ewaba

European Waste-based & Advanced Biofuels Association

DECARBONISING HEAVY-DUTY VEHICLES IN EUROPE

A guide to the role of sustainable biodiesel for HDVs

April 2023

EUROPEAN GREEN DEAL

The European Green Deal aims to reduce greenhouse gas emissions (GHG) by 55% by 2030 and reach net-zero by 2050.

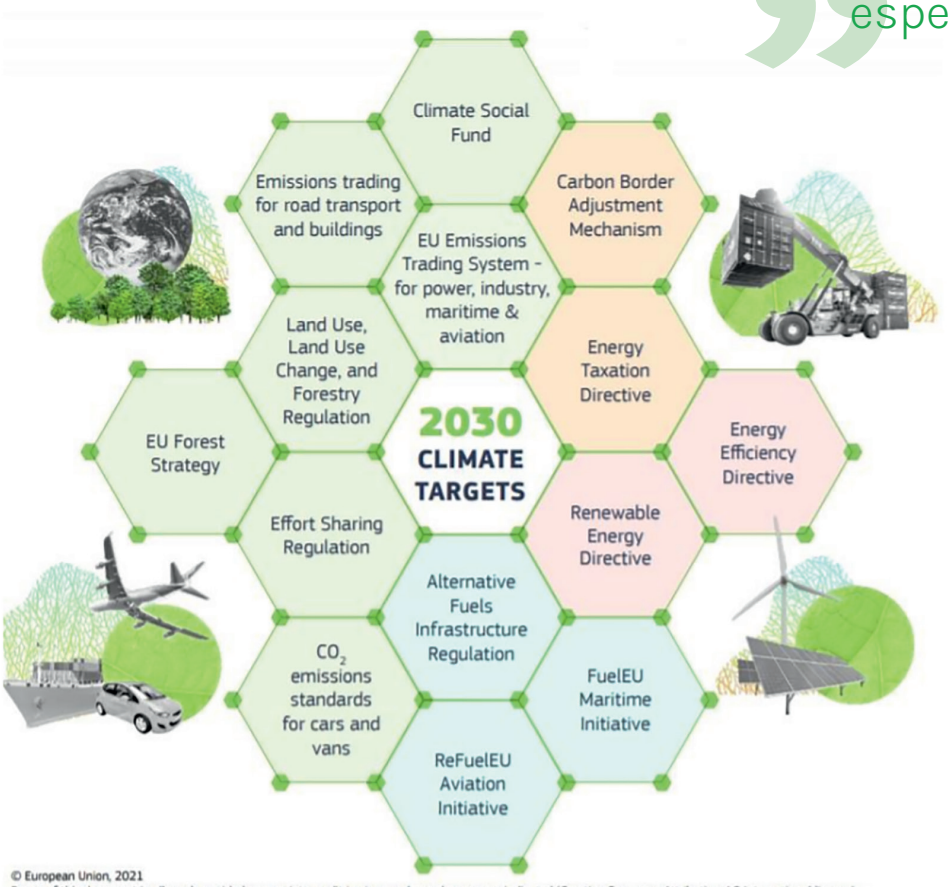
To meet such ambitious targets, bold policies and a rapid shift towards lower carbon solutions leading to major changes in the transport sector will be needed. Transport is the only economic sector whose emissions continue to grow.

These growing emissions would increase significantly without high blends of biodiesel. Road transport is a major source of Greenhouse Gas (GHG) emissions in Europe, and heavy-duty vehicles (HDVs) are responsible for just over a quarter of these emissions, and about 6% of total GHG emissions.

It is therefore critical to understand how to best decarbonise heavy-duty transport in order to achieve EU Green Deal targets.

Electrification has a vital role to play in the light-duty vehicles sector in the coming decades, where it will become widespread. But electrification is not a ‚silver bullet' across transport due to several major challenges in technology, battery development, infrastructure and potential roll-out at scale.

”A combination of technologies will be needed to efficiently decarbonise the transport sector, and especially road HDVs.“



HEAVY-DUTY VEHICLES
in the current EU landscape

Combustion and current fuels

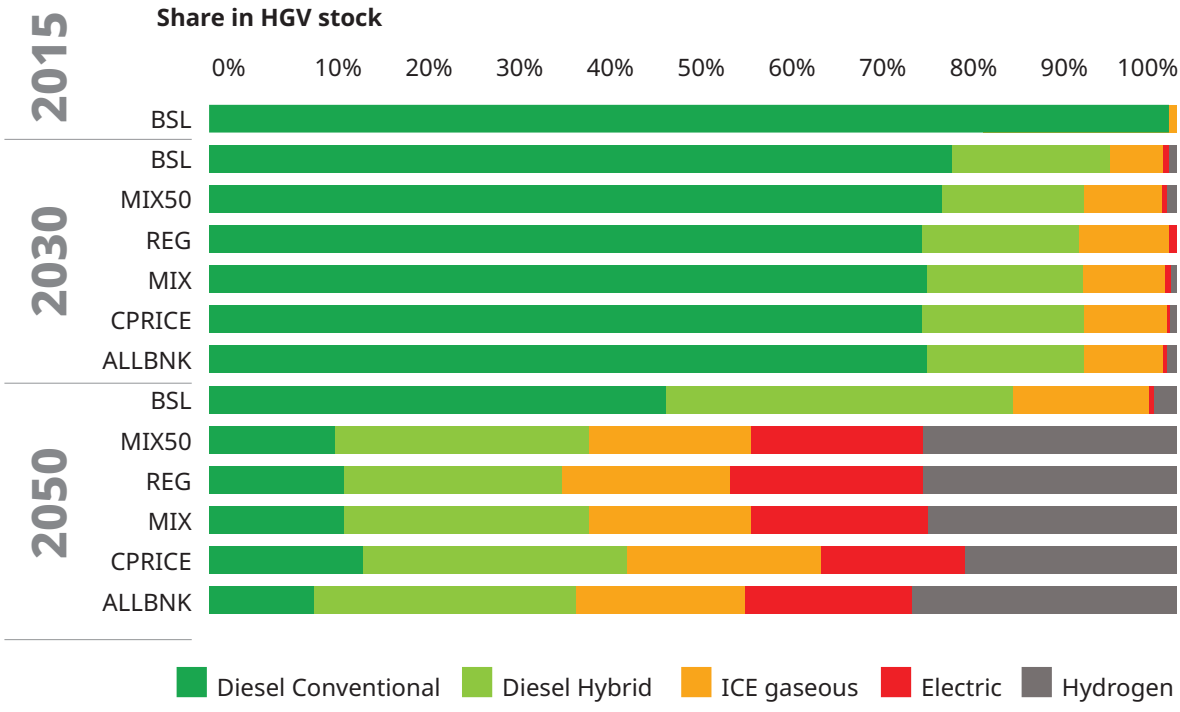
Road freight transport has been the backbone of trade and commerce, the core of the EU Single Market, for decades. Trucks carry 77% of all freight transported over land in the European Union and are part of an enormous logistics chain whose components also include inland waterways, shipping, air and rail transport. Not only do trucks remain the most efficient and economic mode of transport for the vast majority of goods and freight, they are also essential to the functioning of the wider integrated European logistics and transport system.

Transport demand grew by around 25% between 2000 and 2019 while emissions from heavy-duty road transport increased by around 5.5% at the same time. **While major improvements in energy efficiency have limited the rise in emissions, diesel remains the dominant fuel for HDVs with a share reaching 98.8% out of total fossil fuel use in 2019.**

Today, liquid fuels provide energy security for highly resilient and flexible HDV transport and logistics chains. This has proven to be vital for the efficient operation of the single market, including for emergency transport crisis management of all types. Today, the vast majority of trucks sold have an internal combustion engine using liquid fuel.

Out of the total fleet of over 6 million HDVs used to transport goods in the EU, about 2 million vehicles are used in the long-haul transport of goods. With the use of HDVs, transport operators and drivers ensure the security of vital supplies across the EU, including major South-North and East-West corridors.

The PRIMES model (seen below) forecasts diesel and ICE-fueled vehicles that will populate the European Heavy Goods Vehicles sector in 2030 and 2050. The graph was prepared by the European Commission.



Source: https://ec.europa.eu/transparency/regdoc/rep/10102/2020/EN/SWD-2020-176-F1-EN-MAIN-PART-2.PDF

WHAT ARE CO_2 STANDARDS FOR HDVs?

CURRENT STANDARDS

The EU regulation on CO_2 standards for HDVs requires manufacturers to **reduce average fleet emissions of new HDVs by 15% by 2025 and 30% by 2030,** compared to a mid-2019 to mid-20 baseline. These measures apply to almost three out of four new trucks within the EU.

PROPOSAL FOR REVISION OF CO_2 STANDARDS

In February 2023, the European Commission published a proposal to revise CO_2 standards for HDVs including the following **fleet emission reduction targets:**

- 45% in 2030
- 65% in 2035
- **90% in 2040**
- No 100% target is foreseen yet except for buses (100% in 2030)

90% in 2040

The European Commission's approach takes into consideration ‚tailpipe' emissions only – therefore, and based on this approach, the proposed emission reduction targets can only be achieved via electromobility. Higher blends of biodiesel will play a major role in decarbonising the internal combustion engine-powered HDVs already on the market and sold following the proposed trajectory: 55% in 2030, 35% in 2035 and 10% in 2040.

Beyond this proposal, these percentages can certainly be modified during the ongoing legislative procedure and the industry at large is still advocating for a more preeminent role for renewable fuels, mirroring the industry's approach in the legislative passage of the CO_2 standards for cars and vans.

The legislative proposal will be heavily amended during the ensuing ordinary legislative procedure, which is likely to end only once a new Parliament is in place in 2024. The new European Commission, to take office in early Q3 2024, might also have a different approach to the promotion of renewable fuels. This is expected to play a pivotal role as the proposal includes a revision clause for 2028 (the revision clause for the cars and vans Regulation, already adopted, is in 2026).

REVISION OF CO_2 STANDARDS FOR HDVs: Right step, right way?

We consider the role of renewable liquid fuels in the future of heavy road transport as essential and valuable. This hard to decarbonise sector will need significantly more time, effort and investments to reach large-scale electrification or the deployment of novel fuels such as hydrogen, in significant volumes. Sustainable biodiesel is the best available and cheapest fuel solution not requiring any notable infrastructure investments. It should therefore be encouraged for further use in higher blends to decarbonise the heavy road sector.

By incorrectly labelling electromobility as the only ‚zero emission' solution – using the ‚tailpipe' emission approach, and not accounting whole lifecycle emissions – the level-playing field between decarbonising technologies is completely distorted. Electric vehicles are ‚labelled' as green even if charged with fossil energy, whereby ICEs running on sustainable renewable fuels with proven up to 90% emission savings are penalized for emitting GHGs during combustion, and irrespective of how much they contribute to the circular economy, their sustainability credentials, or the level of emission reduction they achieve. The technology neutrality principle in the EU vehicle emission standards needs to be reinstated by ensuring the role that CO_2 neutral fuels will have to play to meet the decarbonization objectives of the Union.

Renewable liquid fuels should be recognized in the future legislation either via dedicated crediting mechanism or appropriate definition of CO_2 neutral fuels covering all sustainable biofuels, biogases, biomass fuels and synthetic fuels as defined in the REDII Directive.

Recognize the potential of sustainable biofuels beyond 2040

Sustainable biofuels such as waste-based and advanced biodiesel are already a significant part of the EU's success story in reducing transport emissions. Despite European Commission proposals on CO_2 standards not tapping the full potential of biofuels for transport, EU Member States and different policymakers realize that biofuels have been the major decarbonizing driver for transport in the past decades.

Supported by the right incentives and sustainability measures, waste-derived biofuels will continue playing a leading role in renewable energy shares seen in transport for years to come. It will be fundamental to consolidate and widen the role of sustainable biofuels during the ongoing legislative procedure on CO_2 standards for HDVs. Waste-based and advanced biodiesel reaches +90% GHG savings compared to fossil fuel alternatives. At the same time, waste-derived biofuels are an important component of the circular economy, tapping unused resources, recovering their energy potential and reintroducing them as fuels into the supply chain. Higher biodiesel blends such as B20, B30 or B100 are already available and used across the EU.

> Most higher blends are currently being introduced through private companies' initiatives instead of a bold public support scheme. **It is time for this to change.**

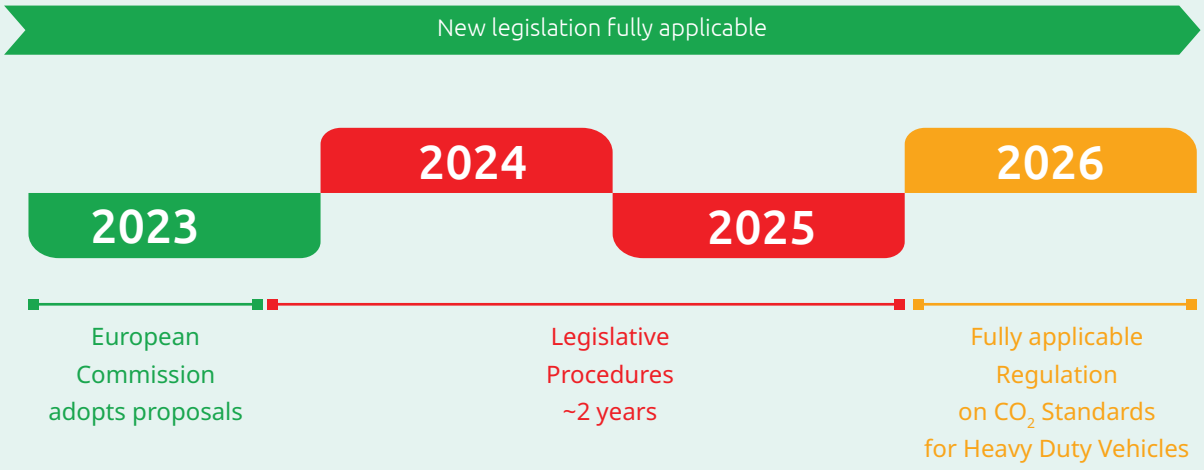
The role of renewable fuels

The EU should recognize the role of renewable fuels in the upcoming CO_2 standards for HDVs as a long-term solution for sustainable road transport alongside electrification and hydrogen. The revision of the regulation should recognize the 'circularity' of CO_2 emissions produced by vehicles running renewable fuels and consider these fuels as 'CO_2 neutral'.

The **current 'tailpipe' approach** completely distorts investment decisions and **maintains a regulatory approach favoring EVs even if they are fed by coal-derived electricity, while penalizing internal combustion engines (ICEs) even if fed by 100% sustainable biofuels or other types of renewable fuels.** Despite efforts to focus on electric-powered trucks, ICEs will continue to play a long-term role in several heavy-duty applications.

REVISION OF CO_2 STANDARDS FOR HEAVY DUTY VEHICLES

Timeline



EWABA'S ROLE IN THE MIX

EWABA represents 45+ stakeholders across the waste-based and advanced biodiesel supply chain. Our members, active in most EU Member States, collect and use waste and advanced feedstocks listed in parts A and B of Annex IX of the Renewable Energy Directive (REDII) to produce sustainable biodiesel with the highest GHG savings (up to +90%) when compared with fossil fuels, thus enabling "near-term decarbonization" of the EU road and maritime transport sectors. In 2022 alone, EWABA members **produced more than 2.2 million tons of waste-based and advanced biodiesel** for the road and maritime sectors, **saving 7 million tons of CO_2 equivalent emissions.**

As seen by the preliminary figures below, EWABA's production has been growing despite the covid-19 pandemic, with advanced biodiesel production in particular seeing an exponential growth. Sustainable biofuels produced by our members provide an important contribution to the security of EU energy supply and foster the creation of new value chains – and jobs - in the agricultural, energy, transport, logistics and fuel sectors.

The EU is a leader in sustainable biofuels and operates 55+ industrial-scale production facilities for waste-based and advanced biodiesel. The introduction of the RED legislation almost 15 years ago incentivizing biofuels from certified feedstocks has created industry experts across the supply chain. We are proud as EWABA to represent companies with a diverse background: from biodiesel producers to feedstock collectors, and technology providers to suppliers of feedstock and advanced biofuels. Our members have been supplying the heavy-duty vehicles sector with high biodiesel blends for years.

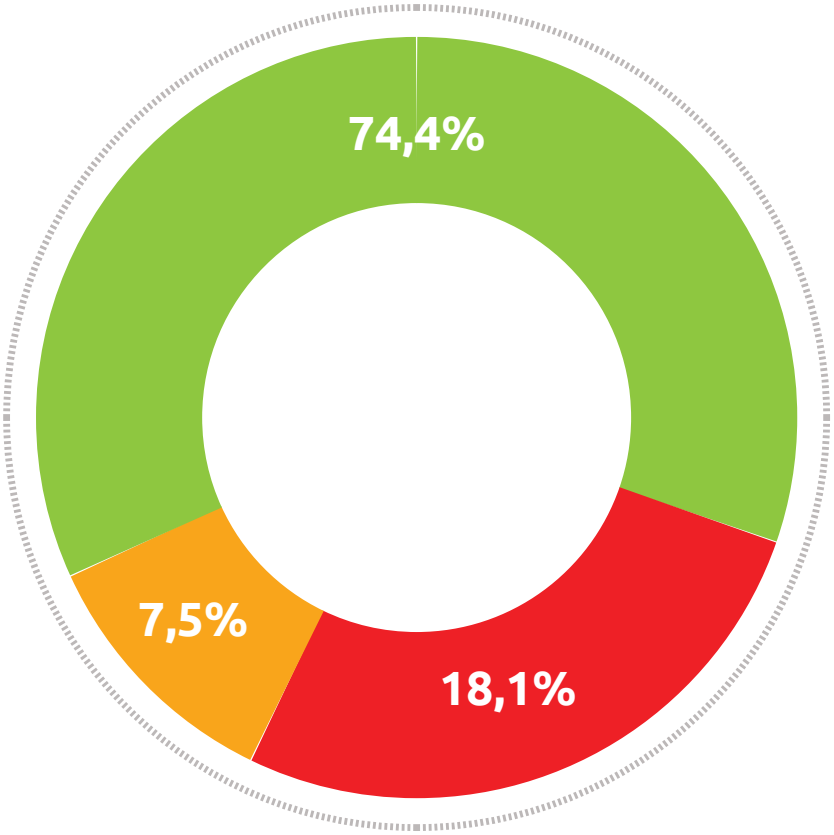
We list examples from various Member States on the next pages.

PRELIMINARY STATISTICS FROM EWABA MEMBERS

2022

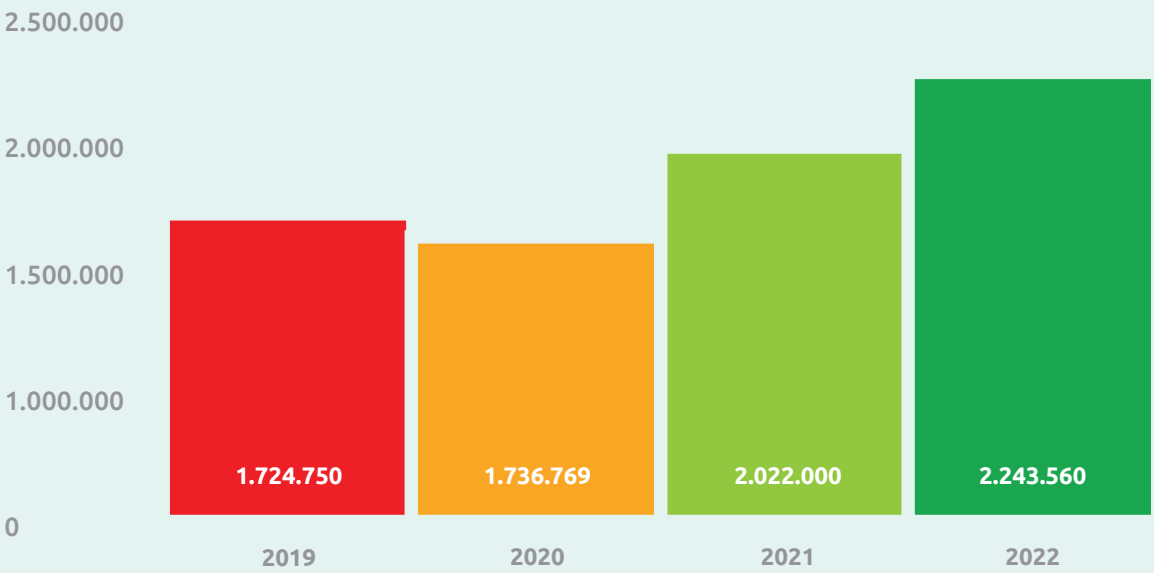
EWABA - Total Waste & Advanced Biodiesel Production in 2022 - 2.243.000 tons

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

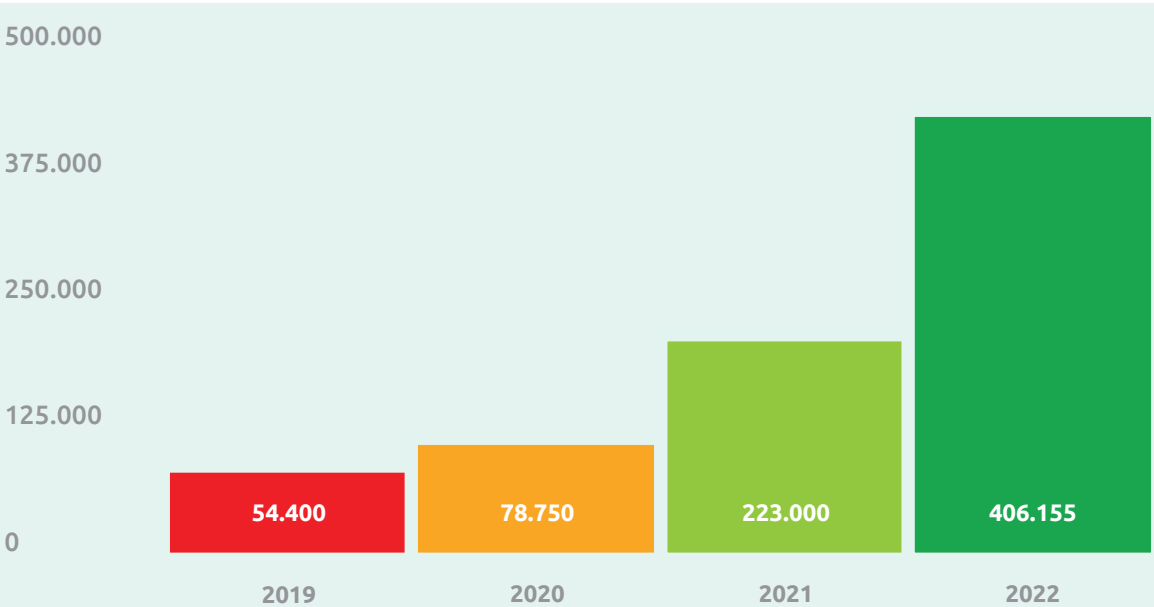


PRELIMINARY STATISTICS FROM EWABA MEMBERS 2022

EWABA - Total Waste-based & Advanced Biodiesel Production 2019-2022 in tons



EWABA - Total advanced produciton (Part A of Annex IX) 2019 -2022



CASE STUDIES from around Europe

France

France is a unique case study in the EU promoting higher biodiesel blends actively through public incentives.

The main initiatives focus on financial incentives, making it more cost-effective for companies and customers to move forward with higher blends programs. There are no similar schemes available in other European countries, i.e., outside of France the financial barrier to decarbonize (the price difference between diesel and biodiesel) is high.

There are two types of financial incentives in France:

- Selling fuel with 100% biodiesel content (B100) generates a ticket, which can be traded in the market,thereby creating a profit that helps compensate the price difference between diesel and biodiesel.
- Over-depreciation: non-convertible trucks running on B100 can be accounted at 140% of the purchase value of the truck in the balance sheet of the company. This implies substantial savings on income tax for the transportation company that is investing in such equipment.

In France, our member Cargill has the intention to supply the French market with 3,000-5,000 tons of B100 in 2023 and scaling up as from 2024. **The fuel efficiency of a B100 replacement fuel is similar to a fossil fuel diesel,** while GHG savings expectations are ranging from 60% to 85% compared with fossil fuels.

The French example shows that if similar schemes would be implemented at the EU level, road transport decarbonisation for goods would progress significantly faster.

Portugal

Higher blends roll-out in Portugal relies on corporate initiatives aiming to attract public investment through successful initiatives and case studies. Our member Prio, the largest producer of biofuels in Portugal, offers two renewable fuel solutions for Heavy-Duty Vehicles:

ECO diesel B15 – 15% of advanced biofuel

- **Combustion Efficiency:** overall fuel consumption reduced by 5%
- **Emissons:** cleaner combustion and product's lifecycle allow for the decrease of particles and greenhouse gases' emissions.
- **Sustainability:** up to 18% GHG emissions reduction compared with fossil diesel.
- **Lubricant and Detergent Power:** elimination of accumulated engine contaminants and consequent reduction of maintenance costs in the long term.
- **More than 3,4 million litres sold:** direct delivery or supplied to gas stations across Portugal.
- **More than 40 million kilometres travelled:** light-duty, light commercial and heavy-duty vehicles.
- Environmental impact – B15 vs B7 = GHG **emission reduction of 12,2%**
- **Delivered to over 60 vehicles** of 6 companies in 2020-2022, saved more than 1400 tons of CO_2eq

ZERO diesel B100 – 100% of advanced biofuel produced from residual and waste feedstock streams

- **100% renewable and sustainable:** 100% fossil-free fuel sourced from the recycling of residual raw materials.
- **Cleaner air, cleaner planet:** cleaner combustion and up to 84% reduction of greenhouse gases' emissions.
- **Lubricant and detergent power:** elimination of accumulated engine contaminants and consequent reduction of maintenance costs on the long term.
- Projects for Carris (6 buses), Portuguese Air Force (7 equipments + 6 vehicles), Cascais municipality (2 garbage trucks)
- **Limitation:** The only subsidy is double counting for biodiesel derived from Annex IX feedstocks (this measure could be time limited).

Slovakia

Higher biofuel blends in Slovakia are tested through private company initiatives without a public support mechanism in place. Two higher biodiesel blends have been tested by heavy duty vehicles in the past few years. These are the following:

B20 – 20% biodiesel blend fuel as standard low-emission transport solution for the agricultural sector.

- B20 has been tested in 2 John Deere tractors since March 2021 with the aim of further deployment
- B20 represents a greener fuel than standard B7 blend because it can contribute to CO_2 emissions reduction in the atmosphere **by an additional 7 g of CO_2/MJ compared to diesel (B7), i.e. there is 9.3% savings in CO_2 emissions per 1 liter of B20 fuel.**
- John Deere as a manufacturer offers vehicles with engines compatible with B20 fuel. Tractors running on B20 fuel do not require any additional special service repairs.

B100 - Special labelled trucks from Scania (1 truck) and Renault (2 trucks) are currently running on 100% biodiesel (B100) in Slovakia.

- In comparison to the standard fossil diesel (95.1 g CO_2/MJ), fully renewable B100 fuel reaches GHG emission reduction up to 90% (based on the feedstock used).
- B100 fuel can be produced from vegetable oils or waste such as used cooking oil. **The emission footprint of biofuel produced differs based on the material used from 33 g CO_2/MJ (vegetable oil) to even lower to 9 g CO_2/MJ when produced from used cooking oils.**
- The vehicle's engine is a standard diesel engine fully adapted to process B100 fuel with no need for extra addition of any fossil fuel.
- Besides the truck brands currently used (Scania and Renault) there are also other manufacturers of trucks, cars, buses, and even tractor engines worldwide that produce a variety of engines running on 100% biofuels, both biodiesel and bioethanol.

Austria

All company trucks of Austria's largest manufacturer of biodiesel, Münzer Bioindustrie, are running on B100 (pure biodiesel) fuel and reaching up to 90% GHG emission savings compared to fossil fuels. A new law was recently adopted in Austria establishing that all trucks running on 100% biofuel are considered to have the emission factor equal to rail. However, further incentives such as tax benefits are still required to achieve broader deployment of higher biodiesel blends like B100 used in Muenzer trucks.

Cooperation with McDonalds and HAVI - Sustainable biodiesel from used cooking oil

From the restaurant to the tank: In 2021, over 910 tons of used cooking oil was collected at McDonald's Austria and processed into ecologically sustainable biodiesel by the local partner company Münzer.

This biodiesel, in turn, powers the trucks of McDonald's logistics partner HAVI, which are used to deliver McDonald's products - this initiative saved more than 2,400 tons of CO_2 last year. This is an initiative that McDonalds has been promoting on a global scale.

Europe's largest manufacturer of waste-derived biodiesel Greenergy purchases waste oils from around the world and converts them to clean, renewable biodiesel.

Greenergy has successfully deployed high biodiesel blend B20 fuel at their largest terminal by volume from January 2022 to present.

- The use of B20 from Q1 to Q3/2022 realised 18% GHG savings over fossil diesel and 13% GHG saving above a standard B7 diesel
- MPG (miles per Gallon) decreased using B20 vs B7 at around ~1%
- No increase in fuel cost per litre were reported
- No operational issues were reported
- **£500 additional cost for the tractor unit to be B20 compatible**

WASTE-BASED AND ADVANCED BIODIESEL

Checklist

Affordability – contributes to consumer affordability of mobility as one of the most sustainable and cost efficient fuels

Scalability – industry can scale up production of renewable fuels given the right incentives in place and work closer with the automotive industry

Energy security – in recent times, security of supply for energy sources has been a main topic across the EU. Domestically produced CO_2 neutral fuels could provide a safety net while other technologies are currently being developed in scale

Level playing field – instead of banning a technology and creating dependency on 'silver bullets', it would be better to focus on phasing out fossil fuels

Faster decarbonisation, reach full potential – CO_2 neutral fuels immediately reduce CO_2 emissions in road transport, including an extensive existing fleet. There is no need to wait for fleet renewal to reduce emissions for transport's most polluting sector – road.

Supportive & reliable regulatory framework

Transformation, not disruption

Focus on innovation, investment & employment

Holistic approach

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