

UK SAF Clearing House

Supporting the testing and qualification of sustainable aviation fuels (SAF)



UK SAF CH Clearing House Overview

UK Aviation Fuels Committee

Prof. Chris Lewis: UK SAF CH Director, University of Sheffield

19th – 20th March 2024



Department
for Transport

UK SAF Clearing House

UK SAF CH status.



UK SAF CH summary of launch and current status

- DfT Contract with University of Sheffield and Ricardo April 2023
- UK SAF CH officially launch 29 November 2023
- Good attendance at the launch event
- Actively working with many potential SAF suppliers, test facilities and key industry stakeholders
- Working towards ISO 9001 (Certification of quality management system).
Target audit stage 1 February/March 2024

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Introduction



What we do

- Act as a central function that will advise and guide potential SAF producers at any stage of development
- Help define technical plans/strategies to develop, **evaluate test and interpret results**
- Support the **qualification of new fuels** to industry recognised standards and protocols
- Connect SAF producers with **key stakeholders, facilitate collaboration**, and provide **access to critical information** and resources
- Provide advice and support to fuel suppliers regarding **due diligence** testing as they scale up from laboratory, pilot and to full production

Fuel Readiness Level (FRL)

FRL	Description	Toll Gate	Fuel Quantity+
1	Basic Principles Observed and Reported	Feedstock /process <i>principles</i> identified.	
2	Technology Concept Formulated	Feedstock / <i>complete</i> process identified.	
3	Proof of Concept	Lab scale fuel sample produced from realistic production feedstock. Energy balance analysis executed for initial environmental assessment. Basic fuel properties validated.	0.13 US gallons (500 ml)
4.1	Preliminary Technical	System performance and integration studies entry criteria/specification properties evaluated (MSDS/D1655/MIL 83133)	10 US gallons (37.8 litres)
4.2	Evaluation		
5	Process Validation	Sequential scaling from laboratory to pilot plant	80 US gallons (302.8 litres) to 225,000 US gallons (851,718 litres)
6	Full-Scale Technical Evaluation	Fitness, fuel properties, rig testing, and engine testing *	80 US gallons (302.8 litres) to 225,000 US gallons (851,718 litres)
7	Fuel Approval	Fuel class/type listed in international fuel standards**	
8	Commercialization Validated	Business model validated for production airline/military purchase agreements – Facility specific GHG assessment conducted to internationally accepted independent methodology	
9	Production Capability Established	Full scale plant operational++	

+ Quantities required for risk mitigation reference

* As referenced in ASTM approved protocols

** As listed in original equipment manufacturers' manuals for aircraft and engines

++ color coding reference Phase of development green (technology phase), yellow (qualification phase), blue (deployment phase)



Support Provided



Advice, guidance and grants on pre-screening and/or early product development and optimisation



Signposting toward recognised aviation fuel testing facilities



Guidance on the evaluation and qualification of SAF via industry recognised processes



Providing access to industry experts and stakeholder groups



Providing additional support through the Clearing House Advisory Group (CHAG)



Acting as forum for UK based fuel production, test and users to optimise and coordinate efforts towards increased SAF deployment.

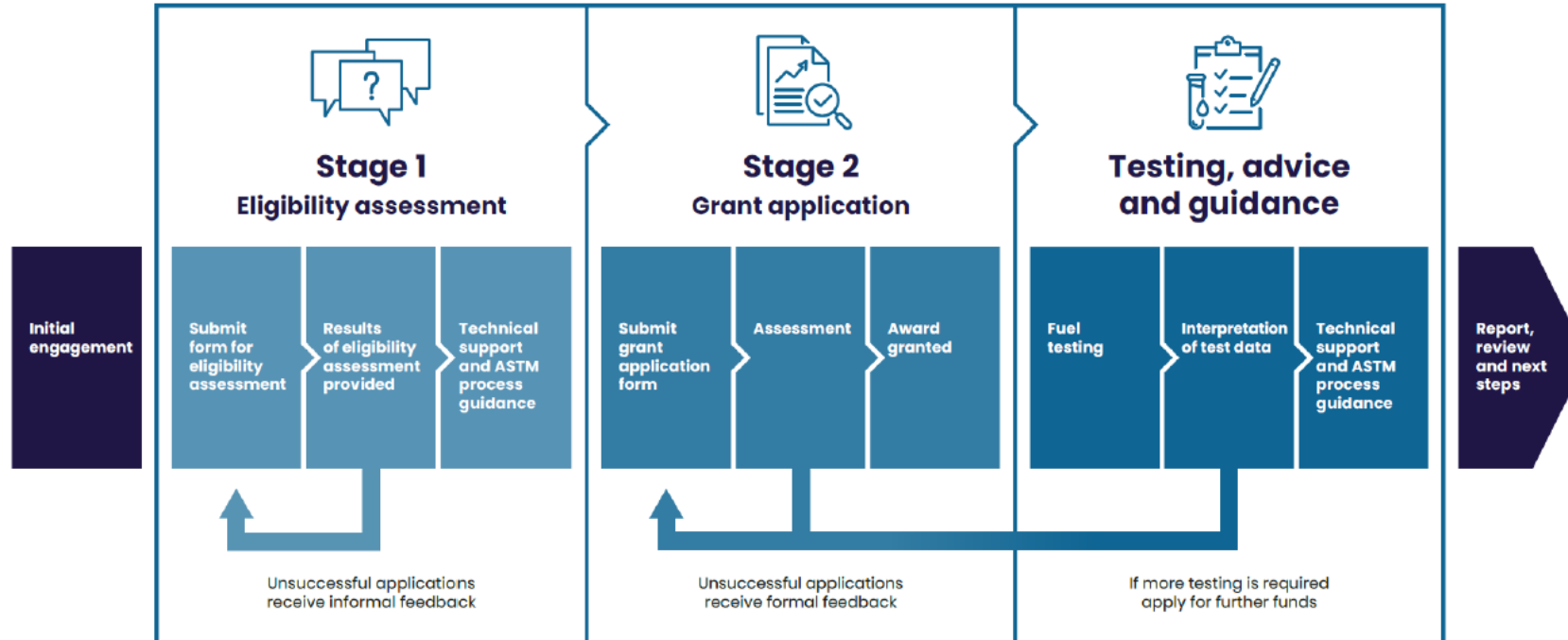
- Advice and guidance to fuel producers on SAF testing and qualification requirements **free at point of use**
- Grant funding from DfT to contribute to testing costs **subject to key eligibility criteria**
 - Technical Suitability
 - Environmental Performance
 - Commercialisation
- **Work in collaboration** with US and EU Clearing Houses to create one work stream per product

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UK SAF CH status.



An overview of fuel testing support UK Sustainable Aviation Fuels (SAF) Clearing House



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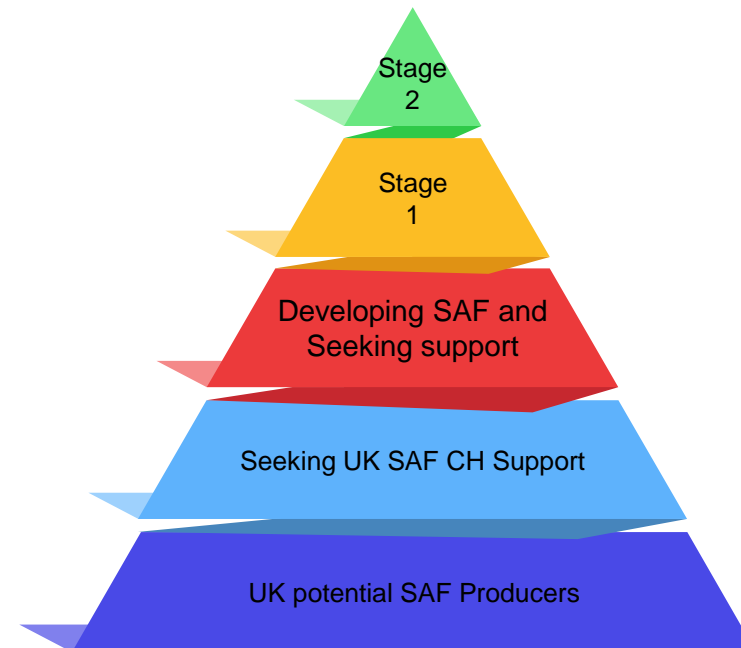
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UK SAF CH fuel producer pipeline



UK SAF CH fuel producer pipeline

- Many potential SAF producers identified
- UK SAF CH positive engagement ongoing
- Many actively developing SAFs and will seek UK SAF CH support
- Range from very early concept to significant product production
- 5-6 will be planning to request OEM initial review in 2024/25
- X have completed stage 1 application. Working with them on stage 2.
- Most have NDAs in place.



As of Feb. 2024

UK Fuel Producer Landscape

Potential SAF Producers in the UK



UK Fuel Producer Landscape

SAF Producers Engaged with UK SAF CH To Date

 C3 BIOTECH

 CNF
CARBON NEUTRAL FUELS

 aVIOXX

 VELOCYS

 WILSON
BIO-CHEMICAL

 XFUEL

 FIREFLY

 iGTL

 CoGen
DELIVERING WASTE + ENERGY SOLUTIONS

 PHILLIPS
66

 Green
Lizard
Technologies

 Enerkem

 Zero®

 petroineos
REFINING AND TRADING

 OXCCU

 University of
Sheffield | Energy
Institute

 RICARDO

 Department
for Transport



SAF Producers Seeking Support with Testing

 C3 BIOTECH

AVIOXX

 XFUEL


FIREFLY


Green
Lizard
Technologies


Zero®

Another Company in very early stage discussion

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Test facility update

Test facility update (hub & spoke model)

- <https://www.safclearinghouse.uk/fuel-test-facilities>
- Agreements in place for test facilities as well as pre-screening facilities
- Minimum requirements test facilities: ISO 9001, 17025 (where applicable)
- No requirement for ISOs for pre-screeners

Recognised fuel testing facilities

The test houses have provided evidence to the UK SAF Clearing House that they meet recognised industry standards for carrying out specific fuel testing and analysis. Note that producers must ensure they meet the required standards for the specific work being undertaken.



Recognised pre-screening fuel testing facilities



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Test facility update



Test facility update - SAF-IC

- Facility completed construction in November 2022
- Equipment delivered August 2023
- Currently working on test equipment and method capability (covers standard spec. tests and adv. Instrumental e.g. 2DGC, ICP, Mid-IR, etc and FFP test capability)
- Operating procedures in place for 90% of equipment December 2023
- Working towards ISO 9001
- Membership of ASTM



University of
Sheffield
Energy Institute

SAF-IC

Note:- SAF-IC is a separate entity to UK SAF CH. SAF-IC will become a 'recognised' facility once all required criteria is met

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Clearing House (EU / US) update



UK/US/EU Clearing House Coordination

- Steering Group Meetings established
 - Coordination of overall effort
 - Single SAF Roadmap
 - Focus on OEM regular meeting agenda
 - Ensuring coordination and one workstream per candidate
- Signification issue around provision of test capability and quality....
- Testing QA and “cross calibration” programme being formulated – Stephen Dooley (EU CH) Lead.

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Thank you

Any Questions

- Useful Links:

<https://www.safclearinghouse.uk/>

<https://www.safclearinghouse.uk/grant-application-form>

[UK SAF CH Launch Webinar](#)