



Sustainability Certification for Emerging SAF Pathways: Guidance, Opportunities and Lessons Learned

Online Webinar

30 September 2026

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101122303.

Agenda

<i>Time</i>	<i>Topic</i>	<i>Speaker</i>
14:00 – 14:10	Welcome and introduction	Esther Hegel
14:10 – 14:25	Key findings from the final ICARUS deliverable “Guidance on SAF Certification” (15 min)	Esther Hegel
14:25 – 14:35	RSB Preliminary Certification Framework and its relevance for early-stage project developers (10 min)	Leticia Millward (RSB)
14:35 – 14:45	Learnings from the SusAlgaeFuel certification journey (10 min)	Darren Carty (SFS)
14:45 – 14:55	Audience Q&A (10 min)	-
14:55 – 15:00	Closing Remarks (5 min)	Esther Hegel

- This webinar is recorded and will be uploaded to the ICARUS website.



INTERNATIONAL COOPERATION FOR
SUSTAINABLE AVIATION BIOFUELS



Welcome & Introduction

Esther Hegel, RSB

ICARUS Project Partner



Who We Are

RSB is a global, non-profit organisation that brings together industry, policymakers, researchers and civil society to advance a sustainable bioeconomy through robust sustainability standards, certification and collaborative action.



The Why

Current scenario

- 1 Negative environmental impact
 - Climate change
 - Unsustainable production practices
 - Increasing use of finite resources
- 2 Negative social impact
 - Unsustainable livelihoods
 - Food insecurity
 - Water insecurity
- 3 Extractive approach to resources
 - Exploitation of natural resources
 - Linear approach
 - Waste creation

Ideal scenario



Environmentally sustainable

- 1.5°C warming cap achieved and net zero emissions
- Sustainable approach
- Fossil fuels left in the ground



Socially just

- Human & labour rights guaranteed
- Global nutrition assured
- Global water access assured



Bio-based and circular resource use

- Productive ecosystems
- Maximum circularity
- Zero waste

RSB's Work



Book & Claim

Enabling credible and transparent sustainable fuel transactions.

RSB's Book & Claim systems help connect sustainable fuel producers and buyers, supporting the scale-up of sustainable aviation fuel (SAF) and other sustainable products through robust sustainability assurance.



Sustainable Transition and R&D Project

Driving innovation for long-term impact.

RSB develops and participates in collaborative projects that address sustainability challenges, accelerate market transformation and advance new solutions for the bioeconomy.



Certification and Standards

Setting the benchmark for credible sustainability.

RSB develops robust standards and delivers internationally recognised certification systems that provide trusted sustainability assurance across global supply chains.



Advisory Services

Providing expert guidance for sustainable transformation.

RSB supports organisations, industries and value chains with practical sustainability expertise, helping turn commitments into measurable action.



RSB Academy

Building sustainability knowledge and capacity.

The RSB Academy delivers training and learning opportunities that help organisations understand, implement and advance best practices in sustainability.



Community (Membership)

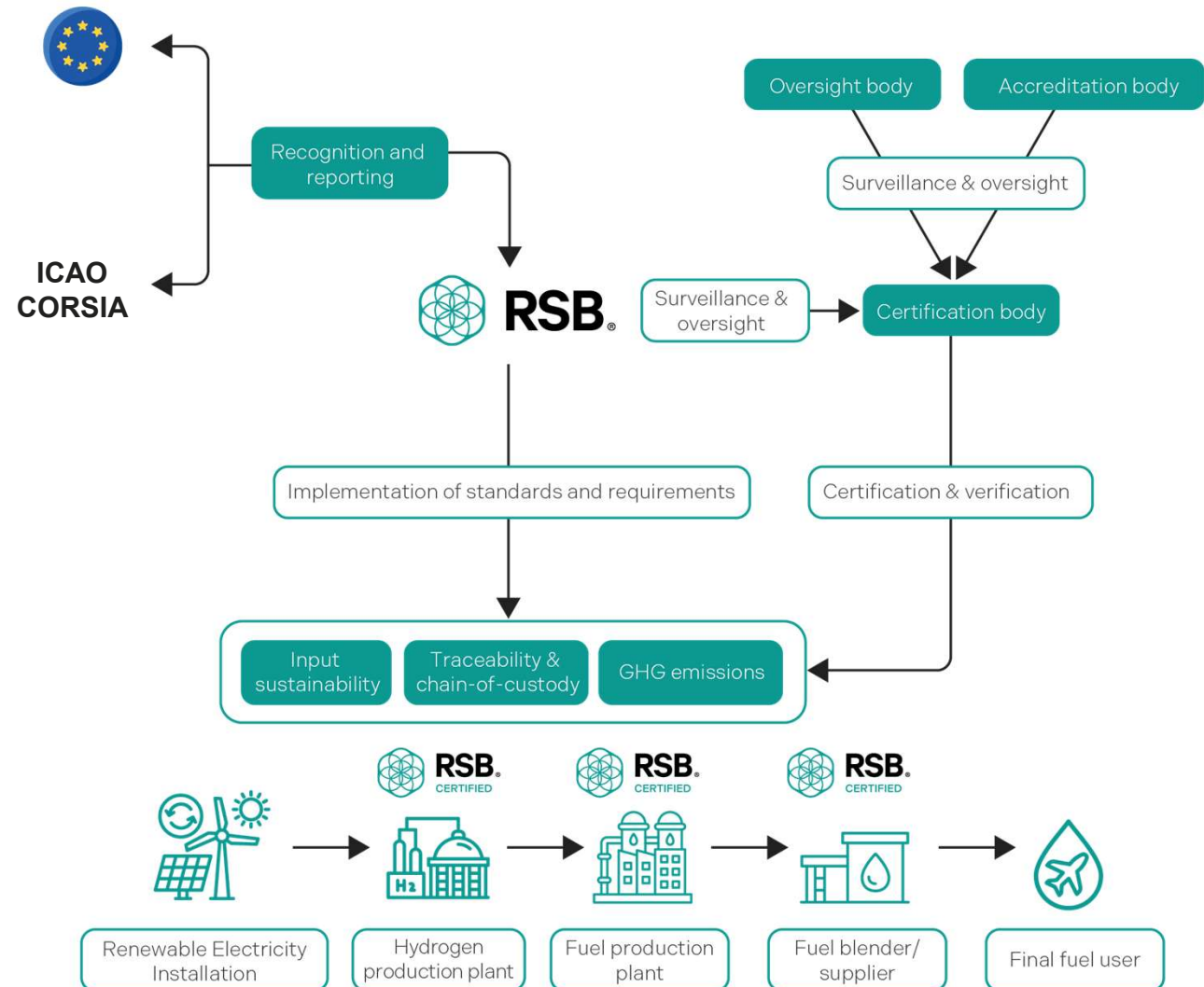
Bringing stakeholders together to create change.

RSB's global membership community connects businesses, NGOs, policymakers and researchers to collaborate, share knowledge and shape the future of a sustainable bioeconomy.

RSB Certification schemes

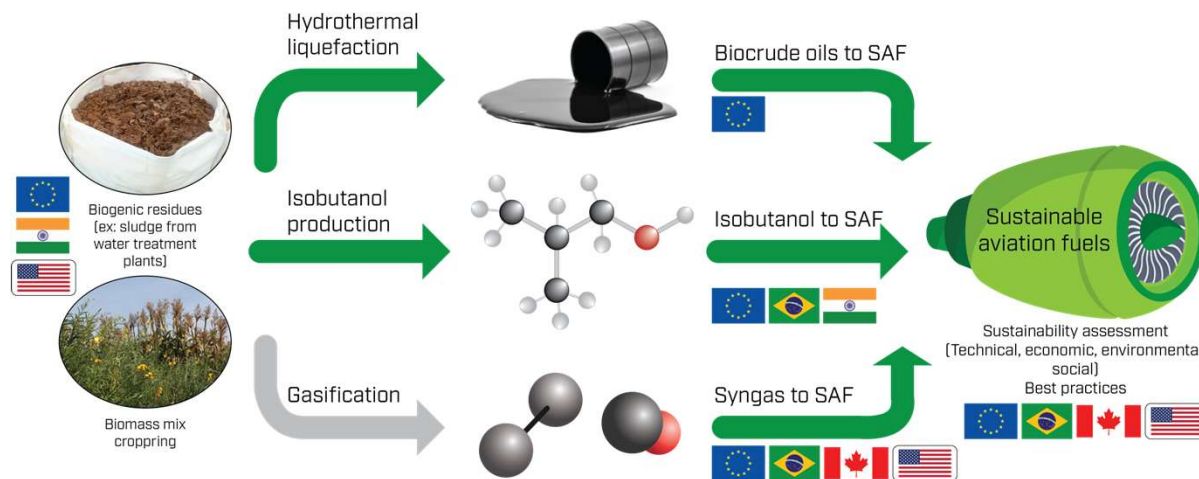
	RSB Global	RSB EU RED	RSB CORSIA	Japan FIT
Sustainability requirements	RSB Principles and Criteria			
Type of claim	Voluntary	Regulatory; linked to EU RED targets	Regulatory; linked to ICAO CORSIA targets	Regulatory; linked to METI targets
Scope	Fuels and materials produced from biocircular feedstock	Renewable fuels and energy produced with bio-based feedstock and RCF/RFNBOs	SAF from bio-based feedstock and waste gases	Bio-based wastes and residues from agri industry for energy production
Renewable input allocation	Across all outputs, based on energy or economic value. Flexible attribution options.	Across all outputs, based on energy value (LHV).	Across all outputs, based on energy value (LHV).	Across all outputs, based on energy value (LHV).
GHG reduction threshold	Fuel: 50% (60% after 2015) Products: 10%	60% (65% after 2021) RCF/RFNBO: 70%	50% core LCA (10% LCA+ILUC)	50% (70% after 2030)
Fossil baseline	Fuel: 90g CO ₂ e/MJ Products: fossil comparator	94g CO ₂ e/MJ RCF/RFNBO:	89g CO ₂ e/MJ	180 g CO ₂ /MJ electricity
ILUC approach	Risk-based (Qualitative)	High-risk feedstocks (palm + soy TBC) disincentivised	CORSIA Default values (quantitative)	No

The Certification Ecosystem



ICARUS at a glance

Aims to develop future best practices and concepts along the entire value chain for the three technological pathways selected in Icarus for accelerating the scale-up of sustainable aviation biofuels production worldwide.

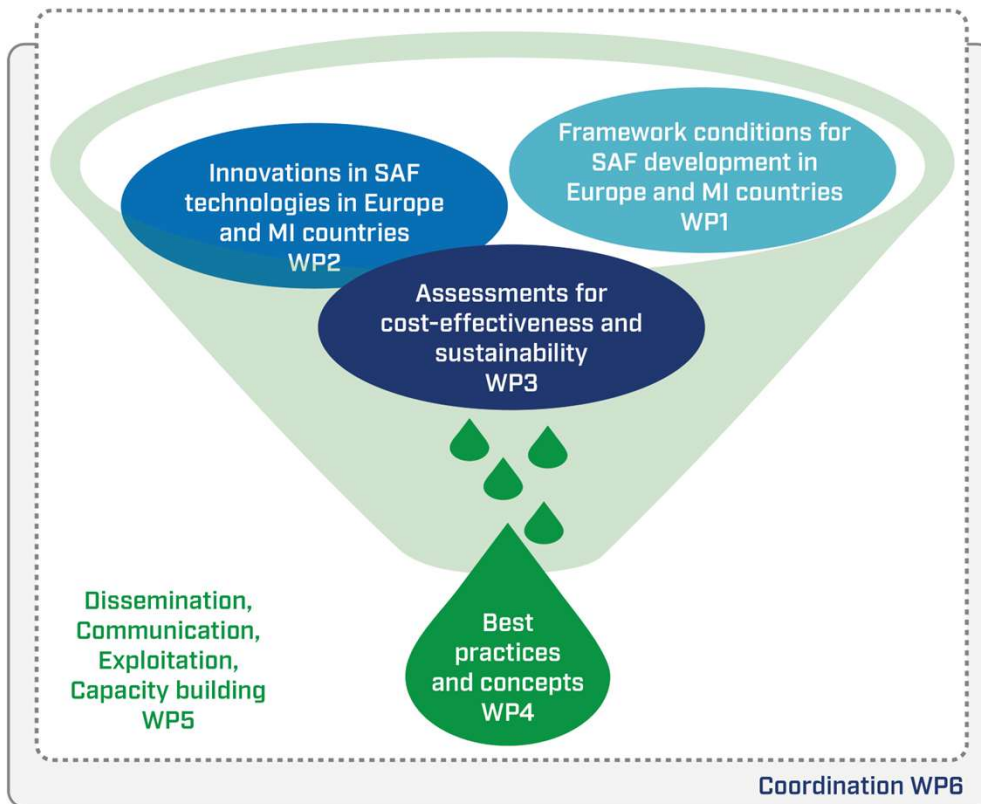


EU funding programme
Horizon Europe
Type of action
RIA

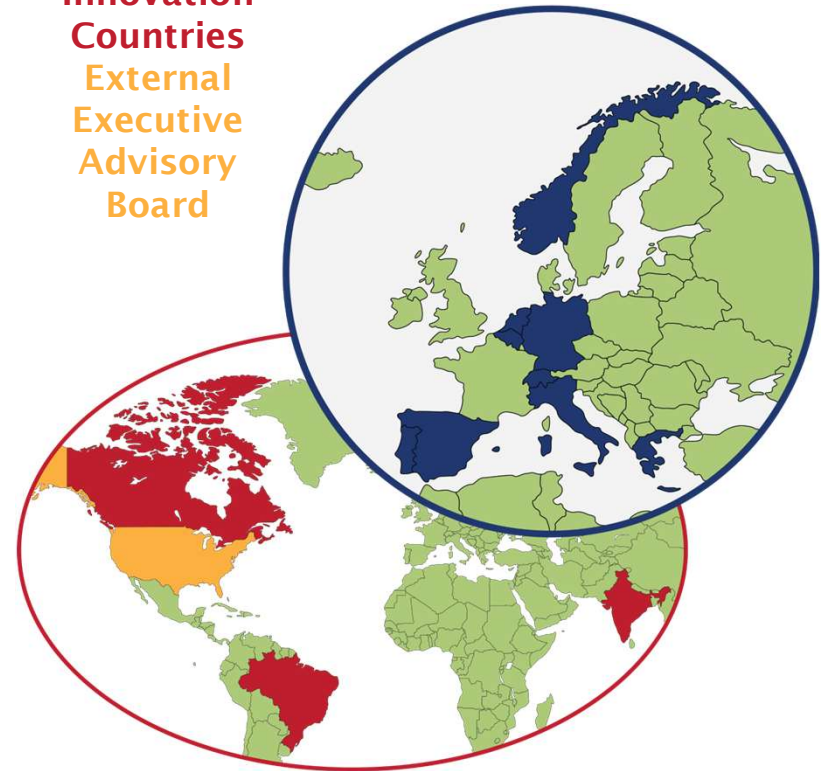
Start
Oct-23
End
Oct-26

Consortium
m
20 partners

ICARUS at a glance



Europe
Mission
Innovation
Countries
External
Executive
Advisory
Board



ICARUS – Best Practices and Concepts

Specific objectives

- To propose a set of **recommendations to accelerate the scaling up** of the three value chains
- Create strong **synergies** between the private **industry** and the **scientific community** by providing further guidance for **SAF certification** and coordinating the **engagement with oil industries, airports and end-users**
- Foster **international knowledge transfer** to establish long-lasting interactions on the upscaling of SAF, with special focus on the MIC and Africa



INTERNATIONAL COOPERATION FOR
SUSTAINABLE AVIATION BIOFUELS



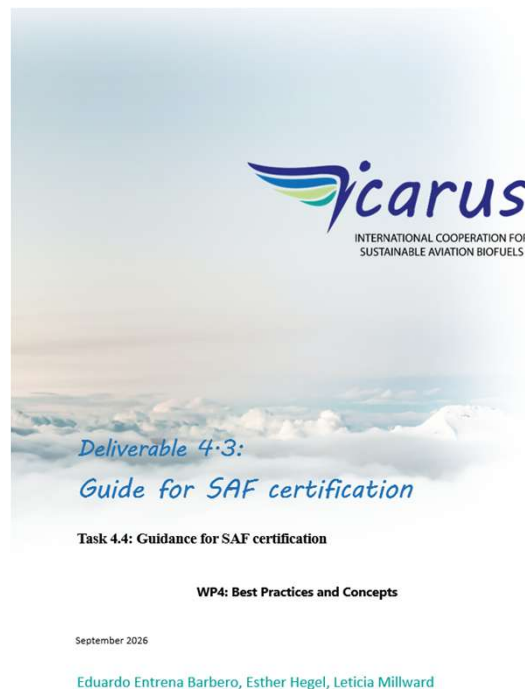
Key findings from the final ICARUS deliverable “Guidance on SAF Certification”

Esther Hegel, RSB

ICARUS Project Partner



Activities on SAF Certification Guidance (Task 4.4)



Goal

Provide practical guidance for integrating technical qualification and sustainability certification into early-stage research and innovation for novel SAF pathways, supporting their progression towards credible market entry

Process

Developed in close collaboration with expert stakeholders, including 3 webinars, 2 conference presentations, case study co-development, and close collaboration with the sister project SusAlgaeFuel and the RSB certification team.

Contents

1. Novel SAF feedstocks and technologies
2. Technical and sustainability certification pathways
3. Clearing Houses and pre certification readiness
4. Step by step guidance from R&D to market entry

Sustainability Certification as Market Entry

Sustainability certification is becoming essential for SAF market access as global SAF demand grows, ensuring credible verification of renewable inputs, carbon sources, and GHG reductions.



ICAO CORSIA
REGULATORY, GLOBAL

Compliance with ICAO CORSIA regulations

CORSIA sets the **global requirements** for SAF used on international flights, defining baseline sustainability and emissions criteria.



EU RED III
REGULATORY,
EUROPEAN UNION

Compliance with EU public policies and market regulation

EU RED III establishes **stricter rules for electricity and carbon sourcing**, forming the benchmark for APAC producers targeting EU markets.



RSB GLOBAL
CERTIFICATION
VOLUNTARY, GLOBAL

Global scope with broader social and environmental

RSB's Global Certification for Advanced Fuels provides a **voluntary, multi-market standard** recognised internationally, helping producers demonstrate compliance across different regulatory systems.

T4.4 Guidance on SAF Certification (D4.3)

Public Engagements & Capacity Building

WEBINAR: SUSTAINABILITY CERTIFICATION OF NOVEL SAF PATHWAYS RECORDING AND PRESENTATIONS AVAILABLE



Date: Thursday, October 02

Time: 14:00 - 15:30 GMT+2

This 1.5-hour webinar, Sustainability Certification of Novel SAF Pathways, will bring together researchers, innovators, and sustainability certification experts to explore how new SAF pathways can meet sustainability standards and assurance requirements.

The session will open with a short introduction to the three innovative SAF pathways under development by ICARUS, before moving into focused expert contributions on the certification landscape—covering global (CORSIA), EU (RED III), and voluntary schemes (such as RSB)—and the practical steps involved, from feedstock validation to lifecycle assessment and compliance auditing. A live case study of the SusAlgaeFuel project, currently pursuing RSB EU RED certification, will illustrate real-world challenges and insights from the R&D context.

The event will conclude with an interactive feedback session, giving participants the opportunity to help shape the ICARUS public study on SAF certification, ensuring it reflects the priorities of technology developers and the broader SAF community ahead of its release in 2026.

Preliminary Agenda

- Welcome & Introduction (Esther Hegel, RSB) - 10 min
- Novel SAF Pathways in ICARUS (Brend Vreugdenhil, TNO) - 15 min
- Understanding SAF Certification: EU RED, CORSIA and Voluntary Schemes (George Deslandes, RSB) - 15 min
- From Innovation to Certification: Insights from the SusAlgaeFuel Project (Darren Carty, SFS) - 15+5 min
- The ICARUS SAF Certification Guidance (Esther Hegel, RSB) - 10 min
- Open Discussion and Online Poll - 15 min
- Closing Remarks and Next Steps (Esther Hegel, RSB) - 5 min

- WORKSHOP RECORDING
- WORKSHOP PRESENTATIONS

EUBCE Workshop, May 2026



Free online seminar series on Recent progress in SAF research

#3/10 – MONITORING OF SAF R&D, DEMONSTRATION PROJECTS AND PRODUCTION DEPLOYMENT | WILL THE GLOBAL MARKET RAMP-UP SUCCEED?
Dec 3rd, 2025 03:30 – 05:30 PM CEST

This free online seminar will highlight recent developments on SAF projects and perspectives.

FRANZISKA MÜLLER-LANGER (DBFZ)
Moderation of this seminar

LÉONIE LAUER (CENA)
CENA SAF-Outlook 2025-2030: Volumes, Technologies, and Market Dynamics

ESTHER HEGEL (RSB)
From Innovation to Certification: Embedding Sustainability in New SAF Technologies

PREETI JAIN (IATA)
IATA's view on SAF deployment on a global level

STEPHEN DOOLEY (EU SAF CLEARING HOUSE)
Drivers and drawbacks for the global market ramp up

Technology Collaboration Programme
Registration: https://eeab.org/content/events/eeab_seminars/webinars_saf86

- + Presentation for EEAB Meeting on SAF Certification
- + IEA-AMF Presentation (Dec 2025)

ICARUS WEBINAR - SUSTAINABILITY CERTIFICATION FOR EMERGING SAF PATHWAYS - 30 SEPTEMBER 2026, 2:00 PM (REGISTRATION LINK)



Wednesday, 30, September, 2:00 PM

Sustainability Certification for Emerging SAF Pathways: Guidance, Opportunities and Lessons Learned

Sustainability certification plays a critical role in enabling market access, regulatory compliance, investor confidence, and environmental credibility for Sustainable Aviation Fuel (SAF). As new SAF technologies progress from research and development towards commercial deployment, project developers increasingly seek clarity on certification expectations at earlier stages of project development.

This webinar will present the findings from the final ICARUS deliverable, "Guidance on SAF Certification", developed to support researchers and early-stage project developers working on novel SAF pathways. The session will highlight key sustainability certification considerations that should be addressed early in project design and development. In addition, RSB will introduce its Preliminary Certification Framework, which provides project developers with a mechanism to engage with certification requirements during the design and investment stages prior to full certification.

The webinar will conclude with a moderated discussion featuring Darren Carty from Sustainable Flight Solutions, who will share practical insights and lessons learned from the certification journey of the EU-funded SusAlgaeFuel project. This discussion will connect the guidance findings to real project experience, highlighting practical challenges, opportunities, and reflections relevant for researchers and early-stage SAF project developers.

PROPOSED AGENDA

- Welcome and Introduction (Esther Hegel, RSB) - 10 min
- Presentation: Key findings from the final ICARUS deliverable "SAF Development in Africa" (Eduardo Entrena, RSB) - 20 min
- Panel discussion: Turning recommendations into action - Speakers tbc - 15 min
- Audience Q&A - 10 min
- Closing remarks (Esther Hegel, RSB) - 5 min

First Webinar, October 2025
+ Expert Interviews (SusAlgaeFuel)

Final Webinar, September 2026
+ Findings & Recommendations (SusAlgaeFuel)

ICARUS General Assembly Final Meeting, Brussels 24 September 2026

Findings: SAF Certification Guidance (Task 4.4)



Dual pathways to credible SAF market entry

R&D AND PATHWAY DEVELOPMENT

CREDIBLE MARKET ENTRY

TECHNICAL QUALIFICATION



Market entry requires both fuel safety / compatibility and sustainability compliance.

Findings: SAF Certification Guidance (Task 4.4)



Certification readiness from R&D to scale-up

	TRL 2-3 Concept / lab	TRL 4 Bench validation	TRL 5 Pilot design	TRL 6 Pilot operation	TRL 7-8 Demonstration	TRL 9 Commercial
Technical data	Composition; key properties	Fuel impurity profile	Test plan; compatibility	Batch consistency	Compatibility evidence ✓	Release and quality control
Sustainability data	Source and eligibility	Land / nature risk; GHG scope	Energy / input sourcing	LCA data; safeguards	Validate GHG and safeguards	Refresh GHG and declarations
Traceability & chain of custody	Supplier records	Mass-balance concept	Batch-tracking design	Tracking and record system	Validate chain of custody	Declarations; record keeping
Governance & review	Assign responsibility	Gap assessment	Readiness review ✓	Internal review	Independent audit planning	Audit; ongoing review
	Identify	Develop	Validate	✓ Milestone review		

Evidence collection starts before formal ASTM evaluation or audit.

Findings: SAF Certification Guidance (Task 4.4)



Certification evidence map for SAF projects

Evidence category	Technical qualification	Sustainability certification	Investor / offtaker due diligence	Project management and risk control
Feedstock eligibility	Feedstock / process relevance to route	RED / CORSIA / scheme eligibility	Supply risk; scalability	Supplier mapping; risk register
Process description	Pathway definition; process evidence	System boundary; input identification	Technology maturity; scale-up assumptions	Process baseline; change control
Fuel properties	Specification and conformity evidence	Link certified output to product records	Buyer requirements; product quality	Sampling plan; data ownership
GHG and LCA data	Not the main focus	Core compliance evidence	Carbon intensity; market value	Data ownership; update cycle
Chain of custody and traceability	Sample / batch identification	Origin and custody evidence	Supply integrity; claims confidence	Supplier and batch records
Quality system	Test controls; consistent results	Document and procedure controls	Reliability; execution risk	Roles, versions and corrective action
Site and operational controls	Operating conditions; process consistency	Safeguard and operational evidence	Operational risk; scale-up readiness	Control owners; monitoring
Claims and communications	Avoid technical overclaims	Use only permitted claims	Credible, clear market messaging	Internal claims approval

Reuse the evidence—not the approval: each process applies its own requirements.

Findings: SAF Certification Guidance (Task 4.4)



Early screening for SAF certification planning

Screening question	If yes	If no / unclear
◆ Drop-in aviation use?	Continue to route fit	Outside drop-in SAF pathway scope
◆ Existing D7566 annex or D1655 co-processing route?	Conformity testing and specification evidence	Assess ASTM D4054 pathway needs
◆ Feedstock eligible in the target market?	Continue to GHG method	Eligibility review; resolve before proceeding
◆ GHG methodology available?	Begin LCA data collection	Define methodology and data needs
◆ Chain of custody documentable?	Continue to review readiness	Build traceability and mass-balance system
◆ Ready for independent review?	Formal qualification and certification planning	Readiness / gap assessment; close gaps and revisit
EXISTING ROUTE	NOVEL ROUTE	NOT YET READY
Certification preparation	D4054 + sustainability readiness	Gap closure before progression



RSB Preliminary Certification Framework and its relevance for early-stage project developers

Leticia Millward (Senior Certification Expert, RSB)



Preliminary certification

Normative framework **supporting projects under development** in the SAF sector and wider bioeconomy sector **in different stages of development** demonstrating alignment with **RSB certification requirements**

- **Early-stage development projects** Pre-FEED (Front-End Engineering Design), FEED, Pre-FID (Final Investment Decision) or more advanced project stages.
- **Third-party documental audit** verifying that the company has made significant progress in the implementation of the requirements and principles of sustainability of the RSB.
- **Supports project developers** to demonstrate its alignment with sustainability standards towards any third-party entity, such as financial institutions, **investors and other key stakeholders**.

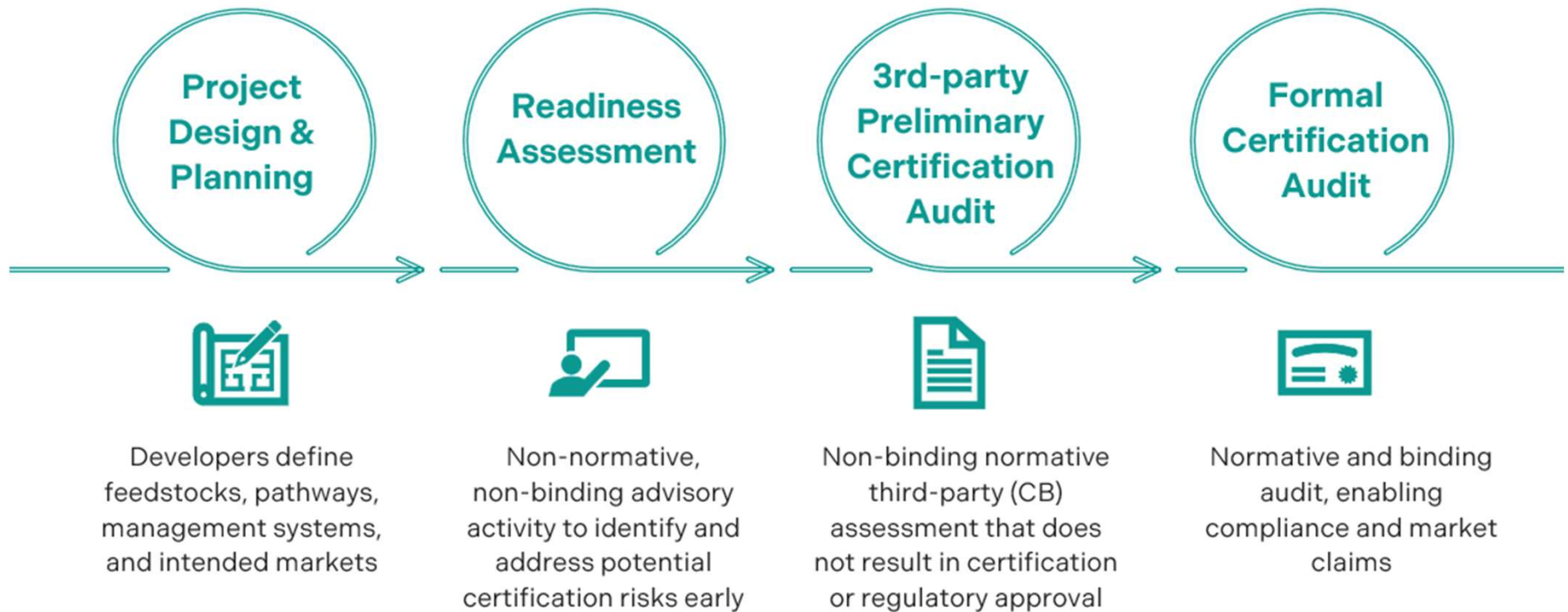


How is the Preliminary Certification Audit conducted?



- Conducted by third-party independent certification bodies as an audit
 - Statement of alignment without further advice
-
- Performed against defined RSB standards and procedures
 - Limited scope to documented plans and management systems
-
- Distinct from consultancy-type readiness support and formal audits

Process stages



Governance principles

Preliminary Certification activities must



Preliminary certification activities must not

- Only identify nonconformities, without making recommendations for resolution of these nonconformities
 - Be conducted by qualified auditors of RSB-approved certification bodies
 - Be conducted only once for the same client
 - Have a reduced audit time in comparison with a full audit, as the Preliminary Certification is conducted for a reduced scope.
- Substitute certification
 - Pre-judge audit outcomes
 - Be a reason for a reduced audit time at the time of certification
 - Create any presumption of compliance
 - Allow corrective actions.

Audit scope

- Scope is limited to:
 - documented plans and management systems
 - design data GHG emissions calculation
 - available evidence of sustainability compliance
- Audit can be conducted remotely
- Shorter audit time in comparison with certification audit



Audit scope

Scope and eligibility	Management systems	GHG emissions	Chain of Custody systems	Principles & Criteria	Sourcing of electricity (if applicable)
• Legal status • Scope: product, feedstock, applicable standards	• Risk assessment and management • Procedure for record keeping and internal monitoring	• Estimation using design data or default values if available	• A documented system for the control of mass balance transactions • A documented system for the issuance and handling of Proof of Sustainability (PoS) • Procedures and systems for separate accounts for materials carrying separate claims	• Documented management plans as described in the guidance	• Description of electricity source and how it complies with the requirements of the applicable standard

Assessment report template

Title: Statement of Preliminary Certification Assessment (Non-Binding)

Project: [Name / Location]

Scope Reviewed: [Standards and pathways]

Summary of Review:

State a summary of the design-phase review of documented project plans, systems, and methodologies, according to the relevant standard scope.

High-Level Conclusions:

Based on information reviewed, the project is *in principle aligned* with relevant RSB frameworks, subject to a full audit and verification of operational data during formal certification.

Assumptions and Limitations:

Design-phase information only

No operational data verified

Limited scope

Disclaimer:

This statement does not constitute certification or regulatory approval.

More information



[Privacy policy](#) [Antitrust statement](#) [Grievances](#) [Call for public comments](#) [RSB certificates](#) [RSB library](#)

[Contact us](#)

[Home](#)

[Framework](#)

[Membership](#)

[Programmes](#)

[Book &
Claim](#)

[Certification](#)

[Advisory
Services](#)

[News](#)

Get certified

[Apply for certification](#)

[Certification fees](#)

[Certification bodies](#)

[Ruby Chatbot \(Beta\)](#)

Certification schemes

[Valid RSB certificates](#)

[Expired, terminated and
withdrawn certificates](#)

GHG Calculator Tools

[RSB's Preliminary Certification
Framework for Developers at
the Design and Investment Stage](#)

Oversight and Accreditation

[RSB Impact Alliance](#)

[Union Database for
Biofuels \(UDB\)](#)



Learnings from the SusAlgaeFuel certification journey

Darren Carty (Sustainable Flight Solutions)



SusAlgaeFuel



Certification Lessons from SusAlgaeFuel

A lab-scale to Pilot Scale SAF journey with integrated RSB requirements

ICARUS Webinar — Sustainability Certification for Emerging SAF Pathways

Darren Carty, SFS Ireland · 30 September 2026

Funded by the European Union under grant agreement 101147601

<https://www.susalgaefuel.eu>

Certification, Embedded From the Lab Bench Up

SFS Ireland leads sustainability certification and LCA within SusAlgaeFuel: A Horizon Europe project (GA 101147601) converting agrifood waste into two jet fuel pathways.

WP5.2 — LCA & S-LCA

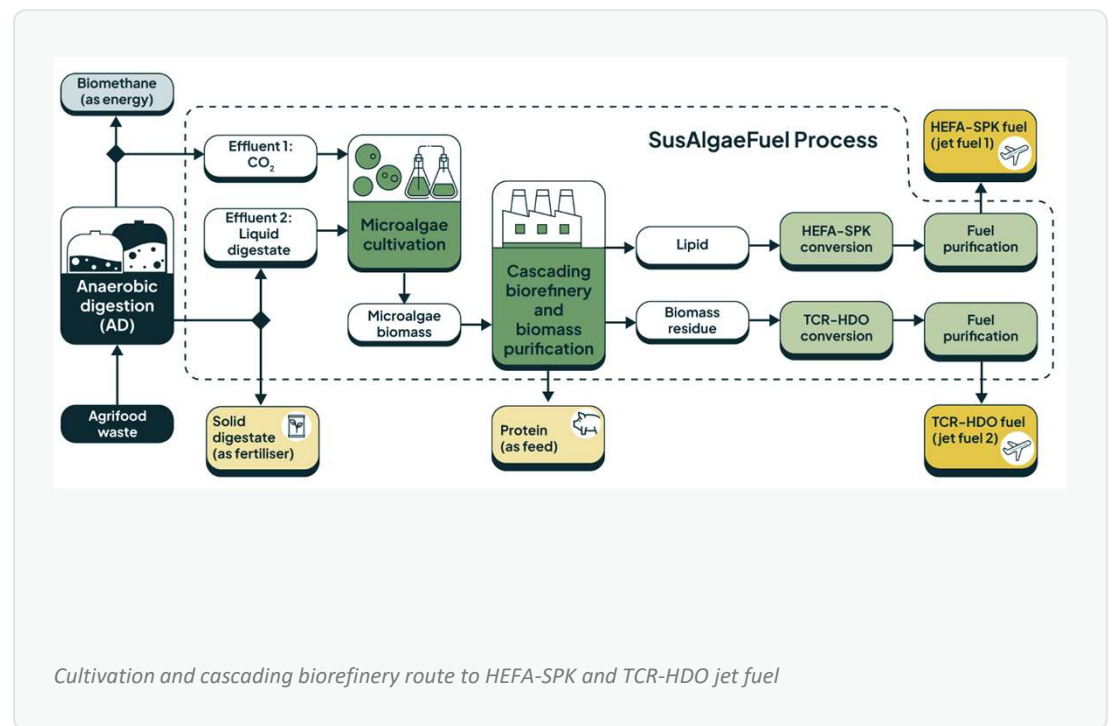
Prospective life-cycle assessment, targeting TRL1–3 by December 2026

Feedstock Certification & Certification advisory

RSB EU RED alignment from lab-scale design onward

Cross-WP coordination

SFS sits between every work package as the LCI connector



Design Certification In — Don't Retrofit It

- **Treat RSB as a design input, not a final exam**

RSB's Preliminary Certification Framework lets developers engage with requirements at the design stage. We used RSB EU RED principles to shape LCA methodology from TRL1–3, rather than retrofitting compliance after pilot scale.

- **Run the LCA as a loop, not a single pass**

Each work package's data feeds the same four-step cycle: **Collect, Model, Hotspot Assess, Check against RSB, refine/optimize** so certification requirements shape the model from WP1 through to pilot scale, not just once at the end.

OUR METHOD

Certification checked at every loop, not just at the end

WP4 + pilot
(TRL3)

WP3
lab data

WP1
lab data

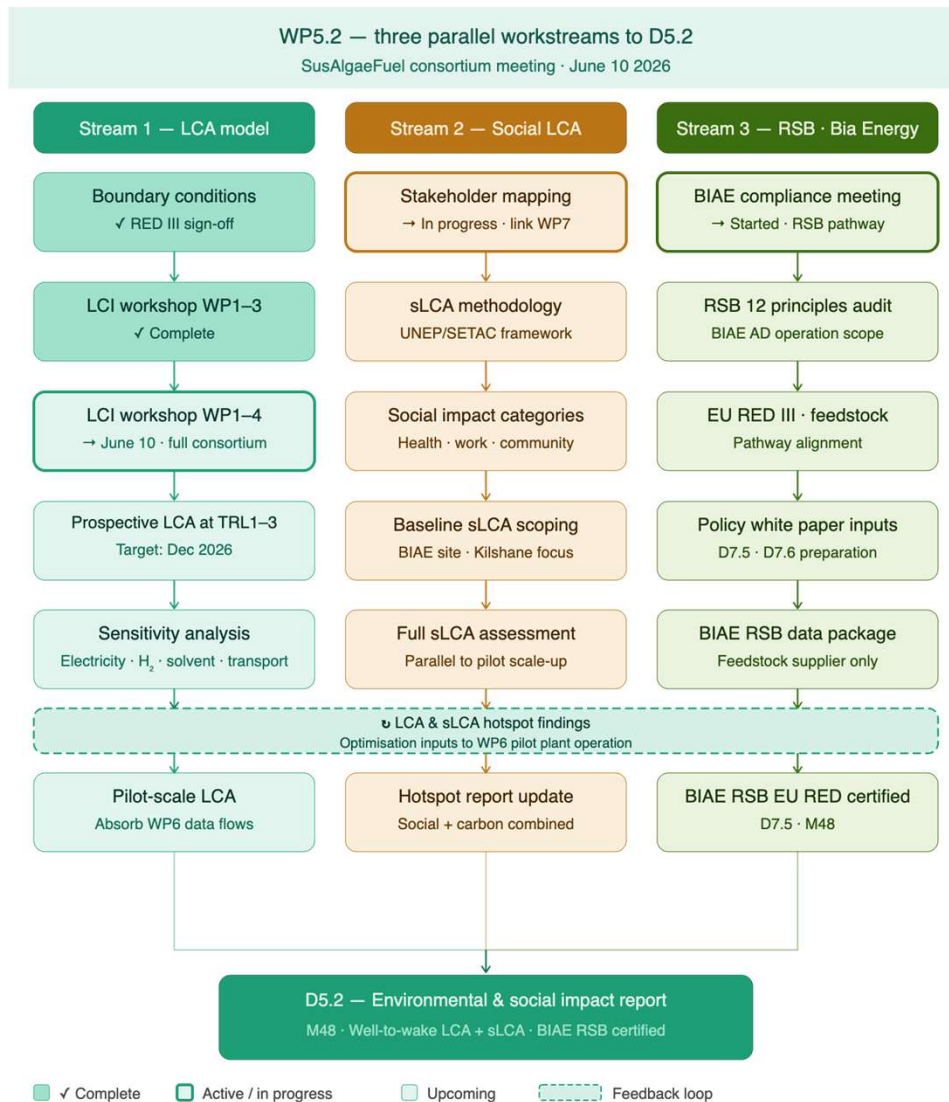
1. Collect WP data

2. Model — GREET /
OpenLCA

4. Refine & reconcile

3. Check vs RSB EU RED
plus HotSpot Optimise

The same four-step loop runs again as each new work package's data arrives, tightening the model on the way up to pilot scale.



Carbon Hotspots

GHG intensity effect only assessed & estimated data used



Integrated Operations

- 1- Significant improvement in LCA 'score'
- 2- Include credit for this via a sensitivity analysis and report on what an integrated operation would look like.



Lipid Extraction

- 1- Solvent Recovery Rates and proof of this
- 2- Thermal Energy use and recovery
- 3- Protein Serum LHV value crucial
- 4- System Optimised for kg Lipid versus kg Microalgae



Transport

- 1- In reality an Integrated setup is best, minimise distance between processing facilities.
- 2- DUB-MUC is adding at least 10g CO₂-eq to the TCR-HDO oil.
- 3- Port to Port good but road is bad.



HEFA-SPK & TCR HDO

- 1- Thermal Energy
- 2- Where is H coming from during HEFA?
- 3- Any low carbon PPAs?



Integrated Operations

- 1- Significant improvement in LCA 'score'
- 2- Include credit for this via a sensitivity analysis and report on what an integrated operation would look like.

The Social Data Gap Rarely Announces Itself

RSB Principles & Criteria cover roughly **75%** of UN-aligned S-LCA data needs.

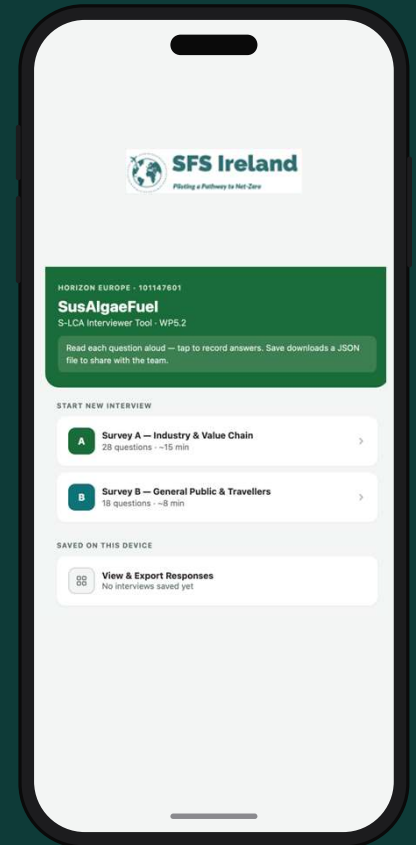
So we built a live, interactive interviewer tool to close it directly with stakeholders:

Survey A Industry & value chain · 28 questions

Survey B General public & travellers · 18 questions

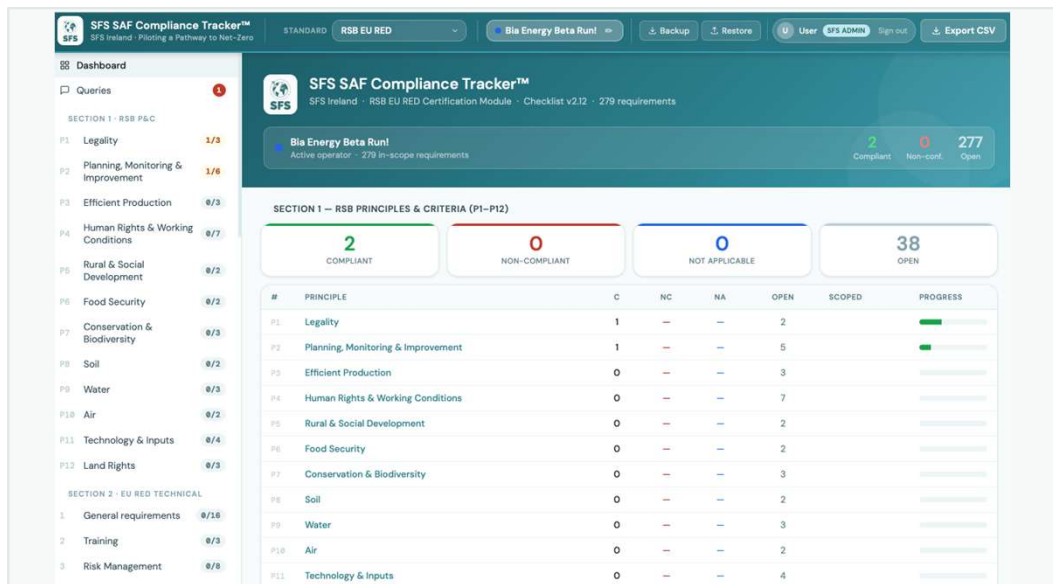
What makes this different: it's interactive, not a static form:

Respondents work through live, guided questions on-device with a SFS Staff member, built to conform to the *UNEP Guidelines for Social Life Cycle Assessment of Products and Organisations (2020)*.



Each interview exports to JSON for the team

Transparency with our Clients- Visible While You Build



SFS SAF Compliance Tracker™ — 279 requirements tracked live against RSB EU RED, from first scoping through to audit, so gaps stay visible at every stage.

Three takeaways

- 1 Bring certification requirements into design at lab scale, not after : Use frameworks like RSB's Preliminary Certification path.
- 2 Agree shared terminology and data types across teams before the data volume grows.
- 3 Track compliance status continuously and visibly, so gaps surface early rather than at audit.

Project Photos and Thankyou, Questions?





Closing

Esther Hegel, RSB

ICARUS Project Partner



Key Messages: SAF Certification Guidance (Task 4.4)



Key Takeaways

1. Start certification at the start of innovation
2. Treat technical and sustainability certification as two sides of the same coin
3. Build certification readiness alongside technology readiness
4. Use pre-certification to reduce risk and increase bankability
5. Design projects for traceability and compliance from day one
6. Make certification a design parameter, not a final checkpoint

Thank you to our collaborators



ICARUS team

For the successful collaboration over the past years!

RSB team

For supporting this work, with special thanks to Eduardo Entrena and Leticia Millward.

External experts

For sharing your expertise, contributing to discussions and providing valuable feedback.