

# Formula One is moving toward hybrid engines, renewable fuel—environmental progress or just 'greenwashing'?

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For the millions of fans who tune into every race, Formula One (F1) is more than just a sport—it's the apex of aerodynamics, skill and strategy.

Behind the scenes, a quieter but more crucial race against [carbon emissions](#) is unfolding.

Given the sport's [substantial carbon footprint](#), F1 has faced criticism from society and even from its own drivers.

For example, Sebastian Vettel, a four-time F1 world champion, [expressed his concerns by stating](#):

"When I get out of the car, of course I'm thinking as well, 'is this something that we should do, travel the world, wasting resources?'"

In the pursuit of speed and sustainability, [F1 teams committed](#) in 2019 to achieving a net zero emissions goal by 2030.

As part of this goal, every team has expressed their intention to use 100% renewable fuel by 2026. F1 has also just announced it will mandate [hybrid engines with a 50–50 split](#) between electric and combustion power.

However, it is crucial to consider whether these promises to go greener are achievable or if this commitment is just an attempt to [greenwash](#) the sport.

### **Just how big is F1's environmental footprint?**

According to a report from F1, the sport releases around [256,000 tons of carbon dioxide](#) into the atmosphere every season.

While cars are often the focus, in reality, the behind-the-scenes activities have a larger environmental impact, as a Grand Prix event involves much more than just the cars on the track.

This includes everything from the transportation of teams and equipment to various international venues, to the energy used in setting up and operating the event and waste management.

A Grand Prix event features ten teams, each operating two cars, which results in a total of 20 cars in each race.

F1 cars actually contribute the least to the sport's emissions, [accounting for only about 0.7%](#).

In 2013, each car [used about 160kg of fuel](#) per Grand Prix race. By 2020, this was reduced to 100kg. F1 is now committed to use as little as [70kg of fuel per car by 2026](#).

## **Are hybrid engines a potential solution?**

The foremost priorities of hybrid engines in Formula One are efficiency and [environmental sustainability](#).

They integrate an [internal combustion engine](#), batteries and an energy recovery system.

Compared to conventional internal combustion engines, the inclusion of batteries allows F1 cars to deliver rapid power more efficiently. The instantaneous torque provided by [electric power](#) significantly enhances acceleration out of corners, contributing to overall performance improvements.

Hybrid engines also reduce [fuel consumption](#) compared to traditional engines.

The hybrid system includes the Motor Generator Unit-Kinetic (MGU-K) and the Motor Generator Unit-Heat (MGU-H). The MGU-K converts

[kinetic energy](#) from braking into [electrical energy](#) and stored in the battery, which boosts acceleration and speed. The MGU-H uses heat energy from exhaust gases to increase engine power.

This configuration not only conserves fuel but also maximizes energy use, thereby reducing carbon emissions and enhancing environmental sustainability.

## **Will these changes reduce the sport's environmental impact?**

To reduce the environmental impact of F1 cars, fuel plays a major role. [F1 started with 10% sustainable fuel](#) ("E10")—a blend of 10% renewable ethanol and 90% fossil fuel.

From 2026, they are determined to shift from 10% to 100% renewable fuel, which is synthesized by municipal waste or non-food biomass.

However, renewable fuels still produce carbon emissions—burning [renewable fuel](#) does release carbon dioxide but the emissions are offset by the carbon dioxide absorbed from the atmosphere during the fuel's production, rendering it carbon neutral overall.

While the hybrid system will remain in place in 2026, given the complexities and cap on engine-specific costs, modern F1 cars will scrap the MGU-H and solely rely on the MGU-K.

Moreover, F1 is committed to increasing the energy efficiency of MGU-K to harvest more braking energy. Consequently, it aims to increase power output of MGU-K [from 120kW to 350kW by 2026](#), nearly tripling it.

As for its broader carbon footprint, F1 has also pledged to incorporate re-purposing and recycling options for race weekend materials, batteries, and MGU-K. This will help minimize waste and the sport's carbon footprint.

Because the carbon footprint of F1 cars is relatively small, the sport should focus its efforts on reducing emissions in transportation, logistics and fan activities.

Likewise, hosting Grand Prix races in various countries across different continents requires extensive logistical arrangements and travel. For instance, the F1 racing series in 2023 visited 20 countries across five continents, resulting in significant carbon emissions.

Consequently, F1 should consider hosting races within a single country or at least within a single continent.

## **Can F1 cars go fully electric?**

For the sustainability of the sport, a transition to 100% electric cars is likely in the future. This transition can benefit from the experiences gained with [Formula E](#), which employs fully electric vehicles.

However, several factors must be considered before fully electrifying F1 cars, including regulation changes, battery weight, battery safety and charging infrastructure.

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