NEW CO_2 EMISSION STANDARDS FOR HEAVY DUTY VEHICLES': ENABLING CLIMATE FRIENDLY LOGISTICS WHILE KEEPING SUPPLY CHAINS INTACT

The eFuel Alliance fully supports the European Commission's assessment that all sectors will have to strengthen their efforts in reducing greenhouse gas (GHG) emissions significantly in order to achieve climate neutrality by 2050. Road transport in particular needs to play a key role as it accounts for a fifth of today's GHG emissions in the EU. One instrument to reduce GHG emissions in the transport sector is the revision of the CO_2 emission standards for heavy duty vehicles (HDVs).

However, the focus of the current EU regulation on tailpipe emissions falls short by failing to assess the carbon footprint of a vehicle's entire life cycle. This is because emissions that occur in earlier or later phases of a vehicle's life cycle, such as during the production of the vehicle or the generation and provision of its operating power, are being ignored. Considering that the EU's electricity mix is still heavily dependent on fossil fuels, under such an approach, even a battery powered truck that is charged with predominantly fossil fuel-generated electricity will qualify as a zero-emission vehicle under the current regulation.

A first step to a more holistic, transparent and effective transport climate policy is the consideration of renewable fuels in the CO_2 emission standards. This will speed up the achievement of the EU climate goals by unlocking the enormous GHG savings potential of carbon-neutral synthetic fuels such as eFuels or even carbon-negative renewable fuels such as biomethane. At the same time, the inclusion of renewable fuels in the regulation will offer manufacturers, alongside battery electric and fuel cell powertrains, complementary technological options to meet the CO_2 emission standards.

There are two possible options to widen the regulation with a sustainable renewable fuels dimension: the preferable option is introducing a so-called carbon correction factor (CCF) in the regulation. In addition, a voluntary crediting system for renewable fuels can be added. These can be implemented individually, but they can also complement each other.

RECOMMENDATIONS

- Accelerate emission reductions while keeping supply chains intact by providing more options to meet new CO_2 emission standards for heavy-duty vehicles.
- Overhaul the outdated focus on tailpipe emissions by including renewable fuels in regulation to unlock their greenhouse gas saving potential.
- Introduce a **carbon correction factor** alongside the implementation of a **crediting system** in the regulation on CO_2 emission performance standards.

1. Carbon Correction Factor

- A carbon correction factor reflects the share of renewable fuels in the existing fuel mix. Such an option would reduce the CO_2 emission targets for truck manufacturers by the average share of renewable fuels included in the EU's current fuel mix.
- This mechanism acknowledges that, in addition to technical improvements and efficiency enhancements to the vehicle, the fuel mix is also crucial in determining how much net CO_2 a truck emits.

2. Crediting System

- A crediting system allows vehicle manufacturers to voluntarily finance additional renewable fuels (beyond the legally required quantities fuel supplier must place on the market) and offset the corresponding emission reductions against their emission targets for new vehicles ('fleet targets').
- When a new vehicle is sold, the lifetime CO_2 emissions of the truck are immediately compensated by injecting the equivalent amount of renewable fuels into the fuel mix.

EU COMMISSION WANTS TO KEEP OUTDATED FOCUS ON TAILPIPE EMISSIONS

In its proposal to revise the CO_2 emission performance standards for new heavy-duty vehicles, presented on 14 February 2023, the EU Commission ignores the GHG saving potential of renewable fuels, as it did in the latest revision of the regulation for new passenger cars and vans.

Instead of enabling vehicle manufacturers to use a range of emission reduction technologies to meet the new stricter CO_2 limits while efficiently reducing road transport emissions, the EU Commission is sticking to the outdated method of determining a vehicle's carbon footprint only by measuring its tailpipe emissions: As a result, CO_2 emissions from new heavy-duty vehicles are to be reduced EU fleetwide by 45% from 2030 (city buses by 100%), by 65% from 2035 and finally by 90% from 2040 compared to 2019 – but without the possibility of including the net zero emission effect of vehicles running on carbon-neutral renewable fuels in the regulation. Given that key enabling conditions, such as an EU-wide charging infrastructure, are not yet in place, which in turn leads to great uncertainties regarding market acceptance among users, the reduction target of 45% CO2 savings from 2030 in particular seems rather unrealistic. An increase of the currently applicable target from -30% to -45% should therefore be seriously reconsidered. Instead, the focus should be on creating the necessary enabling conditions.

Indeed, in its impact assessment, the EU Commission explicitly rejects the possibility of offsetting CO_2 emissions savings from renewable and low-carbon fuels against the fleet targets, either via CCF or a crediting system. It justifies its decision partly by pointing to what it claims are cost disadvantages associated with the operation of heavy-duty vehicles powered with renewable fuels. However, these are not fair comparisons because they are not based on a level playing field. For example, when determining the total cost of ownership (TCO), the Commission applies tax advantages and an exemption from tolls for electric trucks – but not for vehicles with an internal combustion engines (ICE) that run on carbon-neutral fuels. Yet, renewable fuel powered ICE vehicles could enjoy similar benefits if the tailpipe approach in the regulation were complemented by a provision to reflect the GHG savings potential of renewable fuels. Other issues not considered in the impact assessment are unresolved concerns about the availability of battery raw materials, costs for the roll-out and expansion of charging infrastructure and hydrogen refuelling stations that are potentially higher than those assumed by the Commission, and the lack of extended parking space. Furthermore, the TCO calculation used in the impact assessment does not take into account implications that could arise for all parties affected along the value chain from logistics companies to retailers to end consumers. These include negative consequences resulting from a reduction in the payload of electric trucks due to battery weight, idle time caused by longer waiting times during the charging process, and related potential disruption to supply chain management which is currently based on just-in-time delivery. The TCO comparison applied by the Commission only covers the costs associated with the vehicle for the consumer (purchase costs, rebates, subsidies, taxes, energy consumption, maintenance, etc.). A more comprehensive revenue calculation would instead take into account all relevant aspects along the value chain and would be better suited to capture the overall economic impact.

Unless renewable fuels are included in the regulation as a carbon-neutral alternative, the obligation to reduce CO_2 emissions by 90% from 2040 will de-facto force manufacturers to phase out production of heavy-duty internal combustion vehicles in order to meet their fleet targets. We believe that this unbalanced regulatory approach not only undermines the principle of technology-neutrality, but also limits customer choice and jeopardises effective climate protection. That is why **we encourage European decision-makers to amend the EU Commission's proposal, revise the outdated focus on tailpipe emissions, and include renewable fuels in the CO_2 emission standards for new heavy-duty vehicles.**

RENEWABLE FUELS CAN ADDRESS THE SPECIFICITIES OF HEAVY-DUTY TRANSPORT

Heavy-duty transportation is the backbone of trade and commerce on the European continent. Seventy-three per cent of all freight transported by land in the EU is carried by trucks. Public service vehicles such as those used in refuse collection, by fire brigades or construction services also fall into this category. As a result, heavy-duty transport is responsible for nearly a third of the EU's road transport CO_2 emissions and 5% of total CO_2 emissions in the EU – more than aviation and maritime transport combined. Since 1990, these emissions have increased by 25%. Large trucks account for up to 70% of all CO_2 emissions from heavy-duty vehicles. According to ACEA, annual registration of new trucks increased from 217,000 in 2010 to 333,000 in 2019 before the Covid-19 pandemic hit Europe. More than 6.2 million trucks were operating on European roads in 2020. Due to increasing passenger and freight traffic, heavy-duty is a sector with growing CO_2 emissions.

In order to tackle the GHG issue for heavy-duty vehicles responsibly, taking into account the economic, social and climate policy implications, solutions must address the various demands of the different use cases: A delivery van in a metropolitan region requires different technical solutions to a long-haul 40-tonne truck that drives thousands of kilometres every day. A municipal refuse truck has different operation modes to an off-road construction machine. For that reason, a solely tailpipe approach is not suitable for meeting the diverse requirements of heavy-duty transport.

According to Eurostat, even in 2020, which saw lockdowns and border movement restrictions to counter the Covid-19 pandemic, around 60 % of freight volumes were carried out over journeys of more than 300 km, with the distance class of 500 to 999 km accounting for the most tonne-kilometres.[1] To electrify a truck suitable for such distances (usually a 40-tonne truck), an adequate battery to achieve ranges of up to 800 km would weigh between 5,000 and 6,000 kg, equivalent to a payload loss of 5-10% (depending on the truck) compared to diesel. Such a large battery increases the carbon footprint of vehicle production enormously. In addition, charging times would take several hours, even with current fast-charging technology. This comes with a requirement for electricity suppliers to provide at least the same amount of additional renewable electricity generation and electricity storage capacities.

Moreover, there are logistical and infrastructure challenges: For the widespread roll-out of fuel cell trucks, a new hydrogen refuelling network needs to be built across Europe. In addition, there is still a lack of supply chain facilities such as vessels, pipelines or trucks for the transport of green hydrogen from the production site to the refuelling stations. The recently agreed Alternative Fuels Infrastructure Regulation (AFIR) is certainly an important building block in driving the introduction of hydrogen refuelling stations and accelerating the expansion of charging infrastructure for e-vehicles. However, the targets agreed in the AFIR need to be actually implemented first, and then expanded in future revisions. The strategic uncertainties arising from these challenges are reflected in the fact that different truck manufacturers are opting for different technologies.

Sustainable renewable fuels meet many of the specific requirements of heavy-duty transport: they have a high energy density, which is essential for long distances and when weight restrictions apply, they can be deployed using existing infrastructure and logistics, and there is global potential to scale up their production.

BROAD SUPPORT FROM INDUSTRY AND SCIENCE FOR RENEWABLE FUELS

The public consultation on the CO_2 emission standards for new heavy-duty vehicles clearly signals a need for the implementation of a mechanism that brings renewable fuels within the scope of the regulation. Two thirds of the stakeholders – most of them from the industry – are in favour of a consideration of renewable fuels, among them the European Express Association or European Association for Forwarding, Transport, Logistics and Customs Services (CLECAT).

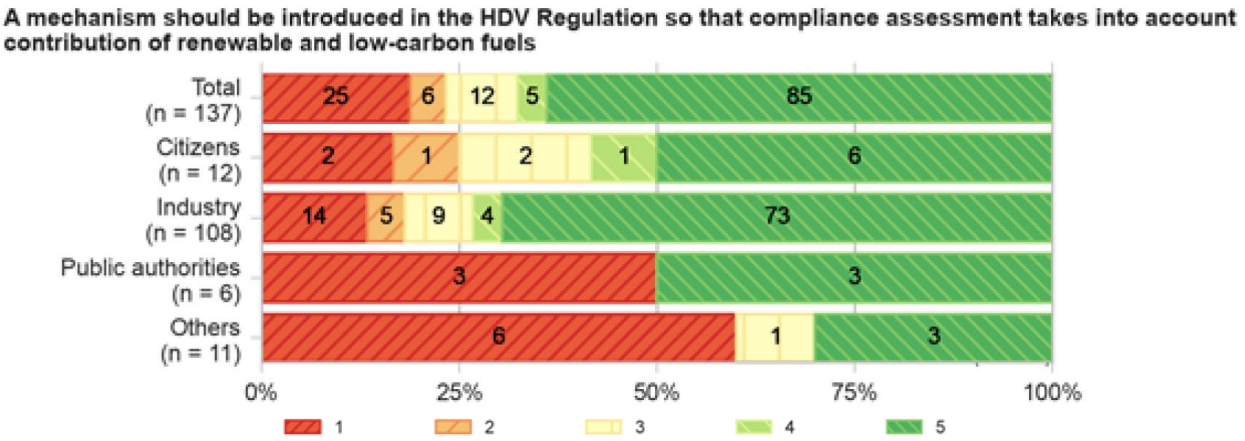

Figure 1: Public consultation welcomes the consideration of renewable fuels in the CO2 emission standards for heavy-duty vehicles (on a scale from 1 to 5 where 5 is highest agreement and 1 is no agreement, not all statements needed to be rated)

The industry's call for renewable fuels to be taken into account when complying with CO_2 emission targets is backed by more than 90 international scientists. They agree that sustainable and renewable fuels can speed up the decarbonisation of road freight transport. Consequently, they call for transport

[1] Eurostat: Road freight transport statistics

companies and vehicle manufacturers to be encouraged to consider cleaner alternatives to fossil fuels, such as liquid and gaseous renewable and synthetic fuels.

TWO OPTIONS FOR CONSIDERING RENEWABLE FUELS IN CO_2 EMISSION STANDARDS

There are two possible options for including renewable fuels in the regulation on CO_2 emission standards for heavy-duty vehicles: introducing a so-called **carbon correction factor (CCF)**, and a voluntary crediting system for renewable fuels in the regulation. Both mechanisms can be implemented individually, but they can also complement each other.

The **CCF** would reflect the share of renewable fuels in the EU fuel mix and reduce the value of tailpipe emissions from a heavy-duty vehicle (as calculated for compliance assessment) by the corresponding GHG savings. This mechanism would address the fact that, in addition to technical improvements and efficiency enhancements to the vehicle, the fuel mix is also crucial in determining how much net CO_2 a truck emits. However, the current legislation ignores the fact that the actual fuel mix does not consist of 100% fossil fuels, but instead contains a steadily increasing share of renewable fuels, as required by the Renewable Energy Directive (RED). This reality should be reflected in the revised regulation.

One of the main advantages of a CCF is that it can be easily integrated into the existing regulation: the data needed to determine the CCF can be collected using the EU Environment Agency's SHARES tool, which records the amounts of renewable energy in all Member States – including all types of renewable fuels that suppliers are required to put on the market to meet their RED obligations. The CCF determined on this basis then only needs to be included in the formula for calculating the specific CO_2 emissions of a new heavy-duty vehicle specified in Annex I Part 2 of the regulation.

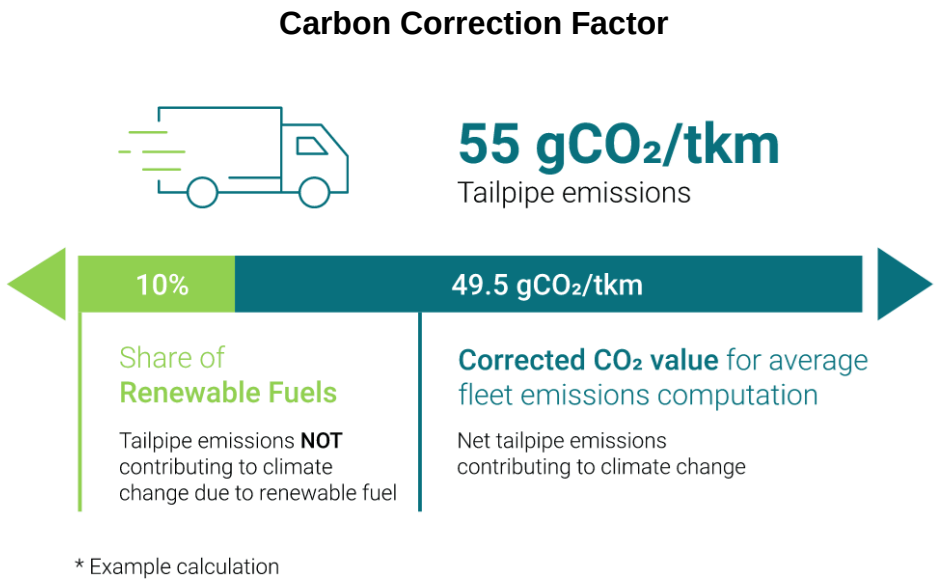

Figure 2: Proposal for considering the share of renewable fuels in the fuel mix when determining the tailpipe emissions of a truck

The eFuel Alliance strongly supports the carbon correction factor as a tool to reflect more accurately the actual CO2 tailpipe emissions of trucks and busses, and encourages European co-legislators to include such an option in the revised regulation on CO2 emission standards for heavy duty vehicles. In order to accelerate the phase-out of fossil fuels by making further quantities of renewable fuels available to the transport market while addressing the existing fleet, a voluntary crediting system could complement the CCF.

Under a **crediting system**, fuel suppliers bring additional quantities of renewable fuels to the market (beyond those required by the Renewable Energy Directive – RED) that can be purchased by vehicle manufacturers. In return, vehicle manufacturers receive credits that they use to offset the corresponding GHG savings against their fleet targets. The proposed scheme does not allow double counting, i.e. credits can only be counted either against the renewable share under the RED or against the fleet targets under the CO_2 emission standards regulation. The crediting system thereby ensures effective climate action, unlocks additional volumes of renewable fuels, and enables additional CO_2 reductions in the transport sector.

The scheme can be introduced with limited additional administrative costs since it would leverage the existing monitoring and reporting procedures established under the RED. At the same time, it gives truck manufacturers an additional option to comply with the CO_2 emission standards, while users could benefit from a wider choice of clean technologies that meet their needs. This would strengthen the demand-side of renewable fuels such as eFuels and ensure that additional volumes of synthetic fuels are being sold in the market.

There are already proposals regarding the practical implementation of such a crediting system, e.g. the report by the consultancy Frontier Economics and the law firm Flick Gocke Schaumburg from May 2020, drafted for the German Federal Ministry for Economic Affairs and Energy (BMWi).

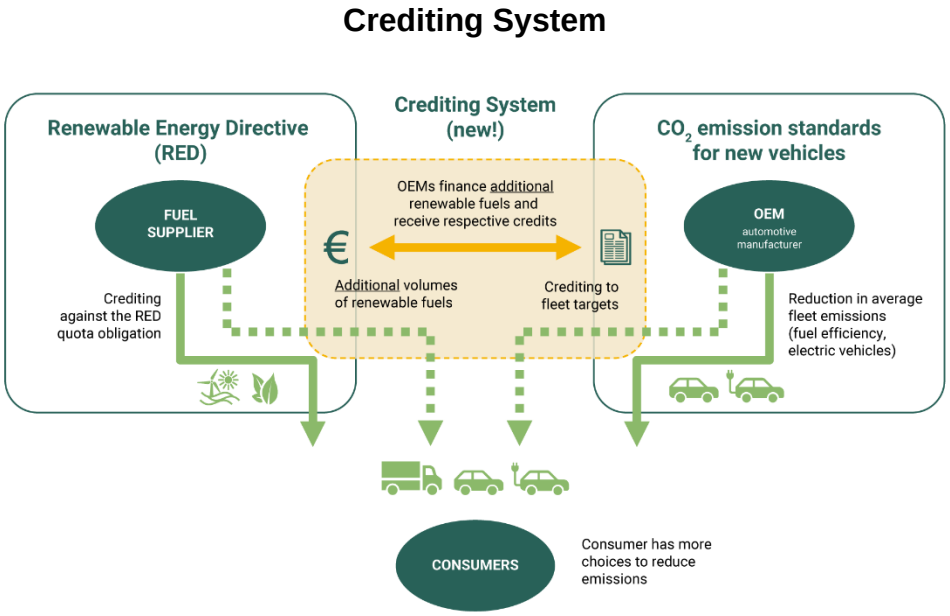

Figure 3: Proposal to link the fuel regulation (Renewable Energy Directive) and vehicle regulation (CO2 emission standards for cars, vans and trucks) via a new Crediting System for Renewable Fuels

BENEFITS OF INCLUDING RENEWABLE FUELS IN A REVISED CO_2 EMISSION STANDARDS REGULATION

Including both mechanisms in the regulation on CO_2 emission standards would create a level-playing field among all emission-reduction options. This will unlock the GHG saving potential of renewable fuels such as eFuels and speed up climate protection efforts.

By providing more options to meet CO_2 emission standards, haulage vehicles such as LNG trucks can continue to be used after 2040, sparing transport and logistics companies expensive conversion processes – and ultimately avoiding higher prices for end consumers.

An increased use of renewable fuels in road transport will also have a positive impact on reducing the production costs of eFuels, which will equally benefit consumers across the EU and facilitate a socially just transition to carbon neutral mobility: As eFuels can be gradually blended with conventional fuels thanks to their drop-in capability, production costs will fall due to economies of scale and eFuels will be affordable for consumers at every stage. Additionally, the upscaling and generation of by-products such as e-Kerosene, which are formed during the production of eFuels, will also reduce costs for hard-to-decarbonise sectors such as aviation and maritime transport.

Potential concerns that wider deployment of renewable fuels could lead to reduced incentives for manufacturers to further invest in efficiency improvements are unjustified. Electric mobility is a promising solution meeting a variety of mobility needs. **Introducing a crediting system alongside a carbon correction factor will create more climate-friendly choices without prompting an 'either or' in European climate-protection policy.** Providing investment security and a prospect for the use of renewable fuels will also stimulate further developments regarding the efficiency of the conventional ICE powertrain. Efficiency is important not only to reduce the overall lifetime CO_2 footprint of a vehicle, but also in terms of consumer acceptance and lowering the total cost of ownership.

INCREASING INVESTMENT INCENTIVES – MAINTAINING TECHNOLOGICAL LEADERSHIP

By revising the regulation on CO_2, the EU Commission claims to want to provide the market with long-term investment security and to maintain the technological leadership and competitiveness of the EU's automotive value chain. The eFuel Alliance strongly supports efforts to strengthen the European automotive industry while pursuing an ambitious climate policy. However, focusing on just one or two technologies neglects the fact that other climate protection solutions also need a long-term planning perspective in order to attract and channel investments. This is particularly true for hydrogen and its downstream products such as eFuels, which will be essential for decarbonising those sectors of the economy for which electrification is not a viable option. In addition to their climate protection potential, there are also huge investment and job opportunities along the value chain of the eFuels production: The export of machinery and equipment for the production of electricity-based synthetic energy carriers alone could create 1.2 million new jobs in Europe.

If Europe focuses too narrowly on the promotion of electric vehicles only, it is likely to lose its technological leadership in areas where it has been at the forefront of innovation over the last century. Fair competition between emission-reduction technologies is vital. Especially in areas where the market ramp up of the electric mobility faces challenges and difficulties, other climate-neutral options must be made available.

eFUELS: A SOLUTION THAT CAN BE DEPLOYED ACROSS THE EU – AND AROUND THE WORLD

To achieve the EU climate targets, we need solutions that work everywhere, regardless of a country's economic power, geography, or technical requirements. If emission-reduction solutions are only applicable in a few Member States that can afford to completely replace their existing vehicle fleet and infrastructure, the EU will never achieve its climate goals. A mix of e-mobility, sustainable and advanced biofuels, eFuels, hydrogen in combustion engines, fuel cells and potentially other emission-reduction technologies will not only reduce GHG emissions effectively, but it will also help to safeguard the single market for vehicles.

A similar situation applies to the second-hand market for heavy-duty vehicles: these trucks have to work not only throughout the EU, but all over the world. Since eFuels help to defossilise the stock without the need to replace the current truck or infrastructure, the energy transition can be made affordable for everyone. Therefore, much wider use of climate-neutral fuels in the near future is vital. The revision of the CO_2 emission standards for heavy-duty vehicles has the potential to be one of the main drivers for such a market uptake.

MEASURING EFFICIENCY IN THE INTERNATIONAL DIMENSION

One issue often debated in the context of eFuels is their efficiency. It is suggested that by using electric energy directly, battery electric vehicles will always have a higher degree of efficiency. However, this perspective does not take into account the international dimension of the production of hydrogen and eFuels and is therefore misleading. The efficiency of the electricity's end usage is not the only criterion for assessing the actual efficiency. It is also important to consider how efficiently electricity can be produced from renewable energies, and then made usable.[2] For example, a wind turbine in Patagonia is generating four times more electricity than it would in Germany. The higher capacity factor in favourable regions compensates for most of the efficiency losses of eFuel production. **In order to achieve a global energy transition and to leverage the potential from regions where large amounts of renewable electricity are available, international cooperation and an import strategy for eFuels on a global scale are needed.**

CONCLUSIONS

As a carbon-neutral alternative to conventional fossil energy carriers, eFuels can make a significant contribution to the global energy transition and to more climate friendly mobility. The upcoming revision of the CO_2 emission standards regulation, one of the key pieces of legislation to promote the use of renewable fuels, gives EU decision-makers the opportunity to overcome the regulation's outdated focus

[2] For more information, also see: 'Comprehensive efficiency of technologies in the transport sector', study by Frontier Economics, October 2020: The study comes to the conclusion that, if eFuels come from regions that are rich in sun and wind, the usage efficiency of battery-powered electric vehicles is almost on par with vehicles powered by eFuels.

on tailpipe emissions by introducing a **carbon correction factor** alongside the implementation of a **crediting system**. This would not only offer vehicle manufacturers complementary options to meet the new, stricter CO_2 emission targets, but also provide transport and logistics companies with more flexibility, keep supply chains intact and accelerate emissions reductions by unlocking the huge GHG savings potential of renewable fuels.

ABOUT THE eFUEL ALLIANCE

The eFuel Alliance is a stakeholder initiative committed to promoting the political and social acceptance of eFuels and to securing their regulatory approval. We represent more than 170 companies and associations along the value chain of eFuel production. We stand for fair competition and a level-playing field for all relevant emission reduction solutions. We are clearly committed to more climate protection and aim to win broader recognition of the significant contribution eFuels can make in the drive for sustainability and climate protection. Our goal is to facilitate the industrial production and widespread use of carbon neutral fuels made from renewable energy sources.