



The role of bioethanol in achieving EU targets

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ePURE: Voice of the EU ethanol industry



- 43 members, including 20 producing companies
- 50 plants across the EU and UK
- 85% of EU renewable ethanol production

ePURE production circularity: More than just ethanol

Main output of European renewable ethanol plants



Source: Aggregated and audited data of ePURE members for 2022

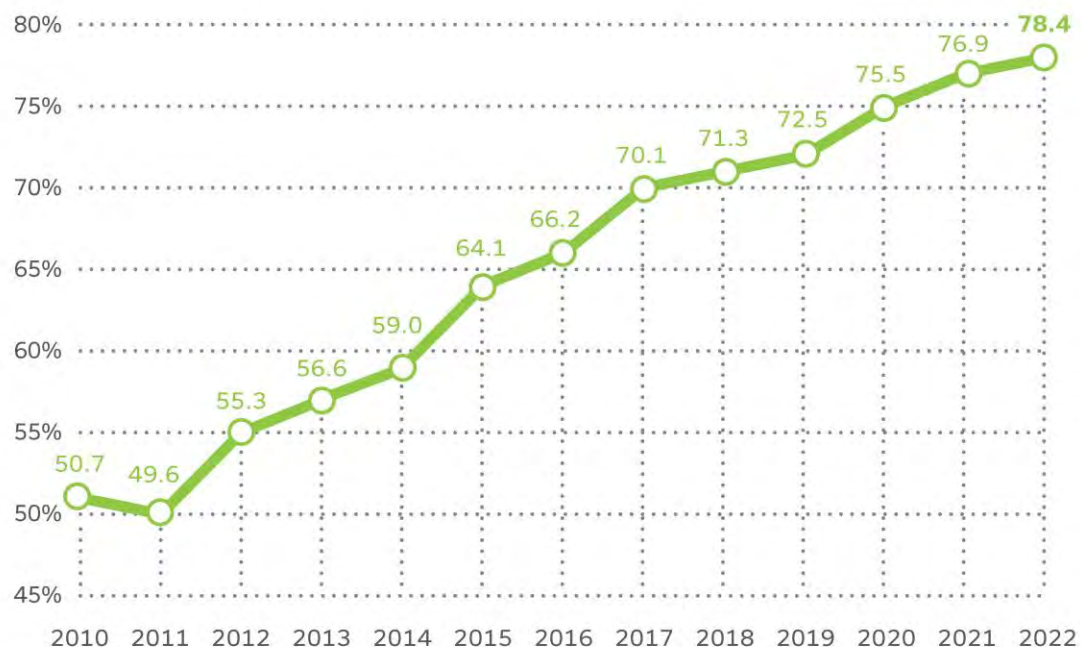
Ethanol – pure alcohol; Food and feed co-products – commercial product equivalent; other co-products – commercial equivalent

In 2022, ePURE members' bioethanol

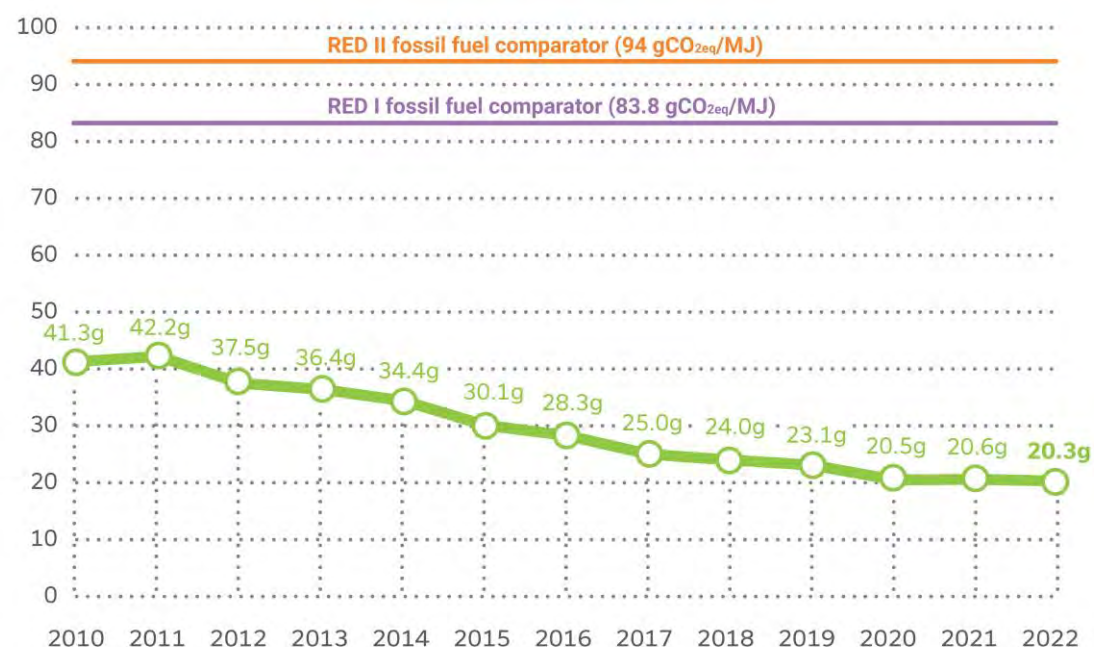
- **more food & animal feed than ethanol**
 - 5.9 million tonnes of food and high-protein animal feed
 - 4.5 million tonnes of ethanol
 - Fuel quality (85%)
 - Non-fuel applications (15%)
- **1.10 million tonnes of biogenic CO₂** (great potential to increase current capacity)
- **reduced GHG emissions by 78.4 %** compared to fossil fuel

European renewable ethanol: GHG emission savings

Average certified emissions savings in %



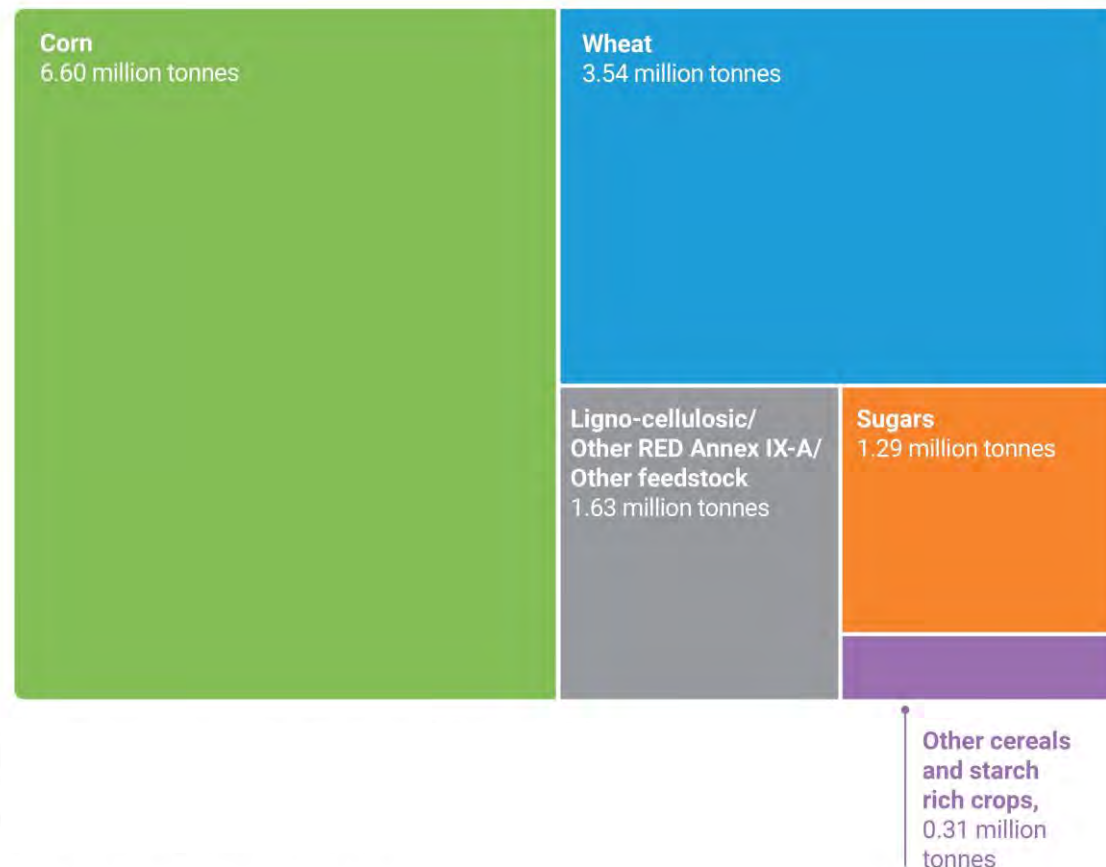
Average certified emissions from the production and use of fuel ethanol in gCO_{2eq}/MJ



Source: Aggregated and audited data of ePURE members for 2022 for volumes certified under RED I or RED II methodology

ePURE ethanol: Made in/from Europe

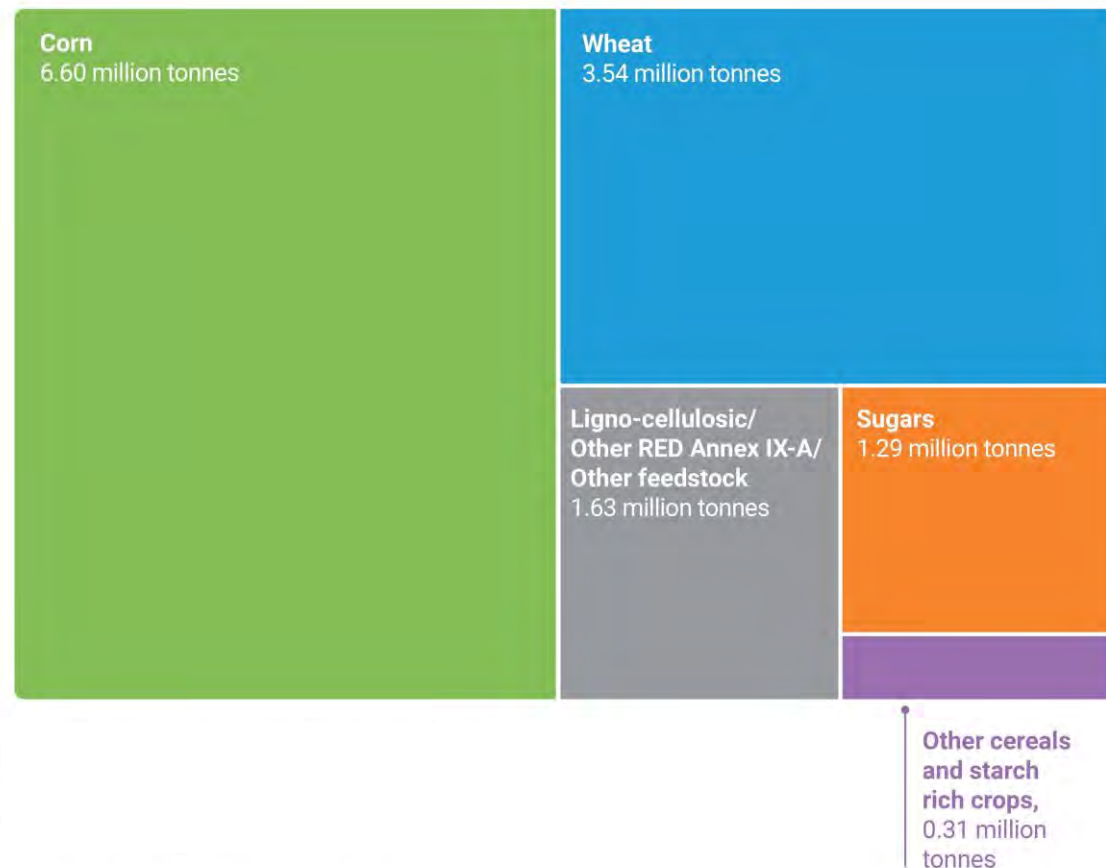
Feedstock used to produce renewable ethanol by ePURE members was grown in Europe



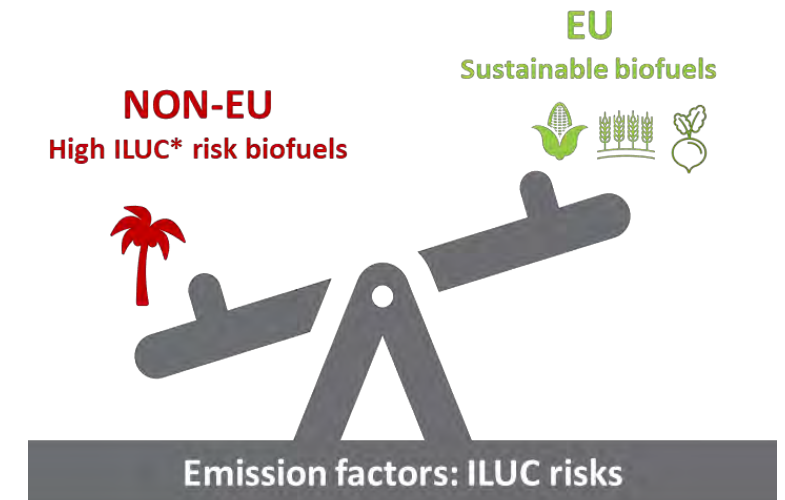
- Of the 5.71 billion litres of ethanol produced in 2022
 - 47.8% was from corn,
 - 22.3% was from wheat,
 - 13.9% was from sugars,
 - 1.9% from other cereals and starch-rich crops, and
 - 14.1% from ligno-cellulosic, other RED Annex IX-A, and other feedstocks.

ePURE ethanol: Made in/from Europe

Feedstock used to produce renewable ethanol by ePURE members was grown in Europe



- RED-compliant
- ILUC is no problem for domestic feedstock used for biofuels production



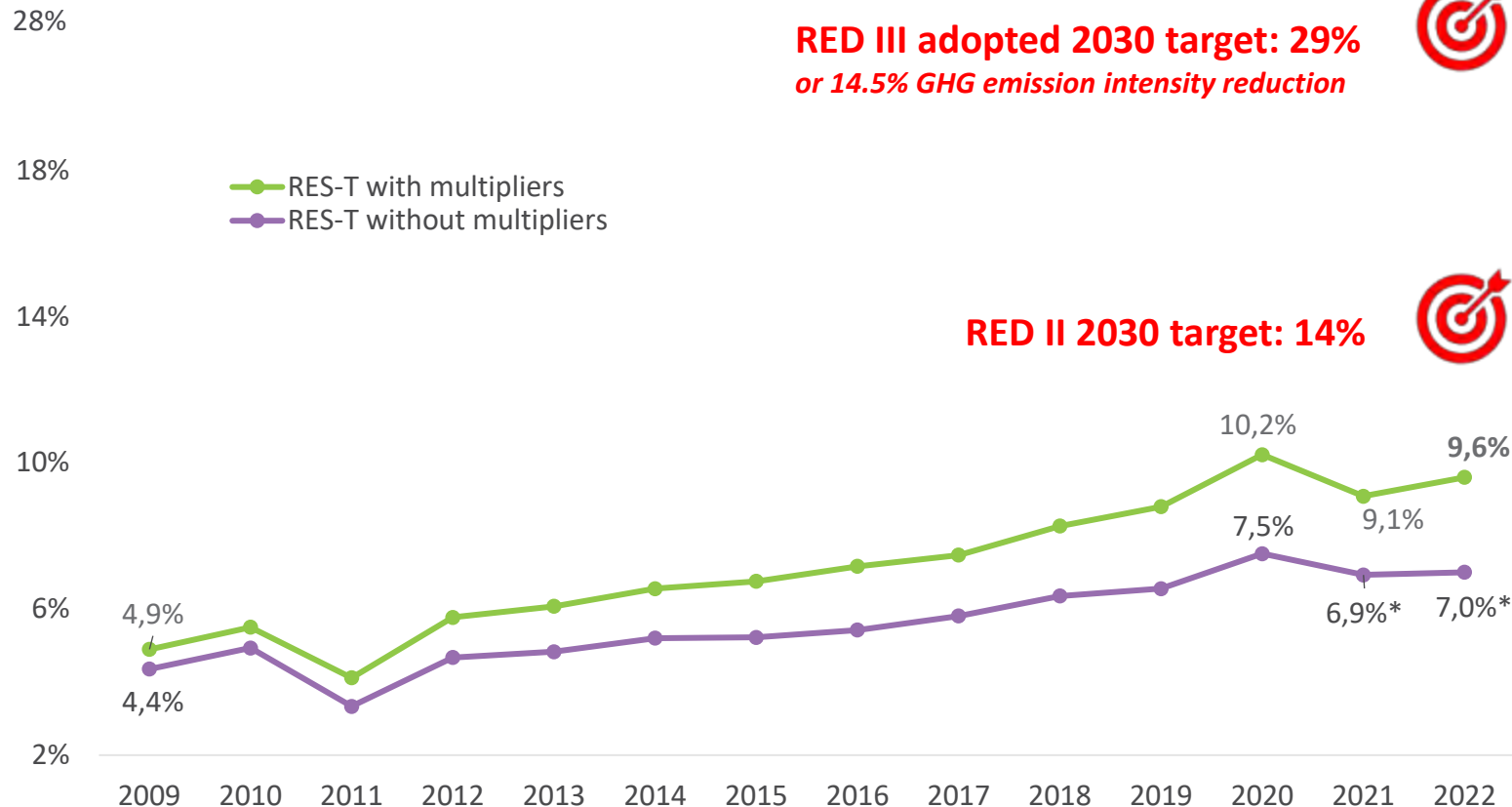
Source: Aggregated and audited data of ePURE members for 2022. Sugars – sugar equivalent; Ligno-cellulosic/Other RED Annex IX-A/Others – dry matter equivalent

Changes to the Renewable Energy Directive (RED)

	RED II	RED II revision (“RED III”)
Overall RES in 2030	Min 32% - binding at EU level	Min 42.5% binding + voluntary 2.5% top-up to reach 45%
RES-T in 2030	Min 14%	Min 29% binding OR (below)
Reduction of GHGi in transport	/	Min 14.5% from the use of renewables [alternative to RES-T]
Crop based biofuels	2020 share + 1%, in road & rail, capped to 7%	2020 share + 1%, in all transport, capped to 7%
Multipliers	Voluntary x2 for Annex IX, x1.5 for RE in rail; Binding x4 for EVs and 1.2x for aviation and maritime	Binding x2 for IX-A & RFNBOs, x1.2 for aviation and maritime, x4 for EVs; Voluntary 1.5x for RE in rail
Annex IX - A	Binding min 0.2% (2022), min 1% (2025), min 3.5% (2030)	IX-A + RFNBOs: min 1% in 2025 and min 5.5% in 2030
Annex IX - B	Capped to 1.7%; MS may modify the cap with EC approval	Capped to 1.7% (except CY and MT) – EC may modify the cap via delegated act
RNFBOs	/	Min 1% in 2030
FQD changes	/	B10 allowed with protection grade for B7 until 2030; FQD LCA GHG methodology repealed

SHARES 2022 – Renewable energy in transport in 2022 (RES-T) Achievement and Multipliers Impact – EU27

Renewable energy share in transport in EU27, with multipliers



2022 (recent update): **9.6% renewables in transport in the EU with multipliers; 7.0% without multipliers***

- Still lower than 2020 (10.2%)
- Since RED I approval in 2009, increased by a mere 4.7%
- Consumption of fossil fuels and renewable electricity is increasing
- Biofuels quantities decreased from 2021

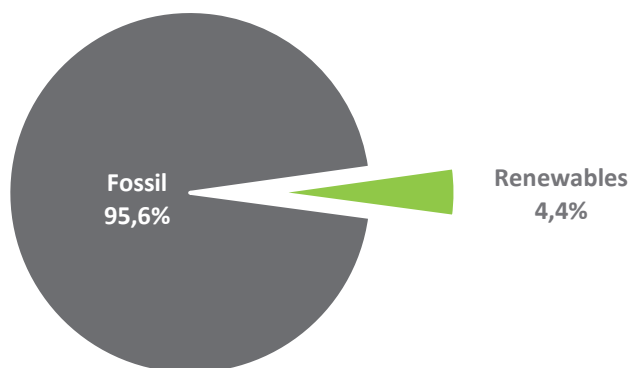
2021: **9.1% RES-T with multipliers; 6.9%, without multipliers***

RES-T must be tripled by 2030 to match Fit for 55 plans

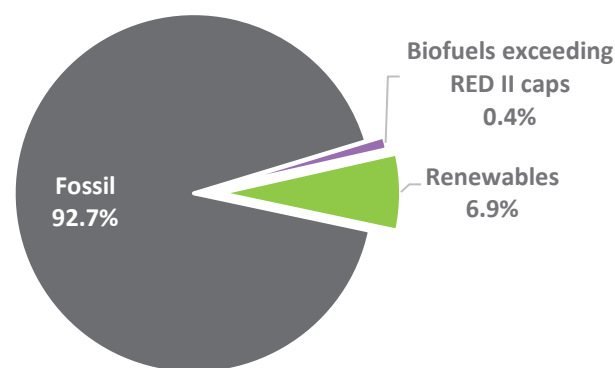
Source: EC SHARES, 2024; *Based on ePURE's estimates

SHARES 2022 – Fossil fuels dependence – EU27

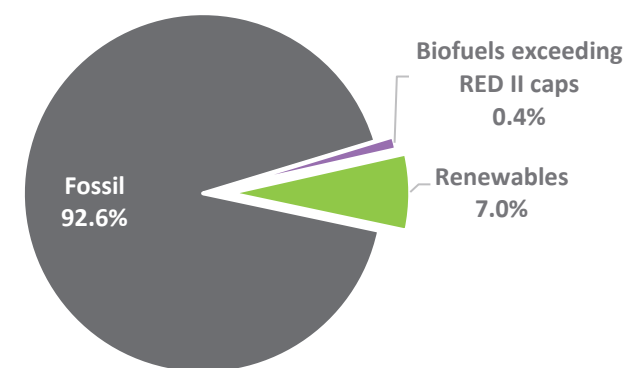
RES-T 2009 without multipliers



RES-T 2021 without multipliers



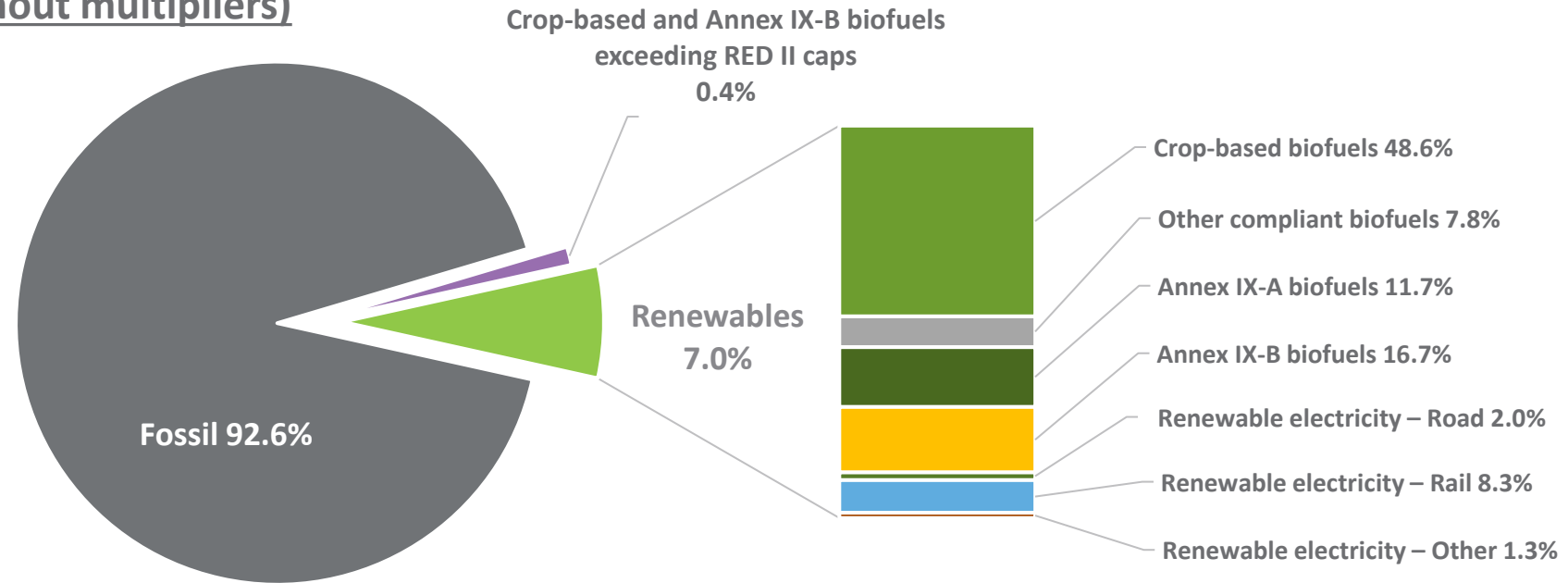
RES-T 2022 without multipliers



- Fossil fuels make up 92.6% of the EU transport energy consumption
- Change since 2009 has been limited compared to ambitions
- 2022 vs. 2021: 0.1% change in 2022 but actual increase in fossils, decrease in biofuels, increased use of electricity
- As per the RED II, MS are not allowed to count crop-based biofuels or Annex IX-B biofuels exceeding certain caps towards the objectives of the RED II

SHARES 2022 – Breakdown of renewables in transport, including biofuels' contribution – EU27

2022 (without multipliers)



- Crop-based biofuels represent the majority of renewables in transport at 48.6% (54.3% in 2021)
- All biofuels together account for 88.4% of renewables in transport
- Renewable electricity contributes to 11.6%, of which 71.6% is used in rail
- No volumes of renewable hydrogen and RFNBOs were consumed in transport in 2022

All available pathways must be mobilised to achieve transport decarbonisation in the EU

Electrification

- Multiplier of 4 (revised RED II)

Advanced biofuels

- Multipliers: x2 Annex IX-A & RFNBOs(road), x1.2 aviation and maritime (RED III)
- FuelEU Maritime
- ReFuelEU Aviation
- Ongoing revision of Annex IX

Crop-based biofuels

- They have played a key role and should continue to do so
- Widely available, affordable and competitive, already capped

Complementarity between crop-based and advanced biofuels

Synergies between ethanol production and e-fuels



Future development of renewable ethanol in the EU

Renewable ethanol certified GHG intensity reduction

- Average 78.4% in 2022 (ePURE members) – independently audited data
- Potential to reach carbon neutrality after 2030 and being carbon negative after 2040

Ethanol biorefineries are an important driver of decarbonisation in transport

- Continuous improvement in GHG intensity savings in the past decade
- Growing implementation of CCU, CCS and CHP technologies
- Increasing circularity
- Sustainability of crop-based biofuels ensured by RED sustainability criteria

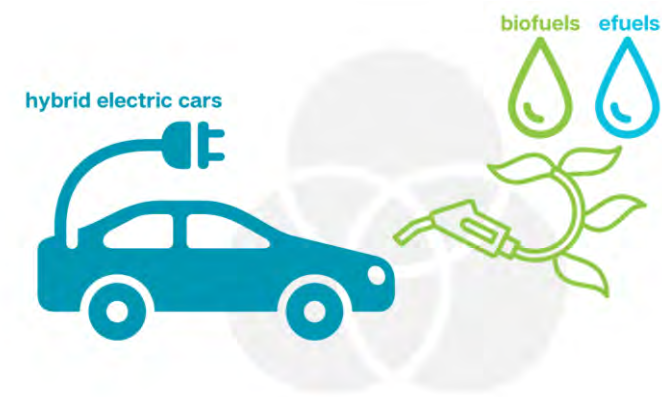
Future potential regulatory changes

- Potential future of RED-Compliant renewable ethanol as a CO₂ neutral fuel
- Possible FQD revision and introduction of E20
- Need more predictability and consistency in the regulatory framework

Future capacity enhancement

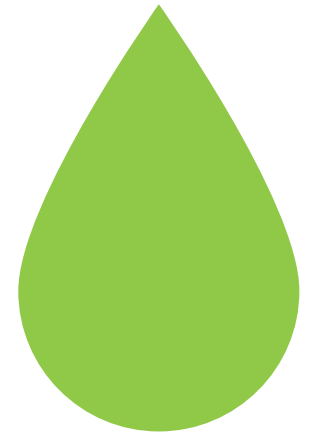
- Current capacity is limited
- Crop-based biofuels capped to 7% per MS – opportunity to mutualise at EU level
- Advanced feedstocks to play an important role in further increasing fuel ethanol supply
- Possible revision of Annex IX in the future – opportunity to add more and not remove feedstocks

Synergies between electric vehicles and CO₂ neutral fuels



Key takeaways

- Ambitious regulatory framework
- Several countries already missed their 2020 RES-T targets
- Implementation of RES-T is very low (9.6% in 2022 with multipliers) compared to the 2030 target (29% as per REDIII)
- Unclear how 29% RES-T can be achieved in 2030 without implementing all available technologies compliant with RED sustainability criteria
- Crop-based biofuels should continue to play a key role in defossilising transport in synergy with advanced biofuels
- Advanced feedstocks should make up for further ethanol supply beyond crop-based cap
- Constant growth in renewable ethanol emissions savings in Europe: 78.4% on average in 2022
- Renewable ethanol producers aim for carbon neutrality after 2030 and being carbon negative after 2040
- Potential for ethanol as a carbon neutral fuel after 2035, synergies with e-fuels





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