



Overview of European Policies – focus on waste and advanced biofuels feedstock

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**Future of Biofuels
Copenhagen**



About EWABA

- Founded in 2013, EWABA is a Brussels-based association representing the interests of the European waste-based & advanced biodiesel industry.
- EWABA is a members-driven non-profit association that supports and represents its members before EU institutions, national governments, industry stakeholders and the media.
- Our [members](#) are waste-based and advanced biodiesel producers, waste collectors and renderers, traders technology providers, and national associations jointly bringing to the market waste-based biofuels with up to +90% greenhouse gas (GHG) savings when compared with fossil fuels.



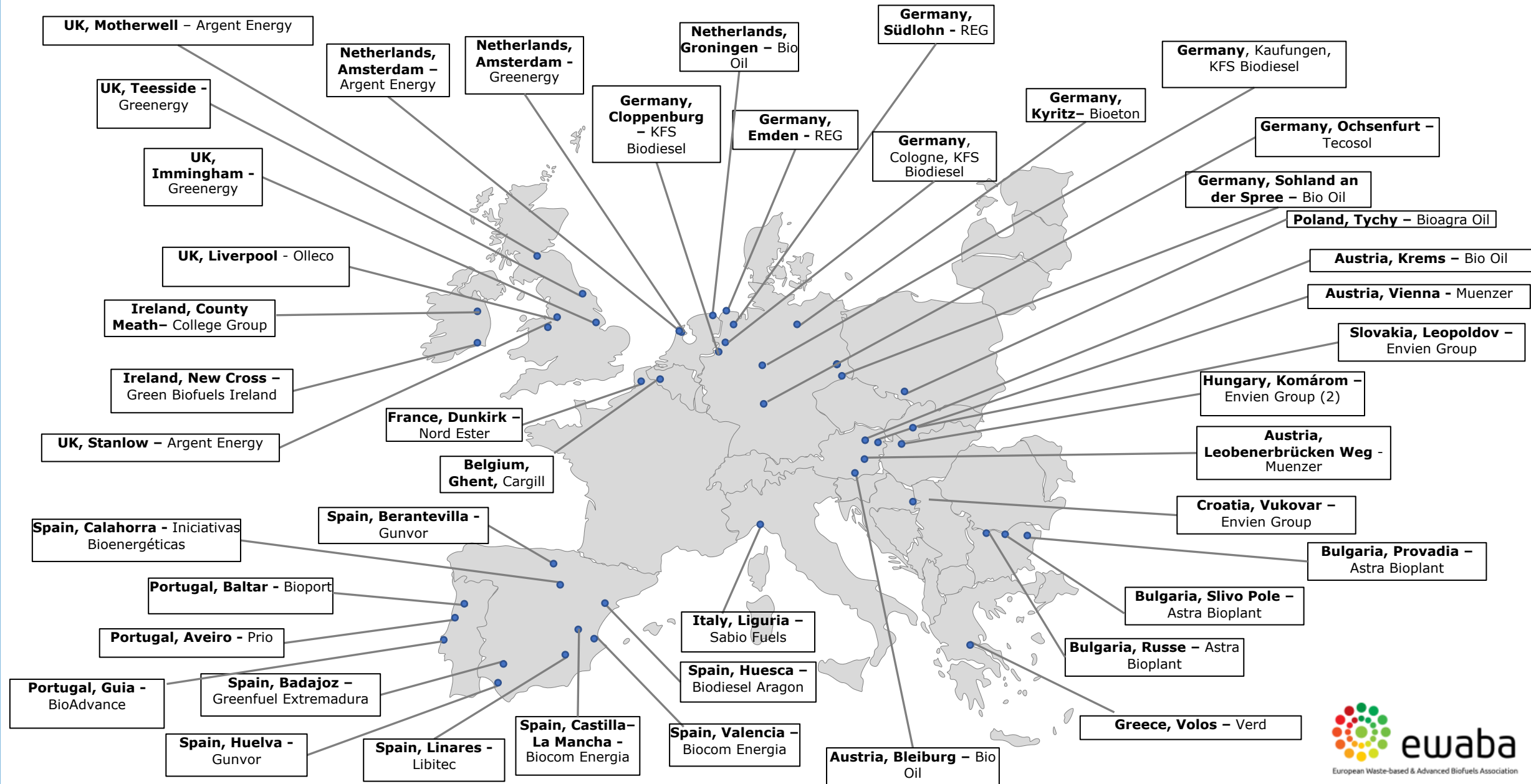
What do we do?

- **We keep our members informed**
 - Daily press reviews
 - Monthly developments – information on policy and market developments
 - Ad hoc alerts
 - Information to our Working Groups
 - Government Affairs
 - Communications
 - Technical
- **We promote the industry with advocacy before EU and national decision makers**
 - When passing EU legislation
 - When transposing EU legislation at national level
 - Objective: achieving the best possible regulatory framework
- **We are a great business hub**
 - Networking opportunities
- **We deal with members' request on regulatory, legal or market issues**
- **We represent the industry at international alliances and conferences**

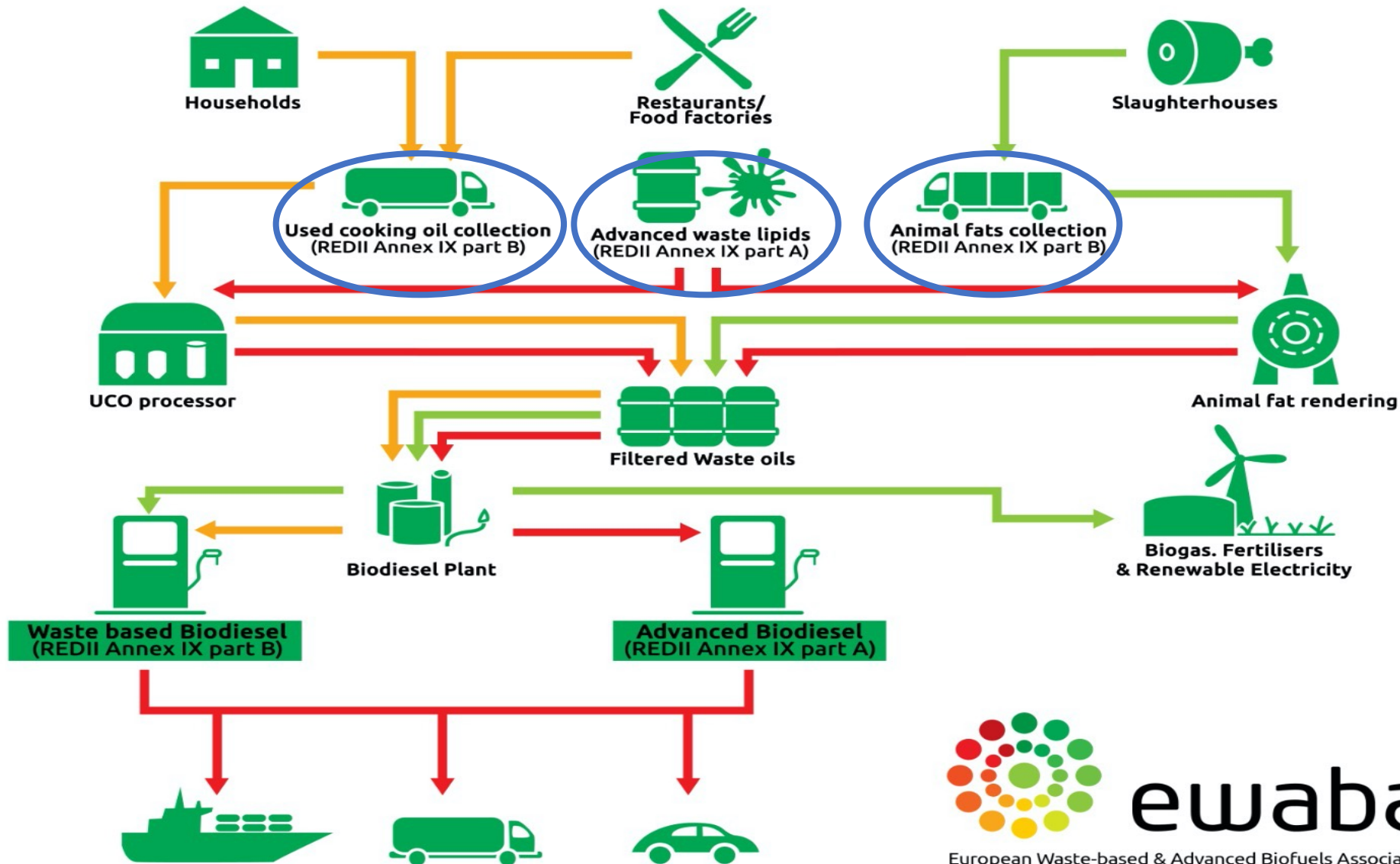




Waste and advanced biodiesel plants in EWABA network



Waste-based & advanced biodiesel supply chain

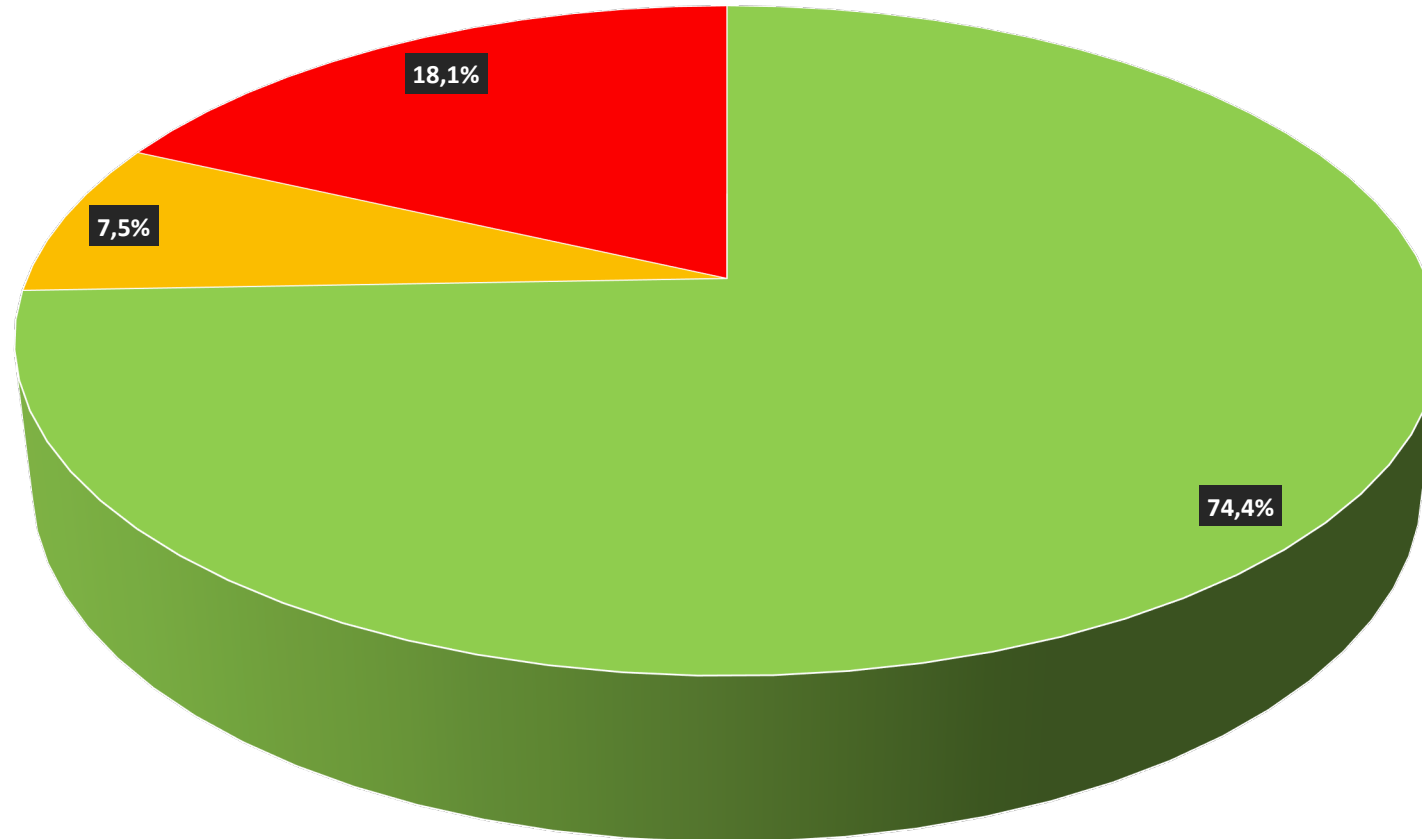


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European Waste-based & Advanced Biofuels Association



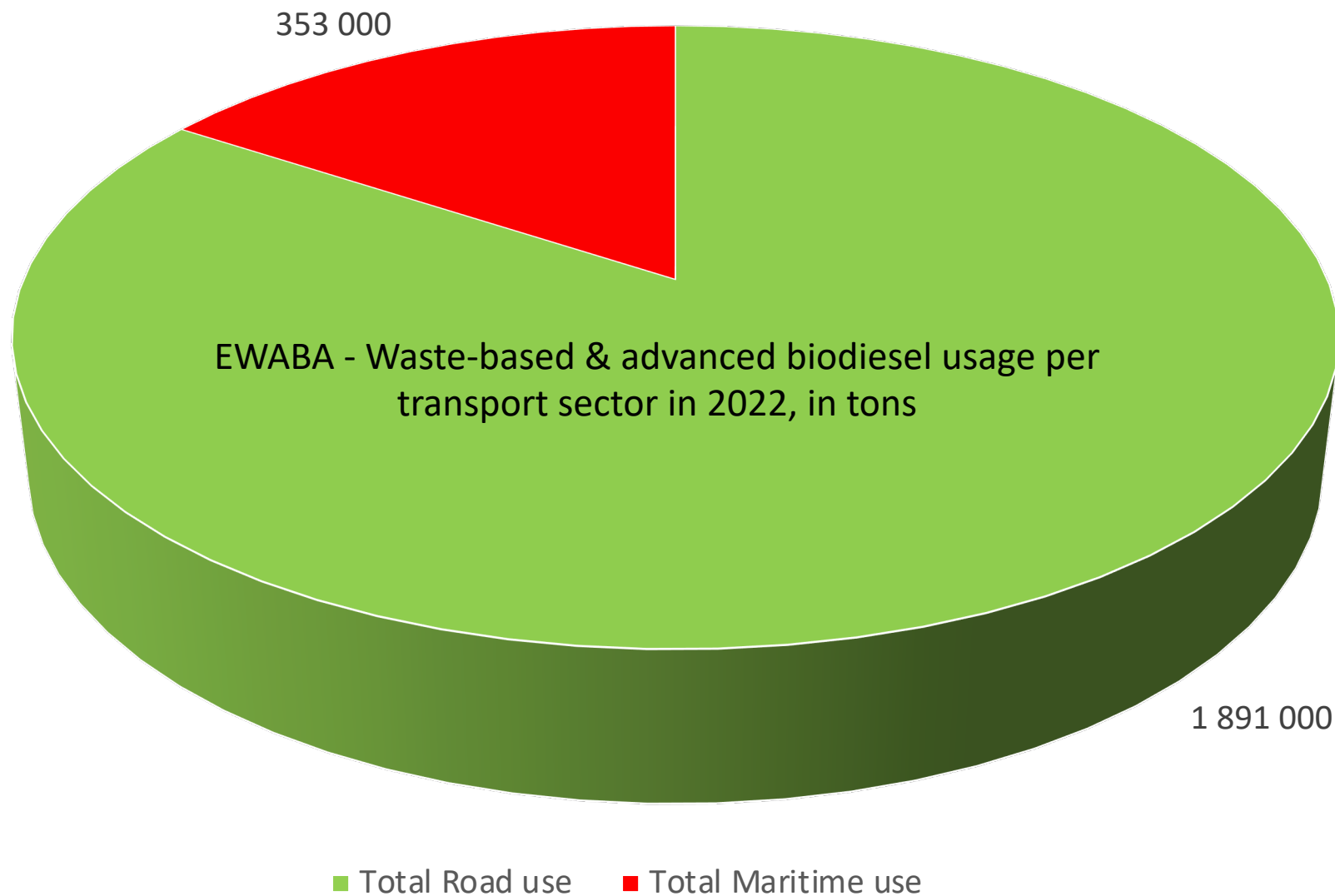
EWABA – Total Waste & Advanced biodiesel production in 2022 2.243.000 tons



- Total UCOME production -inc FFAs declared as Part B Annex IX (1,669,505)
- Total TME production (167,900)
- Total advanced production (Part A of Annex IX) (406,155)



EWABA – Waste-based & advanced biodiesel usage per transport sector in 2022, in tons



Content:

Legislative Framework within the Fit for 55 package

Identifying renewable low carbon fuel demand

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FuelEU Maritime – overview of main provisions

CO2 standards for cars and vans

CO2 standards for heavy duty vehicles

Checklist Waste based and advanced biodiesel

Barriers for waste feedstock market



Legislative framework within the Fit for 55 Package



1. Revision of the Effort Sharing Regulation
2. Revision of the Regulation on land use, land use change and forestry
3. Revision of the EU Emissions Trading System (Directive + Decision)
4. **Revision of the Renewable Energy Directive and Fuel Quality Directive**
5. Revision of the Energy Efficiency Directive
6. **Revision of the CO2 Standards for Cars and Vans Regulation**
7. Revision of the Alternative Fuels Infrastructure Directive
8. Revision of the Energy Taxation Directive
9. **ReFuelEU Aviation Regulation**
10. **FuelEU Maritime**
11. Carbon Adjustment Mechanism Regulation + Social Climate Fund
+ **CO2 Standards for Heavy Duty vehicles**



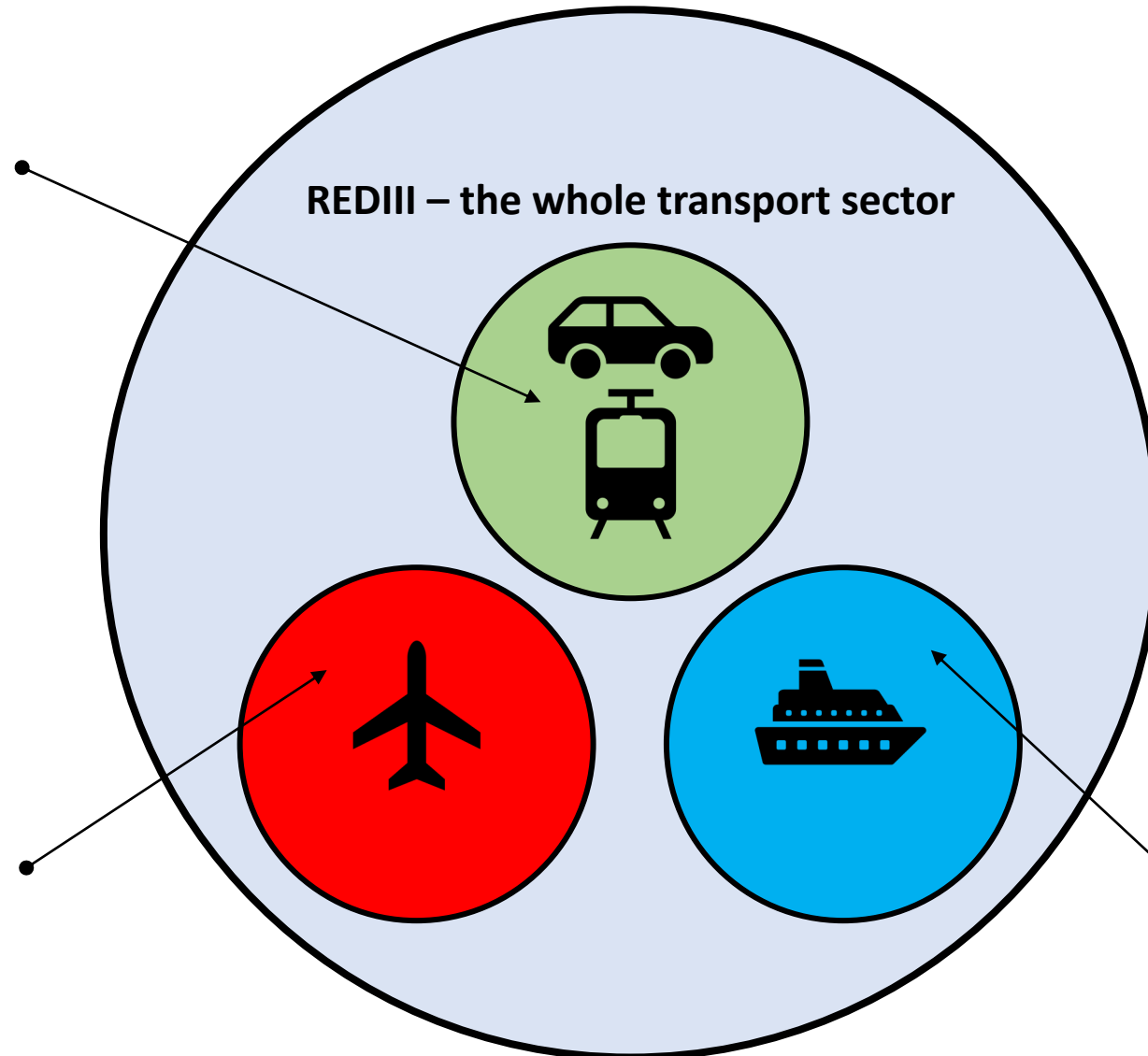
Legislative framework

Road and rail transport

- Mandates within REDIII

ReFuelEU Aviation

- 2% **blending mandate** in 2025, 6% in 2030



REDIII

- **Transport target** (14,5% GHG reduction or 29% energy content) in 2030
- **Cap 7% on food and feed crops**
- **Flexible cap 1,7% on Annex IXB** (waste feedstock)
- **Sub-target for Annex IXA** (advanced feedstock) + **RFNBOs** – 1% in 2025 and 5,5% in 2030 (of which 1% should be RFNBOs)

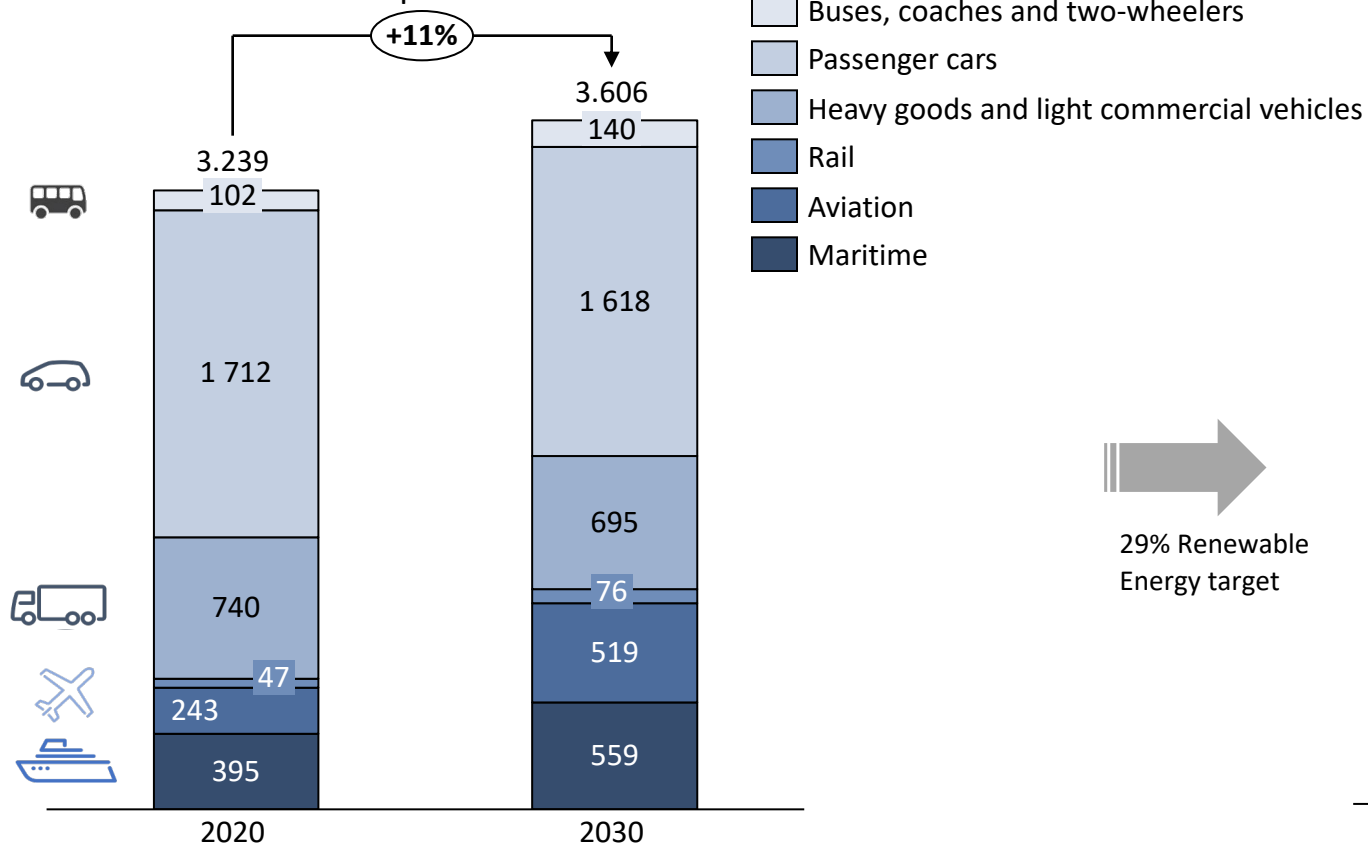
FuelEU Maritime

- 2% **GHG reduction** in 2025, 6% in 2030



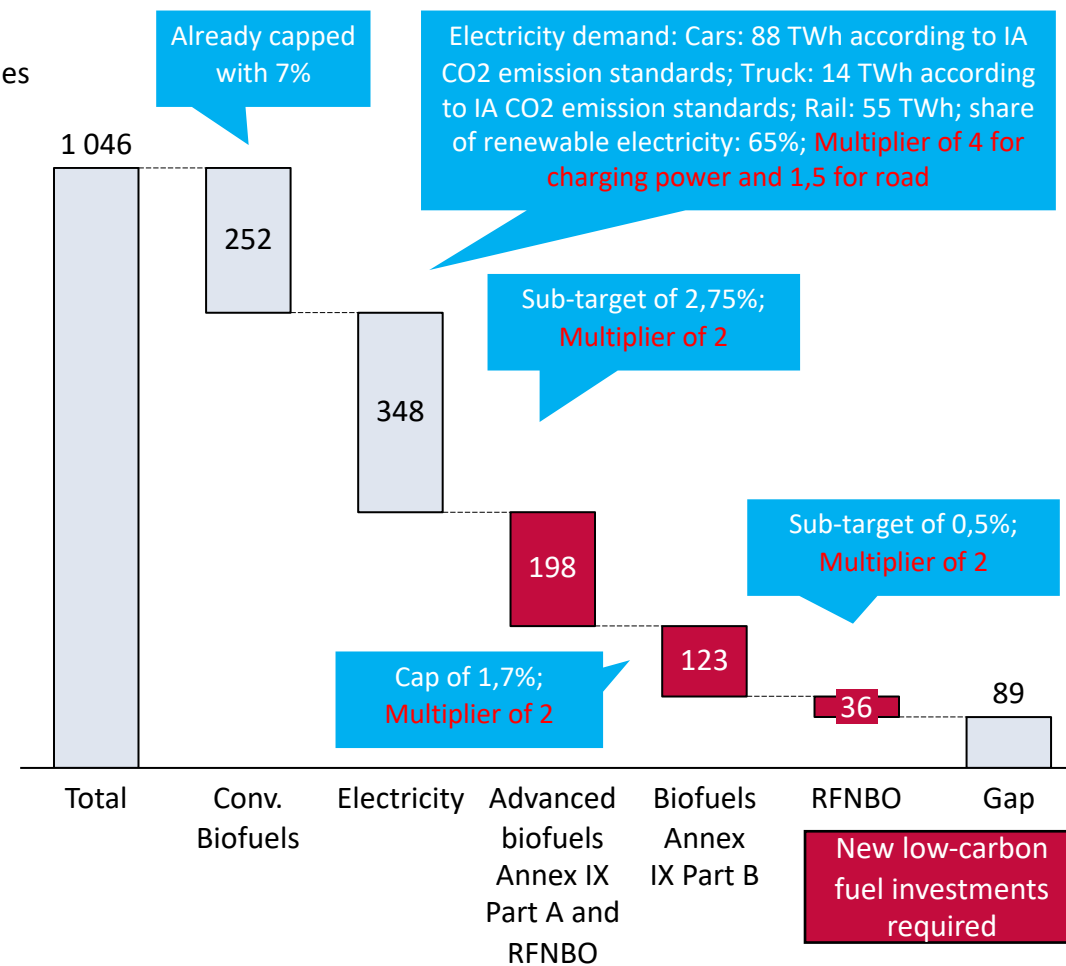
Identifying renewable low carbon fuel demand: REDIII Energy target

EU Fuel Demand Transport Sector in TWh:



29% Renewable Energy target

Compliance options in TWh:



Source:

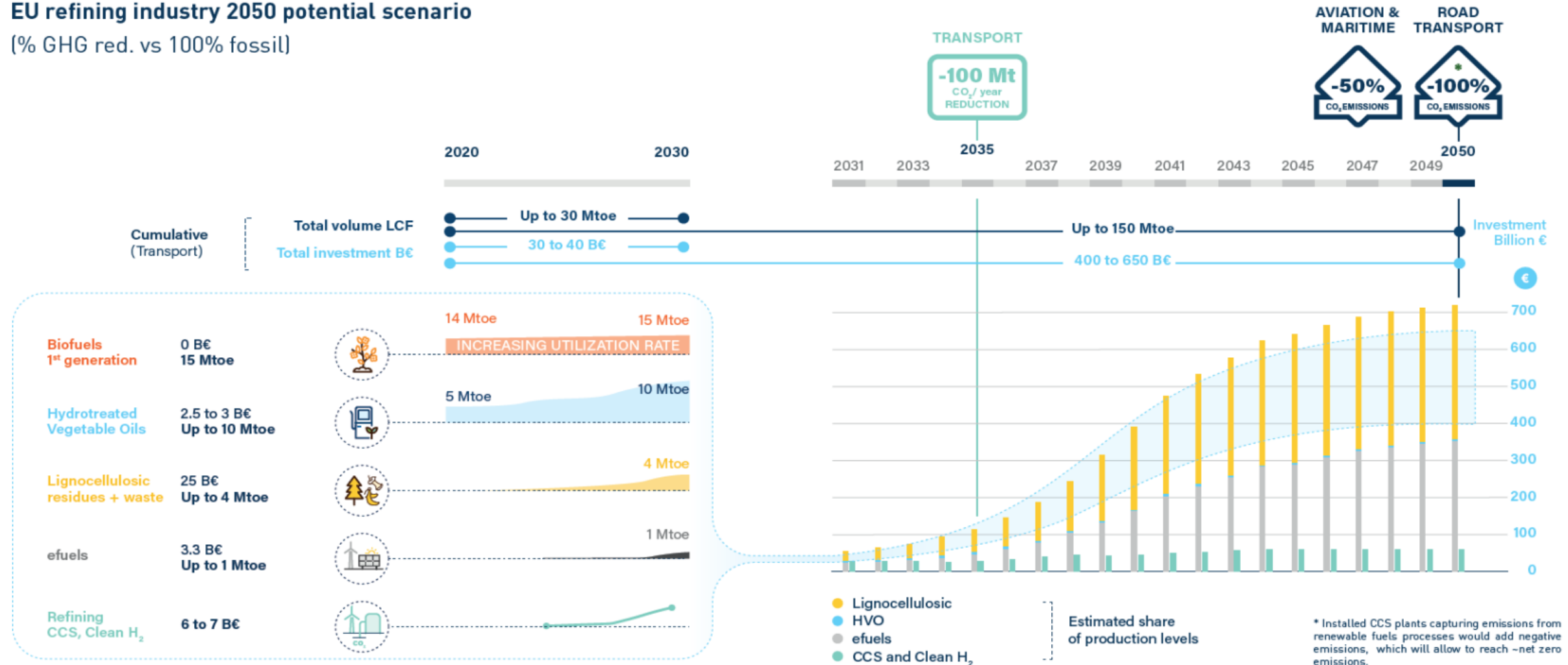
Fuel demand and electricity mix: Policy scenarios for delivering the European Green Deal, MIX-Scenario Fit-for-55: https://energy.ec.europa.eu/data-and-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal_en



Identifying renewable low carbon fuel demand: 2050 potential scenario

EU refining industry 2050 potential scenario

(% GHG red. vs 100% fossil)



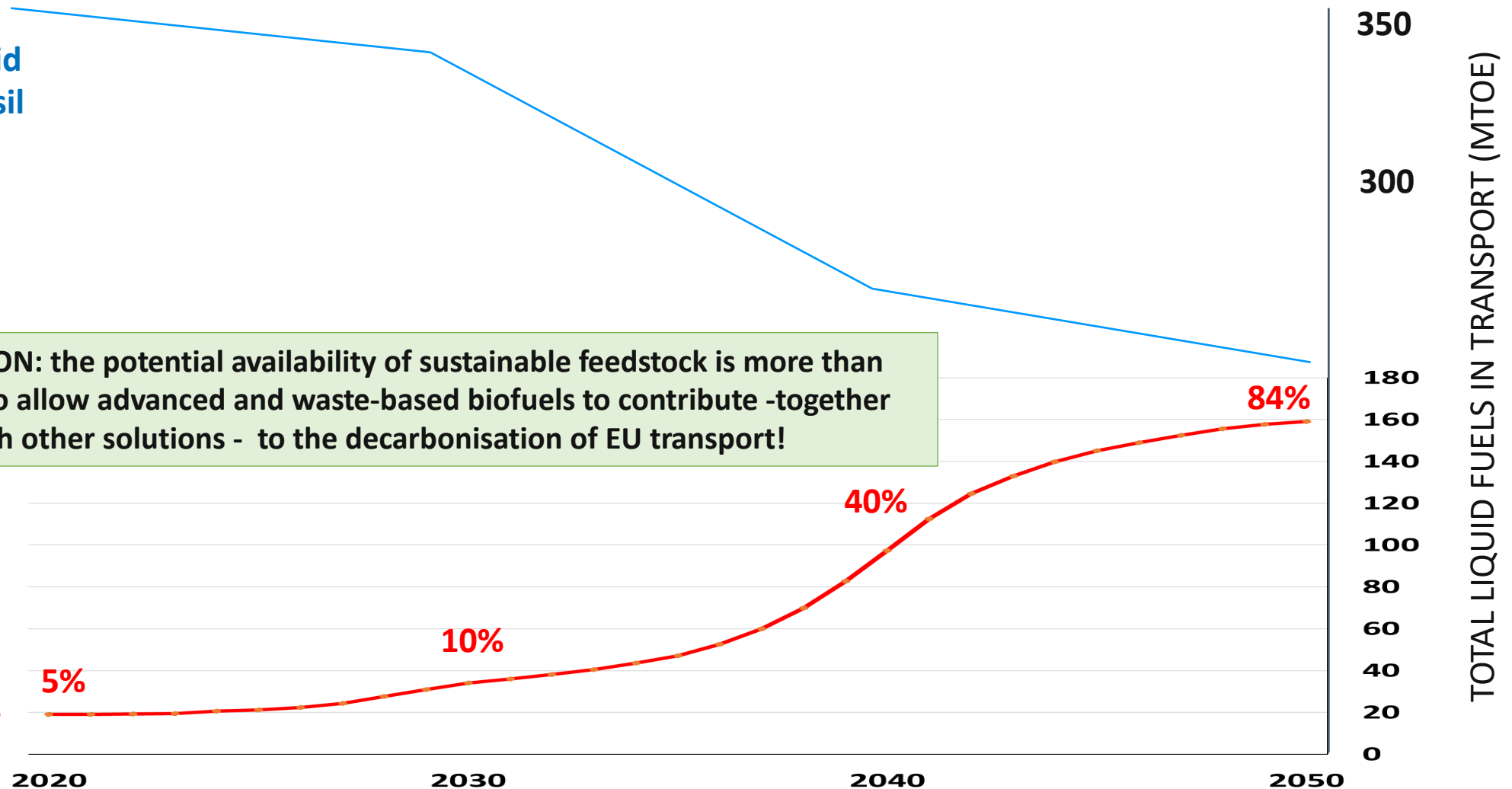
*source Fuels Europe

Identifying renewable low carbon fuel demand

Total liquid
fuels (fossil
+ LCLF)

CONCLUSION: the potential availability of sustainable feedstock is more than sufficient to allow advanced and waste-based biofuels to contribute -together with other solutions - to the decarbonisation of EU transport!

Total LCLF



Revision of Renewable Energy Directive (REDIII)

	REDII	REDIII
Overall RES Target	min. 32% in 2030	min. 42,5% binding + 2,5% voluntary in 2030
Transport Target	min. 14% renewable energy in 2030	14,5% GHG reduction or 29% of energy consumed in the transport sector
Crop based biofuels	2020 share + 1%, max. 7%	2020 share + 1%, max. 7%
Annex IX Part A	binding min. 0,2% in 2022, 1% in 2025, 3,5% in 2030	combined target for RFNBOs and Annex IX Part A min. 1% in 2025 and 5,5% in 2030
Annex IX Part B	max. 1,7% in 2030, possibility to increase by MS subject to EC approval	max. 1,7% in 2030, MS can increase subject to EC approval, or EC can increase via delegated act on the basis of an assesment of availability of feedstock
RFNBO`s	none	min. 1% in 2030
Multipliers	voluntary double counting for Annex IX and 1,5x electricity in rail, obligatory 4x electricity in road transport, obligatory Annex IX 1,2x for aviation and maritime	obligatory double counting for Annex IX, RFNBOs and 1,5x electricity in rail, obligatory 4x electricity in road transport, obligatory Annex IXA 1,2x for aviation and maritime
Non Annex IX feedstocks GHG penalisation	No penalisation of non Annex IX feedstock	No penalisation of non Annex IX feedstock
B10	not allowed according to FQD	allowed but B7 protection grade until 2030



Ongoing revision of Annex IX

- Every 2 years the Commission is entitled to add (but not remove) new feedstocks to Annex IX.
- Feedstock processed on **innovative technologies** goes to **Part A** and feedstock processed on **mature technologies** goes to **Part B**
- On 5 December 2022 the Commission published a Draft revision of Annex IX including a number of new feedstocks to be added to REDII Annex IX parts A and B.
- The European Commission has released the external consultant report (accessible [here](#)) upon which the revision is based.
- The Commission will adopt a final delegated directive in Q4 2023.
- EU Member States will have 18 months to pass legislation transposing the new annex into their national regulatory frameworks.
- **Increased list of Annex IX feedstock should be followed by increased mandate** (possibility for the Commission according to REDIII final agreement) – **especially for Part B** which is currently capped at 1,7% and where most of the feedstock should be added.



Annex IX to the REDII – list of advanced and waste feedstock for biofuels production

Part A of Annex IX:

- (a) Algae;*
- (b) Biomass fraction of mixed municipal waste;*
- (c) Biowaste from private households subject to separate collection;*
- (d) Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry, and excluding feedstocks listed in part B of this Annex;*
- (e) Straw;*
- (f) Animal manure and sewage sludge;*
- (g) Palm oil mill effluent and empty palm fruit bunches;*
- (h) Tall oil pitch;*
- (i) Crude glycerine;*
- (j) Bagasse;*
- (k) Grape marcs and wine lees;*
- (l) Nut shells;*
- (m) Husks;*
- (n) Cobs cleaned of kernels of corn;*
- (o) Biomass fraction of wastes and residues from forestry and forest-based industries;*
- (p) Other non-food cellulosic material;*
- (q) Other ligno-cellulosic material except saw logs and veneer logs.*

Part B of Annex IX:

- (a) Used cooking oil;*
- (b) Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009.*



Ongoing revision of Annex IX – proposed feedstock

Part A of Annex IX:

- (r) Alcoholic distillery residues and wastes (fusel oils) not fit for use in the food or feed chain;*
- (s) Raw methanol from kraft pulping stemming from the production of wood pulp;*
- (t) Non-food crops grown on severely degraded land, not suitable for food and feed crops.”.*

Part B of Annex IX:

- (c) Bakery and confectionary residues and waste not fit for use in the food and feed chain;*
- (d) Drink production residues and waste not fit for use in the food and feed chain;*
- (e) Fruit and vegetable residues and waste not fit for use in the food and feed chain, excluding tails, leaves, stalks and husks;*
- (f) Starchy effluents with less than 20% starch content not fit for use in the food and feed chain;*
- (g) Brewers’ Spent Grain not fit for use in the food and feed chain;*
- (h) Liquid whey permeate;*
- (i) Deoiled olive pomace;*
- (j) Damaged crops that are not fit for use in the food or feed chain, excluding substances that have been intentionally modified or contaminated in order to meet this definition;***
- (k) Municipal wastewater and derivatives other than sewage sludge;*
- (l) Brown grease;***
- (m) Cyanobacteria;*
- (n) Vinasse excluding thin stillage and sugarbeet vinasse;*
- (o) Dextrose ultrafiltration retentate from sugar refining;*
- (p) Intermediate crops, such as catch crops and cover crops that are grown in areas where due to a short vegetation period the production of food and feed crops is limited to one harvest and provided their use does not trigger demand for additional land and provided the soil organic matter content is maintained.”.***



New Part B feedstocks	Potential volumes
Bakery and confectionary residues and waste not fit for use in the food and feed chain	17.7 million tons (2030) / 17.7 million tons (2050)
Drink production residues and waste not fit for use in the food and feed chain	6.5 million tons (2030) / 8.5 million tons (2050)
Fruit and vegetable residues and waste not fit for use in the food and feed chain, excluding tails, leaves, stalks and husks	490 millions tons (2030) / 638 million tons (2050)
Starchy effluents with less than 20% starch content not fit for use in the food and feed chain	20 million tons (2030) / 45 million tons (2050)
Brewers' Spent Grain not fit for use in the food and feed chain	51 million tons (2030) / 42 million tons (2050)
Liquid whey permeate	29 million tons (2030) / 19 million tons in EU (2030)
Deoiled olive pomace	15.9 million tons in EU (2030) / 18.1 million tons in EU (2050)
Damaged crops that are not fit for use in the food or feed chain, excluding substances that have been intentionally modified or contaminated in order to meet this definition	224 million tons (2030) / 301 million tons (2050)
Municipal wastewater and derivatives other than sewage sludge	No data.
Brown grease	2.3 million tons in EU (2030) / 1.6 million tons in US (2030)
Cyanobacteria	Very low, not data available.
Vinasse excluding thin stillage and sugarbeet vinasse	6 billion litres (2030)
Dextrose ultrafiltration retentate from sugar refining	3.3 million tons (2030) / 4 million tons (2050)
Intermediate crops, such as catch crops and cover crops that are grown in areas where due to a short vegetation period the production of food and feed crops is limited to one harvest and provided their use does not trigger demand for additional land and provided the soil organic matter content is maintained	No projection possible. Likely much larger than 77 million tons per year
Totals	937 million tons (2030)
	1,172 million tons (2050)

Three feedstocks at stake – volumes and key considerations

Feedstock	Est. Volumes in 2030	Considerations
Damaged crops	225 million tons*	Nature of “damage” poses important question regarding certification.
Brown Grease	2 million tons	Currently being used as Part A feedstock in several Member States
Intermediate crops including cover crops	+77 million tons* & ** &***	Most promising entry – considerations at large set out below.

* at large, not oil crops exclusively

** Policy promotion would be required for volumes to pick up

*** Not taking conditionality into consideration



ReFuelEU Aviation

Overview of the main provisions



Scope of the Regulation

- **Scope:** Union airports and commercial air transport flights (*Article 2*)
- **Union airport:** passenger traffic higher than 800.000 passengers or freight traffic higher than 100.000 t in the previous reporting period (1 year) and that are not in the outmost regions (*Article 3 Paragraph 1*)
- **Commercial air transport flight:** Flight operated for the purposes of transport of passengers, cargo or mail for remuneration or hire, including business aviation flights for commercial purposes (*Article 3 Paragraph 4*)
- **Exemptions:** MS can decide to include also the exempted airports, operators can include other than commercial flights

Methodology for target calculation

Article 10

- The **amount of aviation fuel and SAF** supplied at each Union airport, for each type of fuel, **expressed in tonnes** (*Article 10 (a)(b)*)
- Reported each year by 14 February, **first time in 2025**

Sustainable Aviation Fuels (SAF) definition

Article 3 Paragraph 7

- **Synthetic aviation fuels** – renewable fuels of non biological origin (RFNBOs) (*Article 3 Paragraph 12*)
- **Aviation biofuels** – advanced biofuels or biofuels produced from Annex IXB feedstock or other biofuels which comply with the sustainability and lifecycle emission savings criteria according to REDII with the exception of biofuels produced from “food and feed crops” (*Article 3 Paragraph 8*)
- **Recycled carbon aviation fuels**



ReFuelEU Aviation

Overview of the main provisions



Limitations

- **Aviation biofuels other than advanced biofuels and Annex IXB biofuels** – max. 3% of aviation fuels (*Article 4 Paragraph 4*)
- **Excluded feedstocks (shall not apply to any feedstock included or to be included within the upcoming revision of Annex IX of RED)** – food and feed crops, intermediate crops, palm fatty acid distillate, palm and soy-derived materials, soap stock and its derivatives (*Article 4 Paragraph 5*)

Reports and Review

Article 17

- By **1 January 2027** and every four years thereafter the Commission shall present a report to the European Parliament and Council on the application of the Regulation. As part of this report the Commission shall assess possible measures to optimise the fuel content in aviation fuels.

Entry into force

Article 18

- This Regulation shall be binding and directly applicable in all Member States



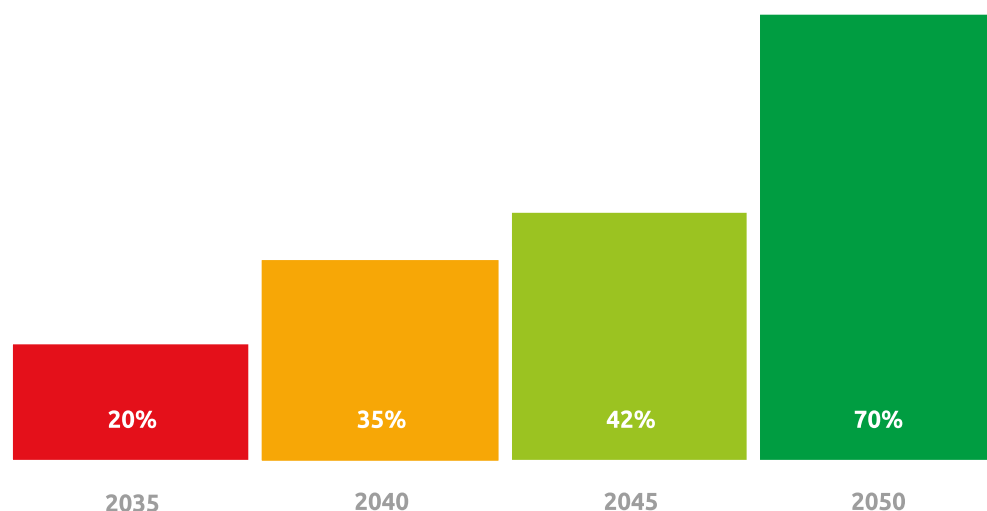
ReFuelEU Aviation

Overview of the main provisions



Targets – Volume shares

Annex I



- From 1 January **2025**, each year a minimum share of **2% of SAF**,
- From 1 January **2030**, each year a minimum share of **6% of SAF**, of which
 - until 31 December **2031** an average share over the period of **1,2% of synthetic aviation fuels**, but minimum 0,7% each year,
 - until 31 December **2034** an average share over the period of **2,0% of synthetic aviation fuels**, but minimum 1,2% each year until 31 December 2033 and minimum 2,0% until 31 December 2034,
- From 1 January **2035**, each year a minimum share of **20% of SAF**, of which a minimum share of **5% of synthetic aviation fuels**.
- From 1 January **2040**, each year a minimum share of **34% of SAF**, of which a minimum share of **10% of synthetic aviation fuels**.
- From 1 January **2045**, each year a minimum share of **42% of SAF**, of which a minimum share of **15% of synthetic aviation fuels**.
- From 1 January **2050**, each year a minimum share of **70% of SAF**, of which a minimum share of **35% of synthetic aviation fuels**.



FuelEU Maritime

Overview of the main provisions



Scope of the Regulation

Article 2

- **Scope:** Ships above 5000 GT, 100% intra-EU traffic + 50% extra-EU, EU ports
- **Exemptions:** Small islands less than 200.000 residents, PSO connections between island MS and other MS and between island and mainland of the same MS, outmost regions, transshipment ports, ice class ships and ships navigating in ice

Methodology for target calculation

Article 4

- **GHG reduction basis:** annual average GHG intensity of the energy used on-board
- **GHGs:** CO₂, CH₄ and N₂O (*Article 3*)
- **Methodology for calculation:** Life cycle (Well-to-Wake) evaluation of marine fuels (*Annex I*)
- **Reference value:** 91.16 grams of CO₂ equivalent per MJ (*Article 4 Paragraph 2*)

Zero emissions at berth

Article 6

- **From 2030, all container or passenger ships are required to connect to onshore power supply** in all AFIR ports, from 2035 also in all non-AFIR ports
- Ships at anchorage not covered, but voluntary opt-in provision for Member States
- Exemptions – short stays less than 2 hours, unscheduled port call due to safety, use of zero-emission technologies (for now fuel cells, on-board electricity storage, on-board electricity production from wind and solar energy), unavailable OPS connection in port or incompatible equipment, emergency



FuelEU Maritime

Overview of the main provisions



Eligibility of fuels

Article 10

- RFNBOs, recycled carbon fuels, biofuels, biogas according to RED directive
- **Food and feed crops biofuels** have the same emission factor as the least favourable fossil fuels = **no motivation for blending**
- **All other biofuels including UCOME are calculated with emission savings according to RED**
- In case substitute sources of energy are installed on board, a **reward factor for substitute sources of energy can be applied**. In case of **wind power** such reward factor is (*Annex I*):
 - 0,99 if the share of wind energy is 0,05
 - 0,97 if the share of wind energy is 0,1
 - 0,95 if the share of wind energy is equal or more then 0,15

RFNBOs

Article 5

- **Multiplier 2** – Energy from RFNBOs counts twice
- If RFNBO share in maritime fuel mix is less than 1% in 2023, then **RFNBO subtarget of 2% will be applicable as from 2034**



FuelEU Maritime

Overview of the main provisions



Flexibility mechanism

Article 20, 21

- Banking and borrowing – surpluses and small deficits can be carried over to the next year (*Article 20*)
- Voluntary and open pooling mechanism to incentivise overachievers and encourage the rapid deployment of the most advanced options (*Article 21*)

Monitoring and Reporting

Article 7, 15

- **Based on MRV approach** (Measurement, Reporting and Verification) with some additional data like calculation of compliance balance, recording of penalties, exchange and notifications between user groups)
- **FuelEU Database** (*Article 19*)
- **FuelEU Penalties** (*Article 23*)

Review clause

Article 30 Paragraph 1

- Extensive report and review clause with the first deadline **31 December 2027** and every 5 years thereafter, **including assessment and possibility to include new GHG abatement technologies** such as energy provided by wind, on-board carbon capture etc...

Entry into force

Article 32

- **Applicability as from 1 January 2025** (monitoring plan from August 2024)



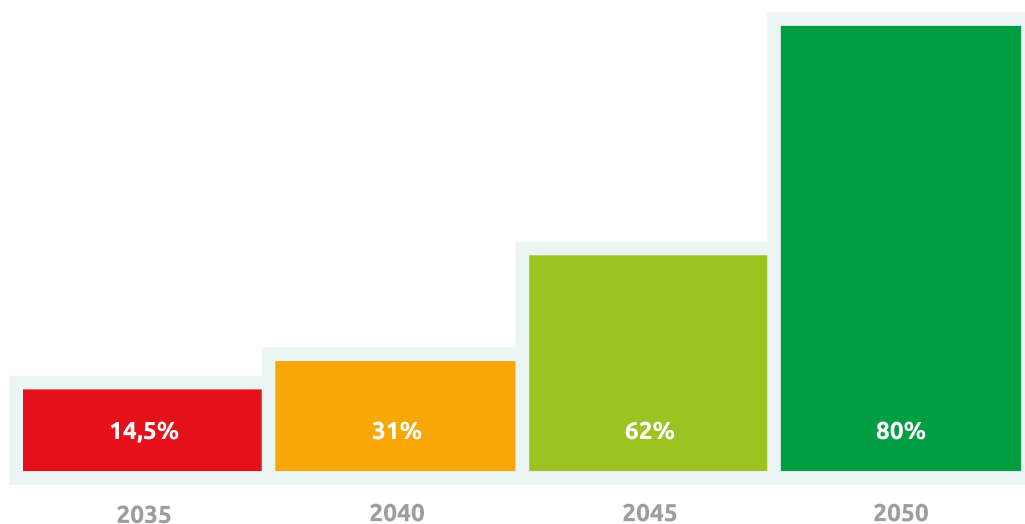
FuelEU Maritime

Overview of the main provisions



Targets

Article 4 Paragraph 2



- 2% in 2025
- 6% in 2030
- 14,5% in 2035
- 31% in 2040
- 62% in 2045
- 80% in 2050



CO2 standards for cars and vans



The Regulation adopted in March 2023 increases the CO2 emission reduction target for 2030 and sets a new target 100% for 2035 – all new cars and vans placed on the market in the EU from 2035 should be zero-emission vehicles:

- As from **2030 – 50% CO2 emission reduction for new cars and 55% CO2 reduction for new vans** compared to 2021 levels
- As from **2035 – 100% CO2 emission reduction for both new cars and vans**
- Based on **tailpipe emissions** – no lifecycle assessment
- Reachable **via electromobility only** – no renewable fuels are recognized
- Recital 11 on inclusion of CO2 neutral fuels - the Commission shall make a proposal for registering vehicles running exclusively on CO2 neutral fuels after 2035
- In the framework of the Euro 6 Regulation an Amending Regulation (implementing Act) was leaked including technical Annex:
 - only RFNBOs are allowed
 - 100% emission reduction is obligatory (DG GROW suggested 70% according to threshold in REDII, but DG Clima insist on 100%)
- Next steps:
 - TCMV (Technical Committee for motor vehicles) discussion on 4 October, vote on 13 November, qualified majority needed for approval
 - In case of rejection or no opinion, Commission can come up with new proposal



CO2 standards for heavy duty vehicles



- Legislative proposal for Regulation under negotiations.
- Obligation for manufacturers to reduce average fleet emissions of **new** heavy-duty vehicles.
- Based on **tailpipe emissions** – no lifecycle assessment.
- Reachable **via electromobility only** – no renewable fuels are recognized.

The CO2 reduction targets for new vehicles compared to 2019 are proposed as follows:

- 45% in 2030
- 65% in 2035
- 90% in 2040 for HDVs
- No 100% target is foreseen yet
- 100% in 2030 for buses

Currently the European Parliament is forming its position – **ambition to include renewable fuels** (biofuels and e-fuels according to REDII sustainability criteria):

- **via carbon correction factor** - volume of renewable fuel brought to the market based on REDII requirements
- **vehicles running on CO2 neutral fuels**
- **voluntary crediting mechanism** – additional voluntary mechanism



Barriers for waste feedstock market

Overall complexity of the legislative system

Lack of coherence between different legal instruments

Regulatory uncertainty - Revision clauses

- REDIII, FuelEU maritime, ReFuelEU – **2027**
- CO2 standards for cars and vans – 2026
- CO2 standards for HDVs – 2028



Checklist Waste based and advanced biodiesel

Sustainable and eligible feedstock

Among highest energy densities

Compatible with existing engines

Compatible with existing infrastructure

Highest GHG savings on record

Lowest costs

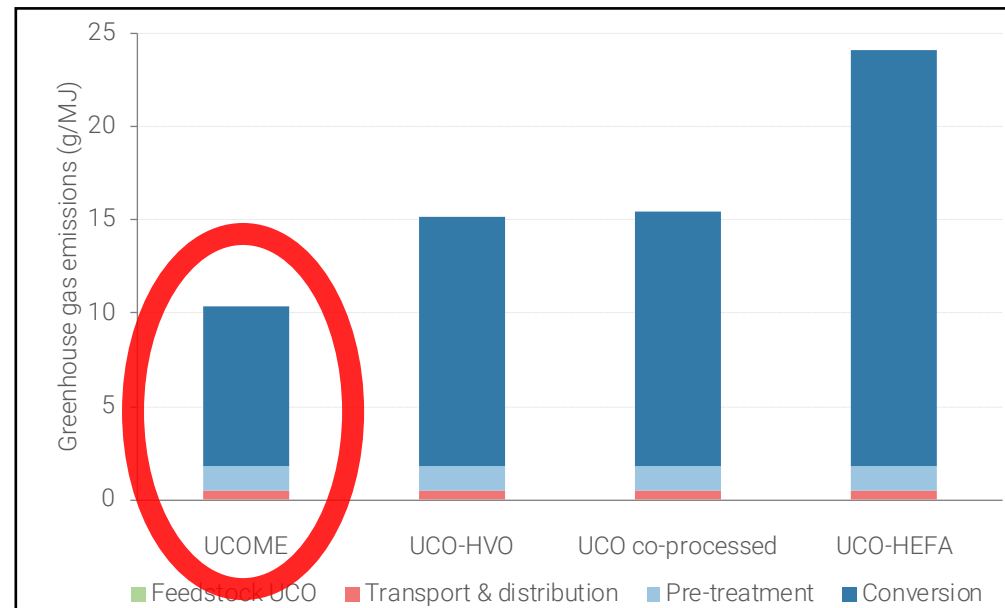
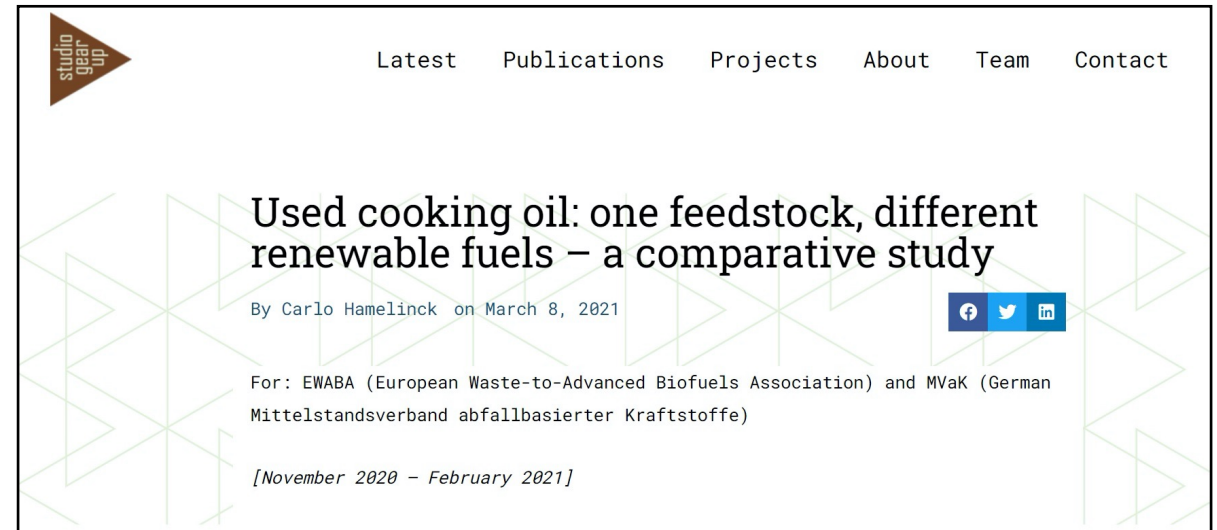
Already supplied to road transport and maritime



Highest GHG savings...

Main results

- All pathways achieve good savings compared to fossil fuels. UCOME achieves a carbon footprint of around 10 gCO₂eq/MJ which implies the largest savings (+ 90% greenhouse gas savings).
- This is in line with the typical value reported in the Renewable Energy Directive and other literature.



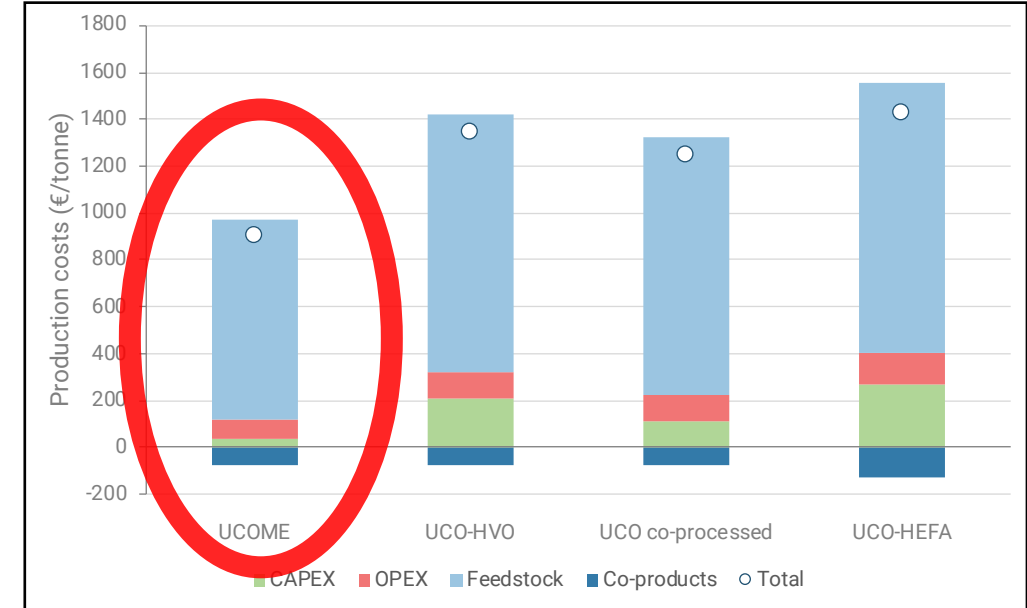
¹⁾ The reference greenhouse gas intensity for fossil diesel is 95.1 g/MJ according to Directive (EU) 2015/652. Note that some studies use 94.0 g/MJ, which is the fossil comparator from the recast Renewable Energy Directive, but this value only serves to determine compliance with the emission savings threshold, it should not be used to determine true savings.



... at the lowest production costs

Main results

- UCOME has the lowest production costs. The low costs of UCOME result from a combination (1) high feedstock efficiency towards final product and (2) simple tech with low investment costs.
- Feedstock costs are the most dominant factor in all four pathways. Therefore, the conversion efficiency has major impact on differentiation between the pathways.



¹⁾ In literature, UCOME costs range from 17-29 €/GJ [EC, 2016, Improving Sustainability of FAME; SGAB, 2017, Building up the future - cost of biofuels], HVO 9-14 €/GJ [SGAB], co-processed 16-33 €/GJ [SGAB], HEFA 26-30 €/GJ [De Jong et al., 2017, Life-cycle analysis of greenhouse gas emissions from renewable jet fuel production; ICCT, 2019, The cost of supporting alternative jet fuels in the European Union].





Thank you!

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