

Bosch trialing fully renewable diesel fuel **CO₂ emissions can be slashed considerably**

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- ▶ Bosch CEO Denner: "Renewable and synthetic fuels can help limit global warming."
- ▶ Cars that chauffeur board members run on fully renewable diesel.
- ▶ Company vehicles can refuel with 33 percent renewable diesel at the Feuerbach, Schwieberdingen, and Hildesheim locations.
- ▶ Bosch aims to offer renewable and synthetic fuels at all its company filling stations in Germany.

Stuttgart, Germany. Since early November, the cars chauffeuring the management board members of Robert Bosch GmbH have been running on fully renewable diesel. Known as "C.A.R.E. diesel," this fuel is synthesized mainly from by-products and waste materials. Its supplier Toolfuel claims that C.A.R.E. diesel reduces the CO₂ emissions of these cars by around two-thirds, or 65 percent, from well to wheel. "Renewable and synthetic fuels can contribute greatly to limiting global warming. Their use has a much faster ecological impact than replacing vehicles and infrastructure, as existing filling stations can remain in operation," says Dr. Volkmar Denner, CEO of Robert Bosch GmbH. For him, the consequences are clear: "Synthetic and renewable fuels should be factored into the CO₂ fleet regulation for passenger cars and trucks." Since C.A.R.E. diesel has yet to be included in the German law on the prevention of airborne pollution, it is not currently available at regular filling stations. In its trials with fully renewable diesel, Bosch wants to show if and how it could be adopted on a broad scale.

Bosch is offering partly renewable diesel at certain company filling stations

The company is encouraging the use of renewable and synthetic fuels. R33 Blue Diesel, an approved fuel made by Shell, has been available for trial and company car pool vehicles at the filling stations at the Bosch locations in Feuerbach, Schwieberdingen, and Hildesheim for some weeks now. This fuel contains up to 33 percent renewables. The carbon footprint of the more than 1,000 Bosch vehicles that regularly refuel at these three filling stations could thus be reduced by as much as 20 percent from well to wheel. On top of that, Bosch aims to make synthetic and renewable fuels available for company cars and internal delivery vehicles at all its company filling stations across

Germany. The supplier of technology and services is also gradually incorporating battery-powered electric vehicles into its fleet.

Fewer diesel vehicles mean more CO₂ emissions from Europe's road traffic

Since it accounts for 18 percent of global CO₂ emissions, road traffic also contributes to the greenhouse effect. On the upside, there has been some progress. In Germany, the CO₂ emissions of newly registered vehicles have fallen by one quarter since 2007. On the downside, the CO₂ emitted by traffic on European roads is rising again. One reason for this is the shrinking share of newly registered diesel vehicles. They have a great advantage over gasoline models when it comes to CO₂ emissions. Compared with its gasoline variant, a diesel model's carbon footprint is around 15 percent lower on average. "We need diesel and other solutions such as renewable and synthetic fuels in addition to electromobility to further reduce greenhouse gas emissions," Denner says. If renewable and synthetic fuels were widely used by European passenger cars, this alone could save up to 2.8 gigatons of CO₂ by 2050, and that is without electrification factored into the equation. This is three times the amount of carbon dioxide Germany emitted in 2016. Bosch has been exploring renewable and synthetic fuels for some time now. The company's fuel-carrying components for diesel engines, such as the fuel pump and injection nozzles, have been rigorously tested, and vehicle manufacturers are free to approve them for use with renewable and synthetic fuels.

Bosch aims to make transportation as resource-friendly as possible

Bosch is approaching future powertrain technology with an open mind. The company is committed to a vision of virtually emissions-free driving. While it will continue to improve the internal-combustion engine, it also aims to become a leader in the market for electromobility. After years of research and development effort, Bosch presented a new diesel technology in April 2018. It is capable of cutting NO_x emissions from diesel vehicles to well below the statutory 120 milligram-per-kilometer limit that will come into effect in 2020 – and it can do so in any real traffic conditions. These results were achieved in test vehicles with heavily modified engine and emission settings. The vehicles were also equipped with leading-edge technology and components, just recently introduced to the market. A combination of advanced fuel-injection technology, a newly developed air management system, and intelligent temperature management made such low readings possible. Bosch customers can now tap this system know-how to develop future lines of mass-manufactured vehicles.

Q&A about renewable C.A.R.E diesel

What is C.A.R.E. diesel?

C.A.R.E. diesel is a fully renewable fuel made mainly of by-products and waste materials, recycled cooking oils, and grease. It contains no conventional diesel – that is, fossil fuel. Neste, a Finnish mineral oil company and biofuel manufacturer, makes C.A.R.E. diesel;

the company's partner Toolfuel distributes it in Germany. C.A.R.E., a trademark of Toolfuel, is short for CO₂ Reduction, Arctic Grade, Renewable, Emission Reduction.

What does Bosch hope to gain by using C.A.R.E. diesel?

Bosch is making every effort to optimize internal combustion engines and believes diesel powertrains help reduce CO₂ emissions in road traffic. This reduction in CO₂ emissions is even greater when vehicles run on renewable paraffinic fuels such as C.A.R.E. diesel, which helps protect the environment and conserve resources.

Why only a 65 percent reduction in CO₂ emissions?

The CO₂ advantage here is that only the CO₂ emissions resulting from the conversion of waste materials into fuel are taken into account. The waste materials themselves are deemed to be CO₂ neutral, as they already exist.

What technical upgrades do vehicles need to run on C.A.R.E. diesel?

C.A.R.E. diesel is a paraffinic fuel and, as such, has a slightly lower density and higher ignitability than conventional diesel fuel. This is why regulatory authorities have drafted an additional standard, EN 15490, for paraffinic diesel fuels. The EN 590 standard applies to conventional diesel fuel. Manufacturers have to specifically approve vehicles for fuels with the properties set out in EN 15940. This is important, as they must first investigate component compatibility, potential increases in peak pressure during combustion, and other factors.

When will C.A.R.E. diesel be available at regular filling stations?

Various test fleets are already running on C.A.R.E. diesel. As it stands now, C.A.R.E. diesel is unavailable in quantities sufficient to supply filling stations on a wide scale across Europe. Also, many countries have national laws regulating the fuel sold at public filling stations. In these countries, including Germany, the EN 15940 standard has yet to be adopted. The decision to amend EN 15940 to the 10th German law on the prevention of airborne pollution is still pending.

How much does a liter of C.A.R.E. diesel cost at the pump?

With approval still pending, C.A.R.E. diesel is currently unavailable at filling stations. A liter of C.A.R.E. diesel is a little more expensive than conventional diesel fuel. This markup is due to manufacturing costs.

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