

SUSTAINABLE AVIATION FUEL: An European Scale



SENASA

SERVICIOS Y ESTUDIOS PARA LA NAVEGACIÓN AÉREA Y LA SEGURIDAD AERONÁUTICA S.M.E. M.P. S.A.



ACTIVITIES



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1.

SUSTAINABLE AVIATION FUEL: The main concepts

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Delhi International Airport
2010 vs 2019

2010
Pax :
29.9 Million
20,7 Domestic
9,3 International



2019
Pax :
69.9 Million
51,4 Domestic
18,5 International

Málaga International Airport
2010 vs 2019

2010
Pax :
12.1 Million



2019
Pax :
19.9 Million
3,1 International
16,8 International

Traffic growth in the last years

1. SUSTAINABLE AVIATION FUEL: The main concerns

Sustainable Aviation Fuels

Sustainable aviation fuel (SAF) is the name given to advanced aviation biofuel types used in jet aircraft and certified as being sustainable by a reputable independent third-party

1. All jet fuel has to meet strict specifications, with ASTM providing the most recognized standard, including for SAF. Once certified as SAF, it can be used directly (at a blending percentage) in aircraft, and in an airport's pipe network.

2. The potential for reducing GHG emissions differs depending on the raw material used, with **values ranging from 65% to 85% reduction potential** with respect to conventional Jet A1.

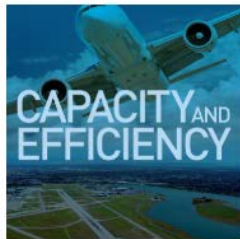
3. Achieving the GHG emission reduction targets proposed by the aviation industry and organizations such as the International Civil Aviation Organization (ICAO) **will require a significant increase in the production and consumption of Sustainable Aviation Fuels.**



ICAO | UNITING AVIATION
A UNITED NATIONS SPECIALIZED AGENCY



ICAO'S Strategic Objectives



1. SUSTAINABLE AVIATION FUEL: The main concepts

Sustainable Aviation Fuels

1. All jet fuel has to meet strict specifications, with ASTM providing the most recognized standard, including for SAF. Once certified as SAF, it can be used directly (at a blending percentage) in aircraft, and in an airport's pipe network.

1. **FT-SPK (Fischer-Tropsch Synthetic Paraffinic Kerosene)**: the maximum blending ratio is **50%**.
2. **FT-SPK/A**: the maximum blending ratio is **50%**.
3. **HEFA (Hydro Processing of Esters of Fatty Acids and Free Fatty Acids)**: The maximum blending ratio is **50%**.
4. **HFS-SIP (Synthetic Isoparaffins from Hydroprocessed Fermented Sugars)**: The maximum blending ratio is **50%**.
5. **ATJ-SPK (SPK from the Alcohol to Jet)**: The maximum blending ratio is **50%**.
6. **Co-processing**: The maximum blending ratio is **5%**.
7. **Catalytic Hydrothermolysis Synthetic Kerosene (CH-SK)**: The maximum blending ratio is **50%**.

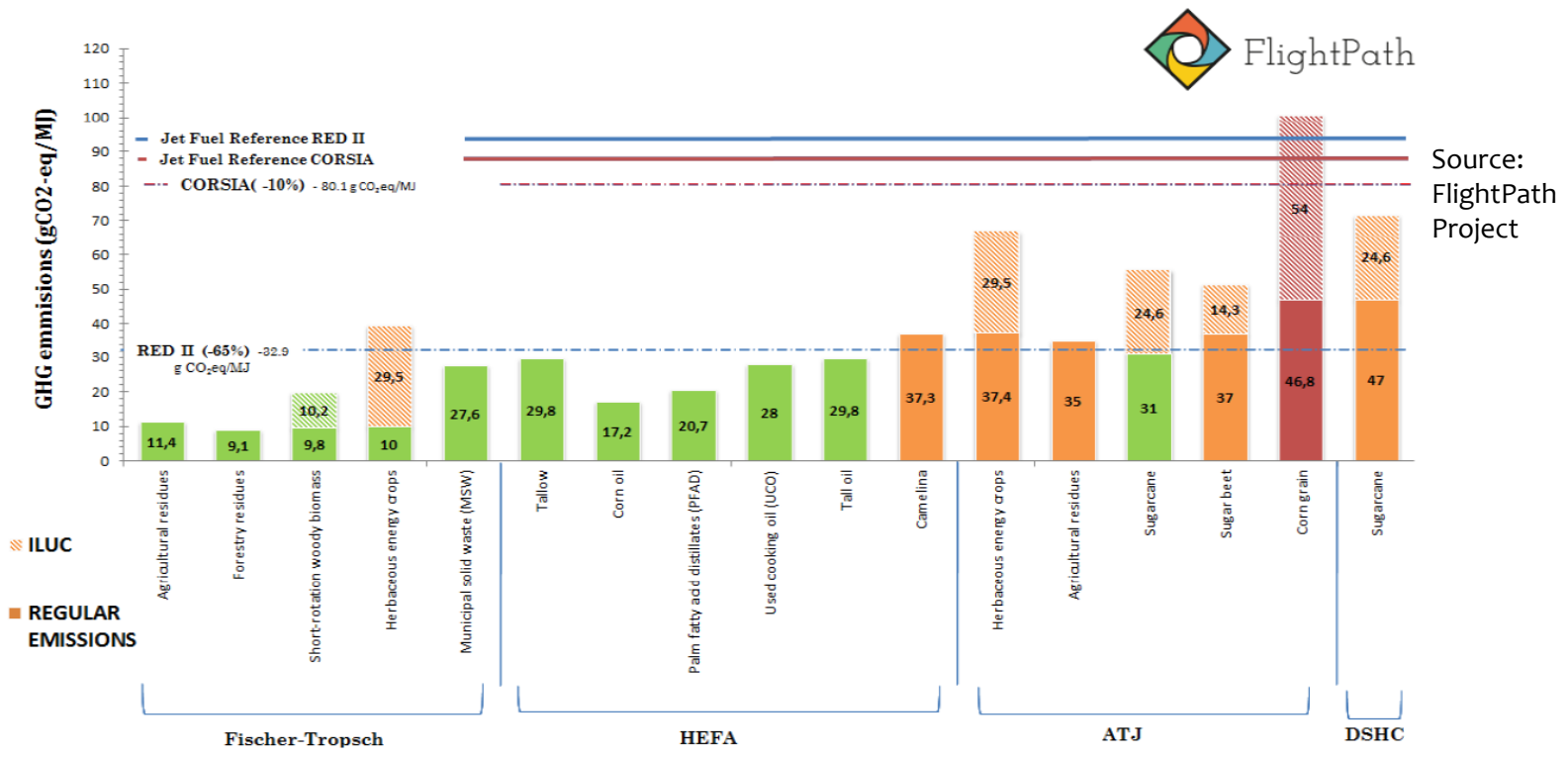


ASTM INTERNATIONAL

1. SUSTAINABLE AVIATION FUEL: The main concepts

Sustainable Aviation Fuels

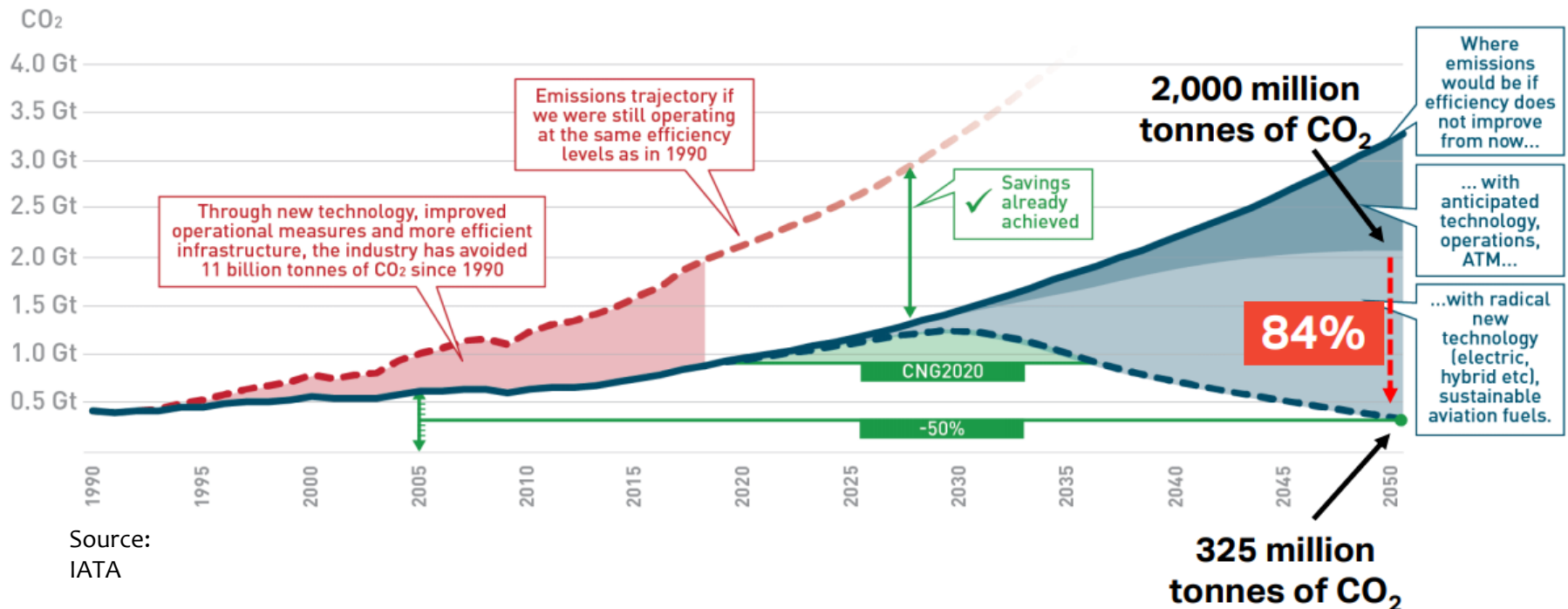
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Sustainable Aviation Fuels

3. Achieving the GHG emission reduction targets proposed by the aviation industry and organizations such as the International Civil Aviation Organization (ICAO) will require a significant increase in the production and consumption of Sustainable Aviation Fuels.

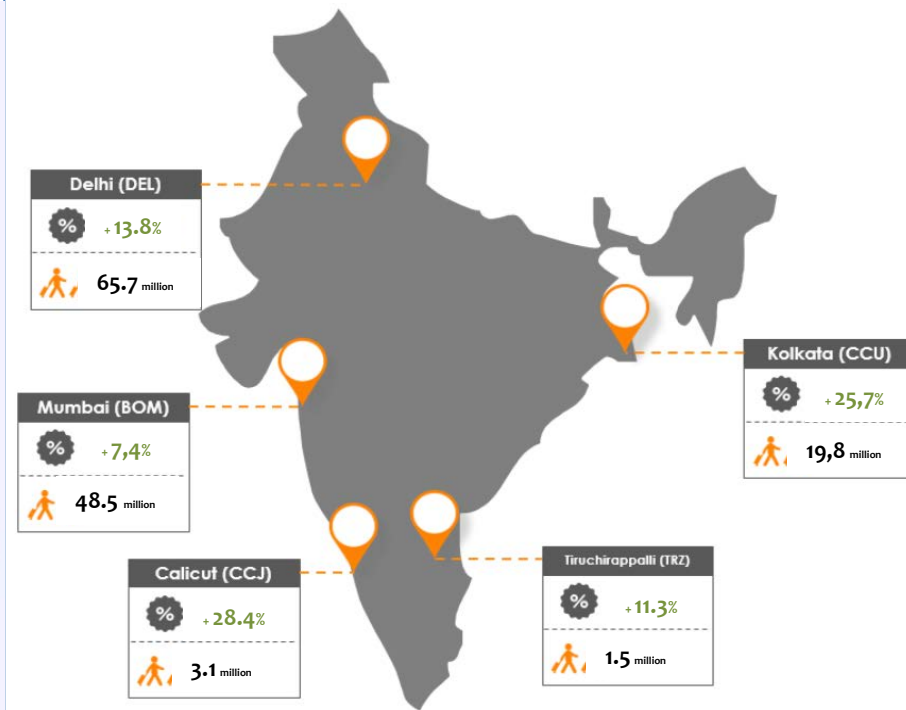
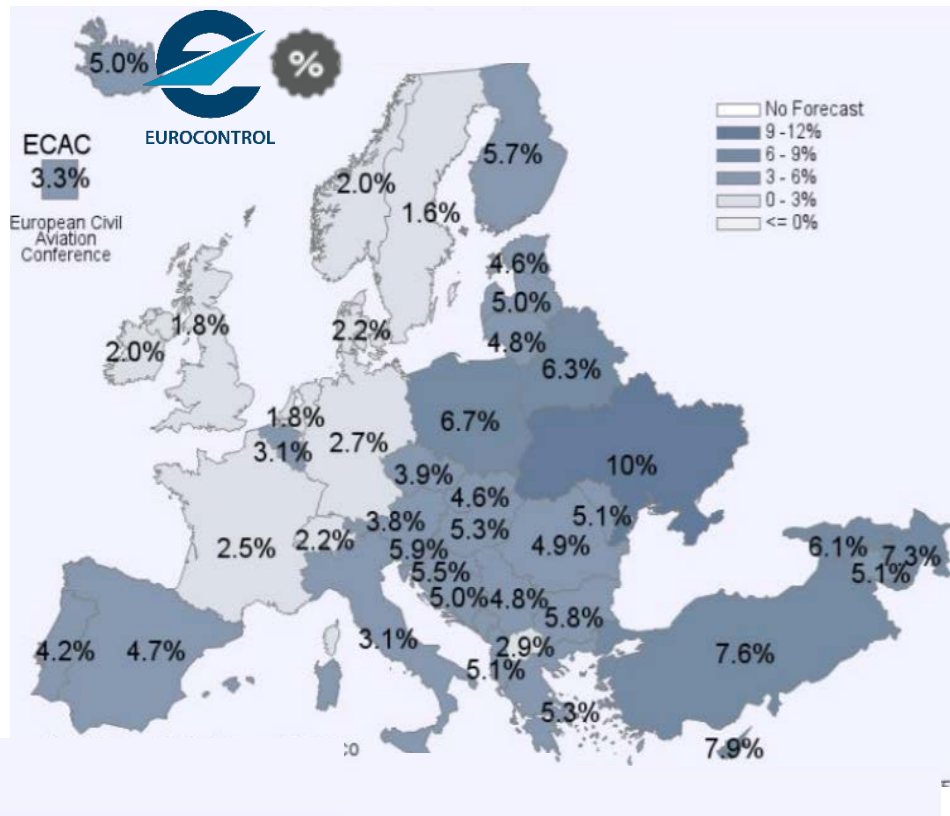


Source: IATA

2.

SUSTAINABLE AVIATION FUEL: The European and Indian traffic case

2. SUSTAINABLE AVIATION FUEL: Increase in Traffic



PAX (2017)	PAX (2018)
1039.7 (millions)	1106.0 (millions)

Source: Eurocontrol

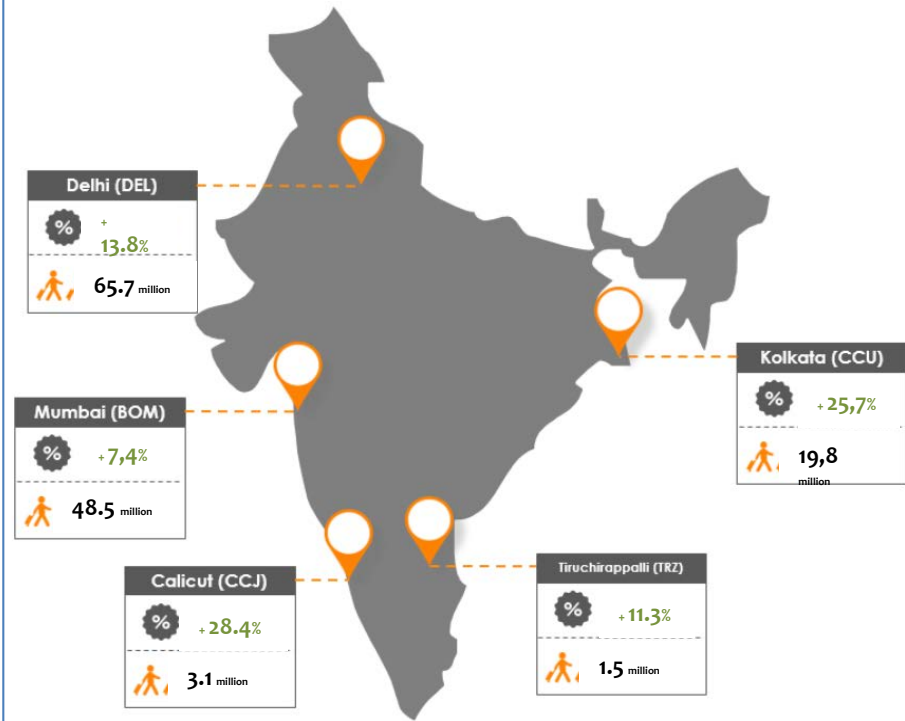
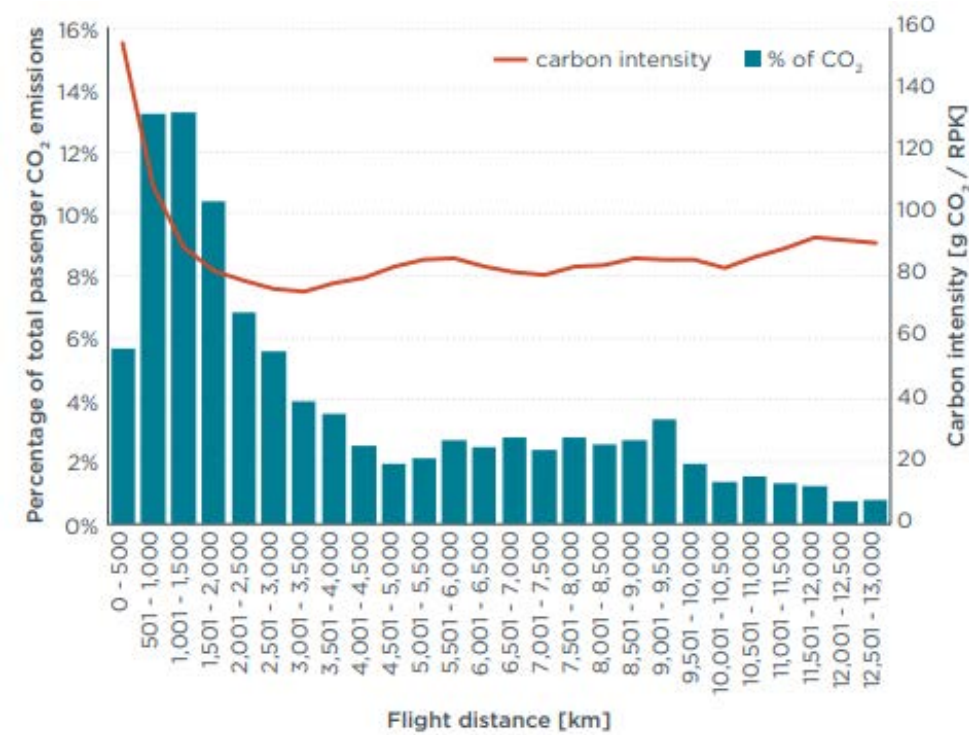
+6.0%

PAX (2017)	PAX (2018)
265.0 (millions)	308.8 (millions)

Source: APAO

+16.5%

2. SUSTAINABLE AVIATION FUEL: Increase in Traffic



	PAX (2017)	PAX (2018)	
Int			
Dom	59.3 (millions)	65,5 (millions)	+10%
	205,7 (millions)	243.3 (millions)	+18%

PAX (2017)	PAX (2018)
265.0 (millions)	308.8 (millions)

Source: APAO

3.

**SUSTAINABLE AVIATION FUEL:
The Member States and EC initiatives**

3. SUSTAINABLE AVIATION FUEL: The Member States and EC initiatives



The Von der Leyen Commission (2019-2024) is the current College of European Union Commissioners which took office on 1 December 2019. Its president is Ursula Von der Leyen, who chairs 26 other commissioners (one from each of the states that make up the European Union)

European Green Deal

Ursula von der Leyen, President of the European Commission, presented the **EU Green Deal at the start of her presidency**, a plan that includes fifty concrete actions to combat climate change:

- The aim is to make Europe the first climate-neutral continent by 2050 - for which a 90% reduction in transport emissions is mentioned as necessary by that date.
- It is mentioned that the European Union should, in parallel, significantly increase the production and deployment of sustainable transport fuels - necessary to achieve the first point.

Many of these measures will be developed in the coming months, including the **possibility of establishing a mandate - or use/production obligation - for Sustainable Aviation Fuels at European level**, which some individual countries are already doing or willing to do.

3. SUSTAINABLE AVIATION FUEL: The Member States and EC initiatives

Norway

A (non-negotiated) "mandate" for the SAF blending that starts with a 0.5% in 2020, increasing to 30% by 2030.

Sweden

'Fossil Free Sweden'. Domestic fossil free flights by 2030 and all departure fossil free flights (Domestic+International) by 2045.

Proposal: A (non-negotiated) 'mandate' for the SAF blending that starts at 1% in 2021, increasing to 30% by 2030.

United Kingdom

The RTFO (fuel obligation) has been extended to include sustainable aviation fuels and renewable fuels of non-biological origin.

France

Joint paper with Spain. Shares the objective and the concept of "balanced compromise".

Announced on 28 January 2020 in Toulouse, the launch of the "national roadmap for the development of sustainable aviation fuels".

Spain

'Balanced Compromise' para apuntalar el desarrollo y el establecimiento de un mandato en el horizonte 2025 - AESA.

Finland

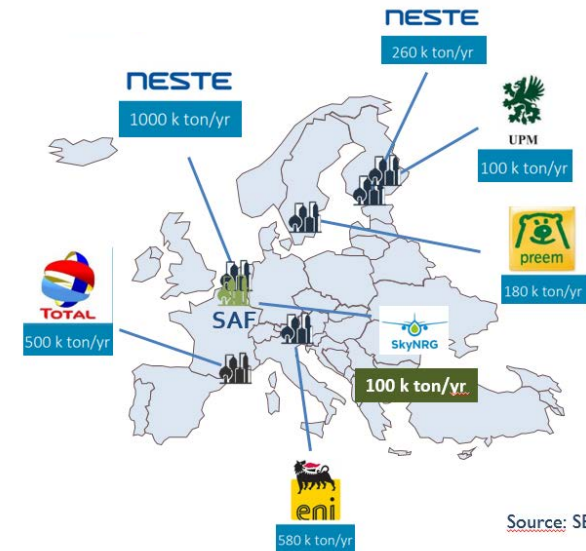
Finland's Air Transport Strategy 2015-2030; Sets a target of 40% of aviation fuels to be sustainable by 2050.



Source: SENASA.

3. SUSTAINABLE AVIATION FUEL: The Member States and EC initiatives

		2020				(2A)
		BAU (Mtoe)	share in fuel demand by mode	BAU (Mtoe)	share in fuel demand by mode	EU RED II Aviation - Blending mandate (Mtoe)
ROAD	Biodiesel FAME/Bioethanol	17.1	6.1%	16.7	6.2%	6.9
	HEFA_UCO					0.5
	HEFA_AF					0.2
	HEFA_CAM					
	HVO_UCO					1.0
	HVO_AF					0.6
	HVO_CAM					0.8
	FT_MSW					
	Cellulosic ethanol_RES					5.3
	Cellulosic ethanol_WBEC					0.1
	Renewable fuels total	17.1	6.1%	16.7	6.2%	15.3
Fossil	261.9	93.7%	253.5	93.6%	253.7	
Renewable electricity	0.2	0.1%	0.3	0.1%	0.3	
Nonrenewable electricity	0.4	0.1%	0.5	0.2%	0.5	
TOTAL	279.6		271.0		269.8	
RAIL	Renewable electricity	1.4	0.5%	2.6	0.9%	2.6
	Other	5.8	2.0%	5.7	2.1%	5.7
	TOTAL	7.2		8.3	3.0%	8.3
ROAD + RAIL	286.8		279.3		278.1	
MAR	Fossil	45.3		48.7		48.7
AIR	HEFA_UCO					0.1
	HEFA_AF					0.04
	HEFA_CAM					
	HVO_UCO					0.2
	HVO_AF					0.1
	HVO_CAM					0.1
	FT_MSW					
	Renewable fuels total	0.0	0%	0.0	0%	0.6
Fossil	56.5	100%	58.3	100%	57.4	
TOTAL	56.5		58.3		58.0	
ALL MODES	Renewable energy total	18.8	4.8%	19.6	5.1%	18.8



Source: SENASA.

Convergence between the demand and the production of Sustainable Aviation Fuel to be achieved in Europe

1. Potential maximum production facilities capacity to be estimated around circa 2.720 Kton / year
2. 1% of the demand of SAF over the total Jet-A1 in 2025 consumption to be 600 Kton/year

3. SUSTAINABLE AVIATION FUEL: The Member States and EC initiatives



Establishment of a national target for sustainable aviation fuel mandate in Spain (2% in 2025)

1. Open to all currently approved technologies and processes
2. Several Spanish energy companies already have projects underway for industrial production under approved JET A-1 standards



DEMANDA DE PRODUCTOS PETROLÍFEROS EN ESPAÑA



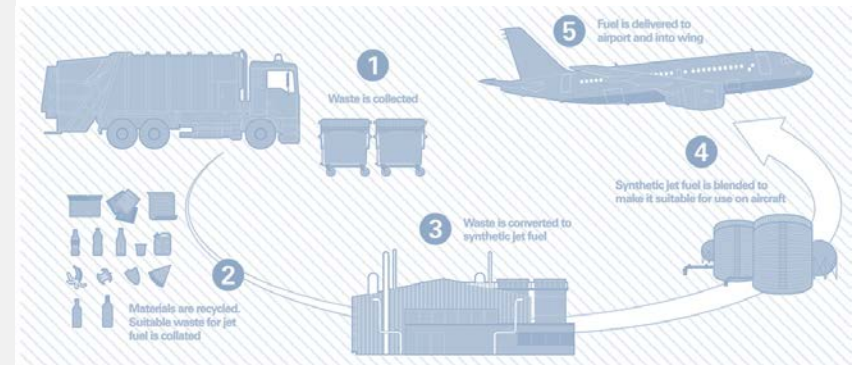
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ARTEMISA (2019)

In view of the unquestionable interest of MSW as a raw material for the production of sustainable aviation fuels in the mid-term, Artemisa was created in 2019 promoted by the EASA - State Agency for Air Safety - **to analyze the feasibility and establish a national implementation plan for Sustainable Aviation Fuels (SAF) from Municipal Solid Waste (MSW).**

The stated objectives are as follows:

1. Identify available technologies and their owners (e.g. Fulcrum, Velocys, Abengoa)
2. Establish a Development Plan with milestones, times and needs
3. Identify potential investors in the conversion facilities (For example Urbaser, Ferrovial, Abengoa, ACS, etc)



SUSTAINABLE AVIATION FUEL: Conclusions

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- 2.** The potential for reducing GHG emissions differs depending on the raw material used, with **values ranging from 65% to 85% reduction potential** with respect to conventional Jet A1.
- 3.** Achieving the GHG emission reduction targets proposed by the aviation industry and organizations such as the International Civil Aviation Organization (ICAO) **will require a significant increase in the production and consumption of Sustainable Aviation Fuels.**
- 4.** Europe has the determination to reduce significantly the impact of the aviation greenhouse emissions, and the European Green Deal has the potential to be a tool that can harmonize the initiatives related to the Sustainable Aviation fuel within the Member States
- 5.** The **convergence of the demand/production in SAF** has to be achieved in the years to come, the measures to be taken have to push in that direction and be coordinated.



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Until next time

Daniel Brousse

