Simulation: LCA for supply chain

How to become SAF ready? How to make SAF happen?

SAF Training for ACI Africa & AFRAA

23-25.04.2025, Arusha, Tanzania

Global Gateway

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Your group work: Decision making from default LCA values for CORSIA eligible fuels

Conduct a simplified LCA to calculate GHG emissions at different stages of SAF supply chain and propose practical strategies to reduce them.

Group work:

- You will be divided into **eight groups.**
- **Discuss and evaluate** the LCA case in your group**.**
- **Propose solutions** to minimize the environmental impacts by **collaborating with other stakeholders**.
- You will have **20 minutes** to dive into your group discussion and to **fill out the worksheet**.
- Summarize the key findings and highlight the stages with improvement potential in **2 minutes**.
- Later, each case group representatives have **5 minutes** to present their collective solutions **to the audience**.

Your group work: Analyze the lifecycle data to identify the most impactful emission values

Scenario: An airport-airline partnership is analyzing two SAF options using an LCA framework to identify environmental trade-offs and areas for improvement.

Tasks

Analyse the lifecycle data to identify the most impactful improvements.

- Which stage contributes the most emissions?
- How can stakeholders collaborate to reduce lifecycle emissions?
- What policy or financial incentives could improve outcomes?

Provisional Data

	Case A HEFA (UCO)		**Case B** FT (Corn Stover)		
Data provider	JRC	MIT	JRC	JRC	MIT
Model	E3	GREET	E3	GREET	GREET
Feedstock Cultivation and Collection*	0	3.6	1.5	2.1	3.3
Feedstock Transportation*	1.7	0.3	4.7	2.3	2.3
Feedstock-to-Fuel Conversion*	11	10.5	3.3	0	0
Fuel Transportation*	0.3	0.5	0.3	0.9	0.9

*(g CO_2e/MJ)

Excel calculation

Source: ICAO; HEFA - Hydoresterrification of fatty acids; UCO – Used cooking oil; FT – Fischer Tropsch; JRC - Joint Research Centre; MIT - Massachusetts Institute of Technology; GREET - Greenhouse gases, Regulated Emissions, and Energy use in Technologies,; E3 - Economy–Energy–Environment

Stakeholder Considerations for LCA-based Decision Making

Sustainability Officer

Focus: Reducing overall lifecycle emissions, aligning with decarbonization goals.
Main Concern: Which SAF pathway offers the lowest total CO_2 emissions reduction potential?
Key Table Data: Feedstock-to-fuel conversion efficiency, total emissions values.

- Which SAF pathway has the lowest overall emissions reduction potential?
- How should emissions reduction potential from different lifecycle stages (e.g., feedstock cultivation, transportation, conversion) be weighted in decision-making?
- How do renewable energy sources (e.g., wind, solar) impact the overall carbon footprint of SAF? Should procurement policies incentivize their adoption?

Policy Advisor

Focus: Ensuring SAF complies with CORSIA regulations and national policies.
Main Concern: Which pathway best aligns with existing sustainability regulations?
Key Table Data: Total emissions, co-product benefits, regulatory fit.

- What kind of policy incentives can encourage SAF producers to transition to renewable electricity and sustainable farming what is the role of LCA on this?
- How can regulatory frameworks ensure that co-product benefits are accurately accounted for in LCA calculations?
- What role do carbon intensity targets play in shaping SAF procurement choices?

Airline Executive

Focus: Ensuring SAF adoption is cost-effective, operationally feasible, and reliable.
Main Concern: Are there trade-offs between low emissions and fuel availability/cost?
Key Table Data: Pathway feasibility, feedstock transportation emissions, fuel transportation costs.

- How do feedstock availability and transportation emissions impact operational feasibility?
- Are there SAF options that are more logistically viable for airlines to integrate?
- Would you prioritize a slightly higher-emission pathway if it meant more reliable supply and lower cost?
- If a SAF producer shifts to low-carbon hydrogen sources or regenerative farming, how will this affect the carbon intensity, fuel availability and cost?
- Should airlines prioritize SAF suppliers that implement integrated waste management and increase co-products, even if the price is higher? Why?

Fuel Supplier

Focus: Ensuring SAF production and logistics are scalable in the long term.
Main Concern: How do infrastructure, supply chain logistics, and feedstock availability impact each pathway?
Key Table Data: Feedstock cultivation and transportation emissions, total emissions.

- Which feedstocks are the most logistically challenging to source and transport?
- What are the biggest challenges in switching to renewable hydrogen sources for SAF production and how these changes would?
- What role do infrastructure investments play in making certain pathways more viable?
- Do co-product benefits make some pathways more attractive despite higher initial emissions?

Task

Fill out the worksheet for option A or option B

Time: 20 min

	Emissions (gCO_2/MJ)	Possible improvements	Stakeholders involved
Feedstock cultivation & collection			
Feedstock Transportation			
Feedstock to fuel conversion			
Fuel Transportation			
Total Emission			

Discussion: Potential actions to minimize GHG emissions

Time: 10 min

Questions	Case A: HEFA	Case B: FT
Which stage contributes the most emissions?		
How can stakeholders collaborate to reduce lifecycle emissions?		
What policy or financial incentives could improve outcomes?		

EASA
European Union Aviation Safety Agency

Thank you for your attention!

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