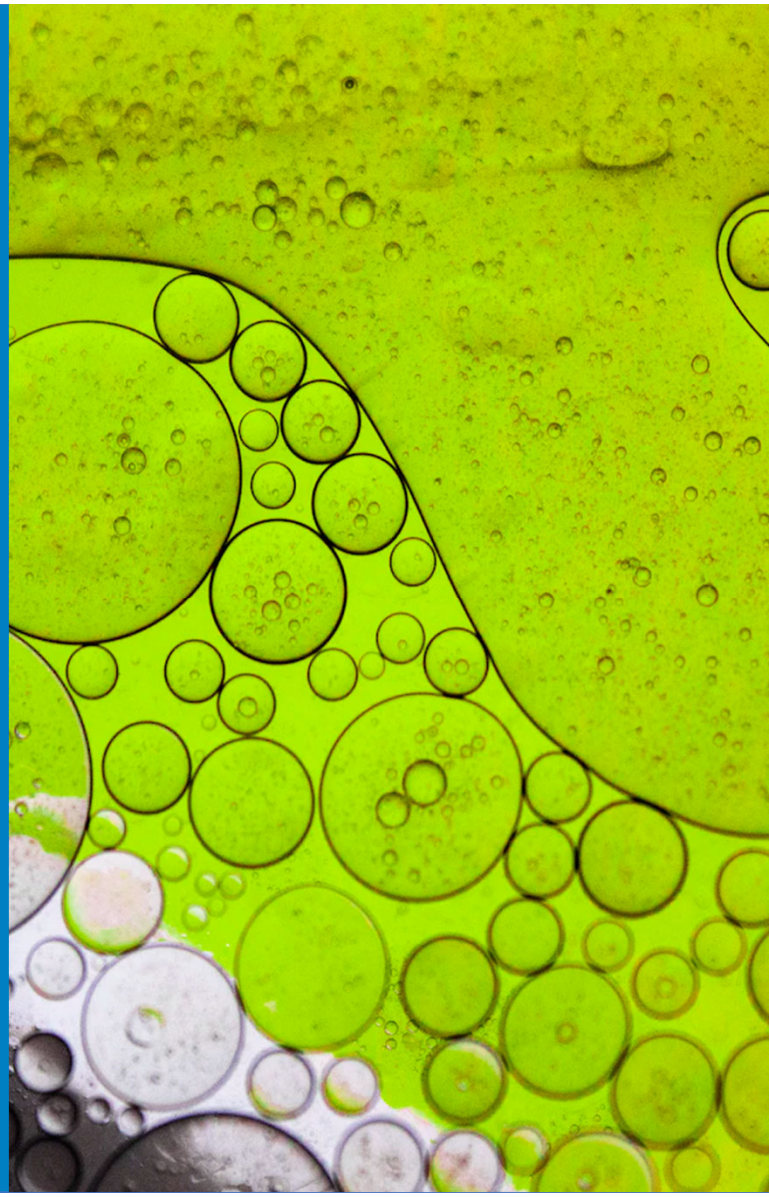
EASA
European Union Aviation Safety Agency

Webinar 12:

Feedstock categories and steps for including new feedstocks

What are the different CORSIA eligible feedstock categories (CEF) and how to include new types of feedstocks? An Aeroplane Operator can benefit from the use of CORSIA eligible fuels (CEF) to reduce their CORSIA CO2 offsetting requirements. Our EASA expert will review the different types of feedstock categories to produce CEF, and guide you through the steps on how to include additional feedstocks to the ones already approved at ICAO level.



An Agency of the European Union

Agenda

1. What are the CORSIA Eligible Fuels
2. Types of Eligible Feedstock
3. How can new feedstock be included

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Webinar: Feedstocks for CORSIA Eligible Fuels

1. What are the CORSIA Eligible Fuels
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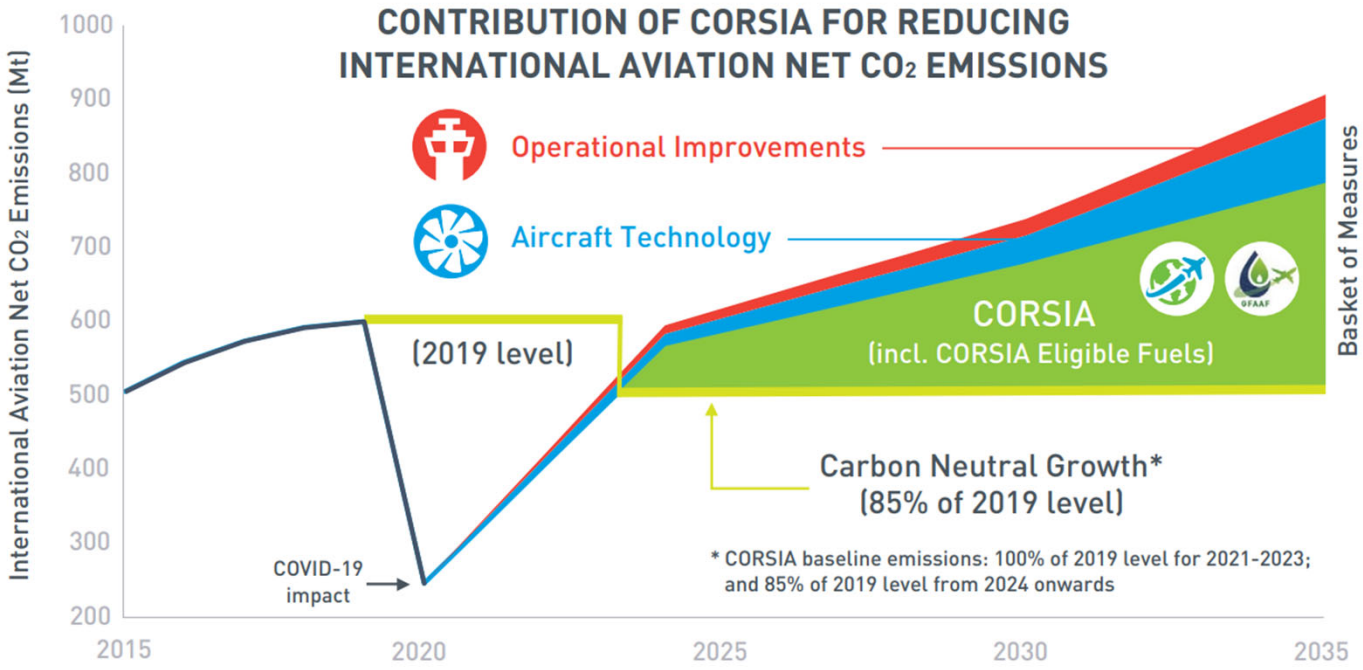
CORSIA is a global market-based measure designed to offset international aviation CO2 emissions in order to stabilize the levels of such emissions from 2020 onwards (CNG2020).

Offsetting of CO2 emissions will be achieved through the acquisition and cancellation of emissions units from the global carbon market by aeroplane operators.



Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA

HOW OFFSETTING REQUIREMENTS UNDER CORSIA ARE MET

Operator's Annual CO_2 Offsetting Requirements = Operator's Annual CO_2 Emissions subject to Offsetting Requirements × Growth Factor*

After the calculation of the offsetting requirements to be attributed to an aeroplane operator (see above):

- The operator reports the use of CORSIA Eligible Fuels (Sustainable Aviation Fuels and Lower Carbon Aviation Fuels) for the compliance period.

- The operator purchases and cancels eligible emissions units equivalent to its final offsetting requirements for the compliance period.

The operator reporting the use of CORSIA Eligible Fuels **will be able to reduce its CO2 Offsetting Requirements**

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Webinar: Feedstocks for CORSIA Eligible Fuels

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Annex 16, Volume IV provides the following definitions regarding CEF:

- **CORSIA eligible fuel**. A CORSIA sustainable aviation fuel or a CORSIA lower carbon aviation fuel, which an operator may use to reduce their offsetting requirements.

→ CORSIA sustainable aviation fuel

→ CORSIA lower carbon aviation fuel

Webinar: Feedstocks for CORSIA Eligible Fuels

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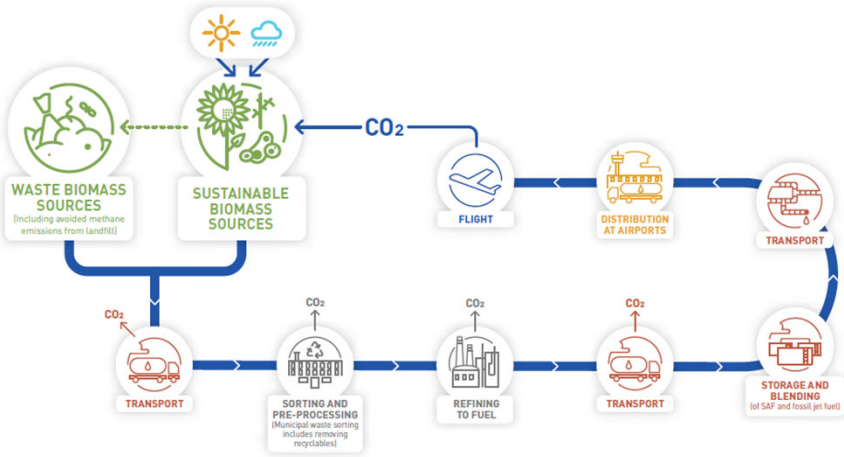
CORSIA Annex 16, Volume IV

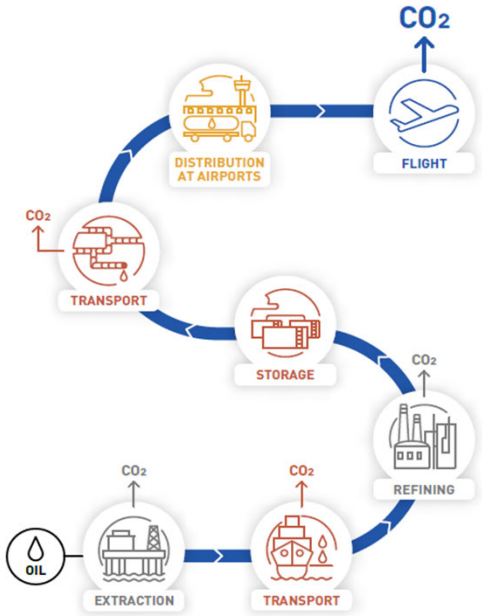
CORSIA sustainable aviation fuel

CORSIA sustainable aviation fuel. A renewable or waste-derived aviation fuel that meets the CORSIA Sustainability Criterias.



CORSIA lower carbon aviation fuel

CORSIA lower carbon aviation fuel. A fossil-based aviation fuel that meets the CORSIA Sustainability Criteria under Volume IV, Annex 16.



- Energy conservation measures (energy efficient design of plans, increased production efficiencies, improved efficiency monitoring)
- Process gas management (flaring management, venting control, fugitive emissions detection)
- Use of renewable/low carbon electricity, gas and hydrogen.
- Use of carbon capture and storage (CCS)

>10% reduction in lifecycle emissions compared to the aviation fuel baseline

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Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel – Reference Documentation

Five ICAO documents comprise the CORSIA Implementation Element for CEF, and they define the procedures and requirements needed for CEF consideration under CORSIA:

1 CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes

2 CORSIA Approved Sustainability Certification Schemes

3 Sustainability Criteria for CORSIA Eligible Fuels

4 Default Life Cycle Emissions Values for CORSIA Eligible Fuels

5 CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

CORSIA Eligible Fuels (icao.int)

Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

The amount of emissions reductions generated by the use of CEF depends on its **life cycle emissions value (LSf).**

Fuel Conversion Factor, fixed value, 3.16 for Jet-A/ Jet-A1 or 3.10 for AvGas/ Jet B [kg CO_2/kg fuel]

$$ER_y = FCF \times \left[\sum_f MS_{f,y} \times \left(1 - \frac{LS_f}{LC} \right) \right]$$

Total mass of CEF claimed in the year y, by fuel type f [tonnes]

Baseline life cycle emissions, fixed value, 89 for jet fuel or 95 for AvGas [gCO_{2e}/MJ]

Example: If, in 2021, an operator uses 10,000 tonnes of Jet-A fuel produced from Used Cooking Oil (default **LSf=13.9 gCO2e/MJ***), the amount of emissions reductions will be:

$$ER_{2021} = 3.16 \times \left[10{,}000 \times \left(1 - \frac{13.9}{89} \right) \right] = \mathbf{26{,}665 \text{ tonnes of } CO_2}$$

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Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

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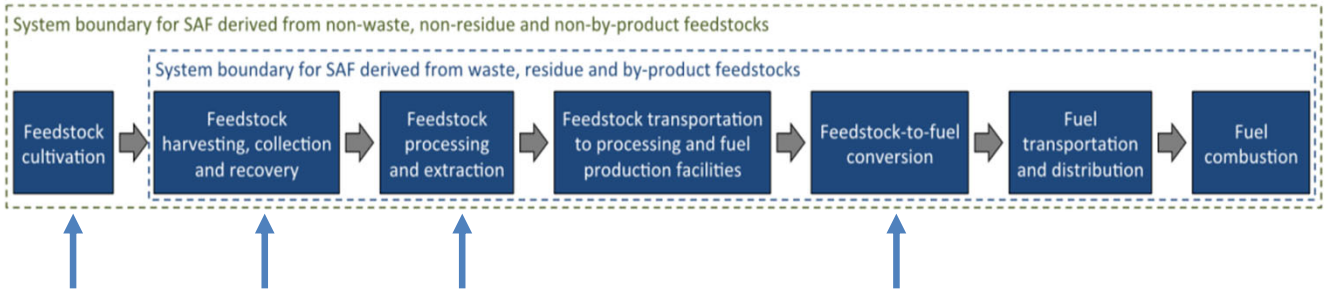

The feedstock used, processing and extraction; and the feedstock to fuel conversion process – pathway – **impact directly in the Life Cycle Emission Value (LSf)**

Agenda

1. What are the CORSIA Eligible Fuels
2. **Types of Eligible Feedstock**
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Webinar: Feedstocks for CORSIA Eligible Fuels

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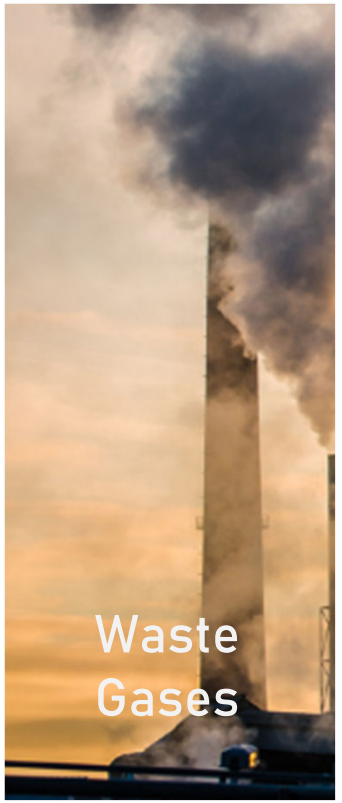
Sustainable Aviation Fuels

SAFs can be produced from multiple and diverse sources of feedstock.

→ This is crucial to develop regional value chains and promote the uptake of SAF

→ It's an opportunity to valorize the feedstocks that are abundant in a region

→ An economic opportunity for using secondary materials that until now had little economic value



Webinar: Feedstocks for CORSIA Eligible Fuels

1. What are the CORSIA Eligible Fuels
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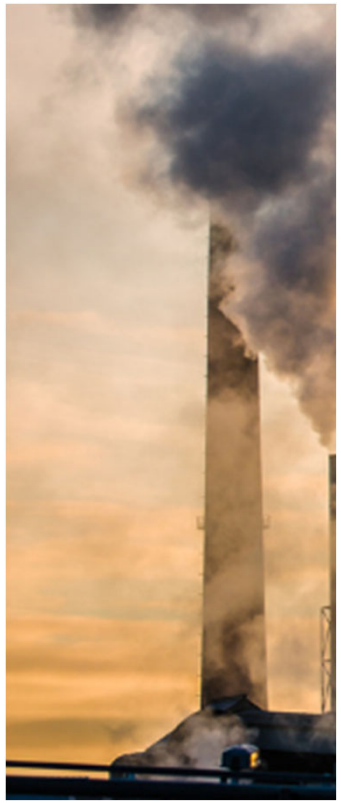
CORSIA

CORSIA Eligible Fuel

1. Residues
2. Waste
3. By-products
4. Co-products
5. Main products



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Webinar: Feedstocks for CORSIA Eligible Fuels

CORSIA

CORSIA Eligible Fuel

1. Residues
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Residues are secondary materials which the holder discards or intends or is required to discard.

✕ No economic value

✕ Elastic supply

(i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced)

Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

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CORSIA Eligible Fuel

Agricultural Residues	Forestry Residues	Processing Residues
Bagasse	Bark	Crude glycerine
Cobs	Branches	Forest processing residues
Stover	Cutter Shavings	Empty Palm Fruit Brunches
Husks	Leaves	Palm Oil Mill Effluent
Manure	Needles	Sewage Sludge
Nut shells	Pre-commercial thinnings	Cruide Tall Oil
Stalks	Slash	Tall Oil Pitch
Straw	Tree tops	

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Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

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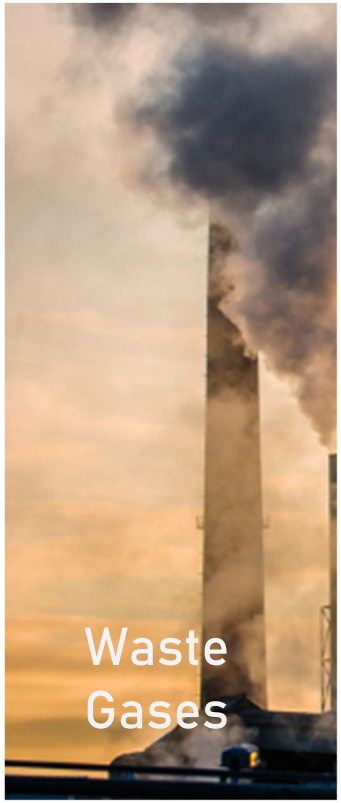

A waste is any substance or object which the holder discards or intends or is required to discard.

✕ No economic value

✕ Elastic supply

(i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced)

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CORSIA Eligible Fuel

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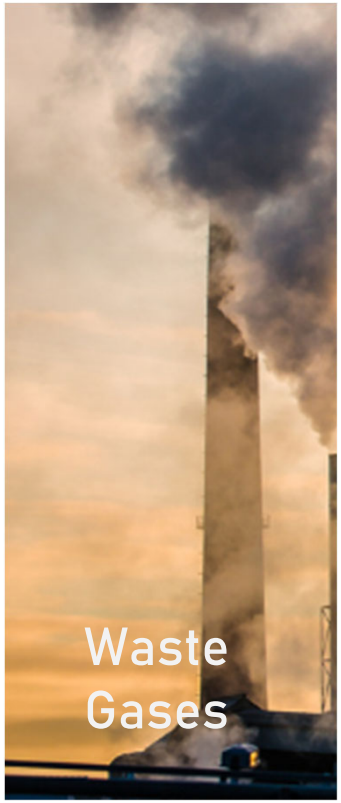
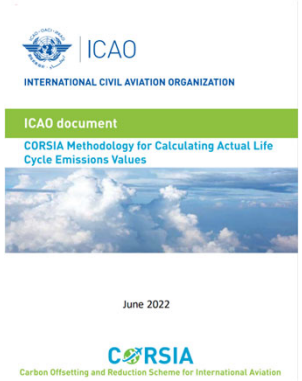


CORSIA Eligible Fuel

Wastes
Municipal Solid Waste
Used Cooking Oil
Waste Gases

Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values



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Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

1. Residues
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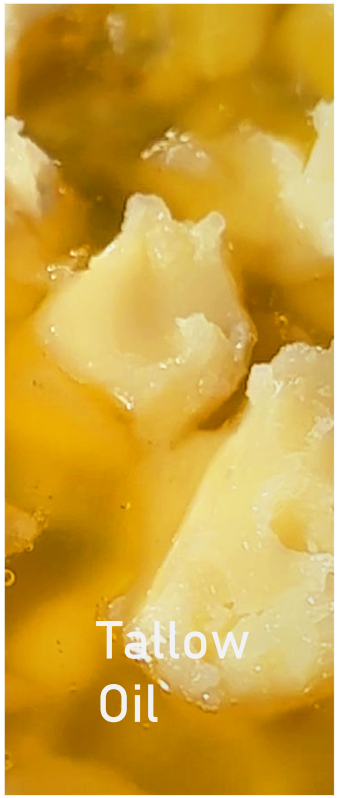

By-products are secondary products of a production process.

☑ Economic value

✕ Elastic supply

(i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced)

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CORSIA Eligible Fuel

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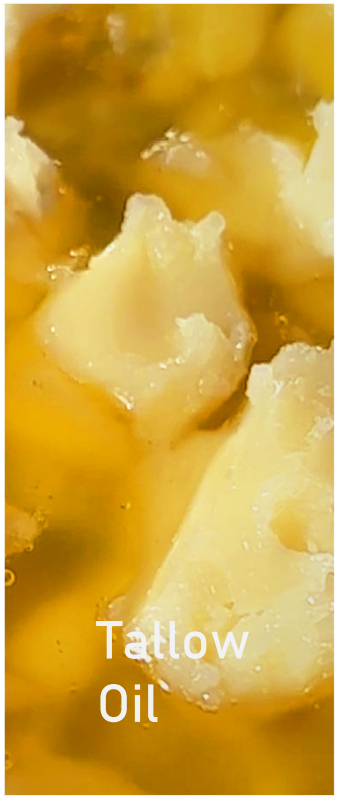
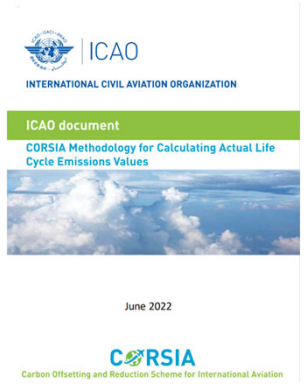


CORSIA Eligible Fuel

By-products
Palm Fatty Acid Distillate
Tallow
Technical Corn Oil

Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values



Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA Eligible Fuel

1. Residues
2. Waste
3. By-products
4. Co-products
5. Main products

Primary and co-products are the main products of a production process.

- ☑ Significant economic value
- ☑ Elastic supply

(i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced)

Webinar: Feedstocks for CORSIA Eligible Fuels

1. What are the CORSIA Eligible Fuels
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CORSIA Eligible Fuel

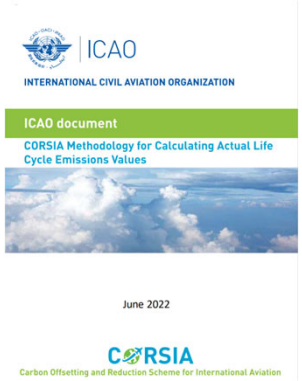
CORSIA Eligible Fuel

1. Residues
2. Waste
3. By-products
4. Co-products
5. Main products

CORSIA Eligible Fuel

Co-products
Molasses

Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values



Webinar: Feedstocks for CORSIA Eligible Fuels

CORSIA

CORSIA Eligible Fuel

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Primary and co-products are the main products of a production process.

- ☑ significant economic value
- ☑ elastic supply

(i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced)

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CORSIA Eligible Fuel

CORSIA Eligible Fuel

1. Residues
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5. Main products

Main Products	
Poplar	Sugar Beet
Miscanthus	
Switchgrass	
Soybean Oil	
Rapeseed Oil	
Palm Oil	
Brassica Carinata Oil	
Camelina Oil	
Jatropha Oil	
Sugarcane	
Corn Grain	

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CORSIA Eligible Fuel

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Why the type of feedstock is important

The amount of emissions reductions generated by the use of CEF depends on its **life cycle emissions value (LSf).**

LSf = actual core LCA value + ILUC - emission credits

Table 2. CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels produced with the Hydroprocessed Esters and Fatty Acids (HEFA) Fuel Conversion Process

Region	Fuel Feedstock	Pathway Specifications	Core LCA Value	ILUC LCA Value	LS_f (gCO_2e/MJ)
Global	Tallow		22.5		22.5
Global	Used cooking oil		13.9		13.9

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Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

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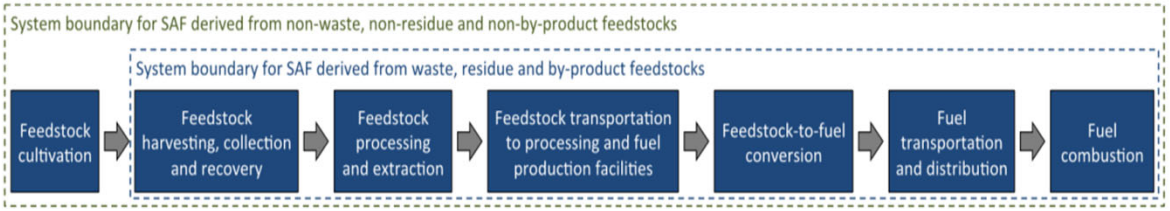
CORSIA Eligible Fuel

1. Residues	core LCA
2. Waste	core LCA
3. By-products	core LCA
4. Co-products	core LCA
5. Main products	core LCA

LSf = **actual core LCA value** + ILUC - emission credits

The system boundary of the core LCA value calculation will include the full supply chain of CEF production and use.



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Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

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CORSIA

CORSIA Eligible Fuel

1. Residues
2. Waste
3. By-products
4. Co-products — ILUC
5. Main products — ILUC

LSf = actual core LCA value + **ILUC** - emission credits

CORSIA Eligible Fuel production may require some additional land to be used, and generate land use change GHG emissions in other locations due to the displacement of crops or animals.

Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

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CORSIA Eligible Fuel

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Global	Used cooking oil		13.9		13.9
Global	Palm fatty acid distillate		20.7		20.7
Global	Corn oil	Oil from dry mill ethanol plant	17.2		17.2
USA	Soybean oil		40.4	24.5	64.9
Brazil	Soybean oil		40.4	27.0	67.4
Global	Soybean oil		40.4	25.8	66.2
EU	Rapeseed oil		47.4	24.1	71.5

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Source: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

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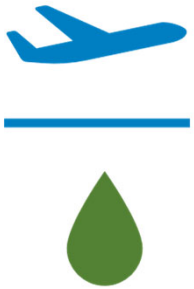
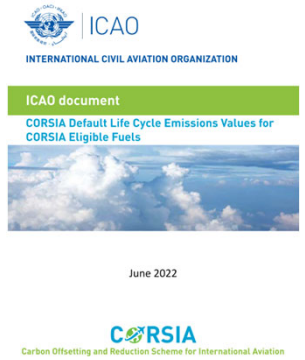
CORSIA Eligible Fuel





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Global	Used cooking oil		13.9		13.9
Global	Palm fatty acid distillate		20.7	0.0	20.7
Global	Corn oil	Oil from dry mill ethanol plant	17.2		17.2
USA	Soybean oil		40.4	24.5	64.9
Brazil	Soybean oil		40.4	27.0	67.4
Global	Soybean oil		40.4	25.8	66.2
EU	Rapeseed oil		47.4	24.1	71.5

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Webinar: Feedstocks for CORSIA Eligible Fuels

CORSIA Eligible Fuel

In general, as the Default Life Cycle Emissions values reflect:

→ The CEF that uses as a feedstock residues/wastes/by-products have better Life Cycle Emissions [LSf]

→ The CORSIA scheme, incentivizes the use of these CEFs by allowing them to reduce the Offsetting Requirements

→ The classification of specific feedstocks is subject to later revisions as part of the regular CORSIA review process

Agenda

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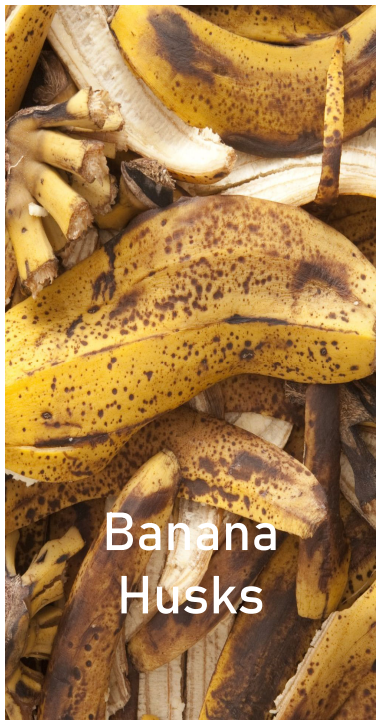
Webinar: Feedstocks for CORSIA Eligible Fuels

CORSIA

Benefits



Benefits of having feedstocks added to the different categories of feedstock for the CORSIA Eligible Fuels:

(1) It can be a source of socio-economic development, mainly for the primary sector

(2) It is a clear form of application of the principles of circular economy – mainly when the feedstock is a residue/waste/by-product -.

(3) Promoting regional feedstocks allows for the viability of sustainable, regional supply chains for SAF.

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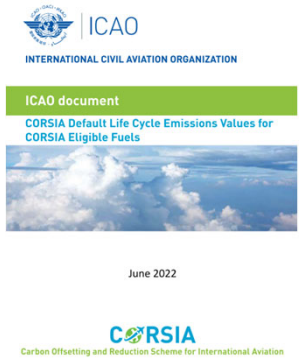
CORSIA

Step 1

How to add a new feedstock into the CORSIA framework

Verify that the identified feedstock is truly out of the CORSIA eligible feedstock lists



Webinar: Feedstocks for CORSIA Eligible Fuels

CORSIA

Step 2

How to add a new feedstock into the CORSIA framework

Engage with the ICAO Secretariat, and ultimately the Fuel Task Group

The Fuels Task Group addresses technical issues related to aviation fuels, including the methodologies for considering CORSIA Sustainable Aviation Fuels and CORSIA Lower Carbon Aviation Fuels under Annex 16, Vol IV.

→ More than 300+ experts from all over the word are working in the FTG

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CORSIA

Step 2

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How to add a new feedstock into the CORSIA framework

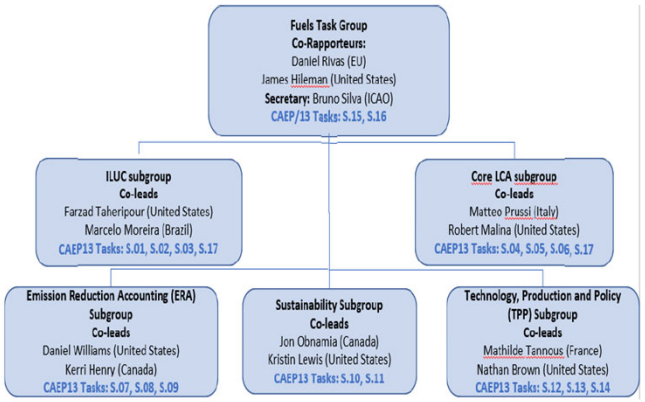

Figure 1 - FTG group structure in CAEP/13, assignment of tasks

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Webinar: Feedstocks for CORSIA Eligible Fuels

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CORSIA

Step 3

How to add a new feedstock into the CORSIA framework

[FTG] Determine which type of feedstock category the proposal will fall into:

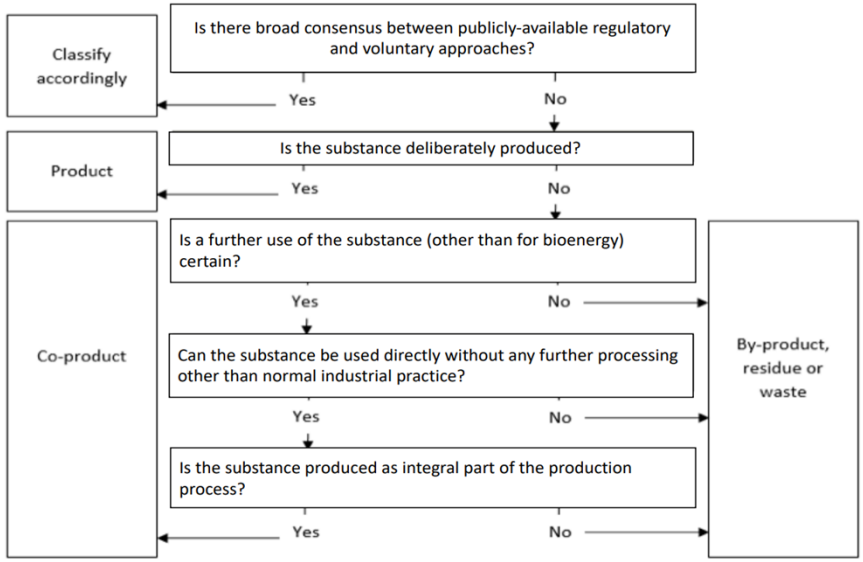

Figure 1. Guidance for inclusion of additional materials in positive list

EASA

Webinar: Feedstocks for CORSIA Eligible Fuels

1. What are the CORSIA Eligible Fuels
2. Types of Eligible Feedstock
3. How can new feedstock be included

CORSIA

Step 4

How to add a new feedstock into the CORSIA framework

Publication in the official documentation of CORSIA – Implementation Elements –.

CORSIA Eligible Fuels (icao.int)

EASA

Conclusions

(1) The operator reporting the use of CORSIA Eligible Fuels **will be able to reduce its CO2 Offsetting Requirements** under CORSIA.

(2) There **is five categories of feedstocks under the CORSIA Eligible Fuels**, depending on its characteristics, price elasticity and economic value: (i) Residues (ii) Wastes (iii) By-products (iv) Co-products and (v) Main products.

(3) New feedstock can always be included in the CORSIA documentation, that is an opportunity for unexplored feedstock that can have potential for Sustainable Aviation Fuel production.