CALL FOR EVIDENCE RESPONSE

SAF Mandate: SAF supply and industry certainty in an evolving market - T&E Submission

Summary

Aviation is one of the world's fastest-growing sources of greenhouse gas emissions – roughly doubling since 2000 and predicted to rise another 50% by 2040. According to the CCC's Seventh Carbon Budget Report this trend is likely to continue - aviation is currently the sixth highest-emitting sector in the UK economy and by 2040 will be the highest emitting sector. Without additional mitigation, emissions from aviation serve as one the primary threats towards the UK meeting its legally binding climate commitments.

Since it came into force last year, the UK SAF Mandate has operated as the Government's primary policy tool to reduce carbon emissions from the aviation sector. It plays a crucial role in gradually increasing the proportion of Sustainable Aviation Fuel (SAF) in the jet fuel mix, thereby enabling the growth and development of the SAF market - a technology that is still relatively nascent. As well as setting a clear path towards less carbon intensive fuels, the SAF Mandate provides the regulatory certainty that is required for long term SAF offtake agreements to be viable. SAF production (particularly e-SAF) requires long build-in times, significant investment and a policy framework that 'de-risks' large scale projects. By setting out a robust and certain pathway to 2040, the SAF Mandate allows for longer term investment support and offtake agreements to hold.

Because of the work to date, the existence of a SAF market in the UK is now not a question of if but *how* and *when*. The next challenge for the UK market is ensuring the scale up and commercialisation of the fuels that will most effectively decarbonise aviation fuel and protect UK energy security in the long term - namely non-HEFA SAF. This means attracting investment, delivering projects, securing feedstocks and bringing production capacity online at scale.

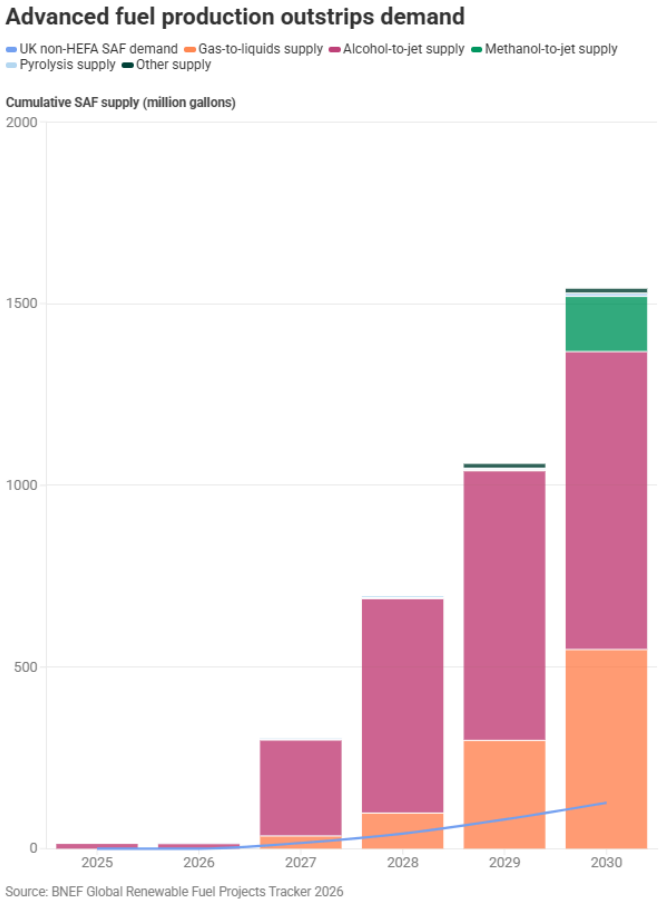
Making changes to either the HEFA cap or the PtL sub-target at this early juncture would derail progress made in commercialising UK SAF, in many cases making projects unviable. At present, offtake agreements between advanced SAF suppliers and airlines are being reached across the globe based on the existing conditions of the SAF Mandate. To change these features now, before we have seen any evidence that there will be significant supply challenges, could lead to considerable financial implications for advanced fuel suppliers both in the UK and globally. Additionally, both the HEFA cap and the PtL sub-target in the SAF Mandate were designed to protect the technology diversity of SAF in the fuel mix and limit the risk of overreliance on finite and insecure feedstocks like Used Cooking Oil. By changing these signals, we open the UK up to potential overreliance on limited and inefficient feedstocks which would reduce future SAF supply.

New data underlines that advanced fuels are scaling up and are doing so at pace. In response, the Government should consider policy levers that maintain ambition and policy direction under the mandate:

- Step back from proposals set out in the recent Revenue Certainty Mechanism (RCM) contract allocation strategy announcement and introduce a specific ringfenced e-SAF funding pot within the scheme, with a separate e-SAF allocation round.
- Commit to an expedited timeline on RCM support, with contract allocation taking place in Q2 2028 rather than Q4 2028.
- Allow e-SAF producers to use the Hydrogen Production Business Model to reduce green hydrogen costs.
- Ensure that crop-based biofuels are kept out of the SAF Mandate to protect the environmental principles of the scheme and limit further market pressures on e-SAF production.

Maintaining the ambitious targets of the SAF Mandate, including the HEFA cap and the PtL sub-target, communicates a clear indication to the global market that the UK is steadfast in its commitment to SAF investment, production and supply.

Q1. Do you expect there to be sufficient non-HEFA SAF (either PtL or non-PtL SAF), domestically and globally, to meet the SAF Mandate targets until 2040? Please provide any supporting evidence including how you expect availability to change over time.



According to BloombergNEF's recent analysis, up until 2030 global non-HEFA production considerably outstrips UK demand.

BNEF estimates that global non-HEFA production could reach roughly **4.7 mega tonnes by 2030**, a volume that vastly exceeds the total requirements of the UK SAF Mandate of **0.38 mega tonnes**. Crucially, the data also shows that by 2030 over **0.63 mega tonnes** of e-SAF will be produced across the globe, also surpassing the sub-target requirements set out in the SAF Mandate which requires **0.07 mega tonnes**.

Crucially, the UK is in a very strong position to access these volumes of the overall global non-HEFA SAF supply through the 2020s, due in part to the specific design of the HEFA cap and the PtL sub-target. By including advanced and e-SAF targets alongside a strict cap on HEFA, the UK has created a long-term demand signal for global fuel suppliers which acts as a global competitive

advantage, incentivising suppliers to prioritise the UK market over other less ambitious or mature frameworks. The SAF Mandate is the only scheme globally with a dedicated e-SAF target that takes hold before 2030, which will draw supply to the UK as a market leader. Aside from ReFuel EU, many other "mandates" only contain indicative targets and do not have the same robust and effective penalties.

This creates a predictable market environment where producers can secure their investment returns, ensuring that the UK can attract the necessary supply of non-HEFA fuels. T&E have spoken with a range of non-HEFA SAF producers who consider the current UK SAF Mandate market to be a primary location for pre-2030 global SAF supply, if production plants can meet FID to expected timelines.

From 2030 onwards, the SAF market should scale primarily through non-HEFA pathways to meet the growing demand for SAF globally because of HEFA “tipping point”. This is set out clearly in SkyNRG’s State of the Market Report, which emphasises that after 2030, demand is set to outpace the HEFA SAF production potential, urging the industry to shift towards a more diversified set of SAF policies and pathways. Despite significant capital costs and plant build times, we are starting to see advanced biofuel and e-SAF production scale up for post-2030:

- ETFuels recently confirmed their flagship e-SAF site will move to the Humber industrial cluster, noting it as “a commitment to creating a new advanced fuels industry that will deliver jobs, growth and energy security for Britain for decades to come”
- International Airlines Group (IAG) - the parent company of British Airways, Iberia, Aer Lingus, Vueling, and LEVEL - announced a major 10-year SAF purchase agreement with e-fuels provider Infinium. Infinium’s Project Roadrunner facility in West Texas is expected to become among the world’s largest e-SAF producers and is expected to start supplying in late 2026. Infinium have consistently referenced the UK’s clear price signal as an indicator of the strength of the UK SAF market.

As part of our SAF Observatory last year, T&E identified a total of 41 large scale e-SAF projects that are under development in Europe, which equates to 3 million tonnes of e-SAF that could be produced in Europe alone if all large-scale projects went ahead. This includes seven in the UK, including NABOO in Teeside, which is expecting to produce 68kt of e-SAF once in production after 2030.

Producing non-HEFA SAF is an expensive process which requires long term financial and policy security. As the SkyNRG State of the Market report also sets out, the greatest pressure on non-HEFA SAF production will be in the late 2020s and early 2030s, where SAF Mandate targets ramp up and the HEFA cap is activated. To ensure volumes come online as planned regulatory stability is critical, and without fixed targets, long term regulatory stability is limited.

Q2. In your view, what would be the likely consequences of maintaining the current approach (no policy change)? Please provide any supporting evidence

By driving the SAF Mandate forward as it was intended, and maintaining the core market indicators within the scheme, the UK Government can send a clear signal to domestic and global non-HEFA suppliers that the UK considers advanced biofuels and e-SAF a long term part of the plan to decarbonise aviation in the UK.

One direct benefit of this approach would be unlocking the economic benefits associated with a long term supply chain of non-HEFA SAF in the UK. As set out by Innovate UK, the UK is already developing production facilities and supply chain capabilities in regional clusters, which has significant job and economic growth potential in some of the UK's most deprived areas.

Innovate UK identified that the two regions with the highest concentration of both planned and operational SAF facilities (in total accounting for over half of the total number of SAF facilities in the UK SAF supply chain) are Yorkshire and the Humber with nine facilities and the North East of England with eight facilities. Building on the competitive economic advantage set out by the SAF Mandate, the UK can position itself as a global exporter of e-SAF expertise, technology and innovation. As many other global SAF mandates start to come online, the UK will be seen as a test-bed for the technology. Building domestic non-HEFA capacity will also directly support the Government's desire to re-industrilise communities outside of London and the South East.

Maintaining the current HEFA cap and PtL sub-target will also allow greater certainty for projects that have already received Advanced Fuel Fund (AFF) funding. The latest AFF data highlights that plants using municipal solid waste as a primary feedstock secured the highest total award value under the scheme, receiving £59m across four projects, while CO_2 was the most frequently represented feedstock, appearing in seven projects and receiving £37.6m. The AFF is a tax-payer funded scheme, and it is T&E's view that the Government should do all it can to ensure that these projects do not fail due to uninforced policy changes. If regulatory changes make these projects unviable, it would risk the collapse of the nascent non-HEFA industry and the waste of committed public funds, stranding investments and undermining the long-term regional economic regeneration they were intended to drive.

If supply does not come online as anticipated, this could lead to some buyout of suppliers obligation under the SAF mandate. However, it is important to emphasise that this outcome would not constitute a fundamental failure of the scheme. The buyout mechanism was explicitly designed as a safety valve to address supply limitations, acting as a managed route for fuel suppliers to fulfil their obligation rather than face a punitive penalty. There is limited evidence to suggest that the use of buyout, and therefore passed on consumer cost, would limit passenger numbers. In fact, T&E analysis consistently indicates that traveller trends remain largely the same in these instances. For example, in Germany between 2000 and 2007 the price of jet fuel tripled yet over the same period the number of passengers at German airports grew by 30%. By 2019, 75% more passengers boarded at German airports than in 2000 and the 2019 jet fuel price was more than double its 2000 level (~60% when adjusted for inflation). Overall, trends in travel behavior tend to have a greater impact on passenger demand than taxation and other costs. Therefore, potential buyout in the SAF mandate, and associated costs being passed on to passengers, does not necessarily equate to an overall reduction in passenger numbers.

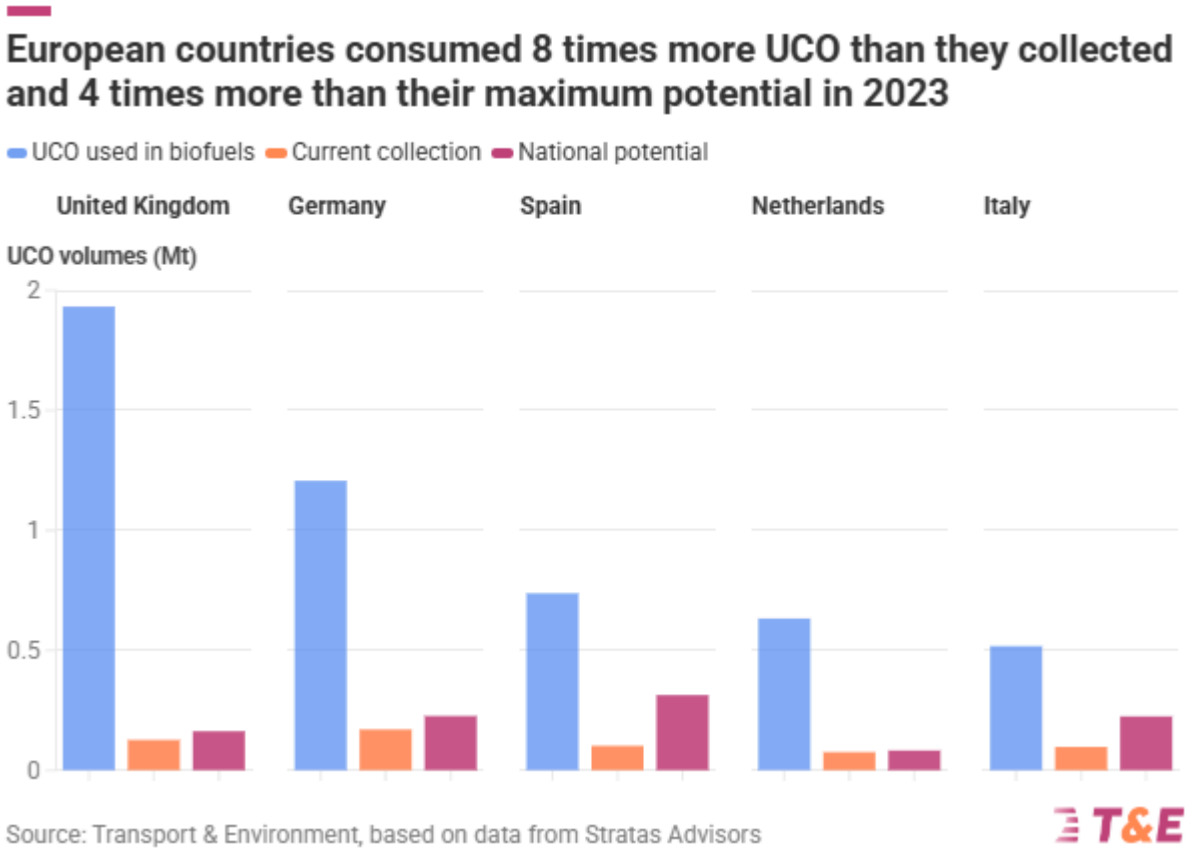
It is also important to consider the cost of the SAF mandate scheme in relation to the high volatility of fossil jet fuel prices. The Climate Change Committee recently found that reaching net zero by 2050 would be 'cheaper for the UK than one fossil fuel crisis' similar to that experienced this summer. In fact, the conditions often associated with buyout under the SAF mandate - higher ticket prices, reduced passenger numbers - are already taking place due to jet fuel market fluctuations. During the Iran Crisis, Europe saw an approximate £25 average increase to the airline per-passenger fuel costs and Heathrow said it expected a 1.1% decline in the total number of passengers to 83.6 million as the Iran war affects air travel. During the

crisis, fuel suppliers such as BP saw windfall profits - estimated to be approximately £2.41bn between January and March after an "exceptional" performance in its oil trading business, and far ahead of income in the same period last year which reached approximately £1.04bn. If buyout does occur, this would be completely manageable for fuel suppliers to digest given their considerable profits.

Maintaining the current approach of the SAF Mandate, specifically upholding the established HEFA cap and PtL sub-target, is fundamental to securing investment and ensuring the bankability of domestic SAF projects. For financiers and developers, long-term regulatory certainty is crucial for offtake agreements, which typically require a 10-15 year outlook. By providing a stable and predictable policy framework, the UK signals that it is a committed market for advanced and e-SAF technologies. This stability de-risks large-scale projects, enabling producers while avoiding the financial volatility that would inevitably follow from unexpected policy shifts.

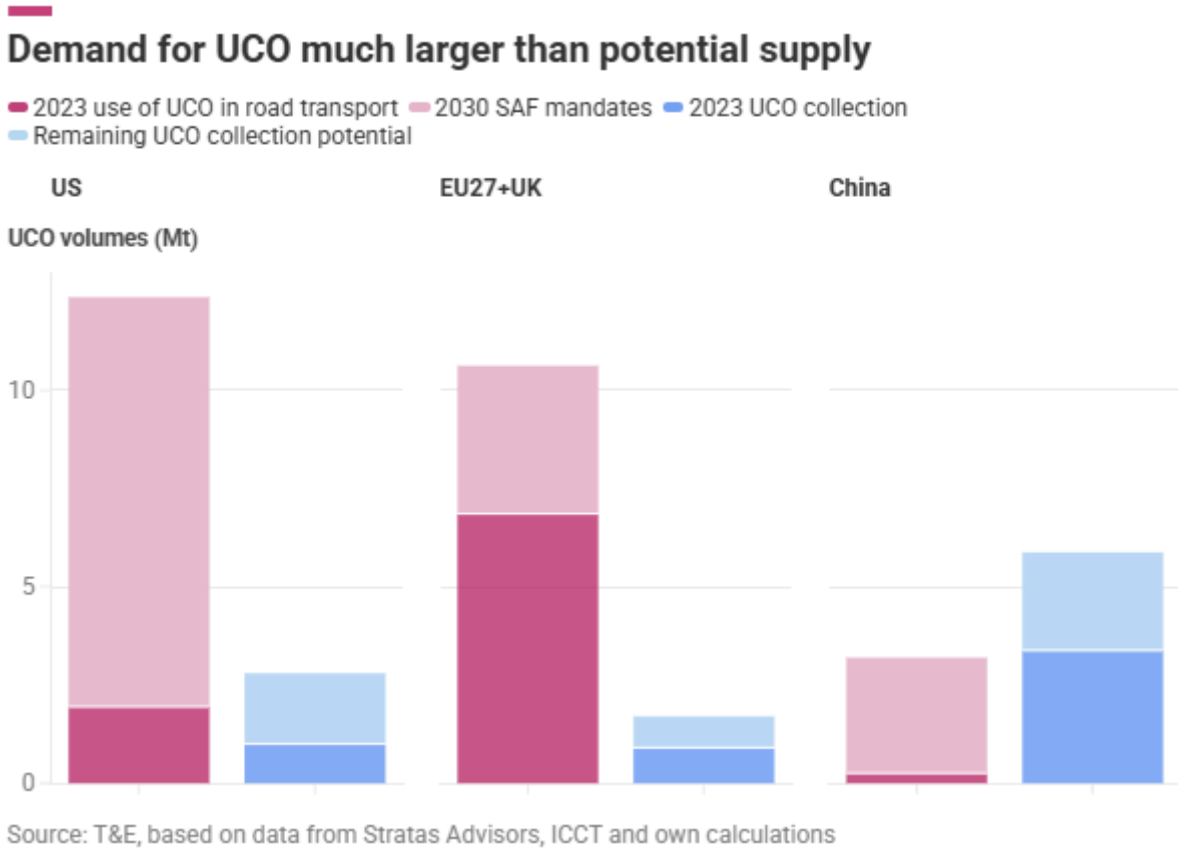
Q3. If you believe a change to the HEFA cap is required in 2027 or subsequent years to address insufficient supply, what type of change do you think is required? Please provide detail of the change and evidence to support it. If you do not believe a change is required to the HEFA cap, please state why. Please provide any supporting evidence as justification. Consider supply availability, and the impact on investment, industry and the environment in your answer.

The HEFA cap plays a vital role in protecting the UK SAF Market from overreliance on a single feedstock, namely used cooking oil (UCO), which has limited long term capacity and weak greenhouse gas saving returns. According to T&E's 2024 study, used cooking oil biofuels account for over one third of European biofuel consumption and Europe burns through 130,000 barrels of used cooking oil a day - eight times more than it collects. This means that there is no potential to further increase UCO use for aviation. The study also shows that for global SAF targets in 2030 to be met, it would require at least twice the amount of UCO that can be collected in the US, Europe and China combined.



Europe is already highly reliant on used cooking oil. Source: T&E

There are also significant geopolitical risks inherent in becoming reliant on imported UCO. According to the latest provisional statistics, 78.5% of UCO supply under the SAF Mandate comes from China. As China advances its own domestic SAF ambitions it is expected that a significant volume of this feedstock will be diverted to meet internal requirements. This creates an inherently insecure global supply chain for the UK. Maintaining a robust HEFA cap is therefore not merely an environmental decision, but important for national and energy security. Relying on imported feedstocks can create vulnerabilities in times of conflict, whereas building robust and domestic non-HEFA production can ensure the UK maintains a secure fuel supply when global chains are disrupted.



Demand for UCO is far greater than potential global supply. Source: T&E

It is also imperative that the UK Government maintains its current exclusion of crop-based fuels from the SAF Mandate. Allowing these feedstocks into the scheme represents a fundamental threat to the environmental integrity of the policy. Crop-based pathways carry substantial risks of Indirect Land Use Change (ILUC), which, when fully accounted for, can result in lifecycle emissions comparable to, or even exceeding, those of fossil jet fuel. Including these fuels would effectively undermine the mandate's purpose, potentially negating up to 95% of its projected carbon savings. Relying on crops for aviation fuel creates direct competition for land and resources essential for food production, worsening global food insecurity without providing a scalable solution to the challenge of aviation emissions.

From an industrial perspective, admitting crop-based fuels would stifle the very innovation the UK SAF Mandate is designed to promote. Because crop-based SAF is significantly cheaper to produce than advanced fuels like e-SAF and waste-based biofuels, it would inevitably outcompete them for market share, absorbing the space intended to support nascent technologies. Additionally, UK domestic production of crop-based ethanol cannot compete with cheaper, heavily subsidised imports, particularly from the US. The mandate would risk pivoting from a test-bed for domestic innovation into a channel for subsidised imports, ultimately jeopardising the industrial shift required to decouple UK aviation from finite and insecure feedstocks. For further information please see T&E briefings on crop fraud, international competition and environmental impacts.

Q4. What would be the impact on investment in non-HEFA production domestically and globally by any change in the HEFA cap? Please provide evidence including differential impacts of different approaches to changing the HEFA cap. How could a change be implemented that mitigated impacts on non-HEFA production most effectively?

The best way to protect non-HEFA investment is to keep the HEFA cap in place and at its current level. As mentioned above, the HEFA cap plays a vital role in protecting the future SAF market from an over-reliance on a limited range of feedstocks and therefore far more limited future supply. By further expanding the early dominance of HEFA SAF by loosening the cap, the drive for investment in non-HEFA production would be severely weakened, with investors reading this as the Government signalling a direct preference for HEFA as part of the SAF mix over a longer term.

As set out by this Energy Solutions Intelligence report, although HEFA dominates SAF production today with around 90% of the market share, it has an acute structural feedstock ceiling, with waste oils limited to around 4.5-5 million tonnes a year globally. This means that it cannot scale beyond 10-15% of overall jet fuel demand in 2035. The HEFA cap reflects this feedstock reality, providing space within the SAF Mandate to allow for other less restricted feedstocks to come online, namely advanced biofuels and e-SAF. The report also identifies that from 2030 to 2035 "e-kerosene from green hydrogen and captured CO_2 grows [in scale] as costs fall and renewable power expands, while HEFA and ATJ plateau due to feedstock constraints".

Relaxing the cap would see increased HEFA production in the early part of the Mandate, primarily through existing facilities and global refineries. However, it would also represent weaker incentives for non-HEFA projects domestically and globally, stifling investment in non-HEFA, cutting supply and driving up prices. The market is highly sensitive to policy change, and the Government risks considerable unexpected fluctuations to price and supply if it makes considerable changes to the scheme especially before any of the advanced and e-SAF targets even come into force.

Q5. If you believe a change to the Power-to-Liquid (PtL) obligation is required in 2028 or subsequent years to address insufficient supply, what type of change do you think is required? Please provide details of the change and evidence to support it. If you do not believe a change is required to the PtL obligation, please state why. Please provide any supporting evidence as justification. Consider supply availability, and the impact on investment, industry and the environment in your answer.

The PtL sub-target, much like the HEFA cap, is key to creating a market for e-SAF by creating the necessary demand to stimulate supply. With that in mind, the PtL sub-target should not be changed. Any change to the sub-target at this juncture will have significant knock-on impacts on existing offtake agreements, investability and ability for plants to reach FID. Investability in potential plants is fundamentally predicated on the existing regulatory environment, meaning any unexpected policy shifts could damage investment potential, which has an inevitable knock-on effect to offtake agreements and the ability for plants to reach FID. Rather than change targets, the Government should work to support and scale up e-SAF offtake and revenue certainty through ringfenced funding support and a stable regulatory environment.

As set out by the Green Finance Institute Fuel Sector Report, offtake agreements are an essential tool for mitigating price risk for investors, producers and users. However, their effectiveness depends on funders "matching debt terms", which typically require a forward look of around 10-15 years. According to T&E research, the average e-SAF plant requires around €1-2 billion worth of capital investment. These agreements are therefore based on the existing regulatory environment, which the SAF Mandate currently provides. Consequently, any unexpected changes to the SAF Mandate, such as alterations to the PtL sub-target, could render these signed offtake agreements unviable. This would create significant financial and operational uncertainty for developers and airlines, and undermine the stability required to secure the long-term investment needed for the UK's nascent SAF market.

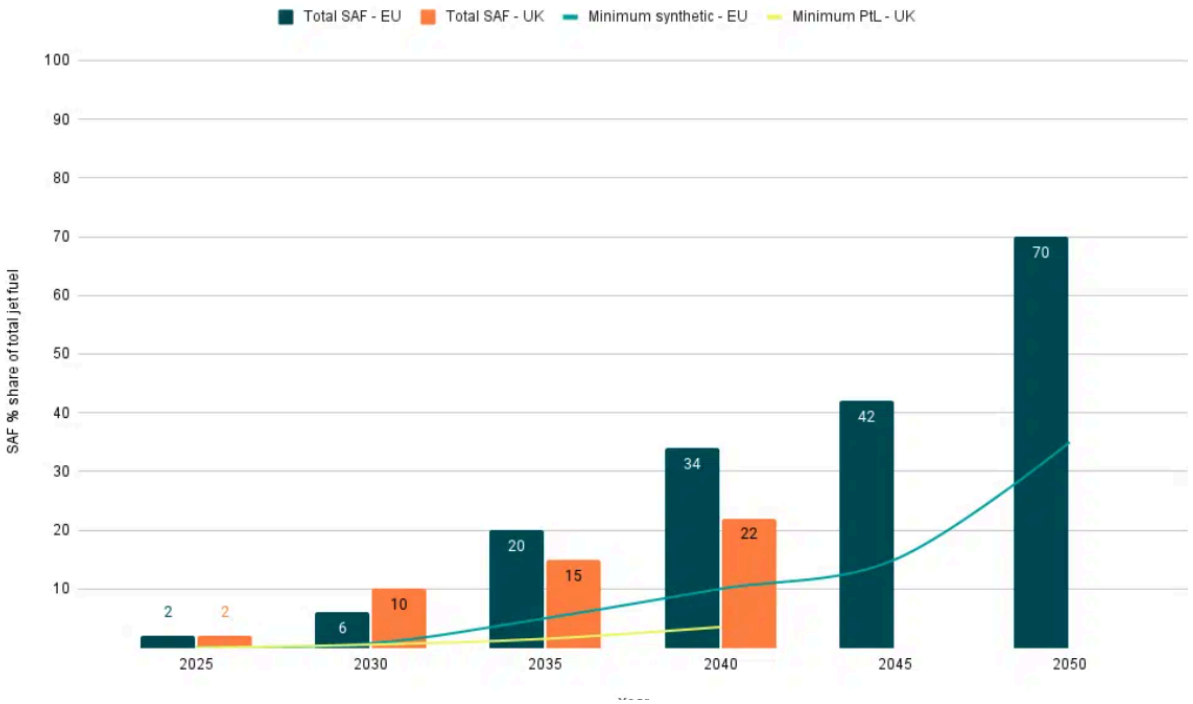
Rather than adjusting the PtL sub-target, the Government should instead be prioritising the development of a regulatory environment that facilitates easier domestic and global e-SAF production. Unfortunately, the Government's recent announcement on Revenue Certainty Mechanism contract allocation is likely to weaken the UK's competitive advantage up until 2030 and perhaps beyond. The Government should instead do the following:

- Ringfence funding support in the Revenue Certainty Mechanism to prevent nascent e-SAF projects from having to compete directly against cheaper biofuel pathways. By choosing not to ringfence support, the government is forcing nascent e-SAF projects to compete directly against cheaper and more carbon intensive pathways, risking e-SAF projects being priced out of early contracts entirely.
- Speed up the contract allocation process, with contracts being allocated in Q2 of 2028 rather than Q4 2028. The current timeline to get plants commissioned and produced in time to meet government targets is highly pressurised.
- Allow e-SAF producers to use the Hydrogen Production Business Model to reduce green hydrogen costs. E-SAF production relies heavily on green hydrogen as a primary feedstock which remains a considerable cost challenge in early stage production. Without financial mechanisms to bridge the gap, developers are facing economic barriers that are slowing down the path to FID.

By actively lowering the barriers to large-scale e-SAF production, the Government can secure the UK as a 'first-mover' and build a reliable domestic industry. Changing rules now would have the opposite effect.

Q6. What would be the impact on investment in non-HEFA production domestically and globally by any change to the PtL obligation? Please provide evidence including differential impacts of different approaches to changing the PtL obligation. How could a change be implemented that mitigated impacts on non-HEFA production most effectively?

T&E have heard first hand from a range of e-SAF producers that even the announcement of this Call for Evidence has caused concern for investors who are looking to support non-HEFA production in the UK and abroad. Inevitably, any change to the PtL sub-target would have a downward impact on long term investment in non-HEFA production globally. Because the PtL sub-target is the primary market signal for the fuel, there are no mitigations that would redress any change to the PtL sub-target. A change would unquestionably have a corresponding impact on the ease to which investment can be sought, and the ability for producers to reach Final Investment Decision.



UK SAF Mandate minimum e-SAF obligations compared to the ReFuel EU scheme. Source: Climate Catalyst

The current PtL sub-target design works well as an early signal to e-SAF developers. The UK SAF Mandate is one of the few mature schemes operating globally, and crucially the PtL sub-target is more manageable than ReFuelEU, as it starts at a lower point and has a more incremental increase. Because of this, the UK is a more predictable, de-risked environment for developers for several reasons:

- The current target, comparative to the EU's, reduces the pressure of meeting compliance requirements early in the scheme.
- Producers are more likely to prioritise the UK market for pre-2030 supply as a primary test-bed for scaling e-SAF technology, as the risks of doing so in the EU are too high.

However, it does not track that any further reduction in the ambition of the PtL sub-target would benefit the wider market, due to the market signal implications of changing the SAF mandate. What is most needed at this crucial juncture for e-SAF is regulatory certainty, and a SAF Mandate that drives supply to the UK market.

Q7. Do you think there are additional options for flexibility within the SAF Mandate that should be considered to help support delivery of the mandate while not undermining investment in SAF production? If so, what are these options and what would be their pros/cons. Please provide evidence. Consider supply availability, and the impact on investment, industry and the environment in your answer.

T&E's position is that the SAF Mandate should be maintained as is, including the HEFA cap and the PtL sub-target. However, we also believe that there are several policy levers that DfT could pull to protect the ambition and purpose of the SAF Mandate if serious supply concerns are realised. However, these must be paired with actions that alleviate cost concerns for non–HEFA producers, and be time restricted to ensure the ambition of the SAF Mandate isn't impacted. These policy levels are as follows:

1. **Provide ringfenced funding for e-SAF producers under the RCM** - The lack of ringfenced support for e-SAF forces nascent projects to compete with cheaper, carbon-intensive alternatives for RCM contracts, making early wins impossible. Given the need for long-term investment and de-risking, the Government should reverse this position to ensure the business case for domestic e-SAF projects remains viable.
2. **Speed up the RCM contract allocation process**, with contracts being allocated in Q2 of 2028 rather than Q4 2028. The current timeline to get plants commissioned and produced in time to meet government targets is highly pressurised.
3. **Allow e-SAF producers to use the Hydrogen Business Model to reduce green hydrogen costs** - e-SAF production relies heavily on green hydrogen as a primary feedstock, which remains a considerable cost challenge in early stage production. Without financial mechanisms to bridge the gap, developers are facing economic barriers that are slowing down the path to FID.
4. **Ensure that crop-based biofuels are kept out of the SAF Mandate** to protect the environmental principles of the scheme and limit further market pressures on e-SAF production.