INTERNATIONAL ORIENTEERING FEDERATION

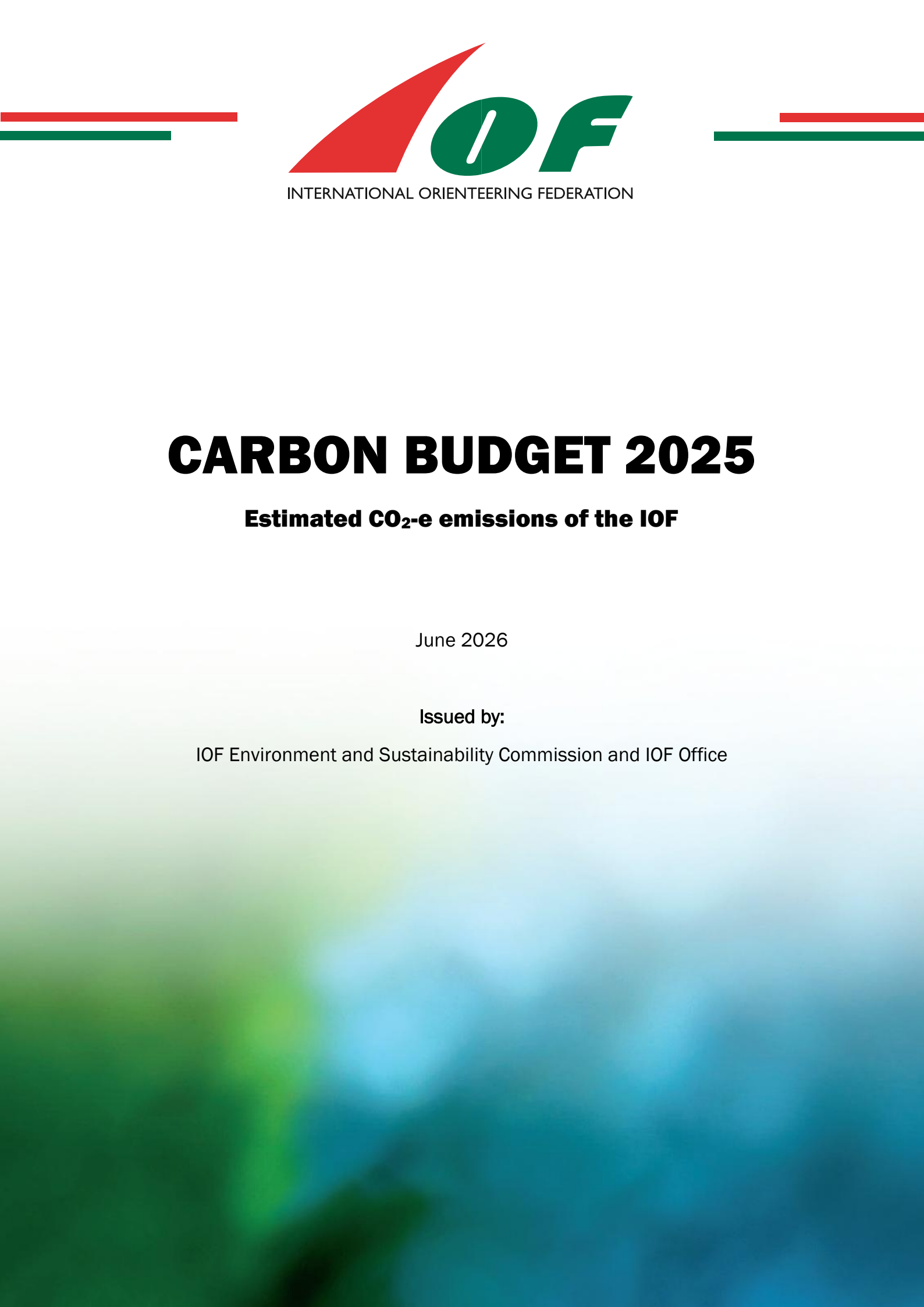
CARBON BUDGET 2025

Estimated CO_2-e emissions of the IOF

June 2026

Issued by:

IOF Environment and Sustainability Commission and IOF Office



Foreword

The IOF joined the UNFCCC/IOC initiative Sports for Climate Action[1] in 2019, recognising the role that sports organisations can play in the effort to mitigate the climate change, not only by reducing their own contributions to GHG emissions, but also by inspiring athletes and fans towards responsible behaviours.

A central element of our commitments has been the measurement of our emissions and the publication of a carbon budget which we started in 2019 (that was taken as our "baseline" year) and have been updated annually. The 2025 budget is the seventh consecutive edition. Taken together, these budgets illustrate our progress towards carbon neutrality.

In 2021 the IOF signed the commitments of the Race to Zero[2] campaign, that is, to halve emissions with respect to the baseline by 2030 and to reach carbon neutrality by 2040. The IOF **decided to exceed the goals by keeping under the level of emissions of 50% of the base year** (2019) **throughout the whole period until 2030**, instead of a gradual approach.

This goal was also achieved in 2025.

[1] https://unfccc.int/climate-action/sectoral-engagement/sports-for-climate-action

[2] https://unfccc.int/climate-action/race-to-zero-campaign.
Setting a target of 50% emissions reduction by 2030 vs the baseline and a net-zero by 2040.
Measure, report and publicly disclose the climate footprint and emissions reductions progress.
Plan for reaching net zero emissions.
Communicate the commitment to stakeholders and the general public.

Definition of the perimeter

The IOF carbon budget considers the CO2-e[3] emissions of the organisation, not those of the wider orienteering movement. Although these represent only a fraction of the sport's overall impact on the climate, we believe that focusing on the IOF as an organisation, including all that falls under its direct control and responsibility, means "leading by example" and showing the way for National Orienteering Federations and clubs.

Therefore, the carbon budget encompasses the activities of the IOF President, Council, CEO, Secretary General, Office and Commissions, all together around 120 persons, the majority operating in European countries, but with a growing number of people from other continents.

Main outcome

The goal of keeping emissions below the limit of 50% of the baseline was achieved also in 2025; indeed, **emissions in 2025 were slightly more than a quarter (26%) of the baseline**. Emissions returned to the 2023 level reversing an upward trend of the post-COVID years.

That upward trend had been certainly a consequence of a fully recovered level of activities after the pandemic, but it raised concerns that imposed a detailed analysis of the underlying causes.

However, it is necessary to clarify that all of the emissions reduction reported for 2025 is due to a **significant downward revision of the DEFRA emission factors for air travels** and not to a reduction of travels, which, in fact, showed a slight increase. This will be discussed in more detail later.

[3] There are a number of different greenhouse gases (GHG), each with a capacity to trap infra-red radiation and a lifetime of its own (CO_2, CH_4, N_2O, NF_3, SF_6, HFCs). For simplicity, the common measurement unit for GHG emissions is the CO_2-equivalent (or CO_2e), or the amount of CO_2 that has the same greenhouse effect.

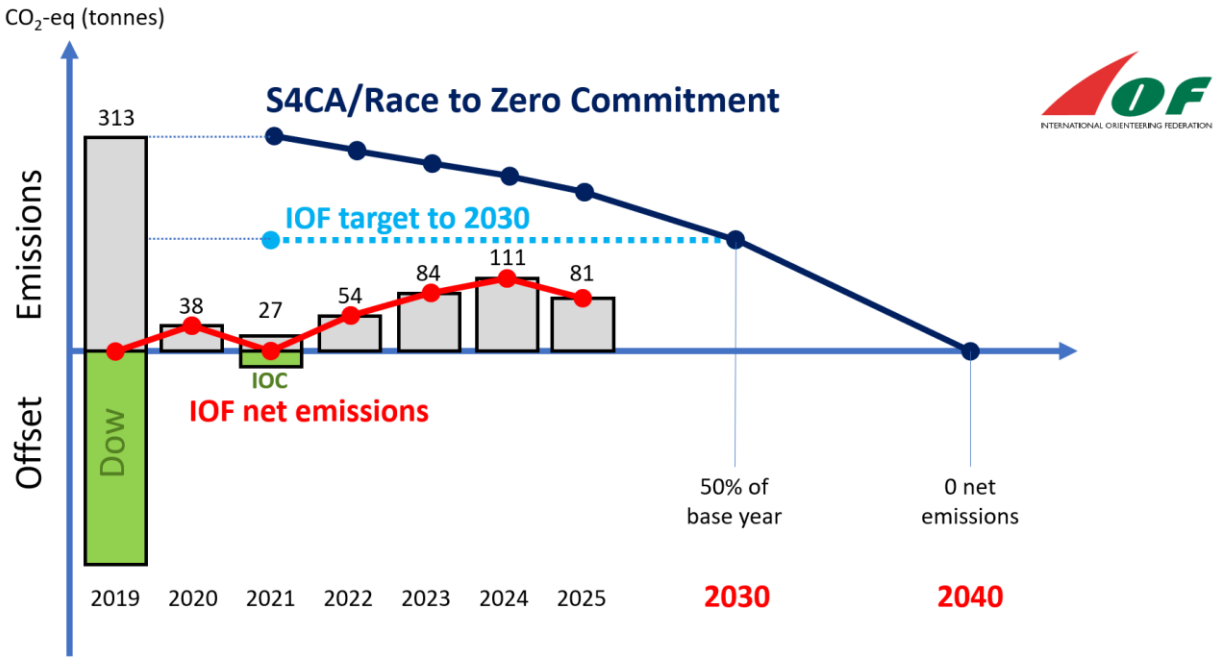


Figure 1 – IOF GHG emissions from 2019 (baseline) to 2025. Grey columns represent actual emissions, green areas emissions offset by carbon credits and the red line the balance of the two components. The black line represents the commitments of the "Race-to-zero" initiative and the blue dotted line the IOF's own commitments.

Discussion

The year 2023 was the first after the outbreak of the Covid-19 pandemic in 2020 to witness an almost complete programme of orienteering events worldwide; 2024 and 2025 can be considered years in which international competitions returned fully to pre pandemic levels.

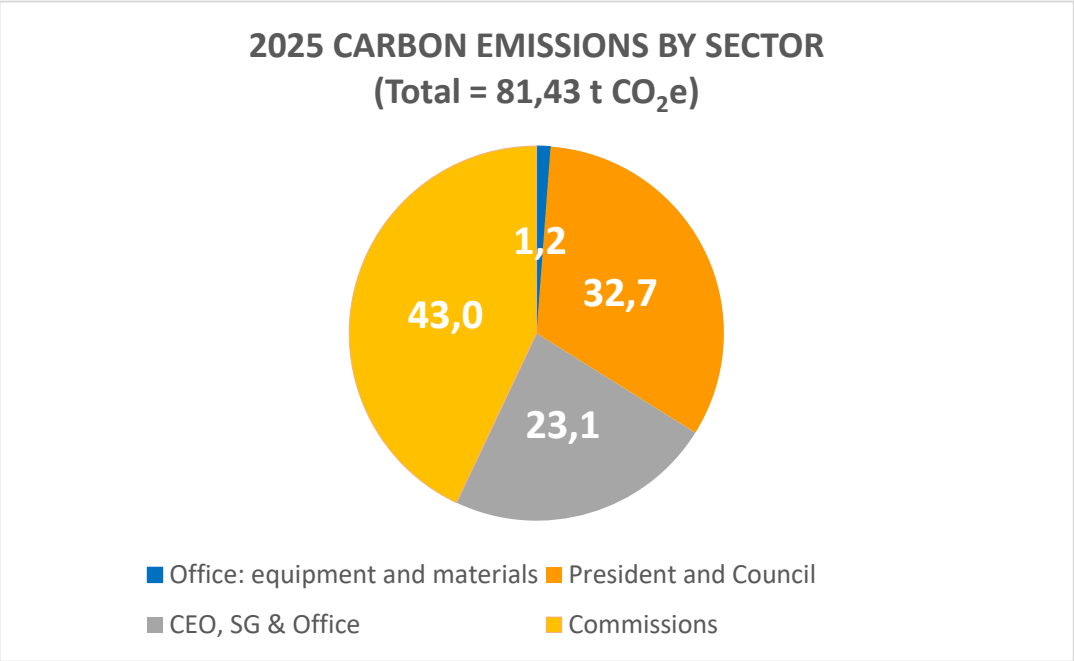
Emissions due to the organisation of events are outside the scope of the IOF carbon budget, in its present form, but the presence of IOF representatives (President or Council Members) and of IOF Office staff is included in the Organisation's functions. This, of course, required travel and accommodation related emissions that were included in the carbon budget.

Indeed, the ambition of the IOF to expand orienteering worldwide has the inevitable consequence of increasing travel needs outside the traditional centre of gravity of Central and Northern Europe. For example, the annual Joint meeting of Council, Office and Commissions was held in Turkey in 2025, whereas it had been held in Germany, Poland and Czechia in the recent past; the World Games 2025, which include Orienteering in their programme, were held in China with preparatory phases as well as a representation during the Games required for Office staff and Council representatives.

Identification of sources

The analysis of sources takes into consideration two aspects:

- the sectors of the organisation responsible for emissions (President & Council, Commissions, Office staff, including CEO and Secretary General);
- the origin of emissions (type of transportation, hotel accommodation, videoconferences, office running).



The travels of President and Council members are due to three major causes:

- two in-person meetings (there were four in the base year and before) that are still deemed necessary despite the introduction of videoconferencing;
- the presence of the President or Council members representing the IOF at international orienteering events, in particular towards local authorities, local organising committees and athletes;
- the participation of the President, CEO and Secretary General in meetings of international sports organisations in representation of the IOF.

Similar considerations for the CEO, SG and Office staff that are a necessary support to event organisers to ensure the observance of high-quality standards and for interactions with media producers.

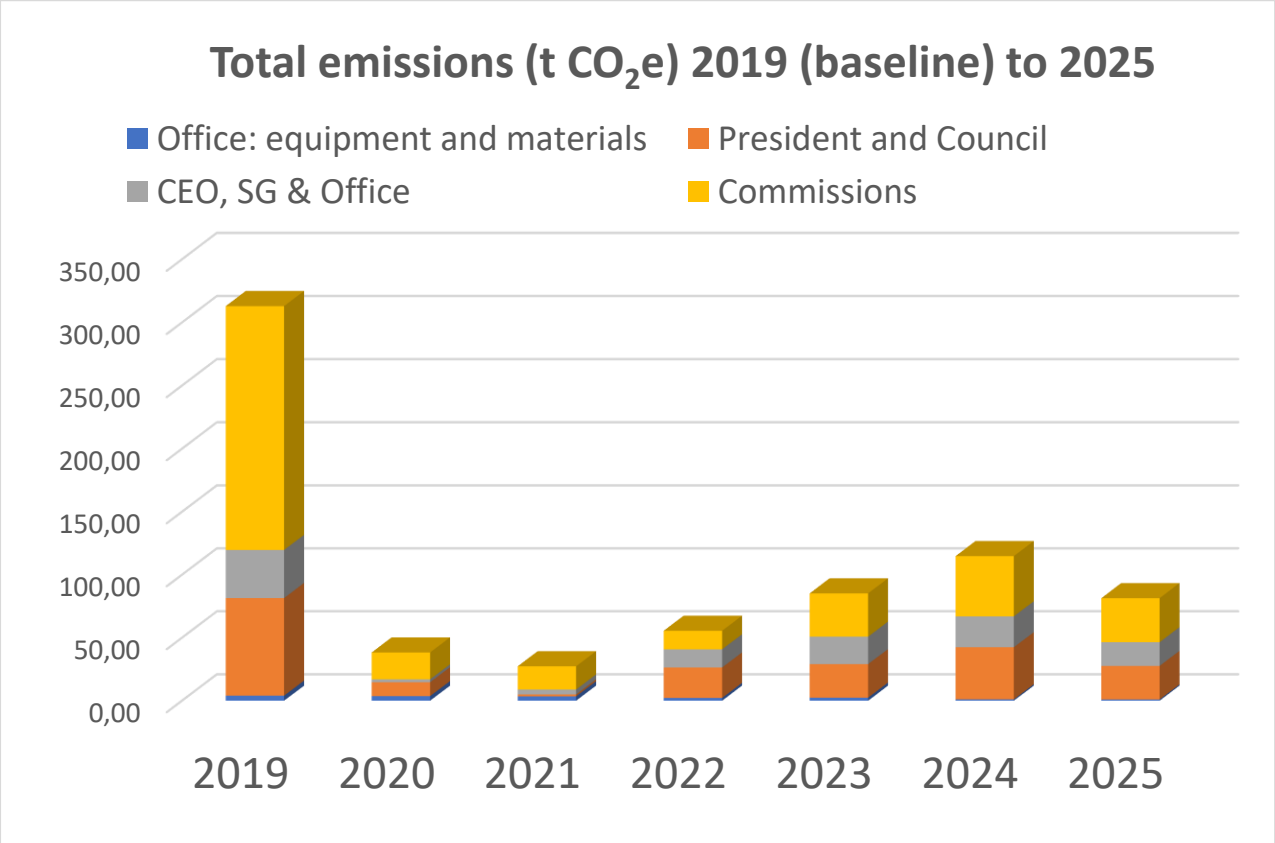
As for the Commissions, whose emissions represent 43% of the IOF total, it must be clarified that the number of people involved is significantly higher than those of the two former sectors combined, and that their meetings are now mainly run as videoconferences.

In order to reduce the number of in-person meetings, the Office, Council members and Commission Chairs received a full Office 365 licence in 2020, including the teleconferencing platform MS Teams and the shared storage space One Drive. This decision proved extremely successful not only in the reduction of mobility-related CO_2 emissions,

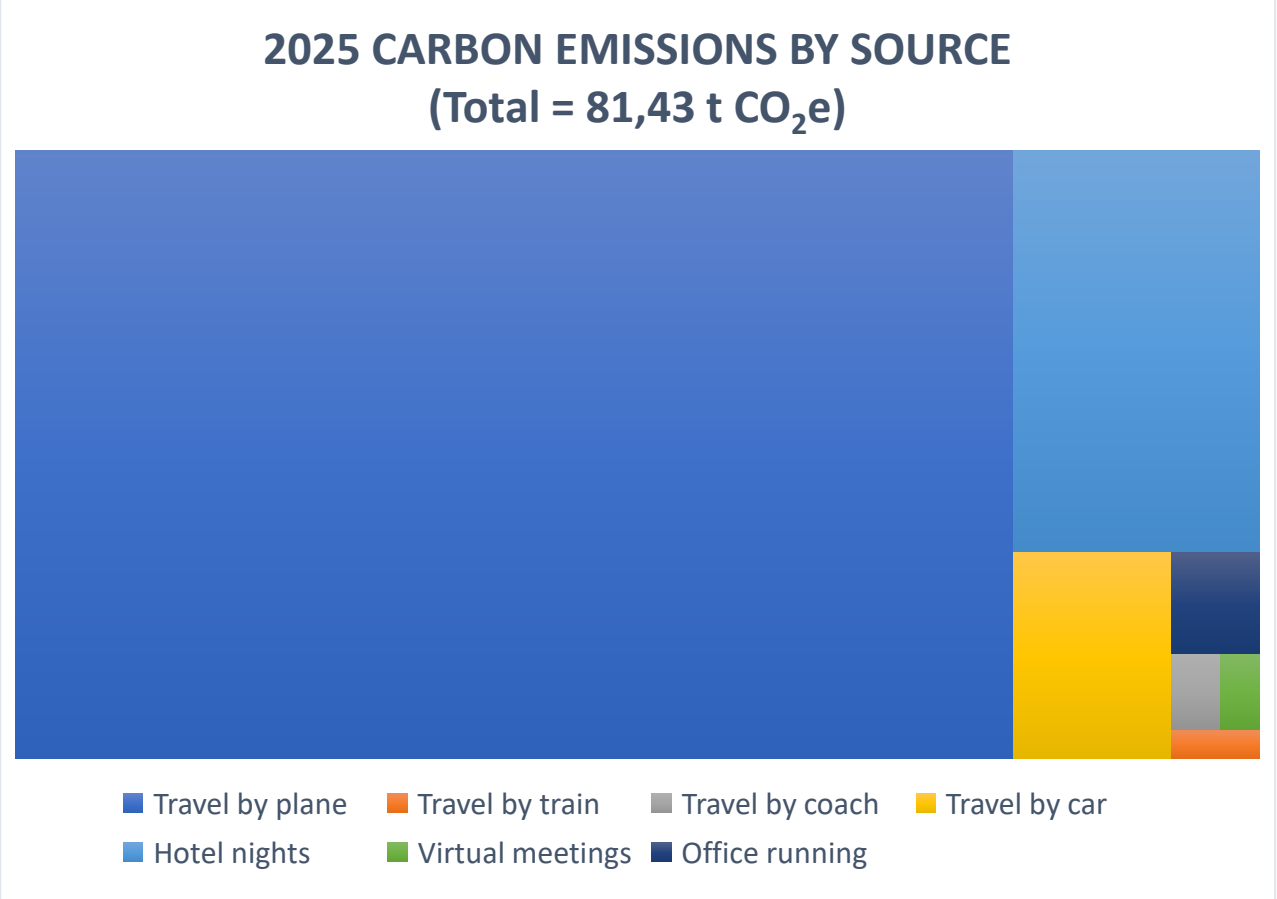
but also in allowing uninterrupted communications within and between the different groups.

Indeed, teleconferencing allowed for more frequent meetings, often managed in a more orderly way, and certainly more convenient for participants and cheaper for the IOF and Member Federations. Drawbacks exist, but they are less significant: the need to accommodate for different time zones, shorter meetings and, in some cases, less effective one-on-one interaction.

The effect of these decisions on the IOF carbon budgets is easily appreciated by looking at the dramatic reduction of emissions: in 2020 the emissions had dropped from 313 to 38,3 t CO_2e and in 2021 they were less than 1/10 of the baseline (27,3 t). The easing of COVID-19 restrictions on travel and events in 2022 saw a slight increase of emissions to 53,7 t and a further increase to 83.8 t in 2023 and to 110,5 t in 2024, with a full return to normality after Covid-19.



As in the previous reporting periods, travel is, in relative terms, the dominant emission cause (85.4%; or 98.4% including hotel accommodation). However, the forced reduction of activities imposed by Covid-19 in 2020 and 2021 and the measures introduced by the Council thereafter have significantly reduced its impact in absolute terms with respect to the baseline.



The international nature of the IOF makes flying the almost unavoidable choice when physical presence at meetings is required and it accounts for 94.0% of all mobility-related emissions and 80.2% of global emissions.

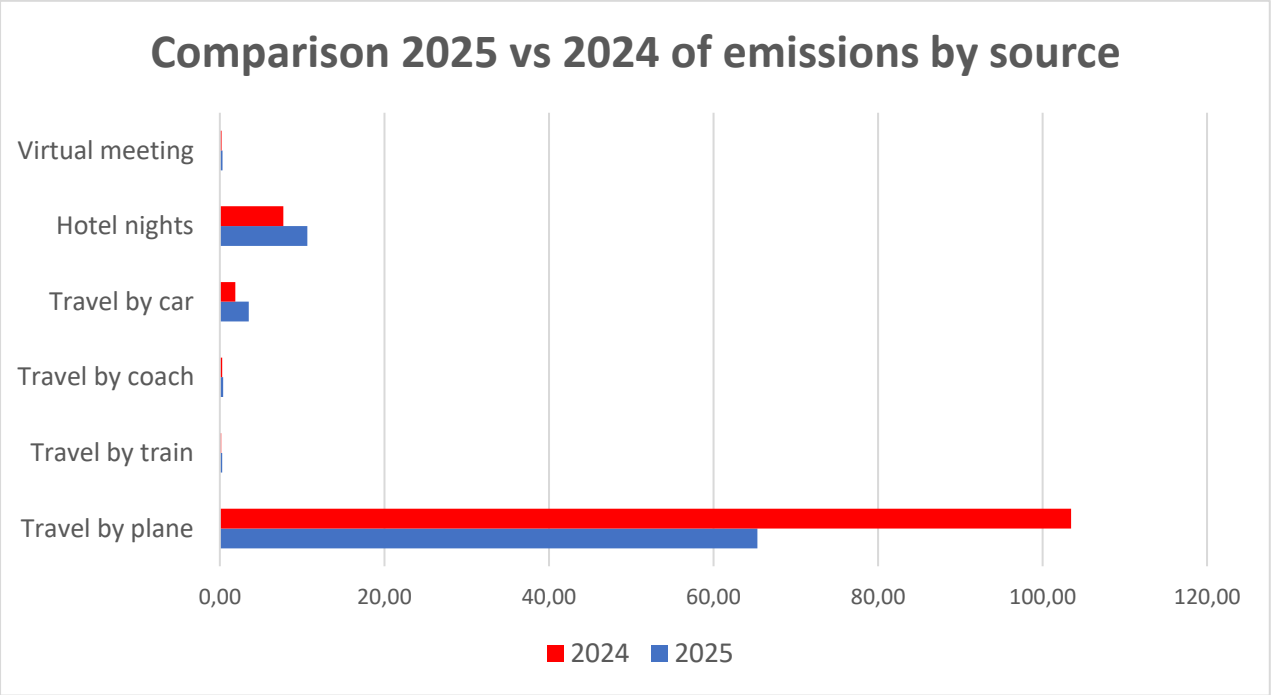
Travels by train remained on the same level as 2024, whereas distances covered by car increased by 78.0% (and corresponding emissions by 87.2%). Trains are by far the most climate-friendly means of transportation but still hardly competitive with flights both in time and price. The IOF has developed specific travel guidelines that encourage the use of trains, but the difference of ticket prices, especially when compared to low-cost companies in Europe, is still too great to be ignored even by climate-conscious people.

Virtual meetings were held by both the Council (6) and by the Commissions (36). As precise data on attendance were not always available, it was conservatively assumed that all the members of Council or Commissions were present at all meetings; emissions were rated at 0,334 g CO_2e per person per hour. Despite a likely overestimate of such source, the impact of virtual meetings on the overall IOF carbon budget was negligible, a mere 0,4% of the total.

The emissions related to the functioning of the Office (excluding staff commuting) represented only 1.2% of total emissions, somewhat higher in relative terms with respect to 2024 but lower (-9%) in absolute terms. As already mentioned in the report for the year 2023, the physical Office in Karlstad had been closed at the end of 2022. The emissions reported in the carbon budget are only due to residual “amortisation” of equipment-related emissions that had been spread over their entire lifetime.

Staff commuting was kept as a category in order to make a comparison with previous years easier. It amounts to a very low figure because public transport was the normal choice and, when personal cars were used, they were always full electric cars.

A comparison of 2024 and 2025

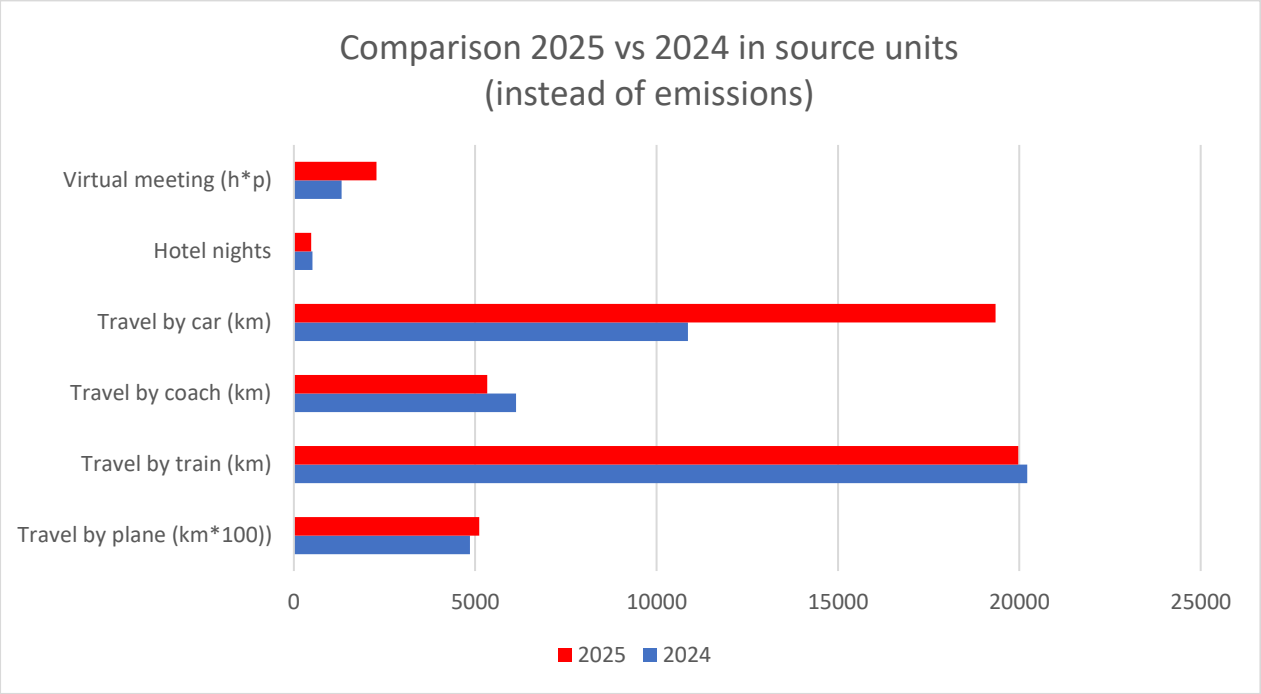


The emissions due to air travel appear to have declined significantly in 2025, from 103.4 to 65.3 t CO_2e, (−36.9%), but this is due only to a **downward revision of aviation emission factors[4] in the DEFRA data set** for the year 2025 as compared with the analogous data for 2024. Indeed, the **total distance travelled by plane increased by 5.3%**.

We chose to calculate the budget with the updated data without a re-calculation of previous emissions with today's factors, a process that would have probably introduced more uncertainties.

[4] The DEFRA aviation emission factors had last been revised in 2012. The downward revision in the 2025 version reflects improvement in aviation fuel efficiency over the 2012-2025 period. As this improvement took place over the full 2012-2025 period it is likely that aviation emissions in the 2019-2024 period were overstated to some extent, more so earlier in the period.

We then compared the two years in units (km, nights, hours) instead of the corresponding emissions, excluding office running, itself a negligible component.



We registered a small increase in flight distances, despite the already mentioned choice of a venue (Istanbul) for the annual Joint Meeting that was outside the more usual locations of Central Europe, and the organisation of the World Games in Orienteering in China.

Travels by car increased both for the Council and for Office staff, mainly in connection with the organisation of international events. This exposes an unavoidable weakness of orienteering with respect to emission reduction objectives: many of the forest areas most suitable for high quality competitions are distant from cities or other hubs that can be reached with public transport networks, making cars the only option available.

Compensation of non-avoided emissions

The emissions of 2019 were offset by Dow (https://corporate.dow.com/en-us/) as the IOF carbon budget for 2019 had been selected for the IOC and Dow "Carbon Initiative Award".

The unavoidable GHG emissions 2021 have been fully offset by the IOC through a portfolio of ICROA-compliant GHG projects as the IOF carbon budget for 2021 had been selected for the IOC “Carbon Action Award”.

The emissions of 2022, 2023, 2024 and 2025 were not offset by the purchase of carbon credits due to the ongoing debate over the reliability of many compensation projects. A discussion is open within the IOF, in order to find suitable third-party certified programmes or alternative initiatives, most likely in the areas of afforestation or reforestation, in line with its strong relationships with forests for the very performance of the sport of orienteering.

A look into the future

The carbon emissions of the IOF are directly proportional to its activities. After the Covid-19 outbreak, which provoked a severe limitation to international travels, and subsequently to international orienteering events, there was a gradual return to normal in 2022 and 2023, which continued in 2024, with a complete set of international competitions. This caused, for these three years in a row, an increase of carbon emissions compared to the absolute low of 2021.

However, the ambition of the Federation is to make Orienteering a global sport and many efforts are dedicated to supporting the spread and the growth of the sport in other continents, from the past and current centre of gravity in Europe, where the sport originated many decades ago. This development is clearly desirable for the future of orienteering worldwide.

The effort of the IOF to become a really global sport is also reflected in the trips aimed at the Global Development of the sport, with clinics organised mainly outside Europe, with a view to supporting the technical growth of nascent orienteering movements.

The main attention of the IOF, therefore, rather than on the absolute amount of emissions, will be focused on maintaining, and possibly decreasing, the "carbon intensity" of its activities.

We tried to develop a "carbon intensity index" that would compare emissions with activities. However, although the numerator (emissions) can be derived with sufficient precision from the carbon budget, choosing an appropriate denominator (a measure of activity) is fraught with difficulties and open to arbitrary assumptions. No progress has been registered on this front so far.

Methodological notes

This chapter is largely unchanged from the corresponding sections of the 2023 and 2024 reports. The methodology did not change over the years, so that year-to-year positive or negative differences could be better appreciated.

Guiding principles

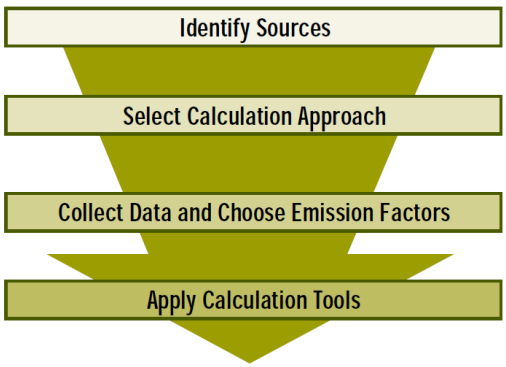
- Relevance – The accounting represents to the best of our abilities, all the sources of GHG that are related to the activity of the IOF and are the most useful references for an improvement pathway.
- Completeness – All available data were included and, for the few cases where reliable data were not available, best estimates and appropriate explanation thereof were given.
- Consistency – As in previous years most emission factors are derived from the "Conversion factors 2025: full set", published 10 June 2025 by the Department for Energy

Security and Net Zero of the UK Government[5], as was done in 2019 (the baseline year), 2020, 2021, 2022, 2023 and 2024. In this report we refer to it as the "DEFRA database", as it was initially developed by the Department for Environment, Food & Rural Affairs.

- **Transparency** – Raw and summary data provided by the Office are based on actual reports, invoices, travel documents etc. Where a best estimate was necessary, the criteria were made explicit.
- **Accuracy** – Every reasonable effort was done to obtain data at the most granular level; in order to remain on the safe side and avoid the risk of under-representation of emissions, **all estimates were increased by 10%.**

Process description

We followed the stepwise approach suggested by the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition (WRI and WBCSD, 2004[6]), pp. 40-45)



… excluding the fifth step (Roll-up Data to Corporate Level) as non-applicable to the IOF.

[5] https://assets.publishing.service.gov.uk/media/6846a4f55e92539572806125/ghg-conversion-factors-2025-full-set.xlsx

[6] : https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

Identification of sources

Scope 1 – As of 1 January 2023, the IOF closed its office in Karlstad, Sweden, whose emissions had been reported until 2022. Staff members now work from home and meet occasionally. Such trips, in order to keep a similar structure as in previous years, was reported as “staff commuting”. The IOF does not own a car fleet. Therefore “Scope 1” emissions is nil.

Scope 2 – For the same reasons, no energy or heat are bought by the IOF, which brings also “Scope 2” emissions to zero.

Scope 3 – All emissions, therefore, are classified as “Scope 3”. The lion’s share is represented by business travels of Office staff, the President, CEO and Secretary General and members of the IOF Council and Commissions. Staff commuting, as mentioned before, is included here.

Calculation approach and Data collection

Reporting is based on the most reliable data available.

Travel reporting is based on a detailed record keeping of individual business travels (km, means of transportation), generally, but not always, including car type and fuel type. Where detailed data were not available prudential estimates were adopted. The most detailed emission factor compatible with the level of information available was used.

As for commuters’ travels (people working for the IOF Office), distances were calculated for each employee (home-office, return) who produced details on car type and fuel: emission factors per km were therefore calculated with the highest possible detail.

- Business trips of President, Council members, CEO, Secretary General, Office staff and Commission members included details of the mode of transport (airplane, train, coach, car) and the number of km per means and trip. Travel that combined IOF business and other activities was assessed on a pro-rata basis according to the estimated proportion of the trip devoted to IOF business.
- Flights: European flights, all in Economy class, were calculated as "short haul"; outside Europe "long haul". No national flights were reported.
- Train: National or International rail emission factors were used according to the trip concerned.
- Coach: Local bus or Coach emission factors were used according to the trip concerned.
- Car: Emission factors used depended on the degree of detail of information available. E.g. in case of staff commuting, where fuel type and segment were known, specific fuel/segment emission data were used. By contrast, in case of Council or Commission members’ trips, average car emissions were used, as distances but not car types had been recorded.

- Hotel nights: a case by case (country-specific) emission factor was used when available; as the DEFRA database is missing a significant number of European destinations, an average emission factor calculated for several European destinations (11.28 kg CO_2e/night) was applied where a country-specific value was unavailable. Outside Europe, country-specific emission factors were used when available (e.g. Turkey, Japan, China); data for neighbouring destinations were employed where country-specific data were missing.

Calculation tool

All data were processed with a MS Excel Spreadsheet.

References

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Annex – Summary data: CO_2e emissions 2025

	km; n; h	CO2e kg	+10%	Final estimate
President and Council				
IOF in-person Council meetings (Istanbul and Kuopio)				
Travel by plane	113732	12751,11	1.275,11	**14.026,22**
Travel by train	3404	15,18	1,52	**16,70**
Travel by coach	0	0,00	0,00	**0,00**
Travel by car	4111	711,37	71,14	**782,50**
Hotel nights	88	1585,70	158,57	**1.744,27**
Virtual meeting (h*p)	408	136,18	13,62	**149,80**
Subtotal Council m.		15199,54	1.519,95	16.719,50
Representation at international events				
Travel by plane	56506	6471,58	647,16	**7.118,73**
Travel by train	5178	23,09	2,31	**25,40**
Travel by coach	0	0,00	0,00	**0,00**
Travel by car	3960	685,24	68,52	**753,76**
Hotel nights	48	992,68	99,27	**1.091,95**
Subtotal events		8172,59	817,26	8.989,85
Representation meetings				
Travel by plane	5980	752,04	75,20	**827,25**
Travel by train	1080	4,82	0,48	**5,30**
Travel by coach	0	0,00	0,00	**0,00**
Travel by car	300	51,91	5,19	**57,10**
Hotel nights	4	34,10	3,41	**37,51**
Subtotal metings		842,87	84,29	927,16
Subtotal Presid. & C.		**24215,00**	2.421,50	**26.636,51**
CEO, SG, Office staff				
Staff commuting				
Travel by plane	0	0,00	0,00	**0,00**
Travel by train	600	21,28	2,13	**23,40**
Travel by coach	1250	34,70	3,47	**38,17**
Travel by car	1240	46,68	4,67	**51,35**
Subtotal		102,66	10,27	112,92
Office meetings				
Travel by plane	0	0,00	0,00	**0,00**
Travel by train	3272	14,59	1,46	**16,05**
Travel by coach	54	5,61	0,56	**6,17**
Travel by car	2143	370,82	37,08	**407,91**
Hotel nights	9	101,57	10,16	**111,73**
Subtotal		492,60	49,26	541,86
Organisation of sport events				
Travel by plane	72190	9078,61	907,86	**9.986,48**
Travel by train	1302	5,81	0,58	**6,39**

Travel by coach	781	216,81	21,68	**238,49**
Travel by car	4704	813,98	81,40	**895,38**
Hotel nights	93	1822,95	182,30	**2.005,25**
Subtotal		11938,16	1.193,82	13.131,98
Particpation in Council meetings				
Travel by plane	15540	1954,31	195,43	**2.149,74**
Travel by train	430	1,92	0,19	**2,11**
Travel by coach	35	9,72	0,97	**10,69**
Travel by car	825	142,76	14,28	**157,03**
Hotel nights	25	595,86	59,59	**655,45**
Subtotal		2704,56	270,46	2.975,02
Participation in business meetings				
Travel by plane	13991	1759,51	175,95	**1.935,46**
Travel by train	385	1,72	0,17	**1,89**
Travel by coach	32	8,88	0,89	**9,77**
Travel by car	0	0,00	0,00	**0,00**
Hotel nights	11	110,49	11,05	**121,54**
Subtotal		1880,60	188,06	2.068,66
Subtotal Office		**17118,58**	1.711,86	**18.830,44**
Commissions				
Travel by plane	233069	26632,28	2.663,23	**29.295,50**
Travel by train	4316	153,05	15,30	**168,35**
Travel by coach	3176	88,17	8,82	**96,98**
Travel by car	2060	356,46	35,65	**392,11**
Hotel nights	197	4428,72	442,87	**4.871,59**
Virtual meeting (h*p)	1869	150,90	15,09	**165,99**
Subtotal		**31809,57**	3.180,96	**34.990,53**
Office running		**885,00**	88,50	**973,50**
Grand total		**74028,15**	7.402,82	**81.430,97**

	km; n; h	CO2e kg	+10%	Final estimate
Summary by source				
Travel by plane	511008	59399,44	5.939,94	**65.339,38**
Travel by train	19967	241,45	24,14	**265,59**
Travel by coach	5328	363,88	36,39	**400,27**
Travel by car	19343	3179,22	317,92	**3.497,15**
Hotel nights	475	9672,08	967,21	**10.639,28**
Virtual meeting (h*p)	2277	287,08	28,71	**315,79**
Office running		885,00	88,50	**973,50**
Grand total		**74028,15**	7.402,82	**81.430,97**


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