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By email to alternativecleanheatsolutions@energysecurity.gov.uk

Exploring the role of alternative clean heating solutions consultation

Dear Sir or Madam

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

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

Fuels Industry UK welcomes the opportunity to respond to the consultation on exploring the role of alternative clean heating solutions.

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

Our responses to the consultation questions are given in Attachment 1. We also attach further information on the complexities of the UK fuel supply chain in Attachment 2.

Yours sincerely

Chris Gould

Energy Transition Lead, Fuels Industry UK

Attachment 1: Fuels Industry UK Response

1 - Do you agree that electric boilers should play a limited role in decarbonising heat, given their comparatively low efficiency and limited ability to load shift, leading to high running costs for consumers?

Fuels Industry UK has no response to this question

2 - Do you agree that (a) thermal energy storage systems and (b) electrical energy generation and storage (solar PV and batteries) can enable electric boilers to become a more efficient and cost-effective option to decarbonise heat?

Fuels Industry UK has no response to this question

3 – Do you have any evidence or views on the role infrared heating could play in decarbonising heat?

Fuels Industry UK has no response to this question

4 – Do you agree that panel heaters and electric radiators should play a smaller role in decarbonising heat, given their comparatively lower efficiency (than heat pumps) and limited ability to load shift, leading to high running costs for consumers?

Fuels Industry UK has no response to this question

5 – In what circumstances, if any, would panel heaters or electric radiators be more suitable than heat pumps, thermal energy storage systems, biomass heating systems or hybrid heat pumps?

Fuels Industry UK has no response to this question

6 – Do you agree that high temperature heat pumps could play a key role in decarbonising heating of buildings?

Fuels Industry UK has no response to this question

7 – What are the key barriers that are preventing the installation of high temperature heat pumps in (a) domestic properties and (b) non-domestic buildings? How could these barriers be removed?

Fuels Industry UK has no response to this question

8 – Do you agree that air-to-air heat pumps could play a key role in decarbonising heating of buildings without wet central heating systems?

Fuels Industry UK has no response to this question

9 – What are the key barriers that are preventing the installation of air-to-air heat pumps in (a) domestic properties and (b) non-domestic buildings? How could these barriers be removed?

Fuels Industry UK has no response to this question

10 – Do you have any evidence on the potential for air-to-air heat pumps to use alternative refrigerants?

Fuels Industry UK has no response to this question

11 – Please provide any evidence or views on a) the promotion of passive cooling measures to increase their uptake, so that active cooling is only used when and where needed, and b) local network impacts during extreme weather events.

Fuels Industry UK has no response to this question

12 – Do you agree that networked heat pumps may have a key role to play for buildings with limited outdoor space for individual heat pumps per dwelling?

Fuels Industry UK has no response to this question

13 – Do you have any evidence or views on a) which business models would be most effective at bringing forward networked heat pumps, where appropriate, and b) what steps would be necessary to support the development of such business models?

Fuels Industry UK has no response to this question

14 – Do you have any evidence or views on a) the public appetite to make use of clean heat solutions relying on shared infrastructure, b) where clean heat solutions that rely on shared infrastructure have been implemented, and c) what steps have been most effective at persuading households to participate in projects?

Fuels Industry UK has no response to this question

15 – Do you have any evidence or views on the role exhaust air heat pumps could play in decarbonising heat?

Fuels Industry UK has no response to this question

16 – Do you have any views on whether exhaust air heat pumps should be targeted primarily at buildings with a) limited outdoor space b) a higher risk of air-tightness c) lower heat demand d) new-builds?

Fuels Industry UK has no response to this question

17 – Do you have any evidence or views on the role heat batteries could play in decarbonising heat?

Fuels Industry UK has no response to this question

18 – Do you have any views on what further criteria, in addition to existing scheme criteria (e.g. MCS certification and SAP-eligibility), should be required for heat batteries that are supported through government grant schemes to prevent systems from drawing energy at peak times?

Fuels Industry UK has no response to this question

19 – Do you have any evidence or views on how future developments in the thermal energy storage market might help reduce strain on the electricity grid and how this could work with other technologies (like heat pumps or electric boilers) to become more cost effective?

Fuels Industry UK has no response to this question

20 – Do you have any evidence or views on the role storage heaters could play in decarbonising heat?

Fuels Industry UK has no response to this question

21 – Do you have any views on what further criteria, in addition to existing scheme criteria (e.g. SAP-eligibility), should be required for high heat retention storage heaters that are supported through government grant schemes, to prevent systems from drawing energy at peak times?

Fuels Industry UK has no response to this question

22 – Do you have any evidence on any other types of electric heating that could play a significant role in decarbonising heat?

Fuels Industry UK has no response to this question

23 – Do you have any evidence or views on the role solid biomass boilers could play in decarbonising heat?

Fuels Industry UK has no response to this question

24 – Do you have any evidence on the types and/or characteristics of properties which would not be suitable for a heat pump or a heat network, but would be suitable for a biomass boiler?

Fuels Industry UK has no response to this question

25 – Do you have any further evidence or views on the sustainable implementation potential for renewable liquid heating fuel production in the UK? We would particularly welcome any evidence which takes into account:
• The availability of sustainable feedstocks that would be needed to produce renewable liquid heating fuels
• The commercial readiness of novel production processes for making renewable liquid heating fuels
• Any potential competing demands for feedstocks from other sectors – like transport.
• The potential to make certain renewable liquid heating fuels – such as bioLPG and HVO – as a co-product of SAF production
• Any other factors you consider may be relevant

We welcome the comments that DESNZ are looking at overall demand for lower carbon fuels across both the heating, and transport, sectors, recognising that lower carbon fuels can be part of decarbonisation solutions. This holistic approach is essential to ensure a realistic trajectory for lower carbon fuels that takes account of their availability and application across multiple sectors.

We note the 2023 Biomass Strategy [2], and largely agree with its findings. In particular we note that current supplies of lower carbon fuels may be limited and should be targeted in hard to abate sectors.

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

Novel production processes are available for lower carbon fuels [3]. Given the direction of travel, these are likely to focus on sustainable aviation fuel (SAF) production in the first instance, with products such as HVO and bio-LPG being produced as co-products. Yields of 80% SAF, 20% co-products would seem to be typical at this point in the technology development. However, the yield of SAF and co-products may be adjusted within certain limits and depending on the technology; this creates an interaction between the SAF mandate economics and those of other schemes, such as the RTFO or low carbon heating scheme (noting as above that heating kerosene can currently contain up to 50% SAF). With HEFA based SAF currently 2-5 times the price of fossil kerosene [4], it is unlikely that co-products would be significantly cheaper than this, until technology developments reduce production costs.

The UK is a challenging place for manufacturing, with high energy [5] and carbon costs [6] relative to international competition. Heating fuel production in the UK needs to compete with international alternatives, given the costs and emissions associated with imports are not prohibitive. This is evidenced in the Renewable Transport Fuels Obligation (RTFO) statistics [7], which confirmed that in 2024, only 7% of the lower carbon fuel supplied in the UK was derived from UK feedstocks.

As we note, the UK is a challenging place for manufacturing, and this extends to investment in lower carbon fuel production. The DfT is seeking to provide investment certainty for UK SAF production plants through the Revenue Certainty Mechanism (RCM) [8]which is looking to begin in 2027. This seeks to apply a contracts for difference (CfD) approach to SAF production although this support is not expected to be available to Hydroprocessed Esters and Fatty Acids (HEFA) derived SAF as this is an established production pathway.

UK SAF plants may be able to supply co-products such as HVO, and their availability is dependent on the UK being seen as an attractive place for investment for these. Imports of these products from abroad are of course still possible.

[3] https://velocys.com/fischer-tropsch-technology-explained/
[4] https://theicct.org/why-and-how-to-bring-down-the-cost-of-saf-sept25/
[5] https://commonslibrary.parliament.uk/research-briefings/cbp-9714/
[6] https://carboncommission.co.uk/wp-content/uploads/2024/03/Frontier-Economics-UK-competitiveness-and-carbon-pricing-FINAL.pdf
[7] https://www.gov.uk/government/statistics/renewable-transport-fuel-obligation-rtfo-statistics-2024-final-report/renewable-transport-fuel-obligation-rtfo-statistics-2024-final-report
[8] https://www.gov.uk/government/consultations/sustainable-aviation-fuels-revenue-certainty-mechanism-revenue-certainty-options

The current RTFO targets are in the process of being reviewed [9], potentially with a view to increasing the targets above those currently set in law [10]. This includes an expected DfT call for evidence in the first half of 2026, with any changes coming in effect in January 2027.

The RTFO changes need to take account of the existing blend walls in fuel specifications, such as a maximum of 7% Fatty Acid Methyl Ester (FAME) in the prevailing BS EN 590 [11] diesel specification. Further increases to the RTFO targets are likely to come from the addition of additional "drop in" lower carbon fuels, such as Hydrogenated Vegetable Oil (HVO) [12]. This is likely to further increase demand for HVO in the ground transport sector. We therefore ask that a combined approach between DESNZ and the DfT (who are responsible for the RTFO) is considered, rather than each department looking at their respective schemes in isolation.

There needs to be due account made of the supply chains for heating fuels; further information can be found in Attachment 2. Kerosene is manufactured or imported into the UK by ship (with imports now accounting for over 80% of UK kerosene supply [13]). This is often supplied within the UK, for example through multi-product pipelines, as a dual-purpose kerosene (DPK) meeting the requirements of both the aviation and heating fuel specifications. SAF can also be added to DPK at up to 50%, in line with the prevailing standards, principally to meet the requirements of the SAF mandate. If the kerosene is used in heating, then it is marked according to the prevailing HRMC requirements [14]. This means that the heating kerosene can, contain up to 50% SAF. It would be extremely beneficial if SAF can also qualify against the renewable liquid heating obligation, rather than relying solely on HVO or bio-LPG as suggested in the consultation.

[9] https://www.gov.uk/government/calls-for-evidence/rtfo-statutory-review-and-future-of-the-scheme/rtfo-statutory-review-and-future-of-the-scheme
[10] https://www.gov.uk/government/collections/renewable-transport-fuels-obligation-rtfo-orders
[11] https://knowledge.bsigroup.com/products/automotive-fuels-diesel-requirements-and-test-methods-7
[12] https://www.ieabioenergy.com/wp-content/uploads/2024/09/IEA-Bioenergy-Task-39-drop-in-biofuels-and-co-processing-report-June-2024.pdf
[13] https://www.gov.uk/government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes

[14] https://www.legislation.gov.uk/uksi/2023/1187/pdfs/uksiem_20231187_en_001.pdf

26 – Do you have any further evidence or views on the cost at which renewable liquid heating fuels – produced from sustainable feedstocks - could be made available to UK consumers?

For reasons of competition law, we cannot comment on this question in detail.

However, we are aware that specific pricing information is available from specialist organisations who analyse trading activity and provide a market assessment. This includes information on HVO pricing [15]. We would recommend that DESNZ contact Argus, or similar organisations such as Platt's, for this information.

27 – Do you have any evidence or views on the potential of renewable liquid fuels to be used in buildings where other low carbon solutions may not be the best solution?

The RTFO has operated effectively for many years (starting in 2008), is well understood by suppliers and provides significant carbon savings (around 8m tonnes in 2024). It has been reviewed and updated on a number of occasions since its introduction, which have been subject to stakeholder consultation, and appropriate notice of any changes.

A similar, and aligned, scheme has the potential to offer similar benefits, subject to the affordability and feedstock availability tests identified in the consultation document.

[15] https://www.argusmedia.com/en/methodology/key-commodity-prices/argus-hvo

28 – Do you have any evidence or views on the practical implications that may arise if some off-grid consumers start using renewable liquid heating fuels? We would welcome any evidence which takes into account:
• At what blend level (i.e. of renewable liquid heating fuel to fossil heating fuel) would existing boilers require certain modifications or upgrades (e.g. to their nozzles)?
• At what blend level would boiler manufacturers be happy to warrant existing boilers?
• Would there be any implications for fuel storage if some off-grid customers took a blend of renewable liquid heating fuels and fossil heating fuels?
• Are there any existing boiler makes or models – used off the gas grid - that could not take a blend of renewable liquid heating fuels and fossil heating fuels?

In terms of blend levels, we would refer to OFTEC [16], who are the subject matter experts in applicable heating technologies. However, Fuels Industry UK has been heavily involved through 2025 in the British Standards Institute (BSI) work to revise the BS 2869 [17] specification on kerosene-based fuels for home heating. Through this work, we are aware that OFTEC have concluded that a blend of 20% HVO in domestic kerosene is acceptable and can be warranted by their members. Although we cannot share this report for confidentiality reasons, we would encourage DESNZ to contact OFTEC for a copy.
The proposed changes to the BS 2869 standard include

- The fact that the requirements for the fossil kerosene will remain consistent with those of aviation kerosene, allowing dual grading to continue and ensuring supplies of heating kerosene remain feasible.
- Additional testing is required if HVO is added to the blend, to ensure that it continues to meet the requirements for heating applications. This ensures that HVO can provide a decarbonisation solution while not damaging heating equipment.
- A recognition that heating kerosene can contain up to 50% SAF, due to the nature of the supply chains involved (as discussed in our response to Q25 and in Attachment 2). The SAF is chemically indistinguishable from fossil aviation fuel, is subject to stringent aviation mandated no harms testing, and meets the applicable SAF standards (ASTM D7566) [18].

We would encourage DESNZ to ensure that these requirements apply as underlying principles in the development and design of any future low carbon heating scheme.

[16] https://www.oftec.org/
[17] https://knowledge.bsigroup.com/products/fuel-oils-agricultural-domestic-commercial-and-industrial-fixed-combustion-applications-specification
[18] https://skynrg.com/sustainable-aviation-fuel-certification-and-astm-international-what-is-it-why-does-it-matter/

29 – Do you have any evidence or views – especially on cost and availability of sustainable feedstock - to demonstrate that a possible initial blend approach could be increased to a 100% renewable liquid fuel solution for consumers? We would particularly welcome any evidence which takes into account:
• The cost and availability of sustainable feedstock
• Any other factors you may consider to be relevant

We would refer to our response to questions 25 and 28, which refer to the cost and implementation of lower carbon liquid fuels. These apply equally to higher blends of renewable fuels, as they do to lower levels. Notable points include:

- There will be competition with other schemes, such as the RTFO and SAF mandate for feedstock and lower carbon fuels such as HVO. As such, we would not expect the costs of these to be materially different when used in the various schemes. SAF is currently priced at a significant premium to conventional aviation fuel.
- We are aware of work that OFTEC have carried out on blends and are prepared to warrant up to 20% HVO in heating kerosene. As the subject matter experts, we would expect them to have a better view on future compatibility issues.

We note from the consultation that extensive modifications may be required when increasing the levels of say HVO in domestic heating appliances. This gives rise to backwards compatibility issues; for example, if 100% HVO is not available can conventional heating kerosene be used? Although we do not have a specific answer to this question, we would recommend that OFTEC are consulted to provide continency plans should this situation arise, and to provide guidance on the issue.

30 – Do you have any evidence or views on the role that hybrid heat pumps, comprising of a heat pump and an appliance using 100% renewable liquid fuels, could play in decarbonising heat?

Fuels Industry UK has no response to this question

31 – Are there any other alternative low carbon heat sources not discussed in this consultation which you consider could offer further benefits if installed as part of a hybrid heat pump system compatible with net zero?

Fuels Industry UK has no response to this question

32 – Do you have any evidence or views that could help inform future decisions on whether to implement a Renewable Liquid Heating Fuel Obligation, and if so, how?

There must be a consistency of approach between the DESNZ operated renewable liquid heating fuel obligation as far as possible. This consistency extends to several key areas:

- Consistency of lower carbon fuel requirements. These are well established and extensive for fuel suppliers under the RTFO, including both requirements for the lower carbon fuels (such as the sustainability, definition of obligated suppliers, minimum carbon savings and verification requirements). They are updated an annual basis and published on-line [19]. This ensures that there are no market distortions between schemes and a level playing field.
- Further to the consistency of sustainability requirements with, for example, the RTFO, the requirements under the renewable liquid heating fuel obligation should be consistent with government decisions on an overarching UK sustainability framework. This is currently out for consultation and is due to conclude on the 27th of February [20]. Again, this ensures a level playing field and minimises market distortions.
- Fuel suppliers report their volumes and sustainability information under the ROS (RTFO Operating System) Lite IT system, operated by the DfT. To avoid increasing the administrative burden on suppliers, we would strongly ask that DESNZ use the same system if at all possible.

The requirements for the RTFO and SAF mandate are well established. This includes targets (and the basis for which they are set including the definition of the obligated suppliers) over a number of years, penalties for non-compliance and appropriate legislative review dates. The requirements for any renewable liquid heating scheme need to be articulated at a similar level so that participants are well informed of their duties under the legislation.

[19] https://www.gov.uk/government/collections/renewable-transport-fuels-obligation-rtfo-orders#rtfo-guidance
[20] https://www.gov.uk/government/consultations/common-biomass-sustainability-framework

33 – Do you agree that evidence of affordability to consumers, and availability at scale of sustainable feedstock are key factors in determining if the government should pursue the implementation of a Renewable Liquid Heating Fuel Obligation? If not, what other factors do you think are significant and why?

Fuels Industry UK agrees that affordability to consumers, and availability at scale of sustainable feedstock (noting the requirements of other sectors such as the transport sector) are key factors in determining whether to implement a Renewable Liquid Heating Fuel Obligation.

34 – Do you have any views on what other steps government or industry could take to develop the market for renewable liquid heating fuels, ahead of making a decision on whether to implement a Renewable Liquid Heating Fuel Obligation?

The RTFO has operated effectively for many years (starting in 2008), is well understood by suppliers and provides significant carbon savings (nearly 8m tonnes in 2024). It has been reviewed and updated on a number of occasions since its introduction, which have been subject to stakeholder consultation, and appropriate notice of any changes.

A similar, well designed and aligned, scheme has the potential to offer similar schemes, subject to the affordability and feedstock availability tests identified in the consultation document.

A well-designed obligation scheme must take account of where the obligation is placed in the supply chain. If the obligation is placed on refiners and importers, but the ability to blend lower carbon fuels rests with distributers [21] then this creates a potential risk of market distortions. This issue must be considered and addressed in any future development and design of a renewable liquid heating fuel obligation.

35 – Do you have any views on whether the introduction of the Renewable Liquid Heating Fuel Obligation would be an effective tool in fully decarbonising oil heated homes or whether it is a transitional solution to decarbonisation (if either)?

It is difficult to answer this question in detail, given the significant uncertainties involved in the transition at this time.

The renewable liquid heating fuel obligation could be an effective tool in decarbonisation if it is well designed and established.

Other schemes, such as the RTFO or SAF mandate provide a framework in the short to medium term and are subject to review.

[21] https://ukifda.org/

We would therefore suggest that any renewable heating fuel obligation scheme is treated in the same way. It should provide a framework under which distributers and fuel suppliers can operate to promote decarbonisation which is then subject to review as the transition develops.

A well-designed obligation scheme must take account of where the obligation is placed in the supply chain. If the obligation is placed on refiners and importers, but the ability to blend lower carbon fuels rests with distributers [22] then this creates a potential risk of market distortions. This issue must be considered and addressed in any future development and design of a renewable liquid heating fuel obligation.

We note that any renewable liquid heating fuel obligation needs to be simple, transparent and not impose an additional burden on fuel suppliers. A poorly designed system may lead to fuel suppliers (including UK refiners who are already operating in a hostile operating environment) exiting the heating kerosene market. This will have a significant, and adverse, effect on UK consumers.

36 – Do you have any evidence or views on the role other low carbon heating systems, not discussed in this consultation, could play in decarbonising heat?

Fuels Industry UK has no response to this question

37 – Do you have any evidence or views on what steps the government could be taking to support the development of early-stage heating technologies that have legitimate potential in decarbonising properties?

Fuels Industry UK has no response to this question

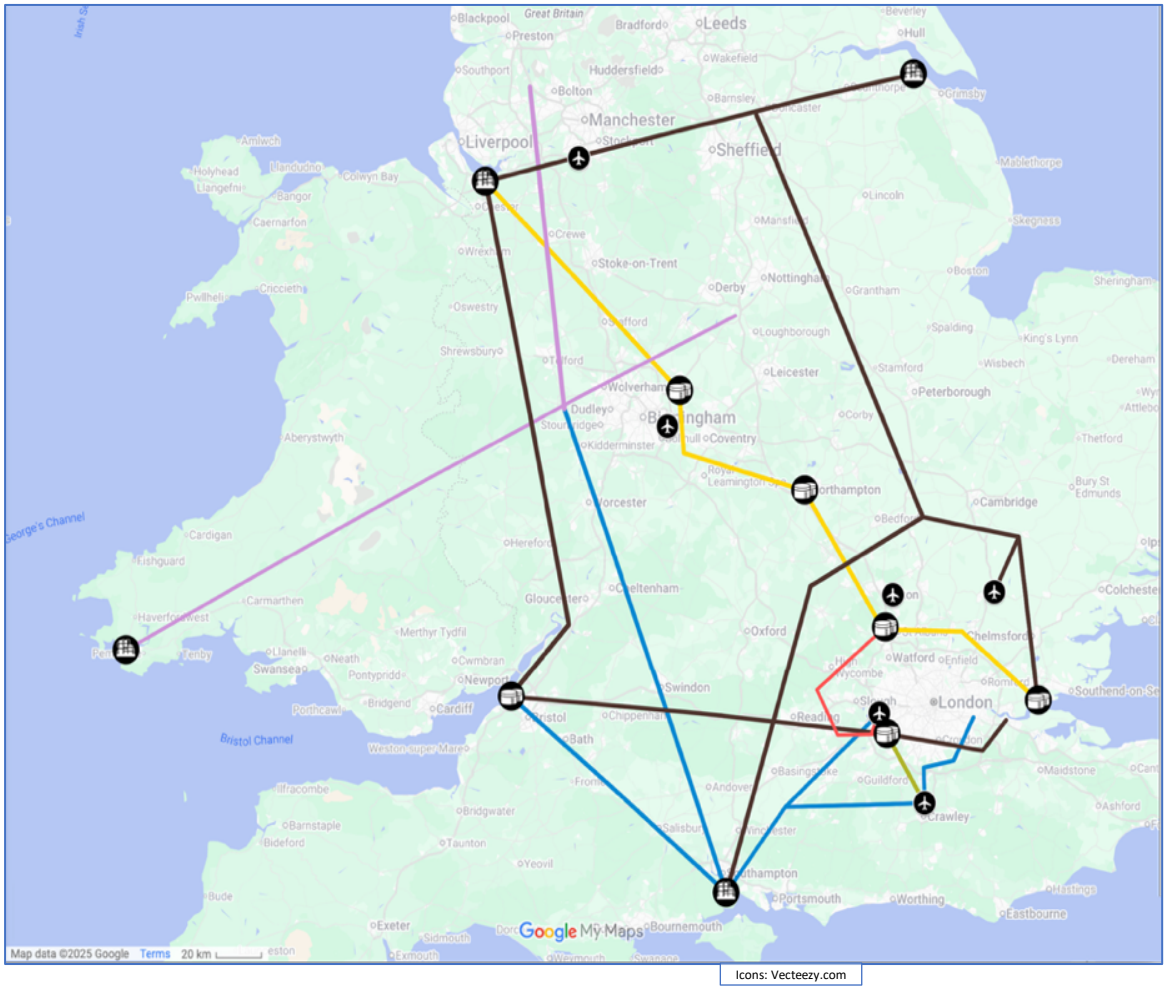
38 – Do you have any additional evidence on how people with protected characteristics under the Equality Act 2010 may be affected by the installation of any of the alternative heating technologies included in this consultation?

Fuels Industry UK has no response to this question

[22] https://ukifda.org/

Attachment 2: Supply Chain Complexity:

The fuel supply chain from a refinery or import terminal to airports and distribution terminals is extremely complex, containing multi-product pipelines [23] where the removal and recovery of interface material is routine, the marking of fuel to provide kerosene for heating applications [24], and storage comingled between different fuel suppliers [25]. Trading of fuel between suppliers also occurs within these complex supply chains, including after the duty point.



Therefore, there will be significant differences between the fuel moving out of the duty point at a refinery or import terminal and the cumulative volume that ultimately enters an airport or distribution terminal. This includes accounting for both the fossil and low carbon components of the fuel concerned; SAF contents can vary from nil to 50% from one batch of aviation fuel to another [26].

[23] https://inspenet.com/en/articulo/multi-product-pipelines-transportation/
[24] https://www.crownoil.co.uk/guides/heating-oil-guide/
[25] https://www.kslaw.com/blog-posts/commingled-oil-gas-allocation-matters
[26] https://www.iata.org/en/programs/sustainability/reports/saf-handbook/section-2.1

The accounting for this stock takes considerable time and expertise and will take a number of months to fully resolve (even within the established RTFO, delays between fuel supply and DfT completing their checks can take up to 9 months). The DfT's approach to the SAF mandate is significantly more complex that the RTFO; In-supply chain mass balances, required for providing sustainability data to aircraft operators or distribution terminals and associated loss/gain tracking, required for this purpose and the SAF mandate significantly increases complexity. Therefore, physical volumes of SAF in any reporting period are unlikely to match that booked via movements from and between mass balance locations.