

## Scaling Up the Market for Sustainable Aviation Fuels with ISCC



Dr Norbert Schmitz, Managing Director, ISCC System GmbH ISCC Global Sustainability Conference, 24 February 2021 SAF allow immediate emission reduction. Electrification and fuel cells are currently not feasible and years away from large-scale application

Comparison vs fossil kerosene	Battery-electric	H <sub>2</sub> fuel cell	H <sub>2</sub> turbine	Sustainable aviation fuel
Climate impact <sup>i</sup>	100% reduction <sup>a</sup>	75%-90% reduction	50%–75% reduction	30%-60% reduction
Aircraft design	Low-battery density limits ranges to 500km-1,000km	Feasible only for commuter to short-range segments	Feasible for all segments except for flights >10,000km	Only minor changes
Aircraft operations	Same or shorter turnaround times	1-2x longer refuelling times for up to short range	2–3x longer refuelling times for medium and long range	Same turnaround times
Airport infrastructure	Fast-charging or battery exchange system required	LH <sub>2</sub> distribution and storage	Existing infrastructure can be used	

Major advantages 📒 Major challenges

i. Including CO<sub>2</sub>, NOx, water vapour and contrails ii. Assuming 100% renewable electricity iii. For e-fuels with fully decarbonized supply chain **Source:** Clean Sky 2 JU & FCH 2 JU: Hydrogen-powered aviation report (made possible with funding provided by the EU); expert interviews

Source: World Economic Forum – Clean Skies Tomorrow Insight Report, November 2020





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### Different fuel pathways for the production of SAF

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Feedstock	Agricultural residues, forestry residues, municipal solid waste, Short-rotation woody crops, herbaceous energy crops		Tallow, UCO, palm fatty acid distillate (PFAD), corn oil, soybean oil, rapeseed oil, camelina, palm oil, brassica carinata		Sugarcane, agricultural residues, forest residues, corn grain, herbaceous energy crops, molasses,		
sing							
Initial processing	Electrolysis	Oil extraction, pre-treatment, separation	Oil extraction, neutralisation, rendering	Fermentation	Fermentation		
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erme	Hydrogen		distillate (PFAD), com oil, soybean oil, rapeseed oil, camelina, palm oil, brassica carinata Oil extraction, neutralisation, rendering Lipids Hydroprocessed Esters & Fatty Acide (HEEA)				
Key intermediate		Syngas	Lipids	Hydrocarbons			
Pathway		Fischer-Tropsch (FT)	Esters & Fatty	fermented sugars	Alcohol to Jet (AtJ)		
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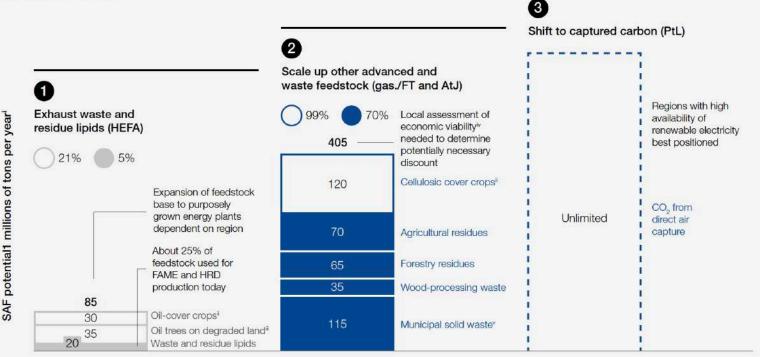


Sources: ICAO document - CORSIA Default Life Cycle Emissions Values For CORSIA Eligible Fuels, November 2019; Image based on Roland Berger – Sustainable Aviation Fuels, 2020

# Scaling up the production of feedstocks is essential and yet there are still some challenges

- Collectability of certain feedstocks
- Maturation of technologies
- Need for increasing demand, stipulated by consumer behaviour and supportive legislations
- Competition from other industry sectors, mainly road transportation and the chemical industry
- Production costs of SAF in comparison with fossil jet fuel

Excluding biofuels from first-generation/crop-based and recycled carbon feedstocks All numbers are rounded



i. Assuming exhaustion of practically available feedstock in plants optimized for jet fuel output (HEFA at 46%, AtJ at 77%, gas./FT at 55%); ii. From land under non-permanent crops, assuming 5% available for oil cover crops, and 20% available for cellulosic cover crops; iii. Assuming 1% of degraded land used for oil trees; iv. Including accessibility and collection rates; v. Organic waste, may contain up to 20% non-reusable plastic

Source: FAOstat; USDA; ACRE solution (based on e.g. Bai et al. 2008; Gibbs et al.); Energy Insights' Global Energy Perspective, Reference Case July 2020; World Bank; Environmental Protection Agency; IRENA; E4TECH 2020; BEIS 2017; ICCT 2016; EC 142/2011; Greenea; Ecofys; Fischer Solve; Statistik der Verarbeitung Tierischer Nebenprodukte 2016; research articles; press search; expert interviews





#### INTERNATIONAL CIVIL AVIATION ORGANIZATION

### **ICAO document**

#### **CORSIA Approved Sustainability Certification Schemes**



#### November 2020

CORSIA Carbon Offsetting and Reduction Scheme for International Aviation

## CORSIA Approved Sustainability Certification Schemes (SCS)

Two SCS are currently recognized by ICAO for the certification of CORSIA Eligible Fuels:

Name of the Sustainability Certification Scheme	Date of approval	Website	Applications and other Supporting Information	Application date	
International Sustainability and Carbon Certification (ISCC)	18/Nov/2020	https://www.iscc- system.org/	https://www.icao.int/environmental- protection/CORSIA/Pages/CORSIA- SCS-evaluation-ISCC.aspx	30/Apr/2020	
Roundtable on Sustainable Biomaterials (RSB)	18/Nov/2020	https://rsb.org/	https://www.icao.int/environmental- protection/CORSIA/Pages/CORSIA- SCS-evaluation-RSB.aspx	30/Apr/2020	

Source: ICAO website: https://www.icao.int/environmental-protection/CORSIA/Pages/implementation-elements.aspx

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## The ICAO Council adopted a set of sustainability criteria for CORSIA eligible fuels



Greenhouse Gases

CORSIA eligible fuel should generate **lower** 

carbon emissions on a life cycle basis



CORSIA eligible fuel should **not** be made from biomass obtained **from land with high carbon stock** 

Criteria

At least **10% net GHG emissions** reductions compared to the baseline life cycle emissions values for aviation fuel on a life cycle basis

**No land use change** of land with high carbon stock (primary forests, wetlands and peatlands) **on or after 01 January 2008** 

ISCC International Sustainability 8 Carbon Certification

Source: ICAO (2019). https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO%20document%2005%20-%20Sustainability%20Criteria.pdf



# CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes (SCS)

#### General requirements for SCS



Documentation & Management & Transparency



Annual reports, Monitoring & System Review



Stakeholder Engagement



Mass Balance & Supply Chain Traceability

#### Requirements set by SCS for economic operators



(Group) Audits & Certificate Issuance



Transparency on other SCS used



GHG Reporting & Accounting



Complaint Procedure



Risk Management Plan



Assurance Level & handling Noncompliances



Accreditation & Auditing Standards



CORSIA Certification Requirements



Source: ICAO website: https://www.icao.int/environmental-protection/CORSIA/Pages/implementation-elements.aspx

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ISCC CORSIA is a stand-alone system. Combined audits with ISCC PLUS or EU are facilitated by harmonized system elements





Multi-stakeholder organization



Quality and risk management



Integrity Program



Requirements for certification bodies



Requirements for conducting audits



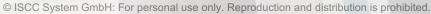
Registration and certification process



### The System Documents build the basis of the ISCC CORSIA certification system

- The ISCC CORSIA System Documents provide clear answers regarding certification requirements and processes for certification bodies and for System Users
- All System Documents are publicly available on the ISCC website





## The ISCC CORSIA standard is ready for take-off. All necessary documents are finalized



The ISCC CORSIA certificate shows compliance of the economic operator with all relevant CORSIA requirements

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The ISCC CORSIA audit procedures facilitate an efficient, consistent and reliable audit.

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## Training of ISCC CORSIA auditors has started as well as regular stakeholder dialogue in a Technical Committee



Stakeholder Meeting

First virtual aviation meeting in December 2020 with more than **130 participants** 

- Speakers from the European Commission, IATA, aviation organisations and market participants
- Demand for the establishment of a Technical Stakeholder Committee "Sustainable Aviation Fuels"

→ Meeting of the ISCC Technical Stakeholder Committee is scheduled for Autumn



#### **ISCC CORSIA Training**

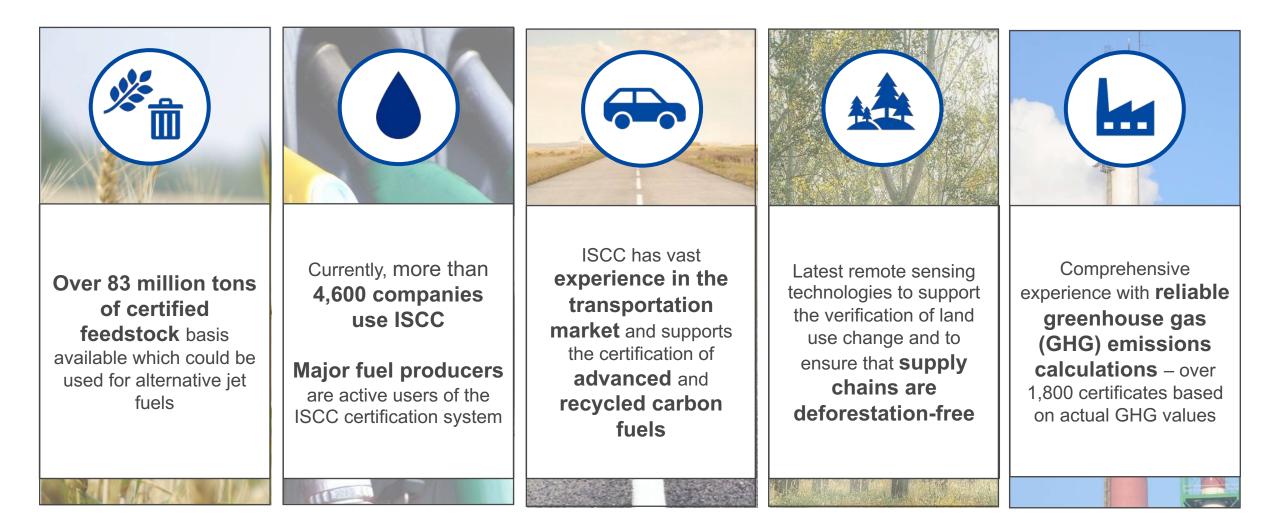
First training course in February with more than **50 participants** 

- The training course is open to all interested parties. Participation is mandatory for ISCC auditors who want to conduct ISCC CORSIA audits
- Detailed insights on the legal framework of CORSIA, SAF certification processes and sustainability requirements
- $\rightarrow$  Next training course is scheduled for Autumn

More information on the ISCC website



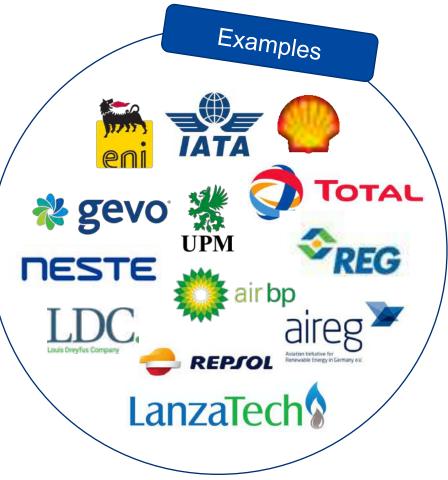
ISCC certification is based on long-term experience in the transport sector, applying GHG calculation methodologies and state-of-the-art technology





## ISCC is engaged in supporting the aviation industry in achieving its climate targets

- Several ISCC members and system users are active in SAF
- ISCC is an active member of the CAEP Fuels Task Group that is working on CORSIA eligible SAF and LCAF (lower carbon aviation fuels)
- ISCC was involved in a scientific project analysing reporting requirements in supply chains of aviation fuel multi-blends
- ISCC is actively supporting various initiatives, and conducts pilots in supply chain certification
- ISCC currently has 2 certificates covering HEFA and 46 covering HVO which can be converted into HEFA







## Many thanks for your attention!



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