different certificates or adhere to specific sustainability criteria.

Following the first consultation on the Mandate, it was confirmed that fossil aviation turbine fuel (avtur) will be subject to an obligation to ensure that the carbon intensity of this fuel decreases over time across the UK. Furthermore, we confirmed SAF that does not meet the sustainability criteria will be subject to the obligation. This will deter the use of any SAF that falls below minimum GHG emissions savings threshold or does not meet any of the other required sustainability criteria which would otherwise lead to a relative increase in emissions. The second consultation proposed that other types of fuel, such as low carbon aviation gasoline, would be eligible for certificates providing it meets the sustainability criteria. The Biomass Strategy reviewed the potential future availability of sustainable biomass to the UK and considered how this resource could be prioritised strategically across the economy to help achieve the government's net zero target, and wider environmental and energy security commitments. We recognised that aviation is a hard to decarbonise sector and requires action now to start on the path to Jet Zero.

For some available feedstocks, there may be uses other than SAF which could offer greater GHG savings at potentially lower cost. The SAF Mandate has a statutory requirement for a review at least every 5 years. The reviews will consider the best use of biomass to support the UK's net zero target and will take into account developments in the evidence base. The mandate also has protections in place to ensure that the eligible feedstocks and fuel pathways deliver genuine carbon savings and adhere to strict sustainability criteria.

Consultation proposals

In the second consultation it was proposed that the supply of fossil aviation fuels other than avtur will not be subject to an obligation, for example avgas. Sustainable fuel alternatives for aircraft using these fuels are not as technically mature as those for avtur so applying an obligation at this stage would be overly burdensome on industry.

To accelerate the development of other low carbon aviation fuels and create additional revenue streams for suppliers, it was also proposed that standard certificates are to be rewarded for the supply of:

- low carbon hydrogen;
- low carbon unleaded avgas; and
- low carbon ammonia.

We previously confirmed that, when replacing avtur, only certified SAF that meets the Ministry of Defence (MOD) Defence Standard (DEF STAN) 91-091 and American Society for Testing and Materials (ASTM) D7566 specification will be eligible for incentives under the Mandate. In a similar manner, we proposed that low carbon avgas must meet the DEF STAN 91-090 specification in order to be eligible for support. For hydrogen and ammonia, we stated our intention to amend the Mandate legislation fuel definitions to include relevant standards once they have been developed.

Question 17

Do you agree or disagree that low carbon avgas, low carbon ammonia and low carbon hydrogen aviation fuel, should be eligible for incentives without being subject to obligation providing they meet the sustainability criteria?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
44	34	4	6	0

Figure 21 Question 17 summary of responses.

Most respondents agreed with the proposal to reward the supply of low-carbon hydrogen, avgas and ammonia with certificates. Respondents broadly agreed that allowing these fuels as eligible to receive certificates would incentivise their uptake and could accelerate their technical development. Others reflected on the need to encourage a range of fuel types to achieve aviation decarbonisation, in particular hydrogen, which could play a prominent role in the future. They added that it also provides a route for all aviation sectors, such as general aviation using avgas, to decarbonise. However, some respondents felt that the Mandate is not the most appropriate mechanism to incentivise these fuels.

The key reasons for disagreeing were that including these fuels could hinder the development of other SAF (avtur) pathways and dampen the certificate price, as well as the need for further development of appropriate technical standards before these fuels can be used safely. Other comments included: that ammonia was not relevant for aviation; that further evaluation of the emissions arising from ammonia use should be carried out first; and the need for clearer definitions of ammonia and hydrogen.

Several respondents suggested that fossil versions of these aviation fuels should be obligated, for example fossil hydrogen or fossil avgas. They considered that owners and operators of general aviation (GA) aircraft should be subject to the costs resulting from the Mandate and have a requirement to decarbonise. If not, the SAF Mandate may not be considered equitable or adhere to the polluter pays principle.

Conversely, a few respondents were in agreement that fossil avgas, hydrogen and ammonia should not be obligated. Some of these respondents went further to suggest that where low

carbon versions did not meet the sustainability criteria the obligation should not apply here either. The reasoning was based on experience from the RTFO, where suppliers have to risk high costs in the event the fuel did not meet the sustainability criteria thereby creating little incentive to supply these fuels.

Three respondents asked for the inclusion of electricity in the Mandate given that it could play a role in short haul aviation.

Government response

Government decision: Low carbon avgas and low carbon hydrogen for aviation will be eligible for standard certificates under the mandate. Low carbon ammonia, however, will not be eligible for certificates under the mandate. These fuels will be eligible for certificates if they meet the relevant technical and sustainability criteria, described in the remainder of this chapter. If they do not meet the technical or sustainability criteria, they will become subject to an obligation.

The supply of fossil avgas and fossil hydrogen will not be subject to an obligation.

The government recognises that a variety of technologies will be required to meet net zero aviation by 2050, as outlined in the Jet Zero Strategy. Allowing low carbon avgas and low carbon hydrogen to receive certificates, which can then be used by obligated suppliers to meet their obligations, is intended to close the price gap between fossil fuel and the cost of producing and supplying low carbon aviation fuel, while also potentially accelerating their development.

With respect to low carbon avgas and hydrogen that does not meet the sustainability criteria, we will place an obligation on this consignment in line with our approach confirmed for low carbon avtur in the government response to the first consultation. This is to deter the use of any low carbon aviation fuel that falls below this threshold or does not meet any of the other required sustainability criteria as this will lead to a relative increase in emissions. The Administrator (see section 3) will work closely with suppliers to ensure that they are aware of the requirements to meet the sustainability criteria and be eligible for certificates.

We do not believe that it is currently appropriate to obligate fossil avgas and hydrogen in the same way that fossil avtur is obligated. The development of low carbon versions of these fuels is in its relative infancy compared to avtur, therefore obligating these would place a disproportionate burden on suppliers and users of these fuels. We will review this position as the low carbon fuel sector develops.

The primary objective of the SAF Mandate is to reduce carbon emissions by using sustainable feedstocks, rather than reducing other pollutants in fuel. Therefore, unleaded avgas, such as UL91, will be treated the same as leaded avgas. That is, if the fuel is made from sustainable feedstocks that meet the sustainability criteria in the future, it will be eligible for standard certificates. However, if it is made from fossil sources that do not meet the sustainability criteria, it will not be subject to an obligation.

The Mandate targets we have set show ambition and allow sufficient space in the market for a range of SAF from different technologies and feedstocks. We therefore do not view the dampening of the certificate price as an issue. Further, there is no low carbon avgas or low

carbon hydrogen currently being supplied to UK aviation. Should low carbon avgas become commercially available, given that avgas accounts for less than 0.1% of total aviation fuel supplied to the UK[18], any certificates gained through its supply will have minimal impact on the market pricing. Hydrogen aircraft are still under development with none to date certified for use in commercial passenger services. The roll-out of hydrogen and/or battery electric aircraft will take time with avtur (included blended with SAF) continuing to make up the majority of aviation fuel until at least 2050.

From our engagement with the aerospace manufacturing sector we are not aware of any major programmes currently focussed upon ammonia fuelled aircraft. We have also taken regard to the findings of the FlyZero project which recommended focusing on hydrogen rather than ammonia in developing commercial zero emission aircraft[19]. Consequently, we are not including low carbon ammonia as an eligible fuel under the Mandate at this time but will keep this position under review should evidence on it change.

We will consider the inclusion of electricity if future evidence indicates this to be appropriate.

Definitions of fuels

Consultation proposals

In the consultation we proposed that low carbon avgas and hydrogen must meet relevant technical standards to be eligible in the Mandate. We also we set out definitions for HEFA and PtL so that suppliers are clear which fuels are subject to the HEFA cap and those that are eligible to receive PtL certificates.

We proposed that the HEFA cap applies to any fuel using a segregated oil or fat as a feedstock, where a segregated oil or fat is defined as “a material that is capable of being used as a transport fuel directly, after extraction, or after conversion by transesterification, into a usable fuel, irrespective of any blend wall limits on use”. This includes used cooking oil and tallow but would exclude tyre pyrolysis oil.

We proposed that fuel eligible for PtL certificates is low carbon avtur for which the energy content of the fuel is derived from renewable (excluding bioenergy) or nuclear energy sources. Fuels produced using fossil energy would not be eligible.

We also proposed that input CO2 has not been deliberately produced for the sole purpose of creating a fuel, where CO2 can be derived from atmospheric DAC or naturally-occurring/geothermal sources, biological sources or from fossil sources (for example, waste flue gases from coal and natural gas power generation).

Where carbon sources other than CO2 are used in the production process, energy would be imparted on the final fuel and therefore the resultant fuel would not be considered a PtL. For example, carbon monoxide (typically generated where incomplete combustion has occurred) contains energy – so if carbon monoxide from combustion of biomass was used

[18] https://www.gov.uk/government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes

[19] FlyZero - Aerospace Technology Institute (ati.org.uk)

the resultant fuel would be a biofuel, while using carbon monoxide from a waste fossil gas would be classed as an RCF.

Question 18

Do you agree or disagree that the definition of aviation fuels should include relevant technical specifications?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
35	27	1	7	0

Figure 22 Question 18 summary of responses.

Most respondents agreed that the definition of aviation fuels in legislation should include the relevant technical specifications. Those that agreed underlined the importance of maintaining safety and performance standards and that any low carbon fuel used in aviation must meet established industry standards. Furthermore, these respondents felt that clearly stating the technical standard in the definition of fuel will provide clarity to industry on which fuels are eligible from the onset. Many respondents referenced ASTM D7566 as the appropriate standard for the Mandate to include in its definitions for avtur. Though, one respondent suggested that reference to specific annexes would be too rigid. It was suggested that in cases where a synthetic standard does not exist, for example avgas, it may be necessary for the Mandate to reference a future standard and update legislation as appropriate.

Among those that disagreed, there was concern that including a specification in the legal definition of aviation fuels would bind industry to specific standards without the appropriate political or legal oversight, which further runs the risk of error in the way standards are referred to. Furthermore, referencing specific standards such as ASTM or DEF STAN, would unnecessarily exclude certain types of fuel that would otherwise be accepted by the aircraft and engine original equipment manufacturers (OEMs), for example those covered by Canadian, Russian or Chinese aviation fuel specifications.

One respondent emphasised the difference between requiring SAF to meet UK DEF STAN 91-091 and ASTM D7566 to be eligible for certificates and including the relevant technical specifications in the legal definition of aviation fuels. In a similar manner, one respondent stated that it is unnecessary to include that technical standard in the definition given that all SAF produced is already required to comply with relevant technical standards.

Government response

We had previously confirmed that avtur, low carbon or otherwise, must be certified in line with DEF STAN 91-091 and ASTM D7566. This will ensure that safety and performance standards are not compromised through the introduction of new decarbonisation technologies.

Government decision: in the Mandate statutory instrument, aviation fuels will include the relevant technical specifications in their definition.

To maintain consistency with the RTFO Order and other domestic and international regulations, we will use established industry standards when defining different types of aviation fuel. For example, avgas will be defined as meeting one of the following standards:

- ASTM International standard D910 (as revised or re-issued from time to time);
- Ministry of Defence standard 91–90 (as revised or re-issued from time to time); or
- a standard that is equivalent to either of the standards mentioned in the first two bullets.

This is the same approach currently adopted under the RTFO Order and we intend on using the same definitions. Adopting this approach will address key responses in the consultation, specifically that the fuel should meet established industry standards, the definition refers to future revisions of standards to ensure keep pace with latest developments and that equivalent standards accepted by OEMs in other parts of the world would be accepted.

Including standards within the legal definition of fuels is standard practice when legislating for regulations that concern transport fuels. This has worked well under the RTFO and we therefore do not intend to deviate from this common approach for aviation fuels within the Mandate legislation.

Hydrogen differs on its technical standards due to it comprising of just one molecule, whereas avtur or avgas which are made up of a variety of hydrocarbons of different lengths and isomers. As a result, no such technical standards exist and the quality of fuel is instead simply enforced by the need for companies to be accurate in what they supply. Should a technical standard be introduced at a later stage we will consider if it is appropriate to require that low carbon hydrogen rewarded under the SAF Mandate meets this standard.

Question 19

Do you agree or disagree with the proposed definition of HEFA? If not, please provide an alternative definition?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
41	26	4	11	0

Figure 23 Question 19 summary of responses.

Many respondents agreed with the proposal to link the definition of HEFA to feedstocks rather than the production pathway. Generally, these respondents recognised that the negative impacts of an over reliance on this fuel is driven by the demand on feedstock rather than the conversion process itself. Some of those in agreement did however underline the importance of monitoring the definition to minimise the risk that “loopholes” can be found to avoid the HEFA cap. This approach is current practice under the RTFO.

However, several respondents disagreed with the proposal on the basis that using a definition of HEFA that deviates from the industry standard leads to confusion and potentially unintended consequences related to aviation fuel quality standards. These respondents preferred that the definition referenced ASTM D7566 specification, or alternatively make an explicit point that this definition concerns HEFA feedstock that will be capped.

A few respondents instead preferred a more flexible approach whereby DfT would assess each individual feedstock to determine whether it is subject to the HEFA cap rather than setting a definition in legislation.

Government response

As explained in the section on the HEFA cap, HEFA feedstocks that are most relevant for use under the Mandate, in particular UCO, are a finite resource and there are competing demands across the globe from other modes of transport, particularly road fuel use. In the future, there will be increasing competition for their use in SAF as other countries' mandates and targets kick-in. Technology pathways will need to be developed that can unlock new feedstocks to supply SAF at scale and help us meet our decarbonisation goals. The HEFA cap is therefore to create space for the development of new advanced technologies and encourage investment.

There is broad agreement between the government and respondents that we should link the cap to certain feedstocks that use this production pathway. This is in line with our objectives of encouraging new feedstocks.

Government decision: any fuel that uses a segregated oil or fat as a feedstock will be subject to the HEFA cap. This will limit the amount of the certificates that can be used to discharge the main obligation in line with percentage cap set out in response to questions seven, eight and nine.

We will use the following definition of segregated oil or fat, as originally proposed in the consultation; "a material that is capable of being used as a transport fuel directly, after extraction, or after conversion by transesterification, into a usable fuel, irrespective of any blend wall limits on use".

This definition will ensure that the cap only includes feedstocks that are currently widely used in the HEFA process or for existing transport fuels. It will allow other more novel feedstocks using the HEFA production pathway, such as tyre pyrolysis oil, to avoid having its use curtailed.

We understand that there are concerns that using this definition deviates from the ASTM definition of HEFA. However, the legislation will specifically refer to segregated oils and fats to avoid inconsistency with other specifications. We will ensure that guidance clearly outlines that the HEFA cap only applies to these specific feedstocks.

We will continue to review the impacts of key feedstocks as the SAF market develops and amend the definition of the HEFA feedstock cap if new evidence justifies any changes.

Question 20

Do you agree or disagree with the proposed definition of fuels that will be eligible for PtL certificates to be redeemed against the PtL obligation?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
47	33	2	12	0

Figure 24 Question 20 summary of responses.

Most respondents either agreed with the proposed definition of PtL outright or broadly agreed and suggested amendments on specific aspects. One of the main points of discussion was regarding CO2 eligibility where respondents generally agreed with the government proposal to allow a wide range of sources initially to kickstart the PtL market. However, some respondents suggested that the definition should be revised in the future to limit eligibility to biogenic and DAC sources once the market is technically and commercially advanced. Respondents pointed to the EU approach where waste fossil CO2 is eligible until 2041. However, a few respondents were concerned with the proposal to include waste fossil CO2 as this could create a financial incentive for ongoing fossil CO2 emissions.

Regarding the proposed requirement that CO2 has not been deliberately produced for the sole purpose of creating a fuel, a few respondents recommended the wording should be changed as it currently excludes CO2 that has been produced during the SAF production process. As a result, this would lead to inefficient SAF production plant design whereby CO2 produced during SAF that has been captured must be stored rather than recycled back into the production process to produce PtL, meanwhile CO2 produced in other industrial processes would be eligible.

A further amendment suggested by a couple of respondents from the nuclear industry was to include reference to direct heat for PtL production. These respondents regard the use of heat as a proven and efficient energy source which they believe should be referenced explicitly in the PtL definition.

Of those that disagreed with the definition, respondents urged the government to include a broader range of eligible energy sources. Specifically, that biogenic energy sources should be eligible for PtL certificates, or more broadly hydrogen that meets the Low Carbon Hydrogen Standard (LCHS) regardless of energy source.

Although not a direct response to the PtL definition, several respondents showed a preference that any guidance on energy allocation where there is a mixed source of input energy and/or feedstock is the same as that of the RTFO. Similarly, one respondent was concerned with the lack of explicit reference to co-processing of PtL in the proposed definition, which would exclude existing fossil fuel production facilities that could be partially repurposed to co-process renewable inputs to produce PtL alongside conventional fossil fuel.

Other comments in the responses included:

- Revising the wording “input raw materials must contain no usable energy” to “input raw material must contain no usable combustion energy”;
- Recognition that the definition excludes the use of carbon monoxide as a feedstock; and
- Stating that there is no need for a PtL definition at this stage.

Government response

Government decision: Fuel eligible for PtL certificates will be defined as low carbon avtur for which the energy content of the fuel is derived from renewable (excluding bioenergy) or nuclear energy sources. Carbon can be derived from atmospheric or naturally-occurring/geothermal sources, biological sources or from waste fossil sources.

This definition therefore remains as proposed in the consultation. It will ensure that we incentivise this strategically important type of SAF while ensuring the eligibility is wide enough for PtL to scale at a rate needed to meet net zero targets. It also maintains consistency with the RTFO.

Further implications of this definition are:

- energy can be either from electricity or direct heat;
- fuels produced using fossil energy would not be eligible;
- as the available energy source comes from electricity or heat, input raw materials must contain no usable energy. This means the only eligible carbon source is CO2.
- hydrogen as a fuel used for combustion or in a fuel cell would not be eligible for PtL certificates.

We are pleased that respondents generally agreed with having a wide range of carbon sources eligible for PtL production that align with the current criteria for Renewable Fuels of Non-Biological Origin (RFNBOs) under the RTFO. Allowing waste fossil carbon to be used will facilitate the scale up of PtL production plants and create synergies with industrial facilities that do not have access to CO2 storage. This will be particularly important during the initial years of the Mandate, while the CO2 transport and storage (T&S) network is being developed.

Carbon sources are assumed to be zero GHG emissions at the point of collection. With relation to waste fossil CO2, this is only the case where emitters must not claim an emission reduction. Given that industrial sectors will have their own requirements to decarbonise, through the UK ETS or otherwise, we do not consider that eligibility of waste fossil CO2 will create an ongoing incentive. However, it offers an opportunity for aviation to decarbonise while these sectors are transitioning to net zero. While we recognise that using atmospheric carbon from DAC will be important in the longer term it is currently more expensive than capturing carbon from point sources. Limiting eligibility to just this CO2 source at the outset would therefore hinder the development of the PtL sector, ultimately leading to less SAF on the market and lower emission reductions. We will keep this under review and will consider any new emerging evidence on whether it would be appropriate to phase out point source carbon and focus support on DAC.

As noted above, eligible energy sources are renewable (excluding bioenergy) or nuclear, where energy is defined as either electricity or heat. We will not extend the definition to

include bioenergy. This is because it is an inefficient process of generating energy when compared to other low carbon energy sources. Therefore, we do not want to incentivise energy production pathway by classing the final fuel as a PtL. If bioenergy is used, the energy content will be derived from biomass and would therefore be classed as a biofuel.

We will allow the recycling of CO2 produced during the SAF production to produce additional SAF, as this will maximise the emissions savings from feedstocks. We will provide full details of carbon accounting in this situation in guidance, which will be published separately. The guidance will also cover other points raised by respondents in this section, including energy allocation (which is explained in the following section), the eligibility of co-processing and explicit exclusion of carbon monoxide.

Low carbon energy criteria

Consultation proposals

In the consultation we proposed that the SAF Mandate should adopt criteria for PtL fuel consistent with those currently used for RFNBOs under the RTFO. That is, the default position is assumed to be that where electricity used to produce the fuel is derived from the national grid. The proportion of the final fuel eligible for certificates will be determined by the proportion of low carbon electricity in the grid mix. For the purpose of the Mandate, low carbon electricity includes renewable (but not bioenergy-derived) or nuclear derived electricity. For example, the average UK grid in the third quarter of 2023 was 41.5% eligible low carbon electricity – so 41.5% of a PtL fuel made using electricity derived from the grid would be eligible for support under the Mandate[20].

The exceptions to this are if a production site is connected to an electricity grid that meets the criteria for regionality[21], when regional grid averages can be used, or if the renewable or nuclear electricity is considered additional[22].

Nuclear energy is not supported under the RTFO. However, we proposed the guiding principles will align with those for renewable energy, while the details on compliance will be set out later in guidance.

Question 21

Do you agree or disagree that the SAF Mandate should adopt the criteria concerning additionality for RFNBOs that aligns with the RTFO?

[20] The actual grid average to be used in the calculation would be taken as an annual grid average, not quarterly.

[21] If the electricity grid a production site is connected to can be reasonably considered to be a distinct electricity grid from the relevant national grid, suppliers may use data from that electricity grid rather than the national grid in determining the portion of their fuel which is defined as a PtL.

[22] Additionality, as defined in the RTFO, is renewable (or nuclear) energy that would not have been available to the grid in the absence of power demand from the RFNBO plant in question.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
42	29	3	9	1

Figure 25 Question 21 summary of responses.

Most respondents agreed with the proposal to adopt additionality criteria for PtL fuels that is the same as the RTFO criteria for RFNBOs. Of those that agreed, four stated that they mostly agree. Those that agreed generally held a view that the Mandate should maintain consistency with the RTFO Order where possible to maintain a level playing field between the two schemes. Furthermore, these respondents highlighted that many PtL producers will also produce fuel eligible under the RTFO, so the same rules should apply. Several respondents noted that introducing these additionality rules for PtL will ensure genuine decarbonisation and avoid shifting emissions from between sectors.

However, a few respondents noted that, while the mandate and RTFO rules should be aligned, the RTFO rules must be updated. These respondents felt that the current requirements of additionality under the RTFO Order are too restrictive, which is evidenced by the limited amount of RFNBOs supplied under the RTFO to date. In particular, respondents urged the government to extend the temporal correlation requirement from 30 mins to 1 month to align with the EU. Several respondents suggested that the mandate instead aligns with the requirements of the Low Carbon Hydrogen Standard (LCHS) to maintain one standard for low carbon hydrogen across the UK.

Those that disagreed outright did so for similar reasoning, stating that additionality requirements would limit commercial-scale production due to investment being directed to the EU where rules are less stringent. Furthermore, the additionality rules will further increase the cost of PtL in the UK and add complexity for suppliers complying with the mandate.

Finally, a couple of respondents suggested that the mandate should adopt the RTFO additionality rules with the further requirement of only allowing imported hydrogen or RFNBOs from countries where the grid is sufficiently decarbonised, to ensure demand does not increase emissions by displacing renewable electricity use in other countries.

Government response

It is vital that the Mandate accurately accounts for carbon emissions and delivers genuine emission reductions. The rules concerning the use of energy under the RTFO Order ensure that the supply of RFNBOs accurately account for the carbon emissions and reflect the amount of renewable energy used to produce the fuel. These rules are in place to ensure that the production of RFNBOs does not divert energy from existing applications, which would likely be replaced with fossil energy sources leading to increased GHG emissions.

We will uphold the same values under the Mandate to ensure that the scheme does not have indirect impacts on other sectors.

Government decision: In line with the consultation proposals the SAF Mandate will adopt the same rules around energy allocation as the RTFO applies to RFNBO production.

This means that if energy is taken from the grid, the carbon intensity of the energy and proportion of resultant fuel that is eligible for certificates is linked to the characteristics of the grid. In special cases, such as where an electricity grid meets criteria for regionality, or where energy is additional, different rules apply (see Figure 26).

In the UK, it is expected that using grid electricity to produce a PtL fuel would not meet the minimum GHG emissions savings threshold (see question 11) as the grid is not yet sufficiently decarbonised. Until the UK grid is sufficiently decarbonised, domestic PtL producers will either need to be connected to a regional grid or use additional energy[23]. We will adopt the same guidance that is already in place for the RTFO[24] which explains how RFNBOs are defined and treated under the scheme and how additionality can be demonstrated in the context of renewable electricity used as an energy input[25].

Although the guidance includes examples of specific use cases, prospective PtL producers and/or suppliers are strongly encouraged to contact the department as early as possible during the development process to ensure that the design meets our requirements for additionality. These rules apply whether the fuel or input energy is domestic or international.

Description	PtL portion	Carbon intensity of electricity	Evidence
Electricity drawn from a national grid	Proportional to the percentage supply from non-bioenergy renewables and nuclear in the national grid	Grid average GHG intensity (national)	Evidence of connection to and electricity supply from the national grid
Electricity drawn from a regional grid	Proportional to the percentage supply from non-bioenergy renewables and nuclear in the regional grid	Grid average GHG intensity (regionalised)	Evidence of connection to and electricity supply from the relevant regional grid
Electricity that meets the criteria for additionality	Proportional to the renewable (non-bioenergy) and nuclear electricity used in production	Zero (renewable)	Evidence of additionality relevant to the specific case

Figure 26 How different parameters are accounted for when determining supplying PtL under different electricity supply scenarios.

[23] Renewable (or nuclear) energy that would not have been available to the grid in the absence of power demand from the RFNBO plant in question.

[24] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1164946/rtfo-guidance-for-renewable-fuels-of-non-biological-origin.pdf

[25] Note that the RTFO does not support nuclear energy which will need separate guidance developed for the SAF Mandate and is explained in response to question 22.

We recognise that some respondents raised concerns about how the energy rules are imposed, or how the requirement for additionality in many countries would apply, and its impact on the ability for PtL to scale up.

It is imperative that the Mandate delivers genuine emission reductions, rather than simply diverting existing renewable energy production from one sector to another. Under the RTFO, these rules have been refined over time to ensure that suppliers have maximum flexibility to meet the requirements and cost effectiveness for suppliers when producing RFNBOs, while still meeting the legal requirements of the Energy Act 2004.

The additionality principles in the LCHS are compatible with the RTFO and Mandate interpretation. Although the LCHS does not require additional energy to be used, there is a commitment to incentivise and reward projects that meet the additionality principles.

Question 22

Do you agree or disagree that additionality rules should be introduced for nuclear power that follow the same principles as those currently applied to RFNBOs in the RTFO?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
30	21	2	5	2

Figure 27 Question 22 summary of responses.

Most respondents agreed what where PtL fuels are produced using nuclear energy, additionality criteria should apply. The predominant reason for agreeing with this proposal was that it supports technology neutrality by placing nuclear energy on a level playing field with renewable energy. A couple of respondents also noted that additionality rules will promote new nuclear deployment and ensure genuine emission reductions. Other comments from those that agreed included, making sure that new nuclear is easy to deploy and introducing bespoke additionality rules that meet the needs of the nuclear industry.

A few respondents, however, preferred an approach that aligns with the LCHS or the EU for reasons based on maintaining consistency in the UK standards and ensuring the UK remains competitive in relation to investment in hydrogen production.

As with renewable energy, the main concern from those that disagreed was that additionality rules would prevent the scale up of hydrogen production due to strict criteria. In particular, if the rules applied mean that only new nuclear is eligible, this would remove a viable route of repurposing existing nuclear to producing hydrogen or SAF. This could be mean less eligible nuclear energy is available given the time and money it takes for new nuclear plants to be financed and permitted.

Government response

The specific rules on the use of energy are to ensure that the final fuel is accurate, both in terms of carbon intensity and the proportion of which is eligible for certificates.

Government decision: we will introduce specific rules around the use of energy for PtL fuels using nuclear as its energy source. These rules will follow the same principles as those already in place for renewable energy, used to produce RFNBOs under the RTFO, including additionality.

We endeavour to keep nuclear and renewable energy on a level playing field when determining the amount of certificates to be rewarded for the supply of PtL. This means that where nuclear energy is additional, the grid intensity will not be used and the proportion of eligible fuel will be allocated on the proportion of additional nuclear energy used to produce the fuel.

We understand there are concerns that such requirements may hinder the scale up of nuclear derived SAF as some respondents understood this to mean that new nuclear facilities would need to be built to meet the additionality requirement. However, we are keen to maximise the opportunity for existing nuclear plants to be used where it fits with our definition. One possible scenario could be avoiding curtailment or wastage.

We are developing specific guidance around what is considered to be additional and how suppliers can demonstrate this. Government will continue to work with the nuclear industry and other interested parties to ensure that the resulting compliance rules are practical, well-understood and meet the requirements set by the Energy Act 2004.

Use of hydrogen in SAF production

Government proposals

Hydrogen is typically used in SAF production either as a process input, where it does not contribute to the final energy content of the fuel, or as a precursor[26], where it does contribute to the final energy content of the fuel.

We proposed that where hydrogen is used as a precursor, it must be low carbon which was defined as hydrogen derived from renewable or nuclear energy, biohydrogen from wastes or residues and RCF hydrogen[27]. This is the same requirement as the RTFO but with the addition of nuclear electrolytic hydrogen as an eligible source. Where hydrogen is used as a process input, no further eligibility criteria will apply beyond the final fuel meeting the minimum GHG savings threshold. We also welcomed evidence from respondents on the role of CCUS-enabled hydrogen in SAF production – the eligibility of which in the mandate would require changes to primary legislation.

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[26] In the consultation, we referred to hydrogen as a feedstock. Where hydrogen is derived directly from biomass or waste fossil sources, these materials are the feedstock not hydrogen. In this document we will therefore refer to it as a precursor where it contributes energy and atoms to the final fuel.

[27] In order to be eligible, RCF hydrogen pathways require substantial CCS of the otherwise emitted carbon.

The distinction between a process input and precursor is not always definitive. In some cases, during the fuel upgrading (or hydroprocessing) process, some hydrogen used as a process input to remove impurities may end up contributing atoms to the final fuel, thereby becoming a precursor, as per current definition in the RTFO. In the consultation we proposed that suppliers must determine the amount of hydrogen in the hydroprocessing step that contributes both atoms and energy of the fuel, unless eligible low carbon hydrogen is used.

Question 23

Do you agree or disagree that, where hydrogen is used as a feedstock, eligibility should be limited to biohydrogen derived from wastes or residues, RCF hydrogen and hydrogen derived from renewable and nuclear energy (when legal powers allow)?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
50	12	3	35	0

Figure 27 Question 23 summary of responses.

Most respondents did not agree with the proposed feedstock eligibility criteria for precursor hydrogen. Instead, they preferred an approach whereby any hydrogen production pathway with a lifecycle analysis that meets the minimum GHG savings threshold should be eligible, regardless of the feedstock. Respondents felt that specifying eligible feedstocks and production pathways would not represent a technology neutral approach and introduces unnecessary complexity. Instead, by simply assessing eligibility on the carbon intensity of the hydrogen production, SAF producers would have greater flexibility without impacting the sustainability objectives of the Mandate.

Respondents stated that this approach would be more in line with the LCHS, which many believed should be the reference for hydrogen eligibility in the Mandate. These respondents were keen to see consistency in standards across government departments and certainty that hydrogen supported under DESNZ schemes, for example the Hydrogen Production Business Model, would be eligible in SAF production. Some noted that DESNZ are currently developing a certification scheme that is aimed at facilitating international trade of hydrogen that meets the LCHS.

Many respondents went further to explain that one key benefit of aligning with the LCHS or taking a technology approach is that it would potentially unlock eligibility of steam methane reforming of natural gas with CCUS (referred to as CCUS-enabled hydrogen). These respondents recognised that CCUS-enabled hydrogen is expected to have among the lowest levelised costs of all low carbon hydrogen production routes so excluding CCUS-enabled hydrogen will limit availability of hydrogen and increase costs of SAF in the UK. Therefore, it was claimed that exclusion of CCUS-enabled hydrogen would go against a key objective of the GHG incentive of the Mandate to deliver emission reductions at the lowest cost. Additionally, CCUS-enabled hydrogen was viewed as a key technology that will enable the SAF industry to scale initially while the cost of other hydrogen production routes is still high. Respondents therefore urged the government to amend the Energy Act (which provide the primary powers for the Mandate) to permit CCUS-enabled hydrogen as an eligible source.

A few respondents explicitly noted opposition to the inclusion of CCUS-enabled hydrogen as a feedstock. Reasons included that it would continue to incentivise natural gas extraction, there is high risk of methane leakage, and that sufficient hydrogen feedstock and production pathways exist to meet SAF demand without the need for CCUS-enabled hydrogen.

Finally, a couple of respondents were against the inclusion of RCF hydrogen as it was not considered a sustainable feedstock. A small number of other respondents felt that only renewable electrolytic hydrogen should be eligible.

Government response

We recognise that many respondents disagreed with the proposal to define low carbon hydrogen by the production pathway and instead prefer an approach whereby hydrogen must simply meet a carbon intensity threshold. However, as we want to ensure that we are consistent with our approach across all feedstocks and to maintain a level playing field, we will implement the same criteria as our wider feedstock eligibility criteria, which specifies certain production routes and is line with what our primary powers allow us to do.

Government decision: where hydrogen[28] contributes to the energy content of the final fuel it must be hydrogen derived from renewable or nuclear energy, biohydrogen derived from wastes or residues, or RCF hydrogen. Where hydrogen does not contribute to the energy content of the fuel (i.e. is considered a process input), there will be no eligibility criteria beyond the final fuel meeting the minimum GHG savings threshold.

Many respondents requested that the Mandate criteria aligns with that of the LCHS, which has been designed to underpin the growth of a low carbon hydrogen economy. The standard is technology agnostic, and sets out certain sustainability criteria which low carbon hydrogen production must meet, including a maximum carbon intensity of 20 gCO2e/MJ. Whereas the primary powers of the RTFO and the Mandate only permits certain routes of hydrogen production to be eligible under those schemes. As with the Mandate, the LCHS is subject to regular review to ensure that it remains fit for purpose and keeps pace with our growing understanding of how new technologies work in practice. We will continue to use these reviews to see how the schemes can align while still maintain the specific objectives of the individual policies.

In the consultation we asked for further evidence on the use of CCUS-enabled hydrogen in SAF production (noting this would require an amendment to primary legislation). Our analysis projects low carbon hydrogen demand for SAF will range between 1.3 TWh and 2.6 TWh by 2035[29], though the actual demand could be significantly lower depending on the level of imports. DESNZ, which is responsible for planning hydrogen production capacity to meet the needs of the hydrogen economy, has indicated that the UK's first 10 GW of capacity could produce around 60 TWh/yr of low carbon hydrogen, assuming the deployment of 4 GW of CCUS-enabled fossil hydrogen and 6 GW of electrolytic hydrogen[30]. Therefore, there

[28] This hydrogen is referred to as a precursor, where the material that made the hydrogen is considered the feedstock (for example biomass or low carbon energy).
[29] Actual demand could be lower or higher depending on the level of imports of SAF.
[30] https://www.gov.uk/government/publications/hydrogen-production-delivery-roadmap

will be a range of hydrogen pathways producing at a commercial scale within the UK to supply to the SAF sector for use as both a precursor or a process input.

Another key point raised about the exclusion of CCUS-enabled hydrogen is that it would raise the cost of SAF. To get the scale and cost reductions we need to meet our carbon budget and net zero commitments, the UK is supporting multiple production routes, including both electrolytic and CCUS-enabled hydrogen. Electrolytic – or 'green' – hydrogen is likely to be a core long-term hydrogen production technology as it is expected to be able to operate flexibly, responding to the availability of electricity inputs, and when paired with renewable electricity can deliver zero carbon hydrogen.

We will reflect on the information submitted as part of the consultation and wider evidence, as well as taking into account interactions with wider Government policy including the Low Carbon Hydrogen Standard and RTFO, to inform any future decision on the inclusion of CCUS-enabled hydrogen. Future inclusion would be subject to consultation and require a change to primary powers used for the SAF mandate.

Question 24

Do you agree or disagree that the contribution of energy content from hydroprocessing should be calculated?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
37	33	0	4	0

Figure 28 Question 24 summary of responses.

Most respondents agreed with the proposal to calculate the energy content arising from hydroprocessing. The main reason being that this approach would treat types of SAF equally and that it would ensure that any use of fossil hydrogen would not be considered renewable. A couple of respondents suggested that as a consequence of this accounting, the use of low carbon hydrogen in refining and upgrading of SAF would be encouraged. Though, several respondents underlined that this proposal is only relevant where the fuel is not wholly renewable, given the lifecycle analysis will have already accounted for the carbon intensity of the hydrogen input. A couple of respondents suggested that the RTFO should also be updated in line with this proposal for the same reasons stated here, as well as to maintain consistency between the schemes.

However, a few respondents noted that the calculation of energy content from hydroprocessing can be burdensome and challenging, particularly in complex and dynamic industrial processes. Furthermore, the energy content from hydroprocessing is minimal and the lifecycle analysis already accounts for the carbon intensity. Therefore, accounting for the energy content would not be a proportionate response and would be at odds to other regulatory schemes.

Government response

Hydrogen used in hydroprocessing is supplied in large volumes with the intention of recycling it through the process again, rather than being carefully scaled as would be expected in chemical synthesis. However, some of the hydrogen is likely incorporated into the fuel and could meet the definition of a fuel precursor.

The hydrotreated vegetable oil (HVO) and HEFA pathways account for most of the hydroprocessing seen under the RTFO. These are considered to be 100% renewable in the RTFO Order, regardless of whether fossil or renewable hydrogen is used in its production. In practice, the hydrogen used in hydroprocessing is considered a process input rather than a feedstock, meaning that it is not subject to hydrogen eligibility criteria. Only in unique cases, such as certain development fuels, is the hydrogen tracked through the hydroprocessng stage in the same way that we proposed in the second Mandate consultation. The government is instead confirming that the HVO and HEFA approach should be adopted for all SAF supplied under the Mandate.

Government decision: hydrogen used in hydroprocessing will be considered a process input and therefore not subject to hydrogen eligibility criteria. However, its use must be accounted for in the lifecycle emissions of the final fuel.

This applies where hydrogen is used to remove undesirable atoms such as but not limited to sulphur, oxygen and nitrogen from an existing hydrocarbon molecule, or to shorten an existing hydrocarbon molecule (hydrocracking processes).

In contrast, where hydrogen is used directly in the production of hydrocarbon fuels prepared from smaller carbon molecules (e.g. CO, CO2, methanol, ethanol) hydrogen should be treated as a precursor.

The confirmed position diverges from what was originally proposed in the consultation. This is to ensure that we do not impose unnecessary administrative burden on suppliers, introduce inconsistencies with other schemes or create unintended consequences. Critically, this approach still accounts for the full emissions of the hydrogen used in the production process and the final fuel must still meet the minimum GHG emissions savings threshold. Given we are rewarding SAF in proportion to the GHG emissions reductions it achieves, there is an incentive to use low carbon hydrogen even if does not impact the renewability of the fuel. Furthermore, the confirmed approach continues to ensure that all CO2 released by SAF is low carbon.

By considering hydrogen used in hydroprocessing to be a process input, we will align with the current treatment of HEFA under the RTFO Order and internationally. This will maintain regulatory simplicity and avoid potential issues with voluntary schemes that have so far used this approach. It will simplify the process for suppliers operating in different regions, who under the original proposal would be required to manage their mass balances separately in the UK and internationally.

This approach will also prevent suppliers from claiming certificates where fossil jet fuel is hydroprocessed with renewable hydrogen. This is important to ensure the Mandate encourages the development of advanced fuel production technologies which are needed to achieve stretching Mandate targets in later years.

Our confirmed approach under the Mandate will not change how the RTFO treats hydroprocessing. This will continue to be considered as part of wider RTFO considerations.

Sustainability criteria

Minimum GHG savings threshold

Consultation proposals

A fuel's carbon intensity is a measure of the GHG emissions generated per unit of energy contained in the fuel, expressed in gCO2e/MJ. We previously confirmed that SAF would need to achieve a minimum GHG saving, compared to fossil derived kerosene, in order to be eligible for certificates under the mandate. We welcomed views and supporting evidence on the following potential minimum GHG savings threshold to be implemented in the Mandate:

- 40% saving compared to fossil kerosene (equal to a maximum carbon intensity of 53.4 gCO2e/MJ)
- 50% saving compared to fossil kerosene (equal to a maximum carbon intensity of 44.5 gCO2e/MJ)
- 60% saving compared to fossil kerosene (equal to a maximum carbon intensity of 35.6 gCO2e/MJ).

It was also proposed that the threshold is increased over time to provide a mechanism for suppliers to reduce the carbon intensity and we welcomed views on how the threshold should change over time.

In the original consultation, questions 25 and 26 were written in terms of carbon intensity. In order to make this section clearer, we have re-phased them, stakeholder responses and views and the government response in terms of the relative GHG saving.

Question 25

What level should the minimum GHG savings threshold be set at to maintain high sustainability credentials while ensuring enough flexibility to allow a wide range of SAF to be developed? Please provide evidence to support your answer.

Summary of responses

Respondents suggested a variety of figures for the minimum GHG emissions savings threshold. The preferred threshold among respondents were 50%, 65% and 40% (in that order), collectively accounting for over half of responses. The remainder of respondents proposed figures ranging between 10%-70%, as well as stating the case for no threshold at all.

Those respondents that supported a minimum GHG emissions savings threshold of 50% did so on the basis that this initial threshold would accommodate a wide range of production pathways and feedstocks. Respondents stressed the importance of this during the early

years of plant operation to successfully manage risks around plant performance. Furthermore, a higher threshold than this may discourage investors. A few respondents also noted that the 50% threshold aligns with that of the US Inflation Reduction Act (IRA) and would therefore facilitate imports of US SAF. Some respondents explained that the minimum GHG emissions savings threshold is less important than other sustainability criteria given that the GHG scheme will incentivise reductions above and beyond the minimum threshold. However, they recognised that a 50% threshold would provide an appropriate minimum level to avoid greenwashing accusations or incentivising fuel that does not provide substantial benefit. A fewer number of respondents provided all these reasons in their justification for a minimum threshold of 40%.

Those in favour of a 65% threshold underlined the importance of aligning the threshold with that of the UK ETS and, to a lesser degree, the RTFO. Respondents highlighted that if the Mandate does not require as stringent sustainability criteria as the UK ETS, there is a risk SAF suppliers will supply SAF to the UK that cannot be zero rated or claimed under the UK ETS by airlines. Similarly, a few respondents proposed aligning with the EU ETS and RefuelEU thresholds (meaning 65% for biofuels and 70% for PtL) to support UK SAF producers exporting to the EU.

Some respondents proposed a threshold of 10% to align with CORSIA, which applies globally to airlines. These respondents felt that a less stringent threshold may mitigate the risk of SAF plant development being slowed down due to the competition for finite design and construction resources such as CCUS, low-carbon hydrogen and enhanced grid connections for renewable energy. They added that, given that the Mandate will award certificates based on carbon intensity, the risk of the Mandate being fulfilled by high carbon intensity SAF is minimal. A couple of respondents went further to argue that there is no need for a threshold at all.

A small number of other respondents preferred a threshold of 60% - the highest in the consultation – which they felt would still allow a wide variety of projects to develop but would also send a strong signal that there is demand for SAF with high GHG emissions savings and accelerate the decarbonisation of the aviation sector.

Several respondents did not propose a figure but instead underlined that the threshold must allow for the use of hydrogen that meets the maximum carbon intensity permitted by the LCHS.

Government response

It is our intention to support a mix of SAF types with high sustainability credentials, avoiding directing investment into SAF technologies that achieve minimal GHG emissions reductions compared to fossil kerosene. The Mandate will reward certificates in proportion to the GHG emission savings of a given SAF consignment. This will incentivise cost-effective GHG emissions reductions and minimising the risk that the SAF mixture will be primarily made up of SAF that achieves minimal GHG emissions reductions. Nevertheless, we feel it is necessary to have a minimum threshold as a further safeguard to guarantee a minimum GHG emissions reduction.

We want to ensure that setting a minimum GHG emissions savings threshold does not unnecessarily exclude certain types of fuels or feedstocks that could still achieve significant

GHG emissions savings compared to fossil kerosene. This could particularly be the case, where SAF may not meet the minimum threshold during the initial years of production. It is imperative that the UK fosters an environment that allows a diverse pool of SAF to be supplied, such that we can reach ambitious long-term targets and maximise decarbonisation through the use of SAF.

We expect that the carbon intensity of SAF will decrease over time through the decarbonisation of the electricity grid and supply chains, as well as the optimisation of production processes and the adoption of CCUS in reducing emissions of some of the SAF pathways. If we set the minimum GHG savings threshold too high, it could risk stifling innovation and reducing investment into SAF. This could minimise the diversity of SAF and limit the volume brought to the UK market, leading to a reduced likelihood of achieving the Mandate targets.

We have reviewed a multitude of evidence, including known projects, such as successful bidders to the AFF, and academic papers assessing the projected lifecycle carbon intensity of different technology pathways in reaching our decision.

Government decision: SAF will have to achieve a minimum GHG emissions savings threshold of 40% against a fossil fuel comparator of 89 gCO2e/MJ in order to be eligible for certificates from the Mandate start date.

This will ensure that investment in SAF production is not hindered while also ensuring a sufficient level of GHG emissions reductions.

We have noted that some respondents stressed the importance of being able to make emissions reductions claims under the UK ETS for the use of SAF supplied for the Mandate. Under the UK ETS,[31] it is possible for an airline to make a claim for a reduction in aviation emissions (an Emissions Reduction Claim (ERC)) from the use of eligible SAF. Eligibility is based on the sustainability criteria of the RTFO.[32] All eligible SAF is currently rewarded an emissions factor of zero. A successful ERC thus reduces an airline's emissions figure and the number of UK ETS allowances they are required to surrender.

The UK ETS Authority will continue to develop proposals on how the UK ETS should treat the use of SAF by aircraft operators and will consult on these in due course.[33] The Authority will consider full alignment with the SAF Mandate sustainability criteria. In addition, while SAF will continue to be zero rated under the UK ETS in the short-term, the Authority will continue to explore alternative options to SAF being zero rated in the future.

Question 26

Do you agree or disagree that the minimum GHG savings threshold should be increased over time? If so, how should it evolve?

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[31] Greenhouse Gas Emissions Trading Scheme Order 2020 (UK ETS Order)
[32] Schedule 1 of the Renewable Transport Fuels Obligation Order 2007
[33] Consultation on Developing the UK Emissions Trading Scheme (UK ETS): https://www.gov.uk/government/consultations/developing-the-uk-emissions-trading-scheme-uk-ets

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
48	27	5	16	0

Figure 29 Question 26 summary of responses.

Slightly more than half of respondents agreed that the minimum GHG emissions savings threshold should increase over time. One of the key arguments was that it would maximise the GHG emissions reductions by encouraging investment in the most low-carbon technologies and seeking efficiencies throughout the production process. These respondents felt it would send a strong signal to drive improvement along the supply chains of existing pathways. Furthermore, as the grid decarbonises and low carbon hydrogen becomes more widely available, it will be easier for producers to meet the minimum threshold, and this should be reflected.

The main reason for disagreeing with this proposal was that it is unnecessary to increase the threshold in a scheme that already incentivises greater GHG emissions reductions through the reward system. Such a scheme already allows for incremental improvement, while avoiding the risk of setting out threshold increases in legislation at the wrong rate. Other respondents disagreed on the basis that the threshold should be set at a high level from 2025 and therefore there is no need to increase it over time. These respondents were keen to avoid a situation whereby fuels with lower environmental standards are eligible or industry invests in infrastructure that cannot be adapted to meet the highest GHG emissions reductions.

In terms of the rate at which the threshold should be increased, respondents urged the government to consider many factors that impact the lifecycle GHG emissions reductions of SAF production. This included grid decarbonisation, low carbon hydrogen availability, CCUS development, commercial readiness of PtL facilities and developments in international sustainability criteria. However, no respondents suggested a specific trajectory.

Many respondents urged the government to communicate any changes to the threshold as soon as possible and to legislate these changes from the start. Critically, many respondents sought clarity on how the Department would consider grandfathering[34]. Respondents explained that clarity on the evolution of the threshold would provide certainty for investors, while grandfathering would ensure existing plants are not penalised.

Some respondents, however felt that there are insufficient data available to set out how the threshold should change at this given time. Rather, the minimum threshold and all relevant factors should be monitored as SAF supply increases. It was suggested that changes to the minimum GHG emissions reductions threshold should be included in the regular review process discussed in questions 15 and 16.

[34] Grandfathering is a provision in which an old rule continues to apply to some existing situations while a new rule will apply to all future cases. Here, it would mean that production plants producing SAF prior to an increase in the minimum GHG emissions savings threshold would not be required to meet this new minimum GHG emissions savings threshold.

Government response

We believe that the GHG emissions reductions threshold of 40% compared to a fossil fuel comparator of 89 gCO2e/MJ is appropriate during the early years of the Mandate to encourage investment into SAF and ensure a diverse set of technologies can develop. However, we feel that it will likely be necessary to increase the threshold as other sectors decarbonise, such as the grid, and CCUS becomes widely available. This is important to ensure we incentivise the continual improvement of SAF production pathways.

Typically, it is RCFs which deliver the lowest GHG emissions reductions of the eligible types of SAF. The GHG methodology uses an energy from waste counterfactual to determine GHG emissions reductions, which is not used for the methodology in biofuels and PtL. This difference in approach reflects the fundamentally different nature of RCFs, which embody fossil carbon. The environmental benefits of RCFs are realised when the conversion of feedstock to RCFs delivers greater carbon savings compared to the counterfactual use. The counterfactual emissions associated with UK derived RCFs could decrease significantly over the coming years as the electricity grid decarbonises[35]. As the electricity grids in the UK and overseas decarbonise, RCF production plants will also have the capability to increase their GHG emissions reductions without any action or investment required.

Given the decarbonisation of the grid is subject to significant uncertainty, it is not possible at this stage to set out exactly how the threshold will evolve over time for all types of SAF. However, based on the Treasury Green Book grid decarbonisation projections[36], RCFs made in the UK are expected to achieve around 65% GHG emissions reductions by 2035[37] should the rate of grid decarbonisation progress as expected.

We will consider the minimum GHG emissions reductions threshold as part of the regular review process covered in questions 15 and 16. We will only make changes to the threshold if there is sufficient robust evidence to do so and this would be subject to consultation. As part of that review we will consider if it would be appropriate to grandfather existing SAF facilities. This is unlikely to be necessary as SAF production plants will automatically reduce their emissions as the electricity grids in the UK and elsewhere decarbonise. Should we make changes to the threshold, we will communicate these to stakeholders, giving sufficient time for SAF plants and suppliers to make any necessary changes to meet the new threshold.

GHG emissions calculation methodology

Consultation proposals

Fuel suppliers must be able to demonstrate that the carbon intensity of their supplied SAF achieves the minimum GHG savings threshold. The carbon intensity also determines the number of certificates to be rewarded. The consultation proposed that existing RTFO GHG

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[35] We note that energy from waste facilities are expected to increasingly export useful heat and install CCS, which will impact the emissions savings of RCFs. The Administrator will define additional evidence-based factors for heat export and/or CCS if and when this becomes relevant.

[36] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

[37] https://assets.publishing.service.gov.uk/media/62f24849d3bf7f4fe5631088/supporting-recycled-carbon-fuels-through-rtfo.pdf

calculation methodologies for biofuels, RFNBOs and RCFs will be adopted for the SAF Mandate after an independent report commissioned by DfT confirmed these methodologies would be appropriate for SAF. For nuclear derived SAF, we proposed to adopt a GHG methodology that follows the same principles as the RFNBO methodology.

Under the existing RTFO methodologies, default values are provided for either a complete process pathway (total default value) or specific lifecycle analysis elements (disaggregated default value). These provide a means for suppliers to submit a carbon intensity value of its fuel where certain GHG values are not easily measurable. In the Mandate consultation, we proposed that disaggregated default values will be provided for downstream emissions where data or robust assumptions are readily available. However, total default values will not be provided. Where disaggregated default values are provided, suppliers will still be able to use and report actual values.

In comparison to renewable energy, nuclear energy has ongoing upstream and operational activities, such as processing and transport, which have GHG emissions associated with them and should be accounted for in the methodology. We therefore proposed that suppliers provide a GHG value for the upstream and operational emissions, either as an actual value or default value provided by DfT. We welcomed views and further evidence on what an appropriate default value is.

Question 27

Do you agree or disagree that the GHG methodologies used in the RTFO should be adopted in the SAF Mandate?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
44	36	1	6	1

Figure 30 Question 27 summary of responses.

Most respondents agreed that the GHG methodologies used in the RTFO should be adopted in the Mandate. Of those that agreed, the main reason was that consistency with the RTFO is important to maintain a level playing field between types of LCF and reduce administrative burden for suppliers complying under both schemes. More broadly, a few respondents noted that the RTFO methodologies have been developed from Renewable Energy Directive (RED) II methodologies, so adopting these will facilitate imports from the EU. Other key reasons for agreeing included that, these methodologies have been developed and refined over time, they are scientifically robust, and they are well understood by stakeholders. Several of those who agreed pointed out the RCF methodology has not been published so they cannot comment on this lifecycle analysis approach.

A few respondents preferred the methodologies to align with international schemes, in particular, CORSIA. These respondents felt that this would make global comparisons more straightforward and avoid any confusion or uncertainty in the market.

Other respondents disagreed with the methodologies on specific issues including co-processing for RFNBOs, additional renewable energy having zero emissions attributed to it at point of use, or that the methodologies are not aligned with the LCHS.

Other comments made by individual respondents included:

- flagging that they use a GHG methodology approved by a voluntary scheme;
- querying how the fossil fuel comparator may change over time;
- underlining it is critical to distinguish between the biogenic CO2 released from biofuels, fossil CO2 emitted from the combustion of RCFs, and the CO2 re-emitted after upstream carbon capture (i.e. for PtL production); and
- noting the importance of dealing with heat where an integrated nuclear facility provides heat as well as electricity to a PtL plant.

Government response

It is imperative that the scheme accurately calculates the carbon intensity of SAF production in order to correctly determine the number of certificates and to ensure that fuel meets the minimum GHG emissions savings threshold. At the same time, we recognise there is a balance to be struck with minimising complexity for both government and industry when administering the mandate.

We are pleased that most respondents agreed with the proposal to use the RTFO methodologies to assess the lifecycle carbon intensity of SAF. These methodologies have been developed over several years to ensure they accurately determine the carbon intensity of fuel production and, as a result, they are familiar to UK fuel suppliers.

Government decision: we will adopt the same methodology for assessing the lifecycle carbon intensity of SAF as the RTFO does for renewable fuels.

For biofuels and RFNBOs, these methodologies are already set out in guidance, while the RCF methodology was recently confirmed in the government response to the consultation on RCFs[38]. **For nuclear derived fuels, this will adopt the same methodology as RFNBOs, with slight adjustments to account for the specificities of nuclear energy compared to renewable energy**.

The UK biofuels methodology is broadly consistent with the methodology employed by the EU. The RFNBO and RCF methodologies have been developed by the UK, though the EU are developing similar methodologies using the UK methodology as a template. We have provided a response in question 23 to those respondents that expressed preference for alignment with the LCHS.

As stakeholders noted, consistency with the RTFO is important for fuel suppliers that will be using both schemes as it reduces complexity and facilitates compliance. We anticipate that most suppliers will use voluntary schemes, such as International Sustainability and Carbon Certification (ISCC), to prove compliance with the sustainability criteria. Importantly, the

[38] https://www.gov.uk/government/consultations/supporting-recycled-carbon-fuels-through-the-renewable-transport-fuel-obligation/outcome/supporting-recycled-carbon-fuels-through-the-renewable-transport-fuel-obligation-government-response

RTFO methodologies are an accurate lifecycle approach to determine the carbon intensity of fuel production and voluntary schemes are already familiar with them.

We recognise that there are differences with the CORSIA methodology. Although CORSIA adopts a similar approach for deriving core carbon intensity values, it also permits a range of additional indirect GHG factors that reduce the carbon intensity of fuels (for example residual waste displacement from landfill or improvements to recycling), resulting in different values for the same fuel declared under the UK Mandate and these schemes. This is because CORSIA provides a wide-reaching framework that recognises certain behaviours associated with SAF production. However, it does not prevent states from adopting more stringent methodologies. We will continue to work through ICAO to ensure that CORSIA provides a robust framework for airlines to claim benefit for their SAF use, while not preventing fuel suppliers being subject to mandates in individual member states.

Whilst the methodology we will use to calculate the carbon intensity will be the same as under the RTFO, the final GHG saving is calculated against a different fossil fuel comparator. We previously confirmed that this comparator is 89 gCO2e/MJ in line with ICAO. This is different from the RTFO as it more accurately reflects baseline emissions of the fossil fuel being replaced. On the specific points raised about distinguishing between types of CO2, treatment of direct heat from nuclear energy, co-processing and additionality, further information will be made in the upcoming guidance.

Question 28

Do you agree or disagree that only disaggregated default values will be provided for downstream emissions while the rest of the SAF lifecycle will require the use of actual GHG values?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
33	26	1	6	0

Figure 31 Question 28 summary of responses.

Most respondents agreed that disaggregated values should be provided for downstream emissions only. A few of these pointed out the benefits of including defaults generally. Namely, that defaults reduce administrative burden, suppliers may not initially have the resource to carry out a detailed lifecycle analysis at every step and that actual values are not always easily attainable. As such, some of those in agreement requested that when real-world evidence becomes available, the government should introduce more default values.

A few respondents understood the question to mean that only default values would be provided for downstream emissions while actual values would not be eligible, to which they disagreed. They underlined that actual values should always be an option, as currently happens in the RTFO. For further alignment with RTFO, some respondents proposed that default values for all appropriate emissions up to the point of final dispatch should be considered to provide a level field for all available technologies. One respondent suggested using default values that have been developed under CORSIA to maintain global standards.

Finally, a couple of respondents suggested the creation of an international expert panel is created to maintain and update guidance and default values going forward, such that there is a dynamic process for amendments. Respondents noted that a similar proposal is being considered by the International Maritime Organization for marine fuel.

Government response

Our experience from implementing the RTFO has demonstrated the importance of providing disaggregated default values to suppliers where possible. We will therefore endeavour to maximise flexibility to suppliers by providing disaggregated default values where it makes sense to. However, we recognise that default values should be accurate to avoid incorrect calculation of certificates and, at this given time, we consider there is insufficient data on many elements of the lifecycle for each SAF production pathway. As a result, it is not possible to provide aggregated default values. When the mandate is introduced, we will therefore only provide disaggregated default values for downstream emissions.

Government decision: disaggregated default values will be provided for downstream emissions. Where disaggregated default values are provided, suppliers will still have the opportunity to provide actual values.

These disaggregated default values will be published in the upcoming Mandate guidance. Working with international voluntary schemes and industry, the default values will be reviewed regularly and updated if new evidence suggests it is necessary. ,

Question 29

Please provide evidence to inform which default values should be provided by DfT for downstream emissions.

Summary of responses

Sixteen stakeholders responded to this question. Most of these respondents pointed out that transport and distribution emissions are comparable to road fuel. Therefore, these default values could be taken from the RTFO. Other respondents suggested different sources including the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model, CORSIA and Roundtable on Sustainable Biomaterials (RSB).

Government response

We have responded to questions 29 and 30 together – see government response following question 30.

Question 30

Do you agree or disagree that upstream and operational emissions should be included for nuclear power generation at the point of delivery? If yes, please provide evidence of what figure could be used for the default value.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
24	20	3	0	1

Figure 32 Question thirty summary of responses.

Most respondents agreed that upstream and operational emissions from nuclear power generation should be included in the carbon intensity at the point of delivery. Many respondents called for consistency with other schemes and to treat all technologies equally. As such all emissions up to the point of final dispatch should be considered, including upstream emissions, regardless of the energy source.

Regarding which default value could be used, a few respondents suggested specific sources while one respondent noted that any default used must still encourage investment in nuclear power to support SAF production.

Government response

It is imperative that all aspects of the fuel's lifecycle are accounted for to ensure that certificates are rewarded appropriately and that the GHG emissions reductions arising from the Mandate are accurate.

Government decision: where additional nuclear energy is used as an energy source, upstream and operational emissions will be accounted for at the point of use.

This marks a difference from the use of renewable energy, which is considered to have zero emissions at the point of use in the RTFO and the SAF Mandate. We will provide a disaggregated default value; however, suppliers reserve the right to provide actual values if they wish.

We continue to review the sources of information submitted in response to questions 29 and 30, while working in cooperation with international schemes and industry, to determine appropriate disaggregated default values. These disaggregated default values will be published in the upcoming Mandate guidance. The disaggregated default values will be reviewed regularly and updated if new evidence suggests it is necessary to change the figure provided.

Other emissions

The proposed GHG methodology focuses on accounting for CO2, CH4 and NO2 emissions. However, we recognise that aviation fuels, and indeed fuels more generally have environmental impacts which extend beyond these emissions.

Research and analysis carried out so far suggests that SAF is expected to have a positive impact on reducing aviation's non-CO2 impacts. Nevertheless, significant uncertainties surrounding the climate impact of non-CO2 emissions and non-CO2 benefits of SAF remain, and there is currently no scientific consensus over a suitable metric for comparing the climate effect of CO2 with non-CO2 impacts, or for effective monitoring of non-CO2 impacts.

Given the lack of certainty in this field, the government is not in a position to develop mitigation measures.

In the Jet Zero Strategy, the government confirmed its objective to address aviation's non-CO2 impacts by better developing our understanding of their impact and potential mitigations. On 13 October 2023, the Department for Transport alongside the Department for Business and Trade and the Natural Environment Research Council launched a multi-year research programme to support these commitments.

3. Involved parties

The Administrator

This section details our final position on who will act as the Administrator of the SAF Mandate and the powers and duties that the Administrator will have. The Administrator will be responsible for enforcing the scheme and supporting fuel suppliers to comply.

The government response to the first consultation confirmed that the SAF Mandate will be administered separately to the RTFO. The second consultation set out the government's intention to align the Mandate with the RTFO; that is, the Secretary of State for Transport acting as Administrator with delegated responsibility to an administrative unit within the DfT. We proposed that the Administrator will have the same powers and duties as those set out under the RTFO Order.

Consultation proposals

We propose that the SAF Mandate will be administered by a specific body (the Administrator) that will be responsible for enforcing the scheme and supporting fuel suppliers to comply. We proposed that the Administrator will have the same powers and duties as those set out in the RTFO Order and the Energy Act 2004. Under the RTFO Order, the Administrator is the Secretary of State for Transport, who delegates responsibility to an administrative unit within DfT. We proposed that the same approach is adopted in the SAF Mandate.

Question 31

Do you agree or disagree that the Secretary of State should be the Administrator, with responsibility delegated to a DfT administration unit?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
34	25	4	5	0

Figure 33 Question 31 summary of responses.

Most respondents agreed with the proposal to delegate responsibility of administration to a unit within DfT. This was primarily due to it being the same approach as the RTFO, which has been effective to date. Some respondents, however, added that it is necessary the administrative functions are well structured and there is sufficient technical expertise to operate both the SAF Mandate and RTFO effectively.

Of those that disagreed, respondents typically showed a preference for joint ownership and administration by the DfT and DESNZ - with one respondent also suggesting Defra due to the cross-sectoral nature of SAF in areas such as hydrogen, energy and feedstock availability. Other reasons for disagreeing were that the Administrator should secure cross-party support given the long-term nature of the mandate, as well as the suggestion that the DfT administration unit should have a reduced role and be accompanied by a private sector body that manages the daily operation of the scheme.

Government response

We have concluded that the current model has been effective at implementing the RTFO and would be equally effective for the operation of the SAF Mandate.

Government decision: the Secretary of State should be the Administrator, with responsibility delegated to a DfT administration unit.

This means that an administrative unit within DfT will act as the regulator of the SAF Mandate and ensure obligated parties comply with legislation. The unit's primary responsibilities will be management of accounts, ensuring that SAF claimed under the scheme meets the sustainability criteria and ensuring obligated parties meet their obligations. We will ensure that the administrative unit has sufficient resource and expertise to deliver the functions and duties assigned to it.

We recognise that some respondents requested the SAF Mandate to be delivered through a cross-departmental administrative unit given the synergies with policy led by other government departments, in particular, DESNZ. While much of the SAF Mandate policy has close links with other departmental policy, the 'RTFO Unit' in DfT has experience in operating the RTFO independently since its inception. Throughout this period, it has maintained close relationships with other government departments. We will take the same approach in the operation of the SAF Mandate and therefore do not feel it is necessary to incorporate other departments in the daily operation of the mandate. The same applies when considering the inclusion of private bodies to support the operation of the Mandate. Nevertheless, we will continue to work with the Jet Zero Council and through other stakeholder engagement to monitor the Mandate as needed.

Question 32

Are there any additional powers or duties beyond those outlined above that the Administrator should be granted?

Summary of responses

Total	Yes	Neither	No	Don't know
21	3	1	17	0

Figure 34 Question 32 summary of responses.

Most respondents did not see the need for any further powers or duties to be legislated for beyond those listed in the consultation. A few respondents highlighted that the RTFO has been developed and updated over several legislative cycles in response to any issues with its operation, so no further changes are required.

A small number of respondents did suggest further powers or duties for the Administrator. These included the power to introduce incentives for producers or revenue certainty mechanisms, the power to redistribute buy-out funds to industry, an arbitration role with other government departments, and powers to ensure continued supply of jet fuel during periods where a SAF obligation cannot be met due to unexpected shortages.

Government response

The powers and duties of the Administrator of the RTFO have been revised several times since the RTFO was launched to reflect issues that may have arisen during the implementation of the RTFO. Upon reviewing these powers and duties, we do not believe that the supply of SAF will require any further changes to the current powers and duties held by the Administrator of the RTFO.

Government decision: the Administrator for the SAF Mandate will have the same powers and duties granted to it as it does under the RTFO Order.

These powers and duties were set out in the consultation and will be written into the SAF Mandate legislation.

In response to stakeholder views on additional powers we have responded to each of these points below:

- Power to introduce a revenue certainty mechanism: the government has already committed to designing and implementing a revenue certainty mechanism for UK SAF projects as soon as possible. Furthermore, this power would fall outside the existing scope of the primary legislation;
- Power to redistribute buy-out funds: we will remain consistent with the approach under the RTFO Order whereby payments go into the Consolidated Fund; however, we will keep this under review;
- Duty of arbitration between government departments: the Mandate has been designed in collaboration with other departments and DfT will continue to work across government to ensure alignment of policy;
- Power to ensure continued supply of jet fuel: where the Mandate cannot be met due to unexpected shortages or prices rises of SAF, the buy-out mechanism allows suppliers to meet their obligation by paying a sum of money proportional to the shortfall of SAF supply. This mechanism will be written into legislation. We would

anticipate that fossil jet fuel would be supplied in the absence of SAF and it is therefore not necessary to include as a specific power or duty for the Administrator.

Obligated parties and obligated fuel

The first consultation confirmed that under the SAF Mandate suppliers of fossil jet fuel to the UK will be subject to an obligation.

This section sets out the government's final position on the 'assessment time' in the Mandate. Whichever party owns the fuel at the assessment time will become obligated if supplying fossil jet fuel, or be rewarded with certificates if supplying eligible SAF. Rewards under the scheme will only be granted once proof of sustainability has been certified. This section sets out the assessment time for avtur, renewable avgas and hydrogen.

The response to the first consultation did not set out the assessment time; however, it noted that for avtur the government was minded towards placing the assessment time at the blending and certification point. This position was amended in the second consultation because this assessment time would not cover all necessary fuel. For example, fossil jet fuel is not always blended and certified and SAF may be blended outside the country. The second consultation proposed that the assessment time for avtur and avgas will be the duty point and the point of retail sale for hydrogen.

Consultation proposals

We proposed that the assessment time for avtur under the Mandate is at the duty point as this aligns with treatment for road fuel under the RTFO. It will capture both imported and domestically produced SAF and conventional avtur, and it is at a point in the supply chain where fuel volumes would be readily auditable.

For avgas, which is subject to duty, we proposed to use the duty point as the assessment time in line with the current position under the RTFO, and the proposed approach for avtur. For hydrogen, we proposed the point of retail sale as the assessment time in line with current practice under the RTFO and welcomed further views on this approach.

Question 33

Do you agree with the assessment time for avtur being set at the duty point? Please provide evidence to support alternative approaches.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
26	23	2	1	0

Figure 35 Question 33 summary of responses.

Most respondents to this question agreed with the assessment time for avtur being set at the duty point. Respondents suggested that this aligns with similar legislation in other

regions and helps to ensure that both imported and domestically produced fuel is covered by the legislation. Some respondents suggested that the government needs to consider the possible interactions with heating kerosene and ensure that there is a simple process in place to ensure this fuel does not receive an obligation. One respondent highlighted that the scheme must ensure producers that decide to blend their SAF with fossil jet purchased from others, do not inadvertently become obligated parties under the Mandate. Two respondents highlighted that the avtur supply chain is very complex and often company-specific and suggested that DfT engage with suppliers during the Mandate implementation period to ensure that any process that is enacted works as intended.

The one respondent who disagreed with the duty point as the assessment time suggested that it should instead be set at the point of sale to the aviation operator, or the wingtip, in order to accurately reflect the volume of fuel used for aviation purposes. Another respondent suggested that the wording ‘importer of record’ be used to cover imported avtur.

Government response

It is critical that the assessment time takes place at the correct point in the supply chain to ensure that the intended parties are either obligated or rewarded with certificates. The assessment time must only happen once, be clearly defined in legislation to remove ambiguity, be identified the moment it happens, and ideally have data available to validate fuel volumes (see question 34). We proposed the duty point as the assessment time as we believed it met these minimum requirements and following stakeholder feedback we do not see any reason to diverge from our proposal.

Government decision: the assessment time for avtur will be placed at the duty point.

Although avtur is fully rebated (no duty is paid), it is still a controlled oil as defined in section 27 (1) of The Hydrocarbon Oil Duties Act 1979 (HODA) and has a duty point. This aligns with the current assessment time for road fuels under the RTFO, making it administratively easier for suppliers of fuels to both the road and aviation markets. Under HODA, unblended SAF HODA would be treated as a “substitution” for the fuel that it is replacing (i.e. kerosene). It would therefore have the same tax code and would not be subject to duty.

Where the duty point falls is determined by a number of factors including type of fuel, production process and whether the fuel is imported or domestically produced. Suppliers will have to consider each of these factors when setting up their supply chains to ensure that the intended party is either subject to an obligation or eligible of reward of certificates.

Broadly speaking:

- Where fossil jet fuel is produced or refined in the UK, the duty point occurs when the fuel leaves the refinery warehouse. This fuel will be subject to an obligation.
- Where unblended SAF is produced in the UK, the duty point will occur when it leaves the production facility and is set aside as a substitution for fossil kerosene to be used in UK aviation. This fuel will be subject to the reward of certificates.
- Where a refinery produces a combination of both fossil kerosene and SAF and blends them on the same site, the duty point occurs when the fuel leaves the refinery warehouse. This fuel will be subject to an obligation and certificate reward.

- Where fossil kerosene, blended SAF or unblended SAF is imported into the UK for the purposes of aviation fuel, the duty point will occur when the fuel leaves the storage facility at the point of import. Depending on the type of fuel being imported, the fuel will be subject to either an obligation, reward of certificates, or both.

We have been working closely with HM Revenue and Customs (HMRC) to ensure that our policy proposals have the intended outcome. We will continue to engage with HMRC and stakeholders to consider if updates to the Hydrocarbon Oil Duties Act 1979 (HODA) are required. Further information on the assessment time will be provided in guidance.

Question 34

Do you agree that the duty point is the most suitable assessment time for renewable avgas?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
23	19	1	1	2

Figure 36 Question 34 summary of responses.

Most respondents to this question agreed with the assessment time for avgas being set at the duty point. Respondents highlighted that this is consistent with avgas' treatment in other regulations. Respondents also highlighted that the duty point works particularly well for avgas because it has an uncomplicated supply chain and a lack of alternatives downstream of this point. One respondent who agreed with the use of the duty point highlighted that it could cause issues with petrol but suggested that this was niche and did not provide explanation for this point.

One respondent suggested that the wording 'importer of record' be used to cover imported avgas.

Government response

The assessment time for avgas must follow the same principles as avtur, which were set out in the response to question 33. For the same reasons explained in the above response, and taking into consideration stakeholder responses, we will continue with our proposal to set the assessment time at the duty point.

Government decision: the assessment time for avgas will be placed at the duty point.

As stated above, we will continue to work with HMRC to ensure that our policy intent and legislation is line with existing legislation. Further information on the assessment time will be provided in guidance.

Question 35

Do you agree that the point of retail sale is the most suitable assessment time for hydrogen? Please provide evidence to support alternative approaches.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
17	11	1	1	4

Figure 37 Question 35 summary of responses.

Most respondents to this question agreed that the point of retail sale should be used as the assessment time for hydrogen. The reasoning provided for this choice was that it aligns with the treatment of hydrogen under the RTFO and under low carbon hydrogen agreements.

Several respondents highlighted that they were unclear on where the assessment time for hydrogen should be because the hydrogen for aviation market is still in early development and supply chains are not yet established. One respondent suggested that hydrogen into aircraft may not follow the same supply chain as hydrogen into road. For this reason, some respondents suggested that the assessment time be kept under review as the market develops.

Government response

As stated in the consultation, hydrogen does not have a relevant duty point. It is therefore necessary to impose a different assessment time for its supply, which we proposed to be the point of retail sale. However, the reference to retail implies that it is the final sale of the fuel and is primarily relevant to when fuel is sold in forecourts. We have therefore removed reference to retail in the definition of the assessment time so that it is more appropriate to aviation. This is in line with the current wording of the RTFO.

Government decision: the assessment time for hydrogen will be the point at which it is sold to a customer in aviation.

This is the point at which the renewable hydrogen is sold to a customer (whether commercial or retail) for consumption in aviation and not for resale in the course of a trade or business.

Given there is insufficient evidence at this stage to assess the effectiveness of this assessment time, due to lack of hydrogen supplied to UK aviation, it is right to maintain consistency with the RTFO. As hydrogen supply to aircraft increases, we will monitor the situation and compare this to other transport sectors to ensure the assessment time is set in the correct place. If new evidence emerges that suggests the assessment time should be amended, then government will take appropriate action. We do not expect significant volumes of hydrogen to be supplied during the early years of the Mandate due to development of timeframe associated with relevant airframe technology. Therefore, government will have sufficient time to consult stakeholders and alter legislation if necessary.

End point of chain of custody

Whilst the duty point will be used as the assessment time, it is still necessary to ensure that SAF has been supplied for use in planes departing from the UK. It is therefore necessary to track the fuel along the chain of custody to its end use. This section sets out the government's final position on where the chain of custody ends under the Mandate.

The chain of custody is the sequence of ownership of aviation fuel as it moves through the supply chain from its origin e.g. where a waste feedstock arises to where the SAF is supplied for use in aviation. The end point of the chain of custody is what will be used under the Mandate scheme to identify when SAF has reached a 'point of no return' where the fuel cannot be used anywhere other than UK aviation.

Suppliers become liable for obligations, or eligible for rewards, at the assessment time; however, there is no guarantee that once fuel has reached the assessment time that it will be used in UK aviation. It is important that obligations and rewards only apply to fuel that is supplied to UK aviation. Therefore, evidence of forward supply of fuel past the assessment time is necessary for the obligations and rewards identified at assessment time to be placed on, and granted to, fuel suppliers. The end point of the chain of custody will be used to identify when SAF has reached a 'point of no return' where the fuel cannot be used anywhere other than UK aviation.

The first consultation confirmed that mass balance will be the only chain of custody permitted in the Mandate scheme. The response also noted that the government was minded towards ending the chain of custody at the point the fuel is held in co-mingled storage. However, the second consultation amended this position and proposed that the end of the chain of custody be set at the 'point of no return', to align with the process that has been successful under the RTFO.

Our final position is to set the end of the chain of custody as the 'point of no return' of the relevant fuel.

Consultation proposals

We proposed that the end point of the chain of custody should be the 'point of no return' of the relevant fuel. This is the position adopted by the RTFO. Evidence that can be submitted to prove forward supply currently includes bills of lading or equivalent transport documentation showing delivery to an airport, proof of payment by airlines accompanied by evidence of transport up to, and including, entry into pipelines, and other arrangements as agreed with the Administrator.

Question 36

Do you agree with the end point of the chain of custody being the 'point of no return' of the relevant fuel?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
30	21	3	6	0

Figure 38 Question 36 summary of responses.

Most respondents to this question agreed that the end point of the chain of custody should be the 'point of no return' of the relevant fuel. The main reasoning provided for this choice was that it aligns with current treatment of avtur under the RTFO and that it will help to avoid the double counting of emission reductions.

Several of the respondents who agreed with the 'point of no return' as the end point of the chain of custody felt that further detail was needed on the practicalities of this. Two respondents suggested that government needs to do further work to define what the point of no return would be in different supply chain scenarios. One respondent who agreed suggested that the point of no return should be aligned with the approach taken in the UK ETS legislation, which ensures that a variety of delivery methods into UK aviation fuel systems can be accommodated.

Several respondents suggested the end point should be at the assessment time (duty point). These respondents suggested that the original reason for an onwards chain of custody past the assessment time was due to the RTFO assessment time for SAF sometimes occurring outside of the UK, and therefore proof being required that the fuel had reached the UK.

Although the question did not directly ask about chain of custody models, several respondents suggested that a book and claim chain of custody be considered under the mandate to allow airlines to purchase SAF without being geographically connected to a SAF production site.

Government response

It is essential that the chain of custody ends at the correct point to ensure that any fuel that is either obligated or rewarded with certificates at the assessment time is used in UK aviation only and is not used for any other purposes further down the supply chain.

Government decision: we confirm that the chain of custody ends at the point of no return where fuel cannot be used anywhere other than UK aviation.

Voluntary schemes, which suppliers currently rely on to provide assurance over the chain of custody for eligible fuels, typically only cover the chain of custody for SAF to the assessment time. There is no guarantee that once fuel has reached the assessment time it will be used in UK aviation and for this reason, we propose that we will require evidence of forward supply of fuel past the assessment time.

We will adopt the same approach as the RTFO whereby the Administrator will regularly conduct compliance checks on random SAF consignments to require evidence of end use. However, fuel suppliers are not required to provide evidence of end use for every litre of fuel supplied due to the significant administrative burden this would place on fuel suppliers.

There are several potential pieces of evidence that can be used to prove fuel has reached the point of no return including bills of lading or equivalent transport documentation showing delivery to an airport and proof of payment by airlines accompanied by evidence of transport up to, and including, entry into the pipelines. However, further information on the exact evidence that can be used as compliance will be provided in guidance.

It is also important that the sustainability credentials for each consignment of SAF are passed through to end users, to allow SAF use to be claimed against obligations in other schemes. For example, airlines using SAF in UK ETS or CORSIA. We are working closely with DESNZ, the Environment Agency and voluntary schemes to develop a solution that will allow sustainability credentials for a given SAF consignment to be passed down onto end users, while ensuring that strict audit requirements continue to be upheld and there is no double counting of emissions savings. Further information on interactions between the Mandate and these schemes will be provided in guidance.

Threshold amount below which fuel is not obligated

This section sets out the government's final position on the threshold by which the supply of conventional avtur will not face an obligation.

A threshold will safeguard small amounts of fuel for end uses such as research and testing, for which the amount of SAF obligated to be supplied would be negligible. To apply an obligation in these circumstances is considered a disproportionate burden. This is the approach successfully taken under the RTFO.

The government response to the first consultation confirmed that the obligation on jet fuel suppliers noted that the government was minded towards introducing a minimum threshold below which fuel is not obligated.

Consultation proposals

We proposed that suppliers that supply less than 370 tonnes (equivalent to approximately 450,000 litres) of avtur within a reporting period will not have an obligation and will be exempt from the reporting requirements of the SAF Mandate. This aligns with the threshold currently in place in the RTFO.

Question 37

Do you agree with the use of a 370 tonne (approximately 450,000 litre volume) threshold under which conventional avtur is not obligated within the mandate? If not, please provide an alternative and any evidence to support this.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
23	20	1	2	0

Figure 39 Question 37 summary of responses.

Most responses to this question agreed with the use of a 370 tonne threshold within the Mandate scheme. Most respondents who agreed did not provide an explanation for this, but those who did highlighted that avtur suppliers supply much larger volumes of fuel than the threshold stipulates, so it should capture all those who supply into aviation. Several respondents were also pleased to see consistency with the RTFO threshold.

Two respondents who agreed with the proposal felt that it would be helpful to have clarification that a small supplier who supplies over 370 tonnes of road fuels and avtur in total will not be obligated under the mandate or RTFO.

Of the respondents who disagreed, one felt that a threshold would create a potential loophole for private aircraft to avoid the Mandate by resetting their obligation every year. Another respondent suggested that in order to reach net zero emissions in aviation, the Mandate should cover all avtur supply regardless of the volume supplied.

Government response

Given most respondents agreed with our proposed approach, and that it aligns with the approach that has worked effectively in the RTFO we will not diverge from this approach when we introduce the SAF Mandate.

Government decision: any fuel supply under the equivalent of 370 tonnes will not be subject to an obligation. Note that the SAF mandate obligation is applied on an energy basis and this equates to 15.9 terajoules (TJ).

This figure relates to the total amount of fuel owned by the supplier for UK aviation, including both fossil jet fuel and SAF. This threshold only applies to suppliers that supply less than 8,000 tonnes. If a supplier supplies 8,000 tonnes (equivalent to 344 TJ) or more then the full amount will be subject to an obligation.

In addition to maintaining consistency with the RTFO approach, we believe it is necessary to safeguard small amounts of fuel supplied for end uses such as research and testing and that it would be disproportionate to apply an obligation to suppliers of small volumes of fuel. Suppliers of small amounts of fuel who would not be obligated under the Mandate are not required to register an account. This will help to avoid unnecessary administrative burden for both the non-obligated parties and for the Administrator.

This minimum threshold is unlikely to impact on the obligation of established avtur suppliers, as they deal in much larger amounts of fuel than the threshold stipulates. It will therefore have minimal impact on the GHG emissions savings of the scheme. For context, approximately 12.4 million tonnes of jet fuel are expected to be supplied to the UK in 2030 leading to an obligation of 1.24 million tonnes of SAF to be supplied equating to 2.7 $MtCO_2e$ saved in that year.

The SAF Mandate and RTFO are two separate schemes. Therefore, this threshold applies only in relation to aviation fuel, while the 450,000 litre threshold will continue to be in place under the RTFO Order for all relevant fuels (which will not include aviation fuel once the Mandate is operational from 2025).

In response to the point raised about private aircraft avoiding their obligation, it must be emphasised that the obligation is placed on suppliers of jet fuel. Avgas typically fuels aircraft used in general aviation, which would not be subject to an obligation regardless of whether a threshold is imposed.

4. Calculating the obligations and certificate reward

Obligation period

This section sets out the government's final position on the obligation period under the Mandate and the specific dates by which obligated parties and the Administrator must take action following the end of the obligation period.

The obligation period is the timeframe over which obligated suppliers will be required to supply their mandated amount of SAF.

Consultation proposals

We proposed that each obligation period is one year in length and runs on a calendar year basis, in line with the RTFO. This time period gives suppliers sufficient flexibility to meet their obligations, simplifies compliance for suppliers obligated under both the RTFO and Mandate and allows for a straightforward transition of SAF support from the RTFO to the Mandate.

Following the end of each obligation period, we propose that deadlines that suppliers and the Administrator must adhere to align with those in the RTFO. That is, in the months following an obligation period end:

- suppliers will be able to submit claims for SAF certificates for the previous obligation period until 12 May;
- the deadline for the Administrator to revoke certificates is 17 June and the deadline for appeal against revocation is 15 August;
- the obligations will be calculated on 15 August and shared with suppliers, at which point suppliers will be able to redeem their certificates against their obligations up until 15 September; and
- the Administrator will calculate the buy-out sums on 21 September and share with suppliers. Suppliers will have until 26 October to pay the buy-out sums.

Question 38

Do you agree or disagree that the obligation period should run for a one-year period and on a calendar year basis?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
33	33	0	0	0

Figure 40 Question 38 summary of responses.

All respondents agreed with this proposal on the basis that it is consistent with other schemes including the RTFO and other domestic and international GHG reporting schemes. For suppliers, aligning with the RTFO will ensure a straightforward transition to supporting aviation fuel under the Mandate and will reduce the administrative burden for those supplying fuel under both schemes.

Government response

Government decision: the SAF Mandate obligation period will be one year in length, running on a calendar year basis.

This means that the first obligation period will run from 1 January 2025 up to and including 31 December 2025.

This obligation period aligns with that of the RTFO ensuring that there is no point at which SAF is not supported or is eligible to receive certificates under more than one scheme. This obligation period has been effective under the RTFO as it provides a sufficient length of time over which obligated parties can source SAF to meet their obligation. Furthermore, consistency with RTFO is important for suppliers or other parties operating under both schemes as it imposes processes with which they are already familiar and simplifies compliance. For the Administrator regulating the scheme, aligning with the RTFO will reduce complexity. We therefore think it would cause undesirable consequences should we diverge from imposing an obligation on a calendar year basis.

Question 39

Do you agree or disagree with dates for which actions must be completed following the end of the obligation period?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
26	25	1	0	0

Figure 41 Question 39 summary of responses.

Most respondents agreed with this proposal to be consistent with the RTFO and provide a clear framework for processes following the obligation period. A few respondents suggested including these dates in the review process to ensure that unforeseen issues can be addressed. For example, coinciding administrative deadlines with the RTFO could result in administrative burden for the Administrator if the same resource is expected to operate both schemes.

Government response

Based on our operational experience of the RTFO and feedback from the consultation, we believe that there is no need to amend the actions and dates that are in place.

Government decision: we will legislate that, following the obligation period, the Administrator and relevant parties must complete the above actions by the following timelines:

- suppliers will be able to submit claims for SAF certificates for that obligation period until 12 May (see question 50 for more information on submitting claims);
- the revocation deadline is 17 June and the revocation appeal deadline is 15 August (see question 59 for further information);
- the obligations will be calculated on 15 August, at which point suppliers will be able to redeem their certificates against their obligations up until 15 September (see question 46 for more information); and
- the Administrator will calculate the buy-out sums on 21 September and suppliers are due to pay the buy-out sums by 26 October.

Suppliers' obligations will be determined according to the amount of energy supplied through aviation fuel

This section sets out how an obligated parties' obligation will be calculated.

Consultation proposals

The second consultation proposed to determine each supplier's obligation to supply SAF based on the energy they have supplied through fossil aviation fuel. Obligating based on energy will allow us to include emerging technologies in the future through the certificate reward system. An obligation on energy supplied will reduce emissions to the same level, at the same rate, as a GHG emissions reductions obligation.

Question 40

Do you agree or disagree that the calculation of each supplier's obligation to supply SAF should be determined on the basis of energy?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
34	31	1	2	0

Figure 42 Question 40 summary of responses.

Most respondents agreed with the proposal to determine each supplier's obligation on the basis of energy. Reasons for agreeing included that it is an accepted unit within industry, it

is easily linked to carbon intensity and ensures that the energy density of different fuels are accounted for fairly.

However, of those that agreed, five respondents were not in entire agreement with the proposal. Generally, these respondents raised points about the lower heating value (LHV). Specifically, that fuel suppliers often trade in litres so an LHV (in MJ/litre) is needed to calculate the obligation. These respondents requested that DfT provide a default value for this conversion rather than requiring suppliers to measure their own as this would be an excessive administrative burden, costly and could lead to inaccuracies. While agreeing with using the basis of energy, a different respondent questioned why the target is based on fossil fuel supplied rather than total fuel supplied, resulting in high and confusing targets.

Those that disagreed did so on the basis that the market uses volumes as a standard unit, making the use of energy confusing and complex. Furthermore, one respondent flagged that the buy-out has been presented in litres and tonnes and would therefore need to be converted to energy using LHV.

Government response

Government decision: the calculation of each supplier's obligations to supply SAF should be determined on the basis of energy. We will use mass (kilograms) for the calculation of the obligation, rather than volume (litres).

This means that the Mandate will require obligated suppliers to ensure that a given proportion of the total energy provided by the aviation fuel it supplies comes from SAF for both the standard obligation and PtL obligation, in line with the targets set out in questions two to six and questions 10 to 11, respectively.

The obligations are calculated by applying the target (as a percentage) to the amount of fossil kerosene (in terms of energy) using the following equations:

$$OBL = m_f \times LHV_f \times E_{target}$$ **Standard obligation**

$$OBL_{PtL} = m_f \times LHV_f \times E_{target}^{PtL}$$ **PtL obligation**

Where:

- OBL is the standard obligation incurred by the fossil jet fuel supplier as a result of delivering a fossil kerosene consignment to the UK, in MJ;
- m_f is the mass of fossil kerosene supplied, in kg;
- LHV_f is the lower heating value of the fossil kerosene consignment (i.e. the energy content), in MJ/kg;
- E_{target} is the standard Mandate target, as a percentage of energy from produced by fossil kerosene supplied to the UK market;
- OBL_{PtL} is the PtL obligation incurred by the fossil jet fuel supplier as a result of delivering a fossil kerosene consignment to the UK, in MJ; and
- E_{target}^{PtL} is the PtL target, as a percentage of energy produced by fossil kerosene supplied to the UK market;

Targets will be set based on the total amount of SAF (on an energy basis) that needs to be supplied annually into the UK's aviation fuel mix. In setting these we have translated what this means for GHG emissions reductions that will be achieved, assuming that SAF achieves 70% GHG emissions reductions relative to fossil kerosene on average. Therefore, our obligation on energy supplied will reduce GHG emissions to the same level, at the same rate, as a GHG emissions reductions obligation.

We note that several fuel suppliers suggested litres are more commonly used within industry for trading and distribution through pipelines and would therefore be preferable to report in litres rather than kilograms. Volume is subject to external factors, such as a temperature and pressure, whereas mass is not. Therefore, mass is more accommodating of fuels such as hydrogen, which could be in liquid or gaseous form. However, we recognise that industry currently reports jet fuel in litres at 15 degrees Celsius to HMRC. Given these are standardised at a given temperature, the Department will convert these figures into mass, thereby avoiding additional burden for suppliers.

Regarding the LHV, we understand that it can be burdensome or risk inaccuracies for suppliers to measure and report the energy density of each individual consignment. Therefore, **we can confirm that the government will provide a standard value for LHV in guidance**. This value will be embedded in the IT system such that suppliers will only need to provide the volume of fuel supplied during the obligation period. The LHV used in calculations is yet to be confirmed as we continue to develop the guidance. However, it will be taken from a reputable source or similar scheme, such as the EU Renewable Energy Directive (RED) or ICAO, to maintain consistency and fairness on a global scale.

Calculation of certificates

This section sets out the government's final position on how the provision of certificates under the Mandate should be calculated.

The government's final position is to adopt the calculations proposed in the consultation. We can also confirm that the GHG reductions from CCUS will be rewarded under the Mandate, including where the final net lifecycle emissions are negative. This will ensure that the Mandate incentivises the use of CCUS in SAF production, delivering increased GHG emissions reductions.

Consultation proposals

To discharge their obligation in full, a supplier will be required to redeem a number of certificates equal to their obligation or pay the buy-out price (see section on discharging the obligation). To acquire certificates, a supplier can:

- supply SAF into the UK aviation market;
- purchase certificates from other SAF suppliers through a trading system (see section on transfer of certificates); or
- pay the buy-out fee.

The second consultation proposed an approach to the calculation of certificates for supplying SAF. We proposed the number of certificates for each consignment is based on

the energy of the fuel (MJ) and the carbon intensity factor. We also proposed an approach of calculating the carbon intensity factor that rewards SAF on a continuous, linear basis, with increasing certificates for every 0.1 gCO2e/MJ savings achieved. This calculation uses a reference carbon intensity, which we sought views on. Full details of the calculations are confirmed in the relevant government response sections. We welcomed views on whether alternative reward systems should be considered, for example an exponential relationship, or banding the reward.

The consultation also asked for feedback on whether emissions savings achieved through CCUS technologies should be rewarded under the Mandate, and if so, whether the Mandate should reward negative emissions.

Question 41

Do you agree or disagree with the calculation of certificates set out above?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
32	28	1	3	0

Figure 43 Question 41 summary of responses.

Most respondents agreed with the calculation of certificates set out in the consultation. There was broad support for an approach that rewards certificates proportionate to the carbon intensity of the fuel, as this will encourage the adoption of the lowest carbon technologies to be adopted in the production of SAF. One respondent also noted that fuels with different energy densities will be rewarded accordingly.

A couple of respondents noted that this calculation is tied to the buy-out when considering the level of reward that the mandate offers. They added that most fuels will not be 100% GHG saving, therefore the reward per unit mass is reduced substantially.

Other comments included recognising the need to have an accurate and robust method of determining the mass, LHV and carbon intensity, stating a preference for litres or tonnes and disagreeing with the baseline lifecycle carbon intensity (see further comments in response to question 44).

Government response

Government decision: for SAF that meets the technical and sustainability criteria, the certificates will be determined by the energy of SAF supplied multiplied by a carbon intensity factor.

We will calculate the certificates in line with the original proposal in the consultation, with the exception that we will use volume instead of mass (as explained in the previous response),

$$Certificates = \frac{m \times LHV_i \times CI_{factor}}{LHV_f}$$

Where:

- $Certificates$ is the number of certificates rewarded to a given SAF consignment;
- m is the mass of a given eligible fuel consignment, in kg;
- LHV_i is lower heating value of the eligible fuel (i.e. energy density), in MJ/kg; and
- CI_{factor} is the carbon intensity factor, as defined in response to question 43
- LHV_f is the lower heating value of jet fuel (i.e. energy density), in MJ/kg.

As confirmed in question 17, we will allow fuels other than avtur to be eligible for certificates, for example avgas and hydrogen. Therefore, by basing the number of certificates on energy, we will accommodate the varying energy densities of these fuels such that certificates can be rewarded appropriately without putting certain fuel types at a disadvantage. This will ultimately lead to decarbonisation across the aviation sector, regardless of the propulsion system. Should any fuels be added to the mandate in the future, the appropriate LHV can be inserted into the equation without the need to develop an energy multiplier, which should help avoid inaccuracies. The exact LHV used will be provided by the Administrator in guidance and will be based on sound scientific evidence as well as consider equivalent domestic and international schemes.

We have divided the total energy supplied by the energy density of fossil aviation turbine fuel so that certificates are issued relative to the energy held in a kilogram of aviation fuel. This will reduce the number of certificates in the system to a manageable level, while still ensuring the energy densities of specific fuels are accounted for.

By scaling the energy with the lifecycle carbon intensity of the SAF, the carbon intensity (CI) factor fulfils one of the key asks from industry for the certificate reward of SAF to be proportionate to the GHG emissions reductions it achieves. This approach means that fuel with higher GHG emissions reductions will likely be worth more in monetary value per unit energy supplied and will help industry to develop the most cost-effective carbon abatement solutions.

Question 42

Do you consider there to be any potential issues with fraud adopting a continuous approach compared to a banded approach?

Summary of responses

Total	Yes	Neither	No	Don't know
24	0	0	23	1

Figure 44 Question 42 summary of responses.

No respondents thought that there would be a greater risk of fraud associated with a continuous approach compared to a banded approach. Many respondents argued the opposite, given that there will be significant financial incentive for those fuels falling at the

edge of bands. A couple of respondents noted that the mandate should have suitable verification processes in place to ensure any potential issues with fraud are addressed, regardless of which reward system is adopted.

In addition to this, most respondents underlined that a continuous system is far more effective at incentivising GHG emissions reductions. This is because a continuous system will encourage producers to make any possible improvement in carbon intensity, whereas a banded approach does incentivise savings beyond the minimum level of the band. Furthermore, if bands are too wide, it would not fairly differentiate between fuels with different GHG emissions reductions.

Finally, some respondents also considered that a banded approach may have unintended consequences, with SAF that falls on the wrong side of a band being exported if they can claim a higher reward elsewhere.

Government response

We have considered the responses to questions 42 and 43 together - see government response following question 43.

Question 43

Do you agree or disagree with the calculation of the carbon intensity factor?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
26	22	0	3	1

Figure 45 Question 43 summary of responses.

Most respondents agreed with the proposed calculation of the carbon intensity factor. However, most of these respondents did not provide any further justification. One respondent commented that the proposed approach is a fair way of ensuring SAF with a lower carbon intensity is rewarded a greater number of certificates.

All three of those that disagreed did so on the basis of the baseline lifecycle carbon intensity. One respondent proposed that the value of the baseline lifecycle carbon intensity should be 35.6 gCO2/MJ (equal to 60% reduction). The other two respondents did not think that the supply of SAF should ever receive below one certificate and instead preferred the baseline lifecycle carbon intensity to equal the minimum GHG emissions savings threshold.

Government response

The primary objective of the Mandate is to deliver GHG emissions reductions contributing to our 2050 net zero target and in line with the 2022 Jet Zero Strategy. The proposal presented in the consultation was designed to ensure that the SAF mix will deliver its GHG reduction targets, averaged over all of the SAF supplied in the UK during an obligation

period. We are therefore pleased that many respondents agreed with the calculation set out and can confirm the calculation of the CI factor as originally proposed.

Government decision: the CI factor for a given SAF consignment will reward SAF on a continuous, linear basis relative to the CI of a reference SAF consignment. We will introduce a reward SAF with increasing certificates for every 0.1 gCO2e/MJ savings achieved per unit of energy of SAF supplied.

The CI factor is expressed in the following equation:

$$CI_{factor} = \frac{CI_f - CI_{SAF}}{CI_f - CI_b}$$

Where:

- CI_{factor} is the carbon intensity factor;
- CI_f is the lifecycle carbon intensity of fossil kerosene, in gCO2e/MJ (this is fixed at 89 gCO2e/MJ for Jet-A1);
- CI_{SAF} is the lifecycle carbon intensity of the supplied SAF consignment, calculated in line with the GHG emissions methodology prescribed by the Mandate, in gCO2e/MJ; and
- CI_b is the lifecycle carbon intensity of a reference SAF which is assumed to achieve the average GHG emissions reductions, in gCO2e/MJ (see response to question 44 below for value for reference SAF CI).

This means that, depending on the CI of SAF supplied, the factor could be more or less than one. Therefore, the CI factor will influence the amount of SAF needed to generate sufficient certificates to offset a given obligation, but this will ensure that a fixed emissions saving is achieved for SAF overall.

Throughout the consultation responses and wider evidence reviewed, we did not see any significant risk of increased fraudulent activity of a continuous system versus a banded approach. By implementing a continuous system, this will introduce an incentive for suppliers to continually improve the CI of the fuel mix. This will broaden the routes to reducing the CI of the SAF to encourage even incremental savings to be achieved, for example, efficiencies in the production process. Ultimately, this will lead to emission reductions throughout the lifecycle of SAF.

Question 44

Is 26.7 gCO2e/MJ an appropriate assumption for the average carbon intensity of SAF? Please provide any available evidence if suggesting an alternative value.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
29	16	3	8	2

Figure 46 Question 44 summary of responses.

Most respondents agreed that 26.7 gCO2/MJ is an appropriate figure for the average carbon intensity of SAF as it reflects current assumptions about its achievable GHG emissions reductions. One respondent agreed on the basis this carbon intensity is the same as the minimum GHG emissions savings threshold of the EU for RFNBOs. Another respondent pointed out that this figure is in line the US Renewable Fuel Standard figure of SAF produced from municipal solid waste (MSW).

Of those that disagreed, half suggested that the baseline lifecycle carbon intensity should be 65% reduction (31.15 gCO2/MJ) to align with the RTFO requirement for development fuels. Similarly, one respondent suggested 60% while another felt that 70% would be too low. Another key reason for disagreeing was that the calculation should not be based on an assumption and will likely lead to a moving target as it is updated over the years. If possible, some respondents requested that the government uses actual values while others suggested following a similar mechanism to CORSIA to incentivise carbon savings. Finally, one respondent disagreed because the 70% figure is based on the unweighted average carbon intensity of all SAF pathways and does not account for the growth of different pathways.

A few respondents requested that the government provides clarity on how this figure will evolve over time. This included suggestions that the figure should be kept under review and updated to reflect the carbon intensity of real world SAF supplied under the mandate. However, other respondents requested that the government fixes the carbon intensity for the duration of the mandate to provide certainty.

Finally, a couple of respondents noted that it is critical the government considers the buy-out price when setting the baseline carbon intensity as this will significantly impact project economics.

Government response

The reference CI which is integral to calculating the carbon intensity factor and in turn reward of certificates for a given SAF consignment. If SAF supplied has the same CI as the reference SAF, it will have a CI factor of one and therefore receive one certificate per unit of energy supplied. Therefore, setting the reference SAF is critical to ensuring that the mandate deliver the GHG reduction objectives it is set out to achieve. If it is set too low, then SAF will be over rewarded and vice versa.

Government decision: the reference CI of SAF will be set at 26.7 gCO2e/MJ (equal to 70% reduction to fossil jet fuel).

We recognise that the SAF industry is nascent and therefore there is limited actual data to review beyond HEFA production. Rather, estimates must be made based on modelling and projections which can vary between projects even if adopting the same technology and feedstock. It is therefore challenging to accurately assess the average lifecycle CI across all SAF pathways until production scales up and more real-life data becomes widely available.

All projections and modelling to date show that 70% reduction compared to fossil jet fuel is a reasonable assumption for an average SAF consignment. Critically, it will ensure that the mandate achieves the GHG reductions target. Furthermore, it is in line with minimum

requirement of the EU mandate, so that we can maintain consistency on an international scale of the GHG emissions reductions that SAF should achieve.

Question 45

In your view, should GHG reductions from CCS be rewarded under the SAF Mandate? If so, should the reward extend to net negative emissions (i.e. less than 0 gCO2e/MJ on a lifecycle basis), or should these be supported by an alternative GGR policy or a combination of policies?

Summary of responses

Reward	Total	Yes	No	Don't know
CCUS	40	38	1	1
Negative emissions	36	30	4	2

Figure 47 Question 45 summary of responses.

Most respondents answered that the Mandate should reward CCUS and extend this reward to net negative emissions. The main reason being that this will maximise the GHG emissions reductions by delivering SAF with lower carbon abatement costs, helping realise the key objective of the Mandate to maximise GHG emissions reductions from aviation. Respondents viewed it as a critical technology to achieve net zero aviation by 2050, particularly considering the need to ensure best use of limited biogenic feedstock. Other comments included that rewarding CCUS would reduce costs to airlines and consumers, increase investment in SAF production and GGR technologies, and be a logical inclusion to the GHG incentive scheme in the Mandate.

If the Mandate did not reward CCUS and negative emissions, respondents felt this would introduce unnecessary complexity, uncertainty and risk. This is due to other policies, such as the GGR business model, not yet finalised. As a result, there is no guarantee that SAF production plants will qualify for these DESNZ CCUS support schemes or that the interactions between these schemes and the mandate may not be favourable to the SAF production plant. This would ultimately lead to greater uncertainty on revenue for SAF plants and negatively impact investment decisions. Respondents felt that treating production pathways that have greater potential for CCUS or negative emissions differently to others goes against the technology neutral approach and does not create a level playing field.

Some respondents recognised that there are complexities, such as how CCUS outside of the UK is accounted for and interactions with other domestic policy, which need to be addressed. One respondent felt that uncertainty on other domestic policy means that a decision on the Mandate cannot be made yet on what policy instrument is most suited to rewarding negative emissions. Only one respondent argued that DESNZ Greenhouse Gas Removal (GGR) policy would be better placed to support emissions reductions from net negative emissions. However, many respondents suggested that suppliers should have the flexibility to decide whether they claim emissions reductions from CCUS or negative emissions under either the Mandate or an alternative scheme.

Several respondents underlined the importance of adopting robust carbon accounting practices and avoiding any double counting of negative emissions. Comments included ensuring that CCUS reductions are certified and permanent, avoiding the use of assumptions such as avoided methane, including other forms of sequestration such as biochar in the lifecycle analysis and following the Climate Change Committee (CCC) guidance to remove upstream negative emissions from the GGR sector.

Other comments in response to this question noted that net negative emissions are already rewarded under other similar schemes such as EU RED and CORSIA, that CCUS rewards should not allow sub-standard pathways to become eligible, the need for use of CO2 abatement credits from existing schemes for those that do not have access to CCS capacity, and that SAF cannot ever achieve net negative emissions due to its combustion.

Government response

The primary objective of the Mandate is to deliver GHG emissions reductions. One of the key enablers to reduce the lifecycle GHG intensity of certain SAF pathways is CCUS. The effectiveness of this technology is dependent on the feedstock and production pathways. It is most effective in pathways that release highly concentrated CO2 streams, which ensures the emission reductions are maximised. In some cases where biogenic feedstock is used, the addition of CCUS in SAF production could result in net negative emissions across the project lifecycle. As stated in the consultation, we are therefore keen to encourage the incorporation of CCUS in SAF production. Although other schemes are designed to specifically encourage the uptake of CCUS installations and CO2 transport and storage (T&S), we agree with respondents that the Mandate should reward the emission reductions from SAF production using CCUS.

Government decision: the emission reductions from CCUS will be rewarded under the Mandate, including where the final net lifecycle emissions are negative.

SAF production is one of several sectors that are compatible with CCUS and will facilitate the establishment a UK CCUS market that unlocks economic opportunities and maximises GHG emissions reductions. Since 2021, the government have established the roll-out process and identified the first four CCUS clusters for deployment in the UK by 2030 to delivering an ambition to capture 20-30 $MtCO_2$ per year. To deliver on this ambition, the UK's CCUS Programme offers government support to companies via various Contract for Difference style business models to support the addition of CCUS technology to a facility.

The business model most relevant to SAF production[39] is the Waste Industrial Carbon Capture (ICC) business model, which is designed to support decarbonisation of the waste sector. The business model comprises (i) a capital grant to support during the construction phase, and (ii) revenue support for 10-15 years, to cover capex, opex and CO2 transport and storage (T&S fees) and (iii) access to the T&S network.

As confirmed in the response to question 25 of this document, the Mandate will reward certificates in proportion to the GHG emissions reductions of a given SAF consignment. The additional certificates and therefore revenue from the mandate reward is likely to provide a

[39] SAF producers and other relevant stakeholders are advised to look up guidance to determine which business model the SAF production plant is eligible for.

significant incentive for a producer to utilise CCUS. Therefore, if a SAF plant is subsidised via the Waste ICC Business Model in combination with the Mandate, the plant may receive revenue significantly beyond what is required to incentivise CCUS deployment.

The ICC business models are designed to alleviate the barriers preventing industrial facilities from deploying CCUS independently. Whilst access to the T&S network will still be required by these projects, as the financial barrier to CCUS may be reduced or removed with the introduction of the Mandate, the support required through an ICC business model may be less or, in some cases, no longer needed. In an update published in March 2024[40], DESNZ confirmed that business model support may therefore be adjusted. The exact mechanism through which this adjustment will occur is still to be confirmed.

In terms of what the Mandate considers as eligible CCUS technologies, we plan to align with the definitions that are being developed by DESNZ, which outline key aspects such as permanence and viable storage solutions.

Discharge of obligation

This section sets out the government's final position on the administrative processes for suppliers and the Administrator to discharge obligations and the calculation of the HEFA cap.

Consultation proposal

Given that the Mandate will prescribe a maximum amount of HEFA that can be used to meet the standard obligation and a separate PtL obligation, we proposed that:

- HEFA will generate HEFA certificates;
- PtL will generate PtL obligation certificates; and
- all other types of SAF, including low carbon hydrogen and low carbon drop-in replacement for avgas, will generate standard Mandate certificates.

At the end of the obligation period, we proposed the same actions to discharge the obligation as currently in practice in the RTFO. That is:

- The final obligations are calculated on 15 August following the obligation period as sum of obligations incurred through the supply of fossil kerosene, throughout the obligation period;
- Each supplier must redeem certificates against the relevant obligation by 15 September; and
- The obligation is wholly discharged once a supplier redeems an equal number of relevant certificates against the obligation.

The government is keen to encourage the supply of SAF beyond the target set in the Mandate. In particular, where a supplier has an excess of PtL certificates but does not have sufficient certificates to fulfil the main obligation. Therefore, it was proposed that:

[40] Carbon capture, usage and storage (CCUS): business models - GOV.UK (www.gov.uk)

- a PtL obligation can only be redeemed using PtL certificates; and
- a standard obligation can be redeemed using any type of certificates, though the maximum number of HEFA certificates that can be used is determined by the cap.

As set out in Chapter two, we propose to introduce a cap on the amount of HEFA than can count towards the standard obligation. In the consultation, we proposed the maximum number of HEFA certificates that can be redeemed against the main obligation is calculated by applying the HEFA cap (as a percentage of SAF supplied) to the amount of fossil kerosene (in terms of energy).

We proposed that the amount owed by the supplier that does not wholly discharge the obligations will be calculated by multiplying the main and PtL buy-out price by the respective certificate shortfall, which will be sent to suppliers on 27 September and should be paid by 26 October. We proposed that any unpaid buy-out amount will be subject to an annual interest of 5% above the base rate set by the Bank of England.

Question 46

Do you agree or disagree with the steps taken by the Administrator and the supplier to discharge the obligation at the end of a period?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
24	23	1	0	0

Figure 48 Question 46 summary of responses.

Almost all respondents agreed with the steps set out in the consultation, largely on the basis that these steps and timings are logical and consistent with the approach taken under the RTFO Order, which has been successfully implemented over several years.

Some of those who agreed suggested amendments including setting a deadline where SAF certificates can no longer be revoked, reviewing the 5% above the base interest rate and considering options to provide more flexibility for suppliers complying with the mandate for the first time to allow time for them to adapt.

The one respondent that did not agree outright did not provide any justification.

Government response

Government decision: we confirm that the steps taken by the Administrator and the supplier to discharge the obligation at the of an obligation period will be the same as the RTFO as set out in the consultation.

The steps set out are identical to those that currently take place under the RTFO Order, which has been implemented effectively since its inception and refined over time to ensure the process is as clear and efficient for both the Administrator and obligated parties. Many respondents pointed to the effectiveness of the RTFO process and urged the Mandate to

follow the same process for these reasons. We have not seen any evidence to suggest that the RTFO process for discharging the obligation should not be replicated under the SAF Mandate. Detailed guidance will set out all the actions to be taken by relevant parties and by which dates.

Question 47

Do you agree or disagree with the approach to calculating the HEFA cap?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
26	9	0	17	0

Figure 49 Question 47 summary of responses.

Most respondents did not agree with the approach to calculating the HEFA cap. Of these respondents, nine stated that they were against the principle of the HEFA cap, as discussed in questions seven and nine.

Regarding the calculation itself, many respondents identified an error in the formula presented in the consultation. Specifically, that the calculation is using a mixture of fossil fuel and SAF terms, such that the cap would not be calculated correctly. A few respondents suggested that the approach to the HEFA cap should mirror that of the crop cap in the RTFO where the government simply provides a percentage, which would provide greater certainty for suppliers. Furthermore, some respondents asked the government for more clarity on how the HEFA cap applies to individual suppliers given that the obligation will be applied in energy terms.

Those respondents in agreement simply stated that they approve of the methodology.

Government response

We recognise many respondents disagreed with the proposal out of principle of including a cap on HEFA feedstocks in the Mandate. These responses have been addressed in Chapter One.

It is important that the cap on HEFA feedstocks is calculated accurately and in proportion to the obligation itself. Several respondents pointed out during the consultation the original calculation proposed did not meet these objectives due to using a combination of both fossil jet fuel and SAF variables. The confirmed calculation has been amended since the consultation.

Government decision: the HEFA feedstock cap will be calculated as a percentage of the total fossil jet fuel or SAF that does not meet the sustainability criteria.

This is determined using the calculation below:

$$HEFA_{cap} = m_f \times LHV_f \times E_{cap}^{HEFA}$$

Where:

- $HEFA_{cap}$ is the maximum amount of HEFA certificates that can be redeemed against the standard obligation;
- m_f is the total volume of fossil kerosene supplied in that obligation period, in kg;
- E_{cap}^{HEFA} is the HEFA cap, as a percentage of the fossil jet fuel supplied (see Chapter One**);**
- LHV_f is the lower heating value of the fossil kerosene consignment (i.e. the energy content), in MJ/kg.

The above calculation has been amended so that the amount of HEFA that can be redeemed against the obligation is in proportion to the fossil jet fuel jet fuel and SAF that does not meet the sustainability criteria. It is also determined using volume instead of mass, in line with both the obligation and calculation of certificates for a given consignment of SAF. This follows the same method by which the crop cap is calculated under the RTFO; however, under the Mandate it is based on energy supplied while under the RTFO Order it is based on the volume of fuel supplied. This means that, in absolute terms, the greater the energy of fossil jet fuel supplied, the greater the number of HEFA certificates that can be redeemed by that supplier.

Question 48

Do you agree or disagree with the approach to paying the buy-out amount when a supplier does not wholly discharge its obligation?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
28	26	0	2	0

Figure 50 Question 48 summary of responses.

Where a supplier does not redeem sufficient certificates against the obligation, they must pay a fee equal to main or PtL buy-out price multiplied by the respective certificate shortfall. This is considered a legitimate form of compliance but does not provide any GHG emissions reductions.

Almost all respondents agreed with the steps set out in the consultation. The key justification was that the process outlined is consistent with that of the RTFO, which has been successful in its implementation and has fair levels of engagement and an appropriate timeframe.

Regarding additional penalties if the obligation is not met, a couple of respondents were in favour of either a fixed penalty or applying an obligation "roll-over" to the following obligation period, to drive the uptake of SAF. However, a couple of respondents explicitly argued against any additional penalties above paying the buy-out amount, including fixed monetary penalties or obligation roll-over. These respondents argued that there are valid reasons for

not meeting the obligation, such as feedstock availability or supply chain issues, and it would therefore not be proportionate to penalise suppliers.

Other comments in response to this question included the need to protect airlines and consumers by prohibiting the passing on of the buy-out fee to suppliers, questioning the 5% above the base interest rate, or outright disagreeing with the buy-out.

Government response

As explained in question 46, any supplier that does not wholly discharge the obligation will be required to pay the buy-out price for the remainder of their obligation. This mechanism is a critical design element of the Mandate to ensure that suppliers have a viable option to fulfil their obligation without being subject to disproportionate penalties.

Government decision: any supplier that does not wholly discharge the obligation will be required to pay the buy-out for the remainder of the obligation by 26 October following the obligation period.

The buy-out is a legitimate form of fulfilling the obligation. Although the buy-out does create an alternative way for suppliers to discharge their obligation, it does not lead to emission reductions. It is therefore not intended to be used as a long-term form of compliance, but only for use in exceptional circumstances. For example, in the case of supply chain issues, or if there are unusually high spikes in SAF costs.

Given that the obligation is determined in energy (see question 40), the buy-out prices will be expressed in pound per megajoule. They will be equivalent to the prices confirmed in response to questions 12 and 13.

In the case where a supplier does not wholly discharge their obligations, the amount owed via the buy-out will be calculated by multiplying the standard and PtL buy-out price (set out in question 45) by the respective certificate shortfall. Following the window within which suppliers can redeem certificates against their obligation, we can confirm that suppliers that have a certificate shortfall will be notified of the buy-out amount owed on 27 September and will be required to pay it by 26 October. Should the supplier not wholly discharge the obligation with the buy-out by this date, the unpaid buy-out amount will be subject to an annual interest of 5% above the base rate set by the Bank of England, but to be calculated on a daily basis starting from 27 October. This approach, including the dates by which actions must be taken, aligns with the RTFO. Generally, respondents approved of aligning with the RTFO and we have not seen sufficient evidence, either via the consultation or otherwise, to make amendments to this approach.

Several respondents raised points, either in support or opposition, about applying additional penalties if the obligation is not wholly discharged. The buy-out price has been set at a level that is above the project market price of SAF so that suppliers are already encouraged to redeem certificates as the preferable option of meeting their obligations. As explained above, the purpose of the buy-out is to provide a way for suppliers to discharge their Mandate obligation in exceptional circumstances where there is no SAF available (or SAF at a cost below the buy-out price). As such, any supplier required to pay the buy-out will be subject to higher costs than if they had supplied SAF. We therefore do not think it is appropriate to apply to additional penalties, such as a fixed penalty or an obligation roll-over, on top of

suppliers paying the buy-out. We have reserved issuing civil penalties to cases where suppliers have intentionally avoided meeting their obligation or failed to meet other requirements stipulated in the legislation (see **Chapter Five**).

5. Submitting claims, reporting the required data, and fulfilling the SAF obligation

It is critical that the fossil jet fuel information submitted by suppliers, as well as the carbon and sustainability information of SAF, is credible and accurate such that the obligation and reward of certificates can be calculated correctly. It is therefore necessary that the Mandate includes robust processes that suppliers must undergo when providing any relevant data to DfT. We propose that an IT system will be developed, which will function as the principal tool for both the Administrator implementing the requirements of, and suppliers complying with, the Mandate.

Requirement for each obligated party to have an account

Each obligated supplier will be required to apply for an account with the Administrator. In the consultation we set out the proposed process for registering an account which aligns with current practice under the RTFO Order. This includes the Administrator assessing whether there is sufficient evidence or information in application and the requirement that each supplier must create its account within 28 days, starting from the date on which the supplier becomes obligated. We also proposed that the Administrator has the power to close accounts in certain situations.

Question 49

Do you agree or disagree with the approach to creating and closing accounts?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
23	22	1	0	0

Figure 51 Question 49 summary of responses.

Almost all respondents agreed with the proposed approach to creating and closing accounts, with most respondents not providing further justification. However, a small number of respondents noted their approval for consistency with the RTFO which has ensured only the relevant stakeholders supplying fuel into the market will take part in the scheme. A few respondents broadly agreed with the proposal but noted that some of the verification steps can be burdensome for suppliers. In the case where the same companies are already obligated under the RTFO and have undergone a verification process, it was suggested that these companies should be automatically enrolled in the Mandate to avoid duplicating the

verification process. Finally, one respondent suggested that government conducts induction programmes for new suppliers that may not be familiar with the scheme.

Government response

Our proposed approach aligns with that of the RTFO, and we do not see reason to amend it.

Government decision: we will confirm the approach set out in the consultation to creating and closing accounts.

We note that some suppliers stated that the process for creating an account can be burdensome. We are planning on using the same IT system for the RTFO and the Mandate. Where suppliers are approved under the RTFO, we will therefore not require them to undergo the account creation process again as they will already have an account with the Administrator. However, we will require existing account holders to alert the Department if they will be supplying aviation fuel so that we can amend the account as needed.

The duties of the Administrator include identifying suppliers that are expected to be obligated, and publicise the obligation appropriately. In line with the Administrator's powers it will therefore engage with relevant parties ahead of the Mandate commencing to build good working relationships and conduct induction programmes to facilitate compliance.

Submitting claims for SAF certificates

Before a supplier can apply for SAF certificates, it was proposed that the supplier must:

- submit carbon and sustainability (C&S) information and a verifier's assurance report;
- submit evidence of the amount of fuel supplied to the UK aviation market;
- meet the other administrative stipulations discussed in this consultation; and
- declare that the fuel has not been used towards the targets in other schemes.

The Administrator will be required to evaluate the application against the requirements stipulated. In the consultation, we underlined that suppliers may choose how often to apply for certificates within the given reporting period. In line with the RTFO, **we proposed all applications for certificates must be submitted by 12 May** following the obligation period.

Where each of the requirements described have been met and the application is successful, we proposed that the Administrator will issue the certificate as soon as is reasonably practical by crediting the supplier's electronic account on the IT system. The Administrator will specify whether the certificate awarded is a HEFA, standard or PtL certificate.

Question 50

Do you agree or disagree with the approach to submitting claims?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
25	25	0	0	0

Figure 52 Question 50 summary of responses.

All respondents to this question agreed with the proposed approach to submitting claims. The main reason given by respondents is that consistency with the RTFO is important and this approach has been successfully implemented for many years as an effective way of providing evidence to support certificate allocation. However, a few respondents asked for clarity on the expected requirements on suppliers when submitting evidence on the amount of fuel supplied to the UK aviation market, as this will be reported on either a volumetric or mass basis rather than energy. A couple of other respondents requested that the government keeps the compliance procedure as simple as possible. Finally, one respondent made two additional points:

- guidance on how to manage the scenario whereby fuel is sold as “dual purpose kerosene” and it is not possible to demonstrate that this has been supplied to the UK aviation market; and
- timetabling for issuing certificates mirrors that of the RTFO, under which RTFCs are issued within a month (subject to the Administrator being satisfied), which is timely and considered an important aspect for suppliers.

Government response

As with other proposals in the consultation, alignment with the RTFO processes is preferable among stakeholders and we do not see reason to diverge from this approach.

Government decision: we will confirm the approach set out in the consultation to submitting claims.

That is, before a supplier can submit claims for certificates for the supply of SAF, it must:

- submit carbon and sustainability (C&S) information and a verifier’s assurance report;
- submit evidence of the amount of fuel supplied to the UK aviation market;
- meet the other administrative stipulations discussed in this consultation; and
- declare that the fuel has not been used towards the targets in other schemes.

This approach aligns with the RTFO in terms of requirements before submitting claims. We can also confirm that the timetabling of issuing certificates will be the same as the RTFO to maintain consistency and ensure that suppliers have continuous opportunity to receive certificates. Our experience from the RTFO is that this process is straightforward and does not cause complications or excessive administrative burden. Regardless, the Administrator will provide induction programmes for suppliers to ensure they are familiar with the process ahead of the mandate commencing.

Regarding the reporting of volumes, each obligated supplier will be required to submit information on the mass of all fossil, renewable or partially renewable fuels that are covered by the SAF Mandate Order. Where necessary, these can be reported in volume (litres at 15

degrees Celsius) and the Administrator will convert into mass using standard factors, from which the energy obligation will be determined. These will be validated by the Administrator, as described in more detail in response to question 31.

The assessment time for aviation fuel in the RTFO is set at the blending and certification point, while we have confirmed that the assessment time will be at duty point in the Mandate. During the first year of the obligation, as SAF moves from the RTFO, a situation may arise whereby SAF has been blended and certified in December 2024 and then passes through the duty point in January 2025, therefore being subject to two assessment times. In this specific case, SAF that meets the RTFO assessment time should not be claimed again when it passes the Mandate assessment time as per their declarations of not claiming multiple incentives.

Regarding the comment on dual purpose kerosene, this is addressed in response to question 50.

Carbon and sustainability information

We proposed that suppliers must report C&S information demonstrating compliance with the sustainability criteria for each application and must arrange for this data to be independently verified before submitting an application for SAF certificates. We proposed the process would adopt current practice under the RTFO meaning that suppliers submit data via the IT system.

We previously confirmed that voluntary schemes (i.e. recognised sustainability assurance schemes) would be eligible to count as a route to demonstrate compliance with sustainability criteria. Voluntary schemes are sustainability assurance schemes recognised by the Administrator as demonstrating compliance with one or more of the sustainability criteria. Experience from the RTFO shows that verification effort is likely to be reduced where the fuel meets a voluntary scheme's requirements, particularly where those schemes cover the full chain of custody and all of the sustainability data. They are therefore recommended but are not mandatory to use to demonstrate compliance.

In the consultation, we underlined that voluntary schemes could be recognised for a specific scope and that any C&S data not covered by the scope of the voluntary scheme will be subject to third party verification. We also stated our intention to provide a list of approved voluntary schemes with their respective scope before 2025. Where a supplier does not use a voluntary scheme, we will set out in guidance how suppliers demonstrate compliance.

As confirmed in the government response published in July, suppliers must use a mass balance chain of custody (or a more a stringent chain of custody system) to demonstrate compliance with the SAF Mandate. Where part, or all, of a supply chain is not covered by a voluntary scheme operating a mass balance system, we proposed that suppliers must set up their own chain of custody, ensuring that a mass balance approach is used. We stated our intention to publish guidance on how to set up a chain of custody and operate a mass balance system.

As confirmed in the government response, C&S data will need to be verified in accordance with the ISAE 3000 standard (or an equivalent standard), by a person who is independent of the supplier and who has the necessary expertise. To maintain consistency with the RTFO,

we proposed that verification should be carried out to the limited level of assurance. It is anticipated that suppliers and verifiers can share data and reports via the IT system. We stated our intention to publish guidance on appointing a verifier and the verification process.

Question 51

Do you agree or disagree with the approach to reporting, demonstrating compliance with and verifying the carbon and sustainability information?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
35	29	3	3	0

Figure 53 Question 51 summary of responses.

Most respondents agreed to the proposed approach of reporting, demonstrating compliance with and verifying the carbon and sustainability information. Reasons included that it is consistent with the RTFO, will minimise administrative complexity and is robust enough such that unverified or falsified data will not be accepted from suppliers. However, a few respondents queried why there is a need to introduce duplicative measures that increase cost when a proof of sustainability endorsed under the ISCC or RSB framework would be sufficient.

Regarding the assurance level, a few respondents did not agree with the proposal on the basis that “limited” assurance allows fraudulent feedstocks in the fuel supply and would not be sufficient to meet the necessary requirements for use in UK ETS or CORSIA.

Regarding the sustainability criteria, one respondent pointed out that it is related to the feedstock rather than the SAF itself, while another requested that it be extended to consider other factors such as water use, embedded emissions and particulate numbers.

Finally, one respondent underlined the role that the UK could have in being a leader in establishing an international standard for book and claim, which will be an important system for a market where supply and demand are geographically distributed.

Government response

As set out in **Chapter Two**, in order for SAF to be rewarded with certificates it must meet strict sustainability criteria. It is therefore necessary to have processes in place to ensure that suppliers can demonstrate compliance with the carbon and sustainability criteria and to gain certificates. This will reduce the need to introduce duplicative measures and minimise administrative complexity.

Government decision: we confirm that we will adopt the approach to reporting, demonstrating compliance and verifying the carbon and sustainability information as set out in the consultation.

We have aligned our approach with the current rules under the RTFO Order to maintain consistency and facilitate compliance for suppliers operating under both schemes. Although the broad approach to submitting claims will be the same, there may be specific differences between the RTFO and the Mandate in exceptional circumstances. These will be explained in guidance.

For each application (i.e. an amount of fuel that has an identical set of sustainability characteristics) suppliers must report carbon and sustainability (C&S) information and have this independently verified before submitting a claim for SAF certificates. This is to ensure that SAF meets the stipulated sustainability criteria and to calculate the certificates, which are based on the lifecycle carbon intensity of the SAF consignment.

C&S reports must contain the information required to demonstrate compliance with the sustainability requirements. This will be submitted through the IT system, which will be designed in a way that is easy for the supplier to use. This includes:

- feedstock type and country of origin;
- lifecycle carbon intensity;
- land criteria;
- forest criteria; and
- soil carbon criteria.

Although some stakeholders suggested further information should be reported, we believe that the information required is sufficient to demonstrate the compliance with the sustainability criteria. However, we will continue to monitor this closely and consider reporting wider environmental impacts that are outside the minimum sustainability criteria, for example, water use and embedded emissions. At the same time, we want to ensure the process minimises administrative complexity for suppliers as much as possible, while still ensuring we receive the necessary information to confirm compliance with sustainability criteria.

We previously confirmed that voluntary schemes (i.e. recognised sustainability assurance schemes) would be a viable option of complying with sustainability criteria. Using voluntary schemes which have been recognised as meeting some or all of the sustainability criteria has been the recommended option for demonstrating compliance as it reduces the administrative burden on suppliers and reduces the verification effort. Under the RTFO, most suppliers use voluntary schemes to demonstrate compliance with C&S requirements. The government will publish details on the process of approving voluntary schemes ahead of the Mandate commencing and will publish a list of approved schemes. However, it will most likely align with the approval process under the RTFO to maintain consistency. Our intention is that those schemes approved under the RTFO will be recognised under the Mandate, providing they have demonstrated they can work to the requirements of our legislation. In saying this, suppliers will be eligible to use other means to provide C&S data. Detailed guidance on alternative options for demonstrating compliance with each of the sustainability criteria will be published ahead of the mandate commencing.

As confirmed in the previous government response, C&S data must use a mass balance chain of custody. This is to ensure C&S data can be tracked back to its original source to demonstrate the fuel supplied meets the sustainability criteria. For wastes and residues, it is particularly important that a robust chain of custody is in place to ensure traceability and sufficient auditing.

Verification of the C&S data is an essential step in the process for submitting claims. It will provide the Administrator with assurance over the information provided by suppliers as a condition of issuing certificates. Verifiers will check that the data submitted to the Administrator meets the requirements of this guidance, and therefore the mandatory sustainability criteria. We will be requiring verification to be carried out to limited assurance in line with ISAE 3000 standards (or equivalent). A review of the RTFO has concluded that it would not be necessary to increase this to reasonable assurance level. However, in some cases the Administrator will have the power to require a 'reasonable' level of assurance level. Further information on verification, including appointing a verifier; the roles and responsibilities of suppliers, verifiers and the Administrator in respect of this process; and an outline of the steps a verifier will undertake will be provided in guidance.

Submitting C&S data, demonstrating compliance sustainability criteria, and verification of C&S information are critical processes that suppliers and other relevant parties must follow in order for the mandate to operate effectively. The guidance published ahead of the Mandate commencing will contain comprehensive guidance to ensure these processes are followed correctly, particularly where complex or unconventional circumstances may apply. This includes, but is not limited to, allocation of GHG emissions, aggregating multiple consignments and changing C&S data.

Validating fuel amount information

We previously confirmed that obligated suppliers will need to report information on the aviation fuel supplied to DfT. In the consultation, we proposed that suppliers must provide information on the mass of fuel, by fuel type, that is owned at the assessment time. We also underlined the necessity to have this information validated, with the simplest approach to check HMRC duty data against fuel amounts submitted by the supplier.

Where a fuel amount is not checkable against HMRC data, we proposed the Administrator will have the power to require further evidence. This could include:

- requiring the supplier to provide evidence for each submission;
- assessing the systems and processes that the supplier uses to derive these quantities on a periodic basis and requiring the supplier to provide assurance to the Administrator that these systems have been used for each submission; or
- requesting that a supplier obtains independent verification of the quantities.

Question 52

Do you agree or disagree that the Administrator should validate fuel amount information?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
25	25	0	0	0

Figure 54 Question 52 summary of responses.

All respondents agreed with the proposed approach that the Administrator should validate fuel amount information. Most respondents did not provide further justification, although a small number of respondents noted their approval for consistency with the RTFO. A few respondents broadly agreed but suggested a few amendments including allowing the Administrator to delegate responsibility to a third body and that the validation is between the SAF data and the HMRC data, rather than verification of the HMRC data itself (which is the current approach under the RTFO Order). Finally, a couple of respondents underlined the importance of protecting commercially sensitive information and ensuring data privacy.

Government response

It is essential that the Administrator has the ability to be able to check that data reported by fuel suppliers is accurate, particularly in relation to the volume of obligated fuel and the number of SAF certificates to be issued.

Government decision: the Administrator will validate fuel amount information.

The Administrator must validate fuel amounts to avoid suppliers either intentionally or unintentionally misreporting jet fuel supplied to the UK. If validation was not in place, these inaccuracies would lead to errors in calculation of obligations or certificates, as well as carbon accounting.

Under the RTFO, fuel amounts have been validated by the Administrator since the scheme came into being in 2008. The current approach whereby the Administrator takes responsibility has been effective and is not overly burdensome. Therefore, we will continue to use the Administrator to validate fuel amount information, though the approaches by which the Unit carries this out may differ to the RTFO Order (see question 31).

Currently under the RTFO, the principal method that the Administrator uses to validate volume submissions is to check a supplier's submitted figures against HMRC duty payment data. However, given aviation fuel is typically not subject to duty, it may not be possible to use the same approach. Further information on how the Administrator will validate fuel amount information where is not checkable against HMRC data is provided in response to the question below.

Question 53

Do you agree or disagree to the powers granted to the Administrator to validate fuel amounts where information is not checkable against HMRC data?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
23	23	0	0	0

Figure 55 Question 53 summary of responses.

All respondents agreed with the proposed powers. Although no further comments were provided in support of agreement, a few respondents had further clarification points. This

included that these powers are unlikely to be used to a significant extent given the coverage of HMRC data, the level of evidence verification required should be consistent with other information such as carbon and sustainability information, and the government must protect commercially sensitive information and ensure data privacy.

Government response

Currently, under the RTFO, we use HMRC data as a third-party data source to verify that the volumes suppliers provide us are correct. This is still the preferred option for verification due to ease for both the Administrator and supplier. However, whilst aviation fuels should be reported to HMRC, it is not a complete dataset and the current reporting does not differentiate between fossil jet fuel and SAF. Therefore, we need to consider a second option to provide assurance that the volumes being uploaded are accurate.

Government decision: the Administrator will require suppliers to seek verification of their aviation fuels by a third party verifier.

We have considered several options to find a simple solution to sourcing a complete dataset. Since the consultation, we have informally consulted with stakeholders most likely to be impacted by this delivery decision, to discuss the option of increasing the scope of verifiers to provide assurance of volumes. Most respondents were in favour of the solution and saw the efficiency benefits it would bring.

Some respondents suggested that it would increase costs and an alternative option could be for HMRC to change their forms to improve reporting. We will explore this option however on the basis that this may not be possible in time for 1 January 2025 we will continue with using third party verifiers to verify the aviation fuel. Whilst asking verifiers to provide assurance over volumes might increase costs, these are expected to be minimal. It is up to the fuel suppliers where they allocate those costs within their business.

The RTFO Unit already have the power to request verifiers to provide volume assurance under the RTFO Order, so this decision also aligns the approach to the Mandate. Verification of aviation volumes will be built into the online reporting platform.

Transfer of certificates

We previously confirmed that suppliers will be able to trade certificates. It was proposed that the process of transferring certificates between suppliers will be the same as that in the RTFO currently meaning that the pricing and financial aspects of the trade will be outside the Administrator’s scope and systems. However, in order to perform the transfer, the account holder is expected to notify the Administrator of basic information via the IT system including name and account number, date of transfer and number of certificates. In the event of there being an insufficient number of certificates for multiple transfer, we proposed the Administrator will give priority to the transfer which was first notified. We intend to allow suppliers to be eligible to transfer certificates as many times as they wish.

Question 54

Do you agree or disagree with the approach to transfer of certificates?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
30	29	0	1	0

Figure 56 Question 54 summary of responses.

Almost all respondents agreed with the proposed approach to the transfer of certificates. Respondents recognised the benefit of a tradeable certificate scheme to offer flexibility in meeting the obligation and noted the consistency of the approach with the RTFO which has been successful in its implementation. One respondent suggested that transfers should not be limited to obligated parties and "trading only" accounts included. One respondent disagreed with the proposal as they felt it would be used to circumvent obligations.

Government response

We are pleased that respondents reacted positively to our proposal on the transfer of certificates. We view this mechanism as a key part of the mandate as it provides SAF suppliers with a direct price support mechanism and allows obligated suppliers to meet their obligation in a flexible and cost-effective manner. We proposed an approach that aligns with the RTFO, and we have not seen sufficient evidence to diverge from this approach.

Government decision: we confirm the approach to transfer of certificates as set out in the consultation.

Suppliers will have the option to transfer certificates from one account to another for a monetary value determined by the account holders involved (this includes accounts that are not subject to an obligation). The transfer will be actioned via the same IT system that suppliers will use to their manage accounts and discharge their obligation. As with the RTFO, we will allow suppliers to set up delayed transactions to occur in the future. Further information on special circumstances surrounding the transfer of certificates will be provided in guidance, for example, where there are disputes.

Introducing flexibility in fulfilling obligation

In the consultation, we proposed that excess certificates can be used to fulfil up to a given proportion of the obligation in the following obligation period. More explicitly:

- standard certificates can be used to fulfil up to 25% of a supplier's standard obligation in the following obligation period;
- PtL certificates can be used to fulfil up to 25% of a supplier's PtL obligation in the following obligation period; and
- HEFA certificates can be used to fulfil the standard obligation in the following obligation period up to 25% of the HEFA cap.

We also proposed that excess PtL certificates can be used to fulfil the main obligation.

Question 55

Do you agree or disagree that excess certificates can be used to fulfil the obligation in the following period? If so, do you agree or disagree with the proportion of the obligation that the excess certificates can fulfil?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
30	26	2	2	0

Figure 57 Question 55 summary of responses.

Most respondents agreed that excess certificates can be used to fulfil the obligation in the following period. The main arguments put forward in support of this were that it provides flexibility for obligated suppliers, it provides certainty to SAF suppliers, and it is consistent with the RTFO.

Nine respondents commented on the proportion of the obligation that can be filled with excess certificates, of which four of these respondents agreed with 25%. Two respondents suggested 20% instead as this would align with US Renewable Fuel Standard, a higher proportion could dampen the certificate price and suppliers should not be incentivised to purchase SAF a year in advance. Other suppliers suggested that the proportion should be higher or have no limit at all. Finally, one supplier suggested 10% to ensure stable SAF supply and scale up throughout the years and facilitate better demand planning for jet fuel suppliers.

A couple of respondents disagreed with the proposals on the basis that these could be used to circumvent obligations.

Government response

This mechanism has been in place under the RTFO and has been an effective tool for suppliers to manage fluctuations in supply of renewable fuel over obligation periods and to meet their obligation in a cost-effective manner.

Government decision: we confirm that excess certificates gained during an obligation period can be used to discharge the obligation in the following obligation period. For standard certificates and PtL certificates, excess certificates can be used to fulfil up to 25% of the obligation period in the following year. For HEFA certificates, excess certificates can be used to fulfil up to 25% of the cap of the following year.

A key benefit of this approach is that suppliers are not required to obtain the exact number of certificates within a given obligation period to offset their obligation. This will lead to cost effective compliance and greater certainty for suppliers which will always be rewarded with certificates for the supply of SAF (even where supply has exceeded targets). This mechanism could encourage suppliers to go beyond their target, potentially increasing the

overall amount of SAF supplied to the UK aviation market. We have found this approach to be effective under the RTFO. The figure of 25% has been used under the RTFO which we believe it an appropriate amount to provide the flexibility to suppliers while also ensuring the continuous supply of over consecutive obligation periods. A higher amount would risk greater fluctuations in fuel supply, while a lower amount limits flexibility for suppliers.

This mechanism is termed “carry-over” whereby obligations are met with certificates issued in the preceding period. The IT system will not allow certificates to be redeemed against obligation that meet more than 25% of the main and PtL obligations with certificates from the previous obligation period.

If targets are being met and a significant amount of excess certificates are available for use in the next obligation period, we will consider whether to increase targets.

Question 56

Do you agree or disagree that excess PtL certificates can be used to fulfil the main obligation?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
33	28	0	5	0

Figure 58 Question 56 summary of responses.

Most respondents agreed with the proposal that excess PtL certificates can be used to fulfil the main obligation. Respondents in agreement recognised that it would offer flexibility to suppliers and is consistent with the RTFO approach of development fuel certificates. Given the higher value of PtL certificates, one respondent suggested that a multiplier should be considered while another stressed that standard certificates must not be used to fulfil the PtL obligation.

Those in disagreement did so on the basis that they disagree with the introduction of a separate PtL obligation, rather than the specific proposal to allow excess PtL certificates to be used in the main obligation. Please see question 11 for more information on the responses to an introduction of a PtL obligation.

Finally, a couple of respondents pointed out an error in the consultation text which stated that any development fuel certificates in the RTFO awarded in 2024 would not be able to be used in 2025.

Government response

We are pleased that most respondents agreed with the proposal to allow PtL certificates to be used to fulfil the standard obligation. This is a similar approach to the RTFO, where development fuel certificates can be used to fulfil the main obligation.

Government decision: we confirm that PtL certificates can be used to fulfil the main obligation.

This will ensure that suppliers with excess PtL certificates can utilise their certificates if they do not wish, or are not able, to sell them to other suppliers. Furthermore, if PtL is available to the market earlier than anticipated and precedes the introduction of the PtL obligation, suppliers that have received PtL certificates will still have a viable use of these certificates. The IT system will allow any amount of PtL certificates to be redeemed against the standard obligation in that year, or 25% of the standard obligation in the following year. However, it will not be possible for standard certificates to be redeemed against the PtL obligation – this can only be fulfilled with PtL certificates or by paying the buy-out for any certificate shortfall.

6. Interactions with other policies and airline operations

Claiming support for SAF across multiple schemes

It is important that the Mandate does not allow fuel suppliers to claim reward under multiple schemes, avoiding over-subsidisation of low carbon fuels. As a result, the government response to the first consultation confirmed that the SAF Mandate legislation, will include provisions that, from 1 January 2025, SAF will no longer be eligible for certificates under the RTFO.

The first government response also confirmed that SAF that has been produced from industrial plants or clusters which have received competitive grant funding from the government will still be eligible for support under the proposed Mandate. This is necessary to secure long-term investment in these plants and develop the UK SAF industry.

In the consultation we proposed that, as far as possible, the Mandate should align with multiple incentive rules set out in the RTFO Order. We also underlined that work is ongoing to ensure that multiple incentive rules are adjusted following the UK's exit from the EU, balancing the need for a level playing field under the SAF Mandate and the operations of the UK's Trade Remedies Authority.

Question 57

Do you agree or disagree with the proposed approach to align Mandate multiple incentives rules as much as possible with the RTFO?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
32	23	8	1	0

Figure 59 Question 57 summary of responses.

Most respondents either agreed or broadly agreed with the proposal to align the multiple incentives rules as much as possible with the RTFO. There was a broad preference for consistent policy design alignment as it reduces complexity and facilitates compliance for suppliers already familiar with the RTFO.

However, many respondents requested further details on the specific interactions between schemes. For example, whether airline operators will be able to claim SAF under the UK

ETS or CORSIA. Generally, these respondents felt that there are challenges with the current multiple incentive rules in the RTFO that need to be worked through for the Mandate.

The key issue raised by respondents was that of stacking incentives. Several respondents pointed out that other countries or regions are building competitive SAF industries by combining support schemes, available throughout the SAF supply chain, to improve the fiscal package and provide greater assurance to investors. Among respondents, there was general concern that the current rules put UK SAF producers at a disadvantage as the Mandate will allow multiple incentives abroad, but not domestically.

Some respondents argued that SAF supplied in the UK should be able to access other subsidies along the supply chain, which would be consistent with the EU approach. One specific example raised by respondents was allowing access to hydrogen that has received subsidy under the Hydrogen Production Business Model, which would dramatically reduce the cost of SAF. Other respondents suggested that production incentives out of the UK must be excluded for any fuel that wishes to claim SAF Mandate certificates. Regardless, there was consensus that the Mandate should treat domestic SAF and international SAF equally.

Related to multiple incentives, several respondents urged the government to provide clarity on how information for a given SAF consignment is passed between the Mandate and the UK ETS so airlines are able to make ERCs. These respondents suggested that the UK could adopt a dual certificate system covering both schemes. Alternatively, a clear mechanism to allow airlines to confirm that the SAF has not been claimed in other jurisdictions to decrease their UK ETS obligations.

Government response

Government decision: We confirm that we will align the rules for multiple incentives in the SAF Mandate with the RTFO as much as possible, subject to the outcome of the multiple incentives targeted consultation.

A targeted consultation on multiple incentives ran from 29 February 2024 – 18 March 2024. Our intention is that any changes to the multiple incentives rules will be implemented from the start of the SAF mandate. This will be supplemented with appropriate guidance for suppliers.

The decision to align the rules for multiple incentives in the Mandate and RTFO is underpinned by the need to ensure that we are maintaining a level playing field for suppliers across the two schemes. The rules will also ensure a level playing field on an international basis following the UK's departure from the EU. This approach will allow us to maintain fair reward for low carbon fuel and chemical precursors[41] under both the RTFO and Mandate, without adding complexity to an already familiar compliance process.

We recognise there is stakeholder appetite for further clarity on how the multiple incentives rules will work with other existing schemes such as UK ETS and CORSIA. Our multiple incentives rules will ensure that SAF Mandate legislation allows a given SAF consignment

[41] Chemicals used in the production of fuel that contribute atoms and energy to the final product.

to be rewarded under the Mandate as well as being used by airlines to make emissions reduction claims under the UK ETS or CORSIA.

It is also important that the sustainability credentials for each consignment of SAF is passed through to end users, to allow SAF use to be claimed by airlines against their obligations in other schemes, such as UK ETS or CORSIA. We are working closely with DESNZ, the Environment Agency and voluntary schemes to develop a solution that will allow sustainability credentials for a given SAF consignment to be passed down onto end users, while ensuring that strict audit requirements continue to be upheld and there is no double counting of emissions savings. Further information on interactions between the Mandate and these schemes will be provided in guidance. We will also reflect on information submitted as part of the upcoming UK ETS Authority consultation on the future of SAF in the UK ETS to ensure the UK ETS and Mandate operate effectively together.

We recognise the RTFO and Mandate regulations will need to account for the establishment of new support schemes, such as the revenue certainty mechanism.

As these schemes are developed, we will consider if further changes to the eligibility criteria would be necessary.

Tankering

In the consultation, we considered the risk of the mandate increasing 'tankering' – the practice whereby airlines opt to take on additional fuel for inbound trips to the UK to cover the outbound trip and avoid paying the additional SAF costs from refuelling in the UK. In response to the first consultation, some stakeholders suggested the introduction of a requirement for airlines to uplift a minimum amount of fuel when departing UK airports. This mechanism has also been proposed by the EU.

Although we were not able to quantify potential tankering scenarios, we welcomed views and supporting analysis on whether the extent of tankering as a result of the Mandate justifies the introduction of a minimum uplift requirement.

Question 58

Does the risk of tankering as a result of the SAF Mandate justify the introduction of a minimum uplift requirement? Please provide supporting evidence if available.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
40	17	10	13	0

Figure 60 Question 58 summary of responses.

Those who agreed argued that this approach is consistent with the approach taken in the EU under the ReFuelEU initiative. Respondents flagged that if the UK is not consistent with

the EU, there is a risk of trade distortions created by the unequal cost frameworks. Another key reason for agreeing was the notion that tankering already occurs which increases GHG reductions[42][43] and will be exacerbated by the mandate.

One respondent suggested both a minimum and a maximum uplift requirement would be more beneficial for the climate, as it would limit the amount of additional fuel uplifted and consequently reduce CO2 emissions. Some respondents referenced an International Council on Clean Transport (ICCT) report[44] which showed that in 2025 tankering levels are projected to be minimal. However, under more ambitious SAF targets post-2030 approximately 80% of the flights into the EU region could be affected by this leading to a projected 22% decline in SAF sales.

The respondents who disagreed believed the requirement would impact economic viability, cause unnecessary complexities and that other price incentives should take priority. They argued that the UK needs to offer similar incentives to the EU, such as the additional free allowance in the EU ETS, to ensure a level playing field. This could otherwise cause significant market distortion due to the high cost of SAF. Others recognised how carrying extra fuel may be for safety reasons or standard business practice, so this requirement would add unnecessary complexity. Furthermore, one respondent argued that this requirement would put the UK at a commercial disadvantage, affecting airline operations and commercial decisions.

Those who neither agree nor disagree mainly believe this requirement should be kept under review. Although industry is aware of the potential tankering risk, especially on short haul flights, these respondents indicated that the UK should monitor and be prepared to intervene quickly to introduce minimum lift requirements if necessary. Finally, one respondent thought that alignment with international standards is crucial for an effective strategy, while another raised concern over how reduced demand for SAF in UK airports as a result of tankering could deter industry growth.

Government response

The government wants to ensure that GHG emissions reductions are maximised under the Mandate. We welcome the views from respondents on the extent of tankering and whether government should take action to mitigate any negative impacts. Tankering is practiced today for several reasons, but evidence suggests that the primary incentive is fuel price reasons. Therefore, any differences in fuel price relative to other regions is likely to increase tankering.

Studies conducted on the impact of tankering suggest it could significantly reduce the impact of a mandate on GHG emissions reductions. As a result, the EU have included a minimum uplift requirement for airlines departing EU airports. These studies have either focused on

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[42] EUROCONTROL Think Paper #1 - Fuel tankering in European skies: economic benefits and environmental impact | EUROCONTROL

[43] Climate change: British Airways reviews 'fuel-tankering' over climate concerns - BBC News

[44] https://theicct.org/wp-content/uploads/2021/06/tankering-eu-SAF-mandate-apr2021.pdf

the EU (and not considered the impact of a UK Mandate) or have not provided sufficient evidence.

Furthermore, respondents suggested a range of alternative measures that address price incentives could instead be more effective in mitigating tankering behaviour, while some respondents noted some unintended consequences of a minimum uplift requirement. Many respondents also noted the uncertainty of the extent of tankering as a result of the mandate and its impact on emission reductions. This is particularly true while other policy that will impact SAF price, such as the UK ETS, is subject to further development.

The government does not therefore consider it appropriate to introduce a minimum uplift requirement, or any other mitigation measure at this stage. In any case, the primary legislation that we are using to implement the Mandate (the Energy Act 2004) would not provide the powers to implement such a requirement in the Mandate.

Government decision: we will not introduce any mitigation measures when the mandate starts in 2025.

We will instead conduct further research into the extent of tankering once the Mandate is operational and examine how this impacts emission reductions. We will also carry out an assessment of mitigation options beyond a minimum uplift requirement on airlines to ensure that we impose the most appropriate solution, if required. We plan to use information from the mandate during the initial years to inform our further work in this area.

7. Enforcement

This chapter sets out our approach to fair and transparent enforcement of the scheme. This will only be necessary in specific circumstances where issues cannot be resolved. The RTFO Administrator has a long history of working with obligated parties and carrying out compliance checks to ensure that any problems are addressed before further enforcement is required. We endeavour to continue this same working relationship with obligated jet fuel suppliers.

We did not ask any questions on enforcement in the first consultation; however, in the second consultation we proposed that, where parties fail to meet obligations, proportionate sanctions can be applied, which will also reassure the compliant majority that they will not be disadvantaged by those that do not meet their obligations. We confirm here that this will be done by revoking certificates as a first response, followed by issuing civil penalties if necessary.

Revocation of certificates

We proposed that the Administrator should have the power to revoke certificates if insufficient, inaccurate, or fraudulent information is present in information submitted by the supplier. In the consultation we set out a similar process to the RTFO including the role of the Administrator to notify the supplier and to consider any representations and the opportunity for suppliers to appeal to the Administrator. However, in contrast to the RTFO, we proposed that where a supplier notifies the Administrator of a mistake and requests a revocation, the Administrator has the power to revoke the certificate immediately. This is so that a certificate can be immediately revoked in a situation where both parties agree on the need for revocation to mitigate the risk of the certificate being traded with other account holders.

Question 59

Do you agree or disagree with the approach to revoking certificates?

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
27	27	0	0	0

Figure 61 Question 59 summary of responses.

All respondents to this question agreed with the proposed approach to revoking certificates. Where justification was provided, respondents approved of the consistency with the RTFO,

which has been implemented successfully and provides familiarity for suppliers. A couple of respondents also commented on the clarity of the framework, stating that it provides a clear timeline and set of actions.

Regarding the proposal that, in the case where a supplier notifies the Administrator the Administrator has the power to revoke the certificate immediately, a couple of respondents commented that this would not make much difference as the supplier would know not to trade the certificates anyway. Though, this proposal was welcomed by other respondents.

Finally, one respondent urged government to allow suppliers sufficient time and opportunity to provide additional information in cases where they are at risk of revocation due to insufficient information.

Government response

Enforcement is an important element of any regulatory scheme as it is the method through which a regulatory body can ensure compliance in a fair and transparent manner. One way in which the Administrator can ensure compliance is through the revocation of certifications.

Government decision: we confirm the approach to revocation of certificates as set out in the consultation.

The approach to revocation of certificates aligns with that of the RTFO with the exception of where a supplier raises the need to revoke a certificate to the Administrator, the revocation can be actioned immediately rather than wait 28 days.

It will only be necessary to revoke certificates or take further action in specific circumstances where issues cannot be resolved. The Administrator will carry out regular compliance checks to identify issues and will notify suppliers promptly so that, where possible, there is an opportunity for issues to be addressed.

Where parties fail to meet obligations, proportionate sanctions can be applied, which will also reassure the compliant majority that they will not be disadvantaged by those that do not meet their obligations. We plan to do this by revoking certificates as a first response, where there is insufficient, inaccurate, or fraudulent information present in the application for the certificate. This includes information in the carbon and sustainability data, the verifier's assurance report and any declarations involved in the process. If further action is necessary, or a different offence is committed, civil penalties will be issued (see response to question 60 and question 61 for further information on civil penalties).

Although the legislation will apply revocation to individual certificates, in practice, the Administrator will revoke all the necessary certificates in one action. The Administrator will notify the supplier of its intent and grounds for revocation of the certificates but will allow suppliers sufficient opportunity to make representation against a revocation proposal or decision. This approach is consistent with the RTFO, which has been effective in its implementation. In practice, revocation of certificates for enforcement purposes is rarely used. Revocations are more commonly used at a supplier's request - in which case the revocation process can be expedited to allow the supplier in question to amend any errors and resubmit a claim for a certificate as soon as possible.

Further guidance on the process of revocation of certificates, including the actions taken by the Administrator, rights held by the Administrator and supplier, and the timeframe, will be set out in guidance, alongside clear examples.

Civil penalties

We set out our intention to give the Administrator powers to issue civil penalties for certain infringements to ensure compliance with the mandate. This includes where a supplier fails to apply for an account, has not wholly discharged the obligation and not paid the buy-out amount, and has not provided accurate information or sought to rectify inaccuracies that have been identified. The infringements set out follow those in RTFO legislation.

We proposed to issue two different types of penalty:

- where an account holder has gained, or attempted to gain, one or more certificates, the penalty will be proportionate to the buy-out price of that certificate; and
- where an account holder has made any other infringement, a fixed penalty will be issued.

We sought comments on which of the following penalties would be appropriate where relating to gaining certificates[45]:

- 1.5 x buy-out price = £3,850 per tonne of standard SAF; £5,287 per tonne of PtL;
- 2 x buy-out price (**preferred option**) = £5,134 per tonne of standard SAF; £7,050 per tonne of PtL; and
- 3 x buy-out price = £7,701 per tonne of standard SAF; £10,575 per tonne of PtL.

And relating to other infringements:

- £50,000 - in line with the RTFO
- £65,000 – approximately 25% higher to reflect the difference between the proposed SAF Mandate buy-out price and RTFO development fuel buy-out price
- £100,000 – double the value of the RTFO penalty

In addition to this, we proposed a daily 5% increase to the penalty for every day that it is not paid in full, starting on the day following the issue of the penalty. Further, it was proposed that any objections to civil penalties will follow the current process in the RTFO.

Question 60

Do you agree or disagree with the reasons for receiving penalties and the approach to issuing penalties?

[45] These values are based on the preferred buy-out prices in the consultation. We have confirmed higher buy-out prices for both the main and PtL obligations than originally consulted on. See responses to Questions 12 and 13 for further information.

Summary of responses

Total	Agree	Neither agree nor disagree	Disagree	Don't know
25	22	3	0	0

Figure 62 Question 60 summary of responses.

Most of the respondents agreed with the approach to issuing penalties set out in the consultation and recognised the need to include penalties. Only a few respondents provided further comment in support of the proposal, which largely referred to approval of the consistency with the RTFO. However, a few respondents underlined that penalties issued to obligated suppliers must not be passed on to airlines and consumers. Finally, one respondent noted that it is extremely unlikely obligated suppliers would incur penalties due to non-compliance, as can be seen by the limited number of cases throughout the RTFO.

Government response

We have responded to question 60 and question 61 together – see response following question 61.

Question 61

Which penalty values do you consider to be high enough to be a deterrent but proportionate to the infringement?

Summary of responses

Respondents typically preferred a £65,000 penalty although a small number of respondents each suggested £50,000 or £100,000. Where a penalty relates to the gaining of a certificate, four respondents stated it should be twice the price of the buy-out, with respondents arguing for consistency with the RTFO or that a penalty any less than this would bring the cost of non-compliance too close to the buy-out price.

Many respondents did not provide comment on a specific figure but instead outlined the considerations that need to be taken when setting an appropriate penalty. Some respondents underlined that penalties must be high enough to act as a deterrent and keep up in line with inflation, with a few respondents stating that the penalty values should be considerably higher than those included in the consultation. Other respondents argued for consistency with the RTFO or other similar international schemes. Although, one respondent questioned whether the RTFO penalty value would still be appropriate given it has not been altered since 2008. Finally, it was noted that suppliers should not be able to pass the cost of the penalty on to airlines and end users.

Government response

As noted in response to question 59 we will give the power to the Administrator to issue civil penalties. We welcome the responses from stakeholders on the reasons for issuing civil penalties, the process for issue civil penalties and the level at which these should be set.

meaning that, should an obligated supplier or an account holder applying for certificates fail to meet certain criteria, DfT can impose civil penalties as an act of enforcement. As with the RTFO, such penalties will only be issued for specific infringements and imposed after the Administrator has given sufficient notification to the party in question and provided opportunity to rectify the issue.

Government decision: we confirm the reasons for receiving penalties and the approach to issuing penalties in line with current practice under the RTFO and as set out in the consultation.

The reasons for issuing a penalty include where a supplier fails to apply for an account, has not wholly discharged the obligation and not paid the buy-out amount and has not provided accurate information or sought to rectify inaccuracies that have been identified. We will set out all infringements in legislation to provide clarity and certainty to account holders without the risk of changes being made without thorough consultation. These are the same as the RTFO and we have not seen sufficient evidence to amend any of these infringements for which an account holder maybe liable for a penalty. As noted by one respondent, it is highly unlikely that any penalty will be issued as the Administrator will endeavour to address any mistakes before reaching this stage. There have only been a few instances of penalties issued under the RTFO since it started in 2008.

We will issue two types of penalties, depending on the infringement:

- where an account holder has gained, or attempted to gain, one or more certificates by contravening one points set out, the penalty will be twice the buy-out price for each certificate gained or attempted to gain. In response to questions 12 and 13**,** we confirmed the buy-out price will be **£5,875** for standard certificates and **£6,250** for the PtL buy-out, meaning the penalty will be **£11,750 and £12,500** for each of these certificates respectively; and
- where an account holder has made any other infringement, a fixed penalty will be issued. The fixed penalty will be set at **£100,000.**

We recognise these penalties are higher than that of the RTFO. However, we believe that they are proportionate to the offence, comparable to other similar schemes and account for the relative cost of SAF, higher proposed buy-out price and impact of inflation. As such, they strike the right balance between acting as a deterrent without being too severe. As with the RTFO, we confirm that:

- a supplier has the opportunity to object to a civil penalty within 28 days of the penalty being issued which will then be considered by the Administrator;
- an appeal can be made if the recipient considers that they are not liable to pay the penalty and/or that the amount of the penalty is too high; and
- to encourage account holders to pay the penalty in a timely manner, for any penalty that is not paid to the Administrator, we will apply a daily 5% increase to the penalty for every day that it is not paid in full, starting on the day following the issue of the penalty.

Again, each of the above will be written into legislation to provide certainty to account holders that may be liable for penalties. Any changes to these rules or processes will be subject to thorough consultation to provide stakeholders an opportunity to provide feedback. In addition to the legislation, comprehensive guidance will be provided for relevant parties prior

to the mandate starting to ensure they are made aware of the processes, the actions that can be taken by the administrator and the account holder’s rights.

Glossary

AIA	Aviation Impact Accelerator
ASTM	American Society of Testing and Materials
avgas	Aviation gasoline
avtur	Aviation turbine fuel
BAU	Business as usual
C&S	Carbon and Sustainability
CBA	Cost benefit analysis
CCC	Climate Change Committee
CCUS	Carbon capture, usage and storage
CI	Carbon intensity
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DAC	Direct air capture
Defra	Department for Environment, Food and Rural Affairs
DEF STAN	Defence Standard
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
EU RED	EU Renewable Energy Directive
GA	General Aviation
GGR	Greenhouse gas removal
GHG	Greenhouse gas
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
HEFA	Hydroprocessed esters and fatty acids
HMRC	HM Revenue & Customs
HODA	The Hydrocarbon Oil Duties Act 1979
HVO	Hydrotreated vegetable oil
ICAO	International Civil Aviation Organization
ICCT	International Council on Clean Transport
ILUC	Indirect Land Use Change
IRA	Inflation Reduction Act
ISCC	International Sustainability and Carbon Certification
LCF	Low Carbon Fuel
LCHS	Low carbon hydrogen standard
LHV	Low Heating Value

MOD	Ministry of Defence
MSW	Municipal Solid Waste
NDF	Nuclear derived fuel
OEMs	Original Equipment Manufacturers
PtL	Power-to-liquid
RCF	Recycled carbon fuel
RED	Renewable Energy Directive
RFNBO	Renewable fuel of non-biological origin
RSB	Roundtable on Sustainable Biomaterials
RTFO	Renewable Transport Fuel Obligation
SAF	Sustainable aviation fuel
UCO	Used cooking oil
UK ETS	UK Emissions Trading Scheme
UKRI	UK Research and Innovation