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The Paris 2024 Games: a far lower carbon footprint than previous editions

APRIL 2025

The carbon impact of the Paris 2024 Olympic and Paralympic Games is estimated at 2.085 million tCO_2-eq (tonnes of CO_2 equivalent). This is approximately half the average for the London 2012 and Rio 2016 Games, and equivalent to the Tokyo 2020 Games, which were held without spectators. The Paris 2024 Olympic Games thus marked a major step forward in considering climate impact when organising sporting events. Above all, the strategic decision made ahead of the Games to maximise the use of existing infrastructure played a key role in keeping emissions under control. However, there remains room for improvement particularly in transport-related emissions. These account for nearly two-thirds of the Games' carbon footprint, with 80% of those emissions linked to spectators traveling from other continents—despite making up only 10% of total attendance.

A CARBON FOOTPRINT BELOW PREVIOUS SUMMER GAMES AND RECENT MAJOR FRENCH SPORTING EVENTS

Using the methodology recommended by the International Olympic Committee (IOC) [1], a study conducted by Ernst & Young for the French Ministry of Ecological Transition [2] estimates that the Paris 2024 Olympic Games generated approximately 2.085 Mt CO_2-eq.

This is roughly half the average for the London and Rio Games, and on par with the Tokyo Games, which took place without spectators during the COVID-19 pandemic. Relative to the number of tickets sold or spectators, the Games' carbon footprint is also meaningfully lower than that of other recent major international sporting events (MISE) hosted in France. On average, a visitor to the Games emitted 0.52 tCO_2-eq, compared with 0.92 tCO_2-eq for the Rugby World Cup in 2023 (*table 1*).

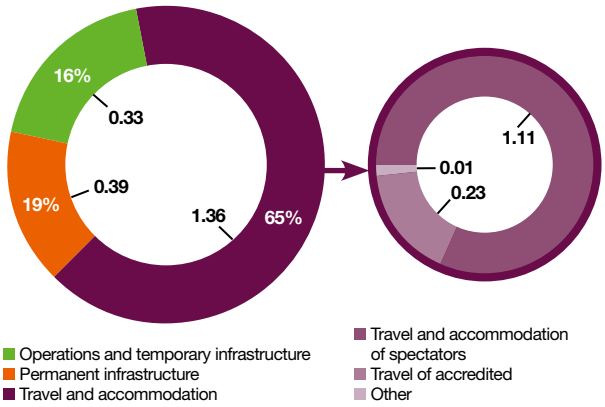
The IOC's methodology divides greenhouse gas (GHG) emissions into three spheres of responsibility, reflecting the extent to which the Organising Committee for the Olympic and Paralympic Games (OCOG) and its partners can influence them (*see box*). Sphere 1 covers emissions directly under OCOG's responsibility for preparing and staging the Games. It includes a variety of sources related to operations and temporary infrastructures. Emissions in this sphere totalled 0.33 Mt CO_2-eq, accounting for 16% of the total footprint. Sphere 2, which covers emissions linked to the construction of permanent infrastructure only, managed by the Olympic delivery authority (Solideo), accounts 0.39 Mt CO_2-eq or 19% of the total footprint. Finally, sphere 3, consists mainly of indirect emissions associated with the travel and accommodation of spectators and accredited participants (such as the National Olympic Committees, media, etc.), represents two-thirds of Games-related emissions (65%), amounting to 1.36 Mt CO_2-eq (*graph 1*).

Table 1: carbon footprint and CO_2 emissions comparison for the 2012-2024 Olympic Games and other major sporting events hosted in France

	Olympic and Paralympic Games				French MISE	
	London 2012	Rio 2016	Tokyo 2020	Paris 2024	Rugby WC 2023	Ryder Cup 2018
Total carbon footprint (in Mt CO_2-eq)	**3.3**	**4.5**	**2**	**2.1**	**0.08**	**0.05**
Tickets scanned (in millions)	10.9	9.9	0	10.7	2.4	0.2
Total CO_2 emissions/ticket scanned (in tCO_2-eq)	0.30	0.45	-	0.19	0.35	0.20
CO_2 emissions/spectator (in tCO_2-eq)	Not known	Not known	-	0.52	0.92	Not known

Source: *EY study for the General Commission for Sustainable Development*

Graph 1: GHG emissions from the Paris 2024 Olympic Games by sphere of emissions
Emission levels in Mt CO_2-eq, % share



Reading: 65% of the emissions produced by the Games came from travel and accommodation, accounting for 1.36 MCO_2-eq.
***Source:** EY study for the General Commission for Sustainable Development based on data from Paris 2024, Solideo and an EY-CGDD survey of Paris 2024 ticket holders*

HEAVY USE OF EXISTING FACILITIES, SIGNIFICANTLY CUTS CO_2 EMISSIONS

The drop in carbon impact of the 2024 Games versus earlier summer Games comes primarily from sphere 2 (permanent infrastructure), thanks to the organisers' decision to use 95% already built or dismountable facilities and to Solideo's efforts on construction methods. Emissions from building and renovation of permanent infrastructure, at 390 kt CO_2-eq, are by far the lowest of the last four Summer Games. By comparison, emissions associated with the construction of new infrastructure amounted to 2,030 kt CO_2-eq for London 2012, 1,590 kt CO_2-eq for Rio 2016, and 1,500 kt CO_2-eq for Tokyo 2020. The construction of the Athletes' Village accounts for more than a third (35%) of the GHG emissions in this sphere. Sports facilities — such as the construction of the Arena Porte de la Chapelle and the renovation of the Stade de France, Roland Garros and various stadiums and gymnasiums — make up around a fifth (19%) of the emissions in this sphere[1].

In a conservative approach, and in line with the IOC's methodology, all the emissions resulting from the construction and outfitting of the infrastructure delivered by Solideo were attributed to the Games' carbon footprint. The ambitious real estate programme will see the Athletes' Village converted into new housing in Saint-Denis, while facilities such as the Olympic Aquatics Centre will serve genuine local needs for housing and community amenities[2].

If these buildings actually replace equivalent constructions in the near future, the real carbon impact attributed to the Games would be considerably reduced[3]. On the other hand, the low level of new construction may have caused a rebound effect on demountable structures within sphere 1. However, with 100 kt CO_2-eq emitted, this effect remains very limited — higher in London and Tokyo, but yet far below Rio.

Efforts focused on operations including logistics, organising-committee offices, energy use, merchandising, etc. (sphere 1, excluding temporary infrastructures and travel managed by OCOG) kept emissions to around 200 kt CO_2-eq,

BOX

Breaking down the IOC's methodology into three spheres

Sphere	Liability	Description	Main sources of emissions
Sphere 1 Preparation and operations	OCOG's direct responsibility	This sphere of programming covers all activities required to prepare and stage the Games, from the bid phase to the end of event.	• Organising committee offices • Logistics and energy use • Games Branding and visual identity • Merchandising • IT and electronic services • Temporary infrastructures • Waste management • Food and beverages on site • Sports materials and equipment • Security • ...
Sphere 2 Construction of permanent infrastructure	Responsibility of OCOG's partners (Solideo, etc.)	This sphere of emissions includes all construction of infrastructure and permanent venues that would not have existed without the Games, plus the renovation of existing venues.	• Construction and renovation of competition venues • Post-Games transformation of sites • Urban infrastructure and transport linked to the sites
Sphere 3 Associated activities	Little or no responsibility OCOG and/or its partners	• This sphere includes all the activities of other stakeholders over which the organising committee has a moderate influence, in particular the behaviour of spectators. • For simplicity, this is called "Spectators" in this document.	• Travel to the host country and within host cities by spectators and accredited populations • Travel by spectators to the torch relay • Spectator accommodation • National Olympic Committee pavilions (Club France), sports federation and sponsors pavilions • Uniforms not ordered by the OCOG • Urban activities

***Source :** IOC, Carbon footprint methodology for the Olympics Games, 2018*

[1] Seine-sanitation works, whose construction was not contingent on the Olympic & Paralympic Games, were therefore excluded from the footprint calculation and are being assessed in a dedicated study.
[2] The Seine-Saint-Denis department has the lowest density of aquatic facilities to its population, and one of the highest proportions of residents who cannot swim.
[3] Allocating the emissions from new buildings in proportion to their use would, however, also require allocating the construction emissions of existing venues on the same pro-rata basis.

i.e. 10% of the overall footprint. The result is better than Paris had forecast before the Games, thanks to a range of measures — such as sustainable procurement strategy centred on the circular economy, connecting venues to the electricity grid, responsible sourcing and a more plant-based catering offer and other measures —, but given the greater number of temporary infrastructures, emissions remain equivalent to the average for previous Games. Emission cuts were particularly notable in the areas of catering (12 kt CO_2-eq versus 30 kt CO_2-eq in Rio), sports material and equipment (2 kt CO_2-eq CO_2 versus 9 kt CO_2-eq in Rio) and energy use (7 kt CO_2-eq versus kt 60 CO_2-eq in Rio or 32 kt CO_2-eq in London). However, due to growing usage, digital-related emissions (60 kt CO_2-eq) and the other remaining emissions are equivalent or even higher than at previous editions.

However, the analysis of the operations carbon footprint should be interpreted with caution. Comparisons with previous Games are made based on data published by each Organising Committee for the Games, which may adopt slightly different boundaries by excluding certain items[4], thus undermines comparability. On this basis, it is difficult to compare travel funded by OCOG across different editions of Games. In addition, some assumptions about equipment reuse need to be refined and including the deployment of military forces — especially air and naval units, difficult to estimate — could increase this result. Conversely, actions taken by Paris 2024 (such as connecting venues to the public power grid) may generate long-term emission reductions that are not captured here.

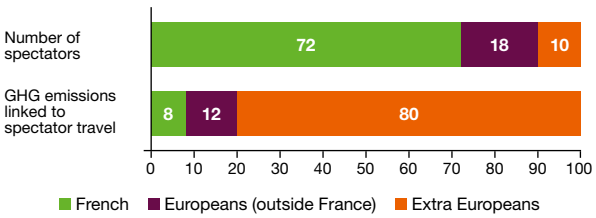
INTERNATIONAL SPECTATOR TRAVEL ACCOUNTS FOR NEARLY HALF OF THE GAMES' CARBON FOOTPRINT

In sphere 3, spectator-related carbon impacts depend on the number, origin, and means of transport of spectators and, to a lesser extent, their accommodation. Based on a survey of 100,000 ticket holders and ticketing data, the number of spectators is estimated at 3.6 million, including 1.12 million from abroad, of whom around 0.4 million are non-European (*graph 2*).

On average, a spectator generates 0.3 tCO_2-eq to travel to France. However, this carbon footprint varies significantly on their country of residence: it is 0.2 tCO_2-eq for European spectators, who travel by short-haul flight, car or train, and 2.14 tCO_2-eq for non-European spectators (*graph 3*). Thus, most emissions in this category come from long-haul air travel. Non-European spectators, who represent only 9% of all spectators, account for 80% of transport-related emissions.

Graph 2: breakdown of spectator transport-related GHG emissions by area of residence (excluding residents of the Paris region)

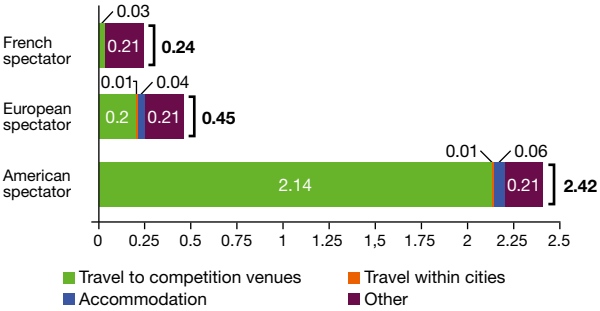
As a % of



Note: only emissions linked to transport from the place of residence to the competition venues are taken into account in the above graph.
***Source:** EY study for the General Commission for Sustainable Development*

Graph 3: comparison of average GHG emissions generated by spectators traveling from America, Europe, or within France to the 2024 Olympic Games

In t CO_2-eq



Note: the amount of GHG emissions from the Games' other emission items, which do not depend on origin of the spectators, have been divided equally between all spectators (i.e. 0.21 t CO_2-eq per spectator).
***Source :** EY study for the General Commission for Sustainable Development*

The transport of all spectators to France (or to the competition venues for those living in France) accounts for almost 1 Mt CO_2-eq, making it the largest single source of emissions in the Games' inventory. With the travel of accredited officials, total mobility-related emissions reach 1.24 Mt CO_2-eq — more than half of the Games' overall carbon footprint.

Sphere 3 emissions also include intra-city and inter-city travel (41 kt CO_2-eq - kept down by the use of active modes and public transport, and city-centredgames), spectator accommodation (74 kt CO_2-eq) and other additional sources (50 kt CO_2-eq). These emissions represent nearly two-thirds of the event's total carbon footprint. Emissions generated by spectator travel and accommodation amount to just over 1.1 Mt CO_2-eq, roughly matching London 2012 (around 1 Mt CO_2-eq) and remaining below Rio 2016 (almost 2.5 Mt CO_2-eq). Comparison with Tokyo is not meaningful, as those Games were held without spectators.

WEIGHING THE IMPACT: WHAT PARIS WOULD HAVE LOOKED LIKE WITHOUT THE GAMES?

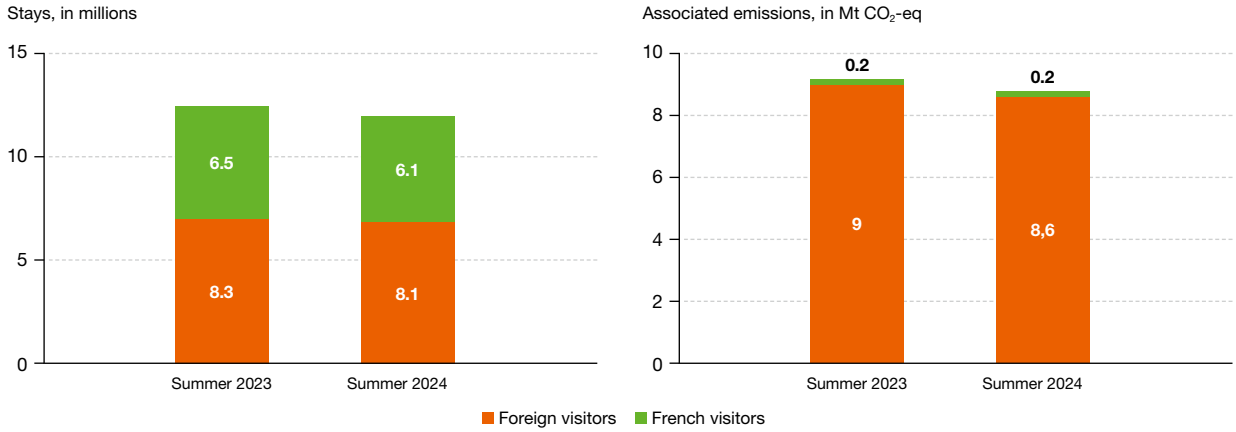
To understand the true climate impact of the Games, we also need to consider the emissions that would have occurred without the event. Indeed, hosting the Games may have displaced some of the usual tourists, and the Olympic Games spectators may have replaced them.

A comparison of tourism numbers, spending and geographical mix in the Paris Region during the Paris 2024 Games with the summer of 2023, considered a typical tourist season, shows a slight decrease (-2%) in the number of foreign tourists in the region between June and September 2024. This drop could be linked to reduction in by 4% of tourism-related GHG emissions in Île-de-France (i.e., about 400 kt CO_2-eq) between 2023 and 2024 (*graph 4*).

Conversely, the global exposure of the Games, which showcased France as a travel destination, may spur future tourist arrivals and the associated emissions. Therefore, the longer-term impact should also be assessed.

[4] For example, London excludes premises, logistics, sports equipment, uniforms, on-site catering, waste and security; Rio excludes uniforms, merchandising, waste management, security and the torch run; Tokyo excludes committee premises, sports equipment, uniforms, on-site catering and waste.

Graph 4: number of stays in Paris Region by foreign and French visitors during the summers of 2023 and 2024 and CO_2 emissions associated with their visit



Reading: 8.3 million foreign visitors came to Paris Region during the summer of 2023. Their travel and accommodation emissions estimated at 9 Mt CO_2-eq.
Note: a stay corresponds to a journey with at least one overnight stay.
Scope: stays in Paris Region by French and foreign visitors during the June to September periods in 2023 and 2024.
***Source:** EY-CGDD survey of Paris 2024 ticket holders. Calculations by EY*

WHAT ARE THE KEY LESSONS FOR ORGANISING FUTURE MEGA INTERNATIONAL SPORTING EVENTS?

Several takeaways emerge from this assessment, both for minimising the carbon footprint of future MISEs and for improving the measurement of that footprint.

In organisation terms, the biggest gains came from strategic decisions made before the Games, enabling emissions to be avoided, rather than reduced, by using existing infrastructure as much as possible. By contrast, the effect of the measures taken by Paris 2024 suggests that there is little additional room for further reductions on the operational side.

As for spectator flows, which account for most of the emissions, ways could be explored to reduce their impact. For instance, reducing the spread of venues and geographically targeting the closest spectators would help cut GHG emissions. However, such a strategy should also be assessed considering its socio-economic impact to ensure its viability.

The methodological guide published by the IOC in December 2018 [1] provides a solid framework for the scope and method of calculating the carbon footprint. Now, there is a major challenge to establish a robust method for data collection — particularly four counting spectators — and to keep harmonising and improving the transparency of these assessments for future Games.

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[1] International Olympic Committee, *Carbon footprint methodology for the Olympics Games*, December 2018.
[2] EY report for the CGDD, *Assessment of the carbon impact of the Paris 2024 Olympic and Paralympic Games*, April 2025.

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Legal deposit: April 2025
ISSN : 2255-493X (online)

Publication manager: Brice Huet
Editor in chief: François Leray
Editorial coordination: Laurianne Courtier
Layout and production: Agence Efil, Tours

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