Lipid waste feedstock for sustainable fuels: A market review

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RE·CORD

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Fuelling Clean Aviation for Europe
Scaling up SAF production towards carbon neutrality and the EU Green Deal

Brussels (and online)

BIO4A (Advanced Sustainable BIOfuels for Aviation) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 789562.

Presentation content

- **INTRODUCTION**
  - **Sustainable fuels for aviation**
- **BIOFUEL and WASTE FEEDSTOCK**
  - **The RED II and the Annex IX**
  - **Used Cooking Oils (UCO) and Animal fats (AFs)**
- **MARKET REVIEW**
  - **Context**
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  - **Conclusion**

Introduction
Sustainable fuels for aviation

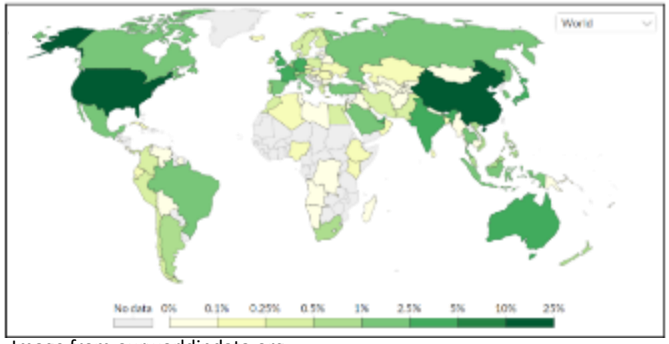
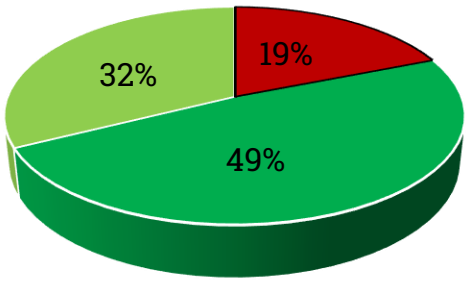


Image from ourworldindata.org



Data from the ICCT (2019)

SAF

ICAO · OACI · ИКАО

国际民航组织 · ايكاو

CEF

- **International Sustainability and Carbon Certification**
- **REDcert**
- **Green Gold Label**
- **Roundtable of Sustainable Biomaterials**
- **SUstainable REsources**
- **Council on Sustainable Biomass Production**
- **Roundtable on Sustainable Palm Oil**
- **Roundtable on Responsible Soy**
- **Accredia (ITALY)**

Biofuels and waste feedstock
The RED II and the Annex IX

2018/2001/EC

EU Renewable Energy Directive (RED II)

"liquid or gaseous fuel for transport produced from biomass, i.e., biodegradable fraction of products, waste and residues from biological origin from agriculture, including vegetal and animal substances, from forestry and related industries, including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin"

CONVENTIONAL BIOFUELS

- Rapeseed
- Sunflower
- Soybean
- Palm
- Sugar/starch

FOOD Vs FUEL

ADVANCED BIOFUELS

- WASTES
- AGRICULTURAL RESIDUES
- NON-FOOD CROPS

Annex IX: Eligible Feedstock

- **Part A**

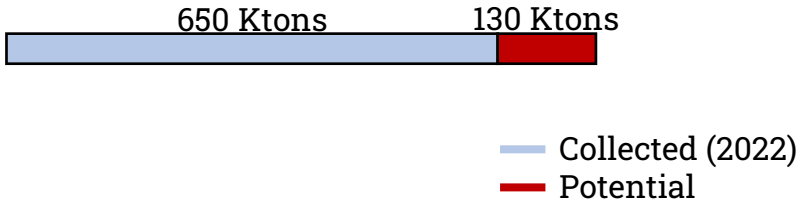
2022	2025	2030
> 0.2%	> 1 %	> 3.5%

- **Part B** — UCOs & AFs < 1.7%

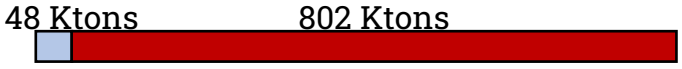
Biofuels and waste feedstock UCOs and AFs in Europe

UCOs are oils and fats that have been used for cooking or frying in the food processing industry, restaurants, fast-foods and at consumer level, in households

EU PROFESSIONAL SECTOR



EU DOMESTIC SECTOR



Data from eubia.org

Animal Fats (AFs) are fats from slaughtered animals that are rendered into a variety of products (internal organs, bones, heads, hides and skins)

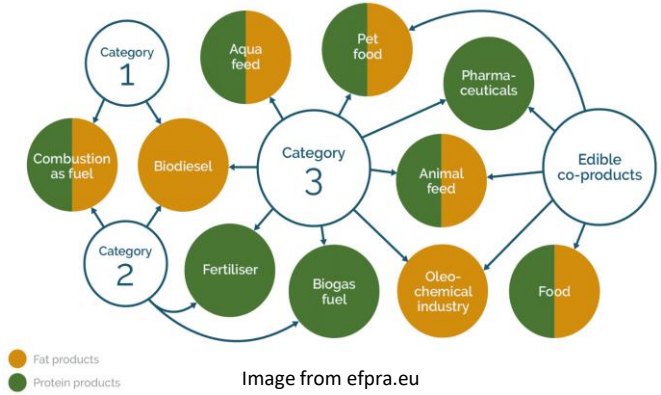


Image from efpra.eu

- **Both “High Risk” and “Low Risk” for BIOFUEL**
- **Cat.1 + Cat.2 = 522 Ktons for BIOFUEL**
- **Annex IX Part B: Cat.1 + Cat.2**

Data from Render magazine (2020)

Market Review
Context

VEGETABLE OILS and ANIMAL FATS PRODUCTION and CONSUMPTION

- Global Production (2021): 240.0 Million tons (+1.0%)
- Global Production (2022): 245.5 Million tons (+2.3%) - expected
- Global Consumption (2021): 240.9 Million tons (+0.7%)
- Global Consumption (2022): 243.3 Million tons (+1.1%) - expected
- CRUDE PALM OIL: **30%** of global vegetable oil production and consumption
- LIPID-BASED BIOFUELS: **18%** of global consumption (vegetable oils and animal fats)

Data from Oil World (2021)

COVID-19 IMPACT

- Consumption pattern shifted from ordering to self-cooking
- Shifted demand and supply (e.g. dropped demand of palm oil in Indonesia and Malaysia)
- Significant gap between demand and supply (e.g. palm oil import of India and Europe)
- Reduced supply (shutdown of the foodservice industry) and wastes recycling drop
- 2020 global market: -12.5% compared to y-on-y growth during 2017-2019

Data from market experts websites

Market Review
UCOs and AFs market size

UCOs global market

YEAR		MARKET SIZE (USD Billion)		CAGR (%)
Reference	Forecast	Reference	Forecast	
2021	2028	**6.0**	**10.1**	**7.8**
2019	2026	**6.0**	**8.9**	**5.0**
2020	2028	**6.5**	**9.6**	**5.1**
2021	2027	**5.7**	**8.5**	**6.6**
2021	2027	**6.7**	**9.5**	**6.1**

REGION

- **Europe**

APPLICATION

- **Biodiesel**
  - Oleochemical
  - Animal feed
  - Others

SOURCE

- **Commercial (food-industry & Horeca)**

AFs global market

MARKET VOLUME (Million metric tons)		CAGR (%)	MARKET SIZE (USD Billion)		CAGR (%)
Reference (2020)	Forecast (2027)		Reference (2021)	Forecast (2027)	
27.1	**NA**	**2.8**	**237**	**285 - 360**	**3.8 – 8.0**

REGION

- **Asia Pacific (LARD)**
- **North America (TALLOW)**
- **Germany in EU (LARD)**

APPLICATION

- **Biodiesel**
  - Animal feed, Oleochemical, Food , Pet-food

Data from market experts websites

Market Review Conclusion

DEMAND

- Increasing population
- Increasing well-being

AGRICULTURAL COMMODITIES PRODUCTS

SHORTAGE and PRICES

- Covid-19 Pandemic
- Ukraine conflict

EU Import Prices 2022

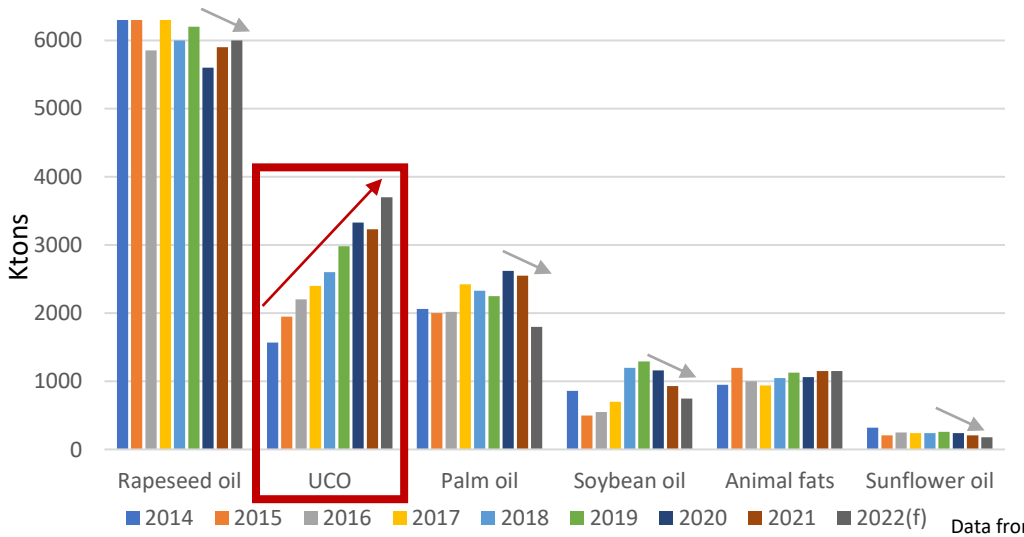
Animal Fats	+30%
Palm oil	+30%
Soybean oil	+20%
Sunflower	+4%
Rapeseed	+3%

EU Export Prices 2022

Sunflower	+1.5%
Rapeseed	+0.6%

Data from FAOStat Database

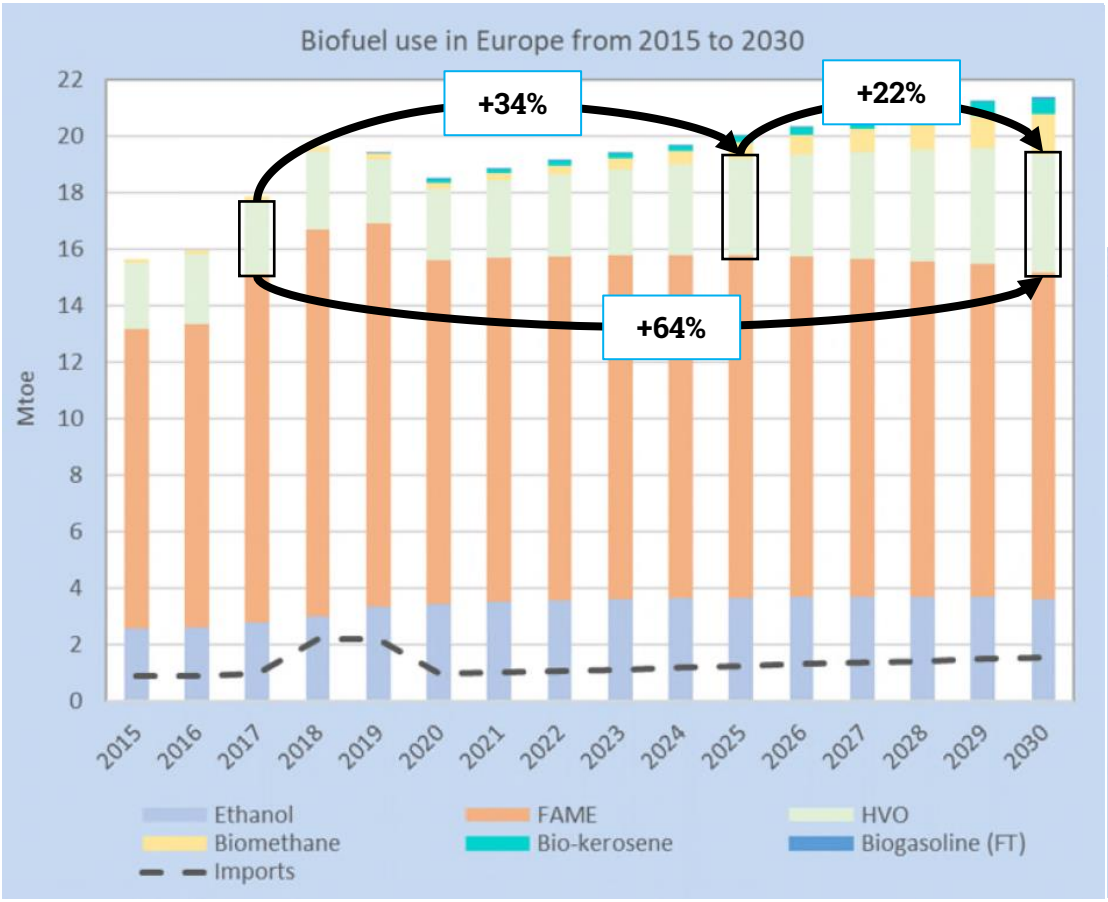
EU Feedstock Use for Biodiesel + Renewable Diesel



Data from fas.usda.gov(2021)

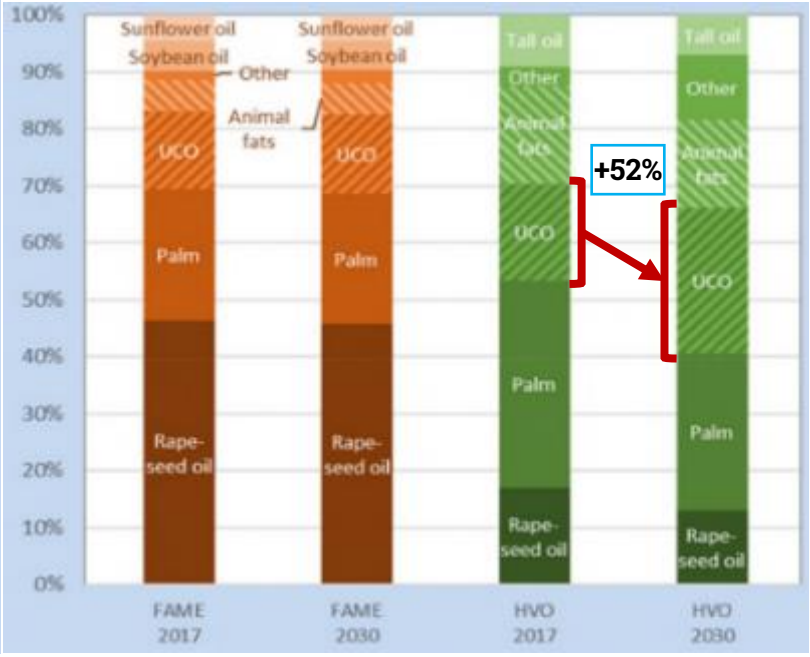
Market Review Conclusion

	Unit	2017	2020	2025	2030
EU FUEL DEMAND	Mtoe/yr	**53.9**	**54.9**	**56.6**	**58.3**



2030 total volumes (energy content)

Compliant biofuels	Mtoe	21.5
Advanced - Annex IX Part A	Mtoe	2.7
First generation - crop based	Mtoe	15.0
Advanced - Annex IX Part B	Mtoe	3.9
Other compliant biofuels	Mtoe	0.0



Data from Concawe Report no. 2/21

THANKS FOR YOUR ATTENTION

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27/02/2023

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