



"Racing Toward a Green Future: The Emissions Battle between Formula 1 and Formula E"

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Two sports catch my attention: BMX, which I have practiced for a few years, and Formula 1, which I try to follow every season. Recently, the Formula E race on April 14 in Misano, Italy, caught my attention, and at the end of the circuit, the inevitable question arose about the "CO2 emissions comparison?" between the two categories. Formula 1 and Formula E represent two very different visions of motorsport, each with its particular focus on sustainability and carbon emissions.

Here I detail a comparison of their CO2 emissions:

Formula 1 CO2 Emissions:

Although Formula 1 has made efforts to be more sustainable, it still largely depends on fossil fuels. The engines in F1 cars have been hybrid since 2014, combining internal combustion engines with energy recovery systems. However, each F1 car emits a significant amount of CO2 during a race¹. Additionally, the transportation of equipment to various locations around the world also contributes significantly to its carbon footprint.

In 2019, F1 announced its goal to become carbon neutral by 2030, which would include reductions in emissions from racing and operations. Wider spectrum of emissions: Besides the direct emissions from the cars in the races, the logistics of moving the "F1 circus" around the world (including cars, equipment, personnel, and hospitality) constitute the bulk of its carbon emissions.

Formula E CO2 Emissions:

In contrast, Formula E was designed with sustainability as one of its fundamental pillars. By using fully electric cars, the direct CO2 emissions from the races are zero. However, the production of electricity to charge the cars, depending on the source, may involve associated carbon emissions. Formula E also works to minimize its carbon footprint in aspects such as logistics and transport, opting for race locations that reduce the need for extensive air transport and using sustainable materials whenever possible.

¹ The race includes three official practice sessions, the qualifying – sprint race*, and the main event.



Sustainability Initiatives:

Formula E also undertakes sustainability initiatives, such as ISO 20121² certification for sustainable events, and promotes the use of renewable energies both on and off the track.

Direct Comparison of Environmental Impact:

Formula E has a significantly lower environmental impact in terms of CO₂ emissions related to the propulsion energy of the cars compared to Formula 1. However, both championships are working towards reducing their total carbon footprint, including operations and logistics.

Carbon Reduction Strategies:

While Formula 1 focuses on hybridization and fuel efficiency as part of its long-term strategy to reduce emissions, Formula E focuses on complete electrification and the promotion of clean technologies.

Both categories are taking significant steps towards sustainability, albeit with different approaches and technologies. Formula 1 is attempting to improve within the existing paradigm of combustion engines, while Formula E represents a radical shift towards electrification and sustainability in motorsport.

Providing exact figures on CO₂ emissions for Formula 1 and Formula E is challenging due to the complex and constantly evolving nature of both sports, as well as variability in the energy sources used to charge the Formula E cars. However, I will provide a general idea based on available data.

Formula 1 Total Emissions:

Formula 1 has reported that its total carbon footprint averages approximately 256,551 tonnes of CO₂ per season. This number includes everything from logistics and transportation to on-track operations.

Emissions per Car, per Race:

The direct emissions from an F1 car during a race are relatively low compared to the total, with estimates suggesting around 0.24 tonnes of CO₂ per car, per race, just for the fuel burned.

Formula E Total Emissions:

² ISO 20121 is an international standard that sets the requirements for sustainability management in events. It was developed with the goal of helping organizations plan, implement, and improve their sustainable management practices across all types of events, from conferences and concerts to trade shows and festivals. For more information, visit www.normasiso.org/norma-iso-20121.



Formula E has been less specific about its total emissions, but its commitment is to have a net-zero carbon impact, offsetting its emissions through carbon credits and sustainability projects, with emissions for season 8 totaling 33,800 tonnes of CO₂.

Emissions per Race:

The direct emissions from the cars in the race are zero because they are fully electric. However, emissions associated with the generation of electricity to charge the cars depend on the energy mix of the host country of the race. Formula E tries to use renewable energy whenever possible to minimize this impact.

CO₂ Savings Comparison:

Directly comparing CO₂ savings between Formula 1 and Formula E is complicated without specific and comparable data. However, the adoption of electric vehicles in Formula E eliminates CO₂ emissions at the source (i.e., on the track), which represents significant savings compared to F1 cars that burn fuel. Additionally, Formula E's sustainability initiatives to minimize its environmental impact across all areas of operation contribute to an overall saving in carbon emissions compared to a more traditional approach to car racing. For its part, Formula 1 made a significant change in air logistics by switching from the Boeing 747 to the much more environmentally efficient Boeing 777 and meeting its sustainability commitments and goals to become carbon neutral by 2030.

The information provided is based on a general understanding of the sustainability policies and practices of Formula 1 and Formula E, derived from public reports, statements from the governing bodies of both sports, and analysis available in the public domain.

Finally, outside the discussion of the green future in speed sports, it is always fascinating to see how these cars accelerate from 0 to 100 km/h in 2.8 seconds in the case of Formula E and from 0 to 100 km/h in 2.6 seconds for Formula 1, with top speeds of 322 km/h for electric cars and 372.5 km/h for combustion cars, a difference that is sure to continue to reduce with current technological advancements.

