New Weather Institute

Olympics Torched

How the Winter Olympics being a platform for polluters is melting the snow it depends on

In association with

Scientists for Global Responsibility

Champions for Earth

This report at a glance

Italy, host to the 2026 Winter Olympics, lost a reported 265 ski resorts in the last five years, while Switzerland has seen 55 ski lifts and cable cars closed.[1] France, due to host the next Games in 2030, has seen the loss of over 180 Alpine ski resorts.[2] The disappearance of snow due to global heating is a prime factor undermining winter sports, with the Games increasingly dependent on artificial snow. Yet, through the promotion of heavily polluting corporations in Olympic sponsorship deals (for example: oil companies, airlines and car-makers) whose pollution fuels global heating, the Winter Games are in danger of torching their own future.

Without change, Milan Cortina will hand a baton of melting snow and ice to the French Alpine hosts of 2030. But, instead of being a billboard for the carbon emissions behind climate breakdown, the Winter Games could draw on its own recent history to be a poster child for progress towards clean, pollution free sport.

Inspired by athletes speaking out, and health experts and scientists explaining what was at stake, it was the Calgary Games in 1988 that took a decisive stand against tobacco advertising and sponsorship that ultimately rid the Olympics, and much of sport more widely, of its lethal influence. With the death toll today from the air pollution alone caused by burning fossil fuels on a par with tobacco, the time has come for the Olympics to end a link that threatens not just its athletes, but its very existence.

Winter Olympic emissions and impacts, excluding those related to sponsorship deals

MILANO CORTINA 2026

930,000tCO_2e

2.3km^2
loss of snow cover

=

1,300 ×

Olympic sized ice hockey rinks

+

Estimated emissions and impacts from three high-carbon sponsorship deals

eni

STELLANTIS

ITA AIRWAYS

1,300,000tCO_2e

3.2km^2
loss of snow cover

=

1,800 ×

Olympic sized ice hockey rinks

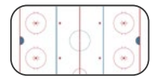
=

Combined impact of the Games and three high carbon sponsorships

5.5km^2
loss of snow cover

=

3,000 ×



Olympic sized ice hockey rinks

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The key findings of the report are:

- Based only on official data – and excluding emissions related to sponsorship deals with major polluters – this report estimates that the 2026 Winter Olympics in Milan Cortina will cause greenhouse gas emissions of about 930,000 tonnes of carbon dioxide equivalent (tCO_2e), with the largest contribution – about 410,000 tCO_2e – being due to spectator travel.
- Based on climate research, this total will in the coming years cause a loss of approximately 2.3 square kilometres of snow cover and over 14 million tonnes of glacier ice – major impacts on exactly the environment needed to support winter sports.
- But, this report estimates that sponsorship deals between the 2026 Winter Olympics at Milan Cortina promoting three major, heavily polluting corporations – oil and gas producer, Eni; car-maker, Stellantis; and ITA Airways – will induce additional greenhouse gas (GHG) emissions of about 1.3 million tonnes of carbon dioxide equivalent (tCO_2e) – about 40% more than the rest of the estimated carbon footprint of the event – including emissions due to preparation, infrastructure construction, hosting, and spectator travel.
- These extra emissions will lead to additional future losses of 3.2 square kilometres of snow cover and over 20 million tonnes of glacier ice. That puts the total impact for the Games and these three sponsorship deals at 5.5 square kilometres of snow cover loss and over 34 million tonnes of glacier ice.
- The additional emissions induced by the sponsorship deal with Eni alone are estimated to be nearly 700,000 tCO_2e and will push on its own the estimated losses of 1.7 km^2 of snow cover and 11 Mt of glacier ice.[3]
- Based on an assessment of several Winter Olympics, the most effective actions for reducing GHG emissions would be to: end sponsorship deals with high carbon corporations; avoid construction of new venues and other infrastructure; and markedly reduce the numbers of spectators travelling by air.

Winter Olympics are increasingly dependent on artificial snow

Executive summary

The Winter Olympics – known officially as 'The Olympic and Paralympic Winter Games' – is the premier event in the winter sports calendar, with a broadcast audience of about two billion people. But the staging of this mega-event makes a big contribution to planet warming pollution – which is particularly ironic given that winter sports are especially vulnerable to climate change.

The purpose of this report is to assess the GHG emissions – both direct and indirect – of the Winter Olympics. The report examines the official data on the total size of the emissions, the main activities which contribute, the sources which are missing from official assessments – especially 'sponsorship emissions,' which result from the promotion of sponsors who are heavily polluting – and key actions which organisers are taking, or could take, to reduce those emissions. It also examines some of the impacts of those emissions on the winter sports environment, especially in terms of losses in snow cover and glacier ice.

Using only official data from the 2026 Winter Olympics in Milan Cortina, this report estimates that the event will cause GHG emissions of about 930,000 tCO_2e, with the largest contribution – about 410,000 tCO_2e – being due to spectator travel. Based on climate research, this total will in the coming years cause a loss of approximately 2.3 square kilometres of snow cover and over 14 million tonnes of glacier ice – major impacts on exactly the environment needed to support winter sports.

However, the official data does not include emissions related to sponsorship deals. These emissions arise due to increased sales of high carbon goods and services that are promoted by the sponsors of the Games. This report, using a recently published methodology, estimates that high carbon sponsorship deals with three major corporations at the Milan Cortina Games could induce additional emissions of about 1,300,000 tCO_2e – about 40% higher than the total due to all other Games-related activities. The three companies responsible are: Eni, the Italian oil and gas giant; Stellantis, the international car-maker whose brands include Maserati, Lancia, Alfa-Romeo, and Fiat; and ITA Airways, Italy's national airline. Of these, the deal with Eni is responsible for more than half of the total.

The report estimates that the emissions of the sponsorship deals with these three high carbon corporations will lead to future losses of 3.2 square kilometres of snow cover and over 20 million tonnes of glacier ice. The report also highlights how other sponsorship deals with high carbon corporations in chemicals and shipping increase these totals further. The assessment is based on a recently developed methodology, which has yet to be incorporated into GHG accounting standards. It demonstrates that sponsorship emissions are an important but neglected factor in GHG accounting assessments.

Some efforts have been made to reduce the GHG emissions and other environmental impacts of the Winter Olympics since 1994. However, it was not until detailed reporting of both direct and indirect emissions was carried out from 2018 onwards that it became clearer how much progress was being made. This report's analysis of the official data reveals that the largest consistent reductions which have been achieved have been by avoiding the construction of new infrastructure – especially transportation and venues – often by reusing existing facilities. In total, this has saved approximately 350,000-720,000 tCO_2e for a single Winter Olympics. Use of renewable energy, energy efficient building design, and lower carbon building materials in combination have saved a further 130,000-310,000 tCO_2e for an individual Games. Due to the unreliable and widely contested effectiveness of carbon offsets – including by leading climate scientists – we do not count them as contributing to reductions in Winter Olympic emissions.

There are two key areas of emission reduction activity that have been neglected. The first, as implied above, is the replacement of sponsorship deals with high carbon corporations by those with much lower emissions. This could, in the case of the Milan Cortina Games lead to savings of over 1.4 million tCO_2e, if the five sponsorship deals with the highest induced emissions are replaced by more environmentally-friendly options. Since lower carbon corporations are already used as sponsors, this could potentially be achieved without significantly affecting Olympic finances. The second area would be action to reduce the emissions due to spectator travel, mainly by reducing the numbers travelling by air. With spectator travel emissions being around 410,000 tCO_2e, there is also potential for major savings here. Indeed, with ticket revenue being a comparatively small fraction of total income for the Games (13% at Milan Cortina), action could again be taken without creating significant funding issues.

Based on this analysis, we make several recommendations, as follows.

- The International Olympic Committee (IOC) and individual Games organising committees should end all sponsorship deals with high carbon corporations, especially fossil fuel companies, airlines, and makers of cars with internal combustion engines, and replace them with partnerships with much lower carbon companies.
- Olympic sponsorship deals should only be made with companies that (a) publish comprehensive GHG data on their carbon footprint (including Scopes 1, 2, and 3), (b) have a small carbon footprint, and (c) have credible near-term plans for reducing emissions in line with the global temperature targets in the Paris Agreement.
- The IOC should expand measures that strongly favour local and national spectators using surface public transport. These should include preferential ticket-pricing.
- Olympic organisers should not use carbon offsets to make claims that the Games are in any way 'carbon neutral'.

Today, the Olympic movement stands in relation to fossil fuel and other high carbon sponsorship just as it did to tobacco sponsors in the late 1980s – before bans on these sponsors were brought in. Indeed, the 1988 Winter Games held in Calgary, Canada, itself played a pivotal role in ridding the Olympic movement, and subsequently sport more generally, of the lethal influence of tobacco sponsorship (see section 3 below).

The opportunity exists not only to follow its own historic precedent in showing leadership, but to act in a way that preserves the future of the Winter Olympics, and the well being, health, and livelihoods of its athletes and fans.

The Milan Cortina Games are sponsored by the major oil company Eni, and indeed Canada's own team sponsor is PetroCanada, the retail branch of Suncor, which is heavily involved in highly polluting tar sands production.

This Games should be a watershed leading to no future Winter Olympics ever again being a billboard for promoting fossil fuel pollution. That could start with the 2030 Winter Olympics in the French Alps.

1. Introduction

The Winter Olympics – known officially as 'The Olympic and Paralympic Winter Games' – is the premier event in the winter sports calendar. Held every four years, about 3,500 of the world's top athletes compete in over 200 medal-events (see Box 1.1). The 2022 Games in Beijing was watched by an estimated broadcast audience of about two billion people[4] – one quarter of the world's population. But the staging of this mega-event has a large carbon footprint – which is particularly ironic given that winter sports are especially vulnerable to climate change.

The purpose of this report is to assess the greenhouse gas (GHG) emissions – both direct and indirect – of the Winter Olympics, in short, its carbon footprint. The report examines the official data on the total size of the emissions, the main activities which contribute, the sources which are missing from official assessments, and key actions which organisers are taking or could take to reduce those emissions.

One novel focus of the report is the issue of 'sponsorship emissions'. When a company sponsors the Winter Olympics – or indeed any high-profile event – it is seeking to increase the sales of its goods and/or services. These goods and services have a carbon footprint, so a sponsorship deal, by increasing sales, will increase this carbon footprint. This increase could be substantial if the company is part of a high carbon sector – such as fossil fuels or aviation – and if the value of the sponsorship deal is large. However, this effect is generally ignored when compiling a conventional carbon footprint. In this report, we use a recently developed methodology to assess the potential size of sponsorship emissions, and compare them with official assessments of other sources of emissions. Following in this vein, we also summarise the history of the Winter Olympics in relation to restrictions in sponsorship by the tobacco industry, and draw parallels with high carbon industries today. The role of the 1988 Winter Olympics in Calgary – where tobacco sponsorship was first banned – is especially significant.

Another notable aspect of the report is to estimate the impact of the Winter Olympics' emissions on the snow and ice environment itself. This is carried out using climate research which estimates the amount of snow cover and glacier ice mass which is lost for a specific level of emissions.

The report is structured as follows. Section 2 assesses the official data on the GHG emissions of the Winter Olympics, and uses these to estimate the effectiveness of the different measures carried out so far to reduce emissions. Section 3 examines the neglected issue of sponsorship emissions, outlines the historical role of high carbon sponsors within the Games, and estimates emissions induced by the high carbon sponsorship deals within the Milan Cortina Winter Olympics. This section also summarises the path to banning tobacco sponsorship within the Winter Games, and its relevance to high carbon sponsorship. Section 4 uses the emissions data compiled in the previous sections to estimate the losses in snow cover and glacier ice mass that will result. Section 5 presents key conclusions and recommendations.

Box 1.1 Olympic Winter and Paralympic Games: key information

The Winter Olympics are held once every four years in a different host town, city or region, rotating between nations and continents. The Olympic Games take place first – usually in February – followed by the Paralympic Games – usually in March – for athletes with disabilities. Organisation is overseen by the International Olympic Committee (IOC), with local management being carried out by an 'Organising Committee' for each Games. In total, the Olympics and Paralympics involve about 3,500 top athletes from about 90 nations competing in nearly 200 medal-events in 16 winter sport disciplines.[i] These include Alpine skiing, cross-country skiing, ski jumping, snowboarding, ice hockey, figure skating, and bobsleigh.

The governing rules – both sporting and non-sporting – are set by the IOC. The non-sporting rules include sustainability standards, and these include guidelines on measuring and reporting GHG emissions, as well as measures to reduce emissions. These efforts are summarised and published in reports on each Games held by the Olympic World Library, including in electronic form,[ii] and it is data from these reports which forms the backbone of evidence presented in section 2. The IOC also oversees the financing of the Games, although the Organising Committees raise a large proportion of the funding themselves. In terms of sponsorship deals, the IOC is responsible for 'Worldwide Partners' (through the TOP programme), with lower tiers arranged by the Organising Committees.

References

i. Figures compiled from:
Wikipedia (2025a). 2026 Winter Olympics. https://en.wikipedia.org/wiki/2026_Winter_Olympics
Wikipedia (2025b). 2026 Winter Paralympics. https://en.wikipedia.org/wiki/2026_Winter_Paralympics
ii. Olympic World Library (2025). https://library.olympics.com/

Box 1.2 A brief introduction to climate change science and terminology

Global climate change is being caused by emissions of greenhouse gases (GHGs) from human activities, especially carbon dioxide. GHG emissions – also known as 'carbon emissions' or 'carbon pollution' – are measured in (metric) tonnes of 'carbon dioxide equivalent' or tCO_2e, which is the basic unit used in this report. The Paris Climate Agreement – agreed by the world's nations in 2015 – includes a target to reduce global GHG emissions to levels which would restrict the rise in globally-averaged temperature to no more than 1.5°C above pre-industrial levels. Beyond this, major global and regional impacts become highly likely, with some being irreversible. However, action by the most polluting nations, sectors, and groups in society has to date fallen far short. At the time of writing, the latest projections from leading climate scientists indicate that the temperature target is likely to be breached as soon as 2031.[i] Because there is a time lag between human emissions of GHGs and the corresponding response of the climate system, this means that at the current annual emissions rate, the world will pass the threshold beyond which a 1.5°C rise is likely by 2027.[ii] This is known as 'exceeding the global carbon budget'. Hence, it is very urgent that climate action is rapidly increased. However, it should also be noted that, even if the 1.5°C target is breached, it would still continue to be essential to reduce emissions rapidly, as the greater the breach, the greater the damage to human society and natural ecosystems.

The total GHG emissions of a particular organisation (or sector) is often called its 'carbon footprint'. These emissions are generally classified in one of three 'Scopes':[iii]

- **Scope 1:** direct emissions – e.g. those from fossil fuels burned by an organisation's assets, such as 'natural' gas in the central heating of its buildings, or petrol in its cars;
- **Scope 2:** indirect energy-related emissions – e.g. those due to the generation of electricity used in an organisation's buildings;
- **Scope 3:** other indirect emissions – e.g. those during the manufacture of products bought by the organisation, or during travel by participants at an event hosted by the organisation.

References

i. IGCC (2024). Indicators of Global Climate Change. https://climatechangetracker.org/igcc
ii. As note i.
iii. WBCSD/ WRI (2015). The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised edition). https://ghgprotocol.org/corporate-standard

2. Measuring and reducing the carbon footprint of the Winter Olympics

This section first examines the official data on the GHG emissions of the Winter Olympics, and then looks at efforts by Organising Committees and others to reduce those emissions.

2.1 Official estimates of the carbon footprint

Initial attempts at estimating the GHG emissions of the Winter Olympics began as early as 2002. For the Salt Lake Games in the USA, which took place in February that year, direct emissions over the 17-day period of the event were estimated at 248 $ktCO_2e$ (thousand tonnes of carbon dioxide equivalent).[5] However, it was not until the 2010 Games in Vancouver, Canada, that an estimation of a total carbon footprint of the Games was made. This included emissions over the seven-year preparation period, as well as some indirect emissions due to the construction of sport venues and spectator travel. The total was 278 $ktCO_2e$, with over half being due to air travel by spectators.[6] However, the methodology still had major shortcomings, so further revisions were made. GHG data on the 2014 Games in Sochi, Russia, was not published,[7] so in-depth data has only been available since the 2018 Winter Olympics in Pyeongchang, South Korea. The carbon footprint of these Games was estimated to be 1,200 $ktCO_2e$[8] – more than four times the estimate for Vancouver. Comprehensive guidelines for GHG accounting at Olympic events were introduced in 2018,[9] based on the experience at Pyeongchang, and these were updated in 2024,[10] but data from the South Korean event remains broadly consistent with subsequent Games.

Table 2.1 summarises the official data on the carbon footprint of the Winter Olympics since 2018. The data is divided into three main categories: games planning and delivery; infrastructure; and spectators. Games planning and delivery covers the emissions of all activities under the direct control of the Organising Committee during the planning phases and the Games themselves, both for the Olympics and Paralympics. These include venue energy use, event management, construction of temporary facilities, most travel by staff and teams, and merchandise. Infrastructure includes all emissions related to the construction of permanent buildings and facilities that will not be dismantled at the end of the Games. This includes sport venues and public transport infrastructure built specifically for the Games, including embodied emissions, but not infrastructure that was already under development when the host city was selected. Spectators[11] includes emissions of travel by spectators, except within the host city (which is included in Games delivery), as well as accommodation and international team travel. This element is dominated by air travel, which also includes a factor to account for indirect heating effects in the upper atmosphere.[12] The table also includes figures for the 'first baseline'[13] – a projection made early in the planning period, and which does not include all measures to reduce emissions – as well as the final estimate.

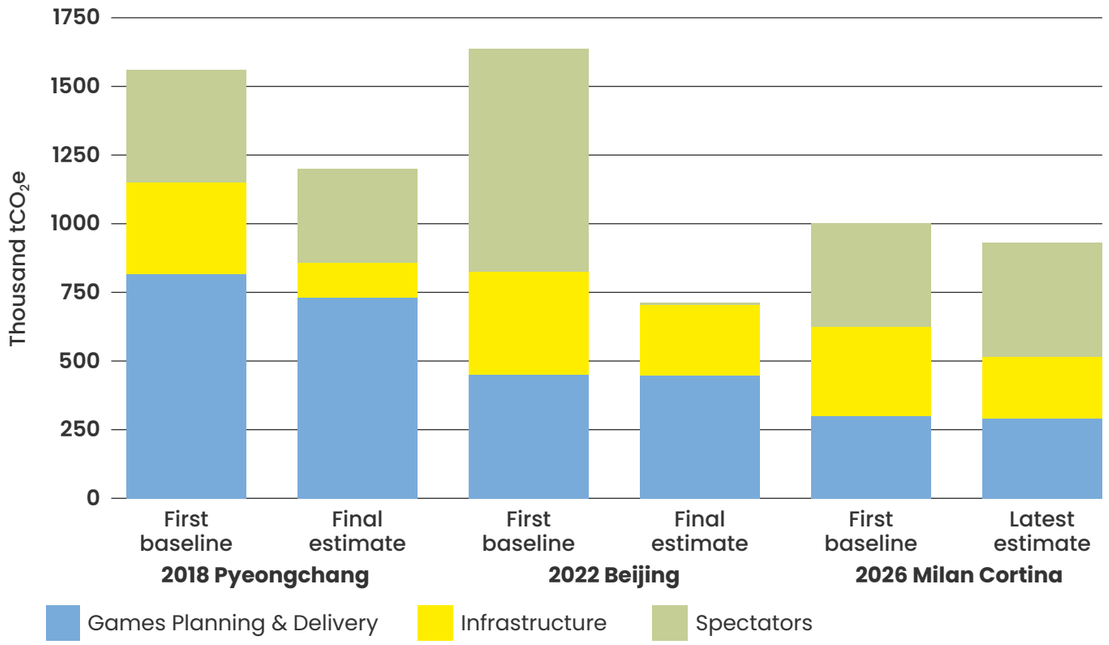
Table 2.1 Official data on the carbon footprint of Winter Olympics, 2018-2026,[i] excluding sponsorship emissions

	2018 Pyeongchang		2022 Beijing		2026 Milan Cortina	
	First baseline	Final estimate[ii]	First baseline	Final estimate	First baseline	Latest estimate[iii]
Games Planning & Delivery	336	129	373	259	324	227
Infrastructure	816	731	452	447	300	290
Spectators	409	340	812	7	376	414
Totals	*1,561*	*1,200*	*1,637*	*714*	*1,000*	*931*

Main sources
pp.36-52 of: POC18 (2015). Greenhouse Gas Inventory for the PyeongChang 2018 Olympic Winter Games. https://library.olympics.com/Default/doc/SYRACUSE/20420/carbon-responsible-games-2018-pyeongchang-greenhouse-gas-inventory-for-the-pyeongchang-2018-olympic – ; pp.22-29 of: POC18 (2018). PyeongChang 2018 Post-Games Sustainability Report (Furthering Benefits to People and Nature). https://library.olympics.com/Default/doc/SYRACUSE/3156668/furthering-benefits-to-people-and-nature-pyeongchang-2018-post-games-sustainability-report-the-pyeon
p.50 of: BOC22 (2022). Beijing 2022: Pre-Games Sustainability Report (Sustainability for the Future). https://stillmed.olympics.com/media/Documents/Olympic-Games/Beijing-2022/Sustainability/Beijing-2022-Pre-Games-Sustainability-Report.pdf ; p.58 of: BOC22 (2023). Beijing 2022: Post-Games Sustainability Report (Sustainability for the Future). https://library.olympics.com/Default/doc/SYRACUSE/2954786/sustainability-for-the-future-beijing-2022-post-games-sustainability-report-beijing-organising-commi
pp.11-18 of: FMC26 (2024a). Milan 2026: GHG Management Strategy – Communication Document. https://milanocortina2026.olympics.com/s3fs-public/documents/2024-08/MICO26_GHG%20Management%20Strategy%20Communication%20Document_EN_09072024.pdf?VersionId=0.nSqp_2C8P45z_TM1wApL0p2o1qLF0V ; pp.77-82 of: FMC26 (2025). Milan 2026: Sustainability, Impact and Legacy Report 2024. September. https://qstatic.olympics.com/s3/mc2026/documents/Sustainability%20-%20Now26/Sustainability%20Report/MICO26_Sustainability_Impact_Legacy_Report_2024.pdf

Notes
i. Baselines were often revised during the preparation for the Games, and some sub-categories altered, so that tracking emission reduction was not always straightforward. The table includes our best estimates when there were inconsistencies between reports.
ii. The figures for the sub-categories of the final estimate of the 2018 Winter Olympics, in particular, were not clearly stated in post-Games report.
iii. At the time of writing, the latest estimate for the Milan Cortina Games was from September 2025. For the latest estimate for games planning and delivery, this includes a projected 30% saving (range: 20%-43%).
NB Figures may not add precisely due to rounding.

Figure 2.1 Official data on the carbon footprint of Winter Olympics, 2018-2026, excluding sponsorship emissions



The overall data reveals several factors, which will be analysed in the next section:

- Emissions due to games planning and delivery have experienced, in all three Winter Olympics, a large fall between first baseline and final estimate, of between 30% and 62%.
- Infrastructure emissions have fallen 60% over the course of the three Winter Olympics – from 731 $ktCO_2e$ in Pyeongchang to 290 $ktCO_2e$ in Milan Cortina.
- Spectator emissions were near zero for the 2022 Winter Olympics – due to COVID-19 restrictions – but otherwise have remained a major source. Indeed, as emissions in the other categories have fallen, it has become the largest source, at 44% in Milan Cortina.

2.2 Actions to reduce the carbon footprint

Since the first so-called 'Green Games' at Lillehammer in 1994, organisers of Winter Olympics have put in place various measures to reduce the environmental impacts of the event. However, as we have seen, with extensive GHG emissions monitoring only in place since 2018, it has only been comparatively recently that it has been possible to assess how effective these measures have been. In this sub-section, we examine the available data to highlight which measures have reduced emissions the most.

Table 2.2 summarises data derived from reports on the four Winter Olympics in Sochi, Pyeongchang, Beijing, and Milan Cortina.

Table 2.2 Key examples of GHG emission reduction measures at Winter Olympics, 2014-2026, and their estimated savings

Emission reduction measures	Size of reduction ($ktCO_2e$)	Further details
Minimise number of in-person spectators	333-805	COVID-19 restrictions at BE22 reduced spectator numbers to near zero, saving an estimated 805 $ktCO_2e$; if similar restrictions at PC18 or MC26 had been applied, it would have saved 333-407 $ktCO_2e$[i]
Avoid construction of new transport infrastructure	245-418	By reusing existing transport infrastructure MC26 saved 245 $ktCO_2e$ compared with BE22 and 418 $ktCO_2e$ compared with PC18[ii]
Avoid construction of new venues	100-300	Mainly achieved through reusing existing venues. 100 $ktCO_2e$ is difference between PC18 and MC26; 300 $ktCO_2e$ is difference between SO14 and MC26[iii]
Purchase of green electricity	97-256	Purchase of renewable energy via national electricity grid, estimated to save: 256 $ktCO_2e$ at PC18; 228 $ktCO_2e$ at BE22; 97 $ktCO_2e$ at MC26[iv]
Lower carbon construction; building energy efficiency measures; onsite installation of renewable energy technologies	35-51	Estimated savings at PC18 (35 $ktCO_2e$) and BE22 (51 $ktCO_2e$)[v]
Use of lower carbon vehicles	2	85% of official vehicles replaced by hybrid, fossil ('natural') gas, hydrogen, and electric models at BE22[vi]
Use of lower carbon refrigeration technologies	1	Use of carbon dioxide refrigeration in ice venues at BE22[vii]

Notes

Abbreviations: SO14 – Sochi 2014; PC18 – Pyeongchang 2018; BE22 – Beijing 2022; MC26 – Milan Cortina 2026

i. 805 $ktCO_2e$ is the difference between 812 and 7 $ktCO_2e$ in the BE22 entries in Table 2.1. 333 $ktCO_2e$ is the difference between 340 $ktCO_2e$ in the PC18 entries in Table 2.1 and 7 $ktCO_2e$, assuming that residual emissions were the same as in BE22. 407 $ktCO_2e$ is the difference between 414 $ktCO_2e$ in the MC26 entries in Table 2.1 and 7 $ktCO_2e$, assuming that residual emissions were the same as in BE22.
ii. Construction of new transport infrastructure at PC18 caused emissions of 418 $ktCO_2e$. p.41 of: POC18 (2015). Op. cit. Construction of new transport infrastructure at BE22 caused emissions of 245 $ktCO_2e$. p.58 of: BOC22 (2023). Op. cit.
iii. For explanation, see main text.
iv. Purchase of grid-based renewable energy (wind power) saved 256 $ktCO_2e$ at PC18. p.25 of: POC18 (2018). Op. cit. Purchase of grid-based renewable energy saved 228 $ktCO_2e$ at BE22. p.60 of: BOC22 (2023). Op. cit. 97 $ktCO_2e$ at MC26 is the difference between 324 and 227 $ktCO_2e$. Figures from MC26 entries in Table 2.1. NB This figure may be lower.
v. Figures from: p.25 of: POC18 (2018). Op. cit.; p.60 of: BOC22 (2023). Op. cit.
vi. p.69 of: BOC22 (2023). Op. cit.
vii. p.60 of: BOC22 (2023). Op. cit.

NB All figures are rounded.

The most effective measure was unintentional – the travel restrictions enacted during the Beijing Games due to COVID-19. With those Games originally projected to have especially high emissions due to spectator travel – over 800 $ktCO_2e$ – the resultant savings were enormous. In the table, we have also included lower estimates for the reduction should such restrictions have been applied to the smaller Games in Pyeongchang and Milan Cortina. Despite the restrictions, the Beijing Games were still considered a success due to its huge TV and internet audience – estimated to be about two billion people.[14]

So how might this experience guide future action to reduce spectator emissions? The bulk of these emissions are due to air travel. Unfortunately, a lack of transparency over the data used to calculate these figures means that the exact proportion is unclear. Nevertheless, with the average attendance at a Winter Olympics being about 1.2 million,[15] a large reduction in those flying to the event would make a large difference to the emission totals – measured potentially in the hundreds of thousands of tCO_2e. Among the options to reduce air travel is ticket-pricing which favours rail and coach travel, as well as regional or home nation spectators. Given that revenue from tickets is a comparatively small fraction of total income – estimated to be 13% at Milan Cortina 2026[16] – any negative effects on the economics of the Games should be small.

Another measure with a very large saving was to host the Games in a city or region with an existing high-quality transport network. Installation of such a system leads to large construction emissions, which can only be justified if they benefit the area for far longer than the hosting period of the Games. For example, for the Pyeongchang Winter Olympics, a new high-speed railway and a major new road were built (together with support infrastructure). This led to emissions of approximately 418 $ktCO_2e$, more than one-third of the total for the whole event.[17] Furthermore, these measures only led to an emission saving of 6 $ktCO_2e$ during the event,[18] demonstrating the lack of a near-term environmental case for them. Transport infrastructure emissions were likely even higher in Sochi where extensive road maintenance, new railways, and even the modernisation of the local airport were undertaken.[19] No emissions data was reported from these upgrades. In contrast, for the Milan Cortina Winter Olympics, only limited modernisation of the transport infrastructure has been required, with the total emissions of the event consequently being far smaller.

The next measure in our list is to avoid building new infrastructure by reusing existing venues, both competition venues and non-competition venues (including athlete accommodation). Our lower estimate of a saving of 100 $ktCO_2e$ is based on the difference between venue construction in Pyeongchang, where six new permanent sport venues were built,[20] and Milan Cortina where only two new permanent sport venues were constructed.[21] In Sochi, 14 new sports venues were built,[22] 12 more than in Milan Cortina. Without specific data on Sochi, we assume that average emissions necessary to construct each venue is the same as in the other Winter Olympics, so it would lead to three times the level of emissions.[23]

The data on the reuse of existing infrastructure – both transportation and venues – therefore shows that a total of between 345 and 718 $ktCO_2e$ can be saved by these measures alone.

Large emission reductions can also be made through the expanded use of electricity from renewable sources via a national grid. This has mainly been achieved through the use of green tariffs or purchase of renewable energy certificates. However, there is concern that these measures might not actually reduce emissions, but simply shift the existing savings to another part of the grid. It is necessary to have robust certification processes to ensure that this does not happen, and that therefore the expansion of renewable energy is accelerated by use of such mechanisms.

Next on our list is the use of low carbon building materials, building energy-efficiency measures, and onsite renewable energy technologies, such as solar photovoltaic panels. The range of 35 to 51 $ktCO_2e$ is from data collected at the Beijing and Pyeongchang Games.

Finally, in our table, we include two measures which only reduced emissions by a fraction of one percent: the use of low carbon refrigeration technologies; and the use of lower carbon vehicles. We have included these because, despite their small size, they were given high prominence in post-Games sustainability reports.[24] In the case of the use of lower carbon vehicles, we are concerned that the prominence of this measure may have been due to the supplier of those vehicles being a leading sponsor of the Games – Toyota (see Table 3.1c). The undue influence of sponsors from high pollution sectors is one that we address much more fully in the next section.

Not just elite events, but regular ski resorts rely more on artificial snow

One major area of emissions reduction has not been robustly estimated in the assessments to date: the widespread use of surface public transport, including trains, coaches, and buses, rather than (mainly) high car usage. Unfortunately, without good quality baseline data from a Winter Olympics which relied heavily on car travel, it is difficult to estimate the reductions. However, given the well-documented environmental advantages of public transport, these are likely to be large as well.

One further issue is the controversial role of carbon offsets. Organising Committees of recent Winter Olympics have purchased these in large quantities and used them to claim that their Games were 'carbon neutral'.[25] However, the use of carbon offsets in this way has been criticised as "misleading and incredibly dangerous" by prominent climate scientists.[26] Indeed, FIFA, the world football federation, was ordered by a Swiss court not to repeat its claim that the 2022 World Cup in Qatar was carbon neutral because of the misleading nature of such statements.[27] We have discussed the numerous problems with using carbon offsets as part of GHG management strategy for sporting events in a previous report.[28]

3. Sponsorship emissions: the neglected issue

There is another key source of GHG emissions that is neglected in current accounting practices: additional emissions induced by sponsorship deals. With companies using the deals with sporting events to sell more products, the GHG emissions of these extra sales need to be included in any robust assessment of the carbon footprint. Indeed, the UK-based Advertising Association argues that every £1 spent on advertising – including sponsorship – leads to an additional economic output of £6[29] – bringing with it sizeable additional emissions. In this section, we first use a recently developed methodology based on standard, more conservative economic expectations for return on investment – see Appendix 1 – to provide an initial estimate of the emissions attached to the sponsorship deals of the 2026 Winter Games in Milan Cortina. Then we go on to discuss the role of the Olympics in taking a lead on sponsorship restrictions and bans, using the case of tobacco sponsorship as an example.

3.1 Assessing the size of sponsorship GHG emissions

In order to estimate emissions induced by sponsorship deals, three sets of information are needed:

1. **a list of the corporations involved;**
2. **data on the carbon footprints of these corporations; and**
3. **the value of their sponsorship deals.**

Item 1 is straightforward as these lists are generally provided on the websites of the sports organisations involved. Item 2 is more difficult – as the quality of data on the total carbon footprints of the specific companies can vary considerably. Finally, data on item 3 is frequently poor. Because commercial confidentiality is used to hide the specific levels of funding involved, in this report, we have been forced to use estimates, which obviously introduces significant uncertainty into the figures.

More transparency around sponsorship deals would obviously be desirable to better understand their role in generating GHG emissions.

To illustrate the importance of the problem of induced emissions from sponsorship deals, we begin by listing those companies within high carbon sectors that have sponsored the Winter Olympics in recent years. Tables 3.1a-d list the leading sponsors for the four Winter Olympics from 2014–2026 inclusive, which were within these sectors. We begin by looking at seven sectors: fossil fuel extraction and use (including in the electricity sector); aviation (including airlines, aircraft manufacturers, and airports); the automotive industry (especially car manufacturers); shipping; chemicals; steel; and meat and dairy products. It should be noted that some other sectors – for example, financial services – can also be high carbon, so our analysis is conservative in this respect.

Table 3.1a Leading sponsors of the 2014 Winter Olympics (Sochi) in high carbon sectors

Sponsor level and category	Corporation	Sector
Tier 1: Worldwide Partner	Dow	Chemicals
	GE	Multiple (incl. fossil fuel electricity/ aviation)
	McDonalds	Meat & dairy
	P&G	Chemicals
Tier 2: General Partner	Aeroflot	Aviation (airline)
	Rosneft	Fossil fuels (oil & gas)
	Volkswagen	Automotive

Main source: SOC14 (2014). Sochi 2014 Legacy Report. https://library.olympics.com/Default/doc/SYRACUSE/37836/sochi-2014-legacy-report-january-2014-soci-2014-nasledie-otcet-o-nasledii-soci-2014-janvar-2014-orga

Table 3.1b Leading sponsors of the 2018 Winter Olympics (Pyeongchang) in high carbon sectors

Sponsor level and category	Corporation	Sector
Tier 1: Worldwide Partner	Dow	Chemicals
	GE	Multiple (incl. fossil fuel electricity/ aviation)
	P&G	Chemicals
	Toyota	Automotive
Tier 2: General Partner	McDonalds*	Meat & dairy
	Korean Air*	Aviation (airline)
	Hyundai-Kia	Automotive
	SK	Multiple (incl. oil, chemicals)
	Posco	Steel
	KEPCO	Fossil fuels (electricity production)
Tier 3: Official Sponsor	Aggreko	Fossil fuels (electricity production)
Tier 4: Official Suppliers	Bombardier	Aviation (aircraft manufacturer)
	S-Oil Corporation	Fossil fuels (oil & gas)
	Korea Airports Corporation	Aviation (airports)
	Incheon International Airport Corporation	Aviation (airports)
	Korea Midland Power	Fossil fuels (electricity production)
	Korea South-East Power	Fossil fuels (electricity production)
	Korea Southern Power	Fossil fuels (electricity production)
	Korea Western Power	Fossil fuels (electricity production)

Main source: POC18 (2019). Pyeongchang 2018: About Partners. (Archive website.) https://web.archive.org/web/20180201072733/https://www.pyeongchang2018.com/en/partners

Notes

* McDonalds and Korean Air were also 'Sustainability supporters'. p.82 of: POC18 (2018). Op. cit.

Table 3.1c Leading sponsors of the 2022 Winter Olympics (Beijing) in high carbon sectors

Sponsor level and category	Corporation	Sector
Tier 1: Worldwide Partner	P&G	Chemicals
	Toyota	Automotive
Tier 2: General Partner	Air China	Aviation (airline)
	China National Petroleum Corporation (CNPC)	Fossil fuels (oil & gas)
	State Grid Corporation of China	Fossil fuels (electricity transmission)
	Shougang Group	Steel
	Chinese Petroleum and Chemical Corporation (SINOPEC)	Fossil fuels (oil); chemicals
	Yili	Dairy products

Main source: BOC22 (2022). Beijing 2022. (Archive website.) https://web.archive.org/web/20220220000149/https://www.beijing2022.cn/en/
A full list of sponsors by sponsorship category are listed at the foot of the homepage.

Table 3.1d Leading sponsors of the 2026 Winter Olympics (Milan Cortina) in high carbon sectors

Sponsor level and category	Corporation	Sector
Tier 1: Worldwide Partner	P&G	Chemicals
Tier 2: Premium Partner	Eni	Fossil fuels (oil & gas)
	Stellantis	Automotive
Tier 4: Sponsor	ITA Airways	Aviation (airline)
	Fincantieri	Shipping
Tier 5: Official Supporter	Versalis	Chemicals

Main source: p.185 of: FMC26 (2025). Op. cit.
Notes
Another of the other Worldwide Partners is a joint collaboration between Coca-Cola and Mengniu, the latter being a Chinese dairy products company. Although Mengniu is in a high carbon sector, the lack of publicly available financial details about the collaboration means it is very difficult to assess its contribution to emissions.

As these tables illustrate, there has been – and continues to be – large-scale involvement of companies from within high carbon sectors in the Winter Olympics. Of particular concern is that, wherever the Games take place, national fossil fuel producers, airlines, car manufacturers, coal users and other heavily polluting industries use the opportunity to market themselves closely with the Olympic brand. So, in Sochi, Russian oil company, Rosneft, and national airline, Aeroflot, were tier 2 sponsors. In Pyeongchang, several Korean electricity companies which owned major coal plants were sponsors, as well as the national airline, Korean Air, the nation's leading car-maker, Hyundai-Kia, and numerous other problematic companies. In Beijing, the huge Chinese oil companies, CNPC and SINOPEC, were tier 2 sponsors, together with the national airline, Air China, amongst others. And in the latest Games in Milan and Cortina, sponsors include: Eni, Italy's national oil and gas company; Stellantis, owner of Italian car brands such as Maserati, Alfa-Romeo, Lancia, and Fiat; ITA Airways, the national airline; and Fincantieri, national (and international) manufacturer of warships and cruise ships. It is very difficult to see this practice as compatible with the sustainability strategy of the IOC.

However, there are some more positive trends. For example, the number of tier 1 'Worldwide' sponsors from high carbon sectors has fallen from four in 2014 and 2018 to one in 2026. This is especially important as these have the highest visibility in Games advertising – and, of course, make up the largest share of sponsorship income. Overall, the proportion of all sponsors from these seven high carbon sectors has fallen from around 20% in 2018 to about 10% in 2026.[30]

Now we estimate the GHG emissions induced by the high carbon companies through their sponsorship deals with the Milan Cortina Games. As discussed, we use the equation explained in Appendix 1. First, we calculate the emissions per unit of sponsorship spending in $kgCO_2e$ per US dollar based on annual company revenues and total GHG emissions (including Scope 1, 2 and 3). Then we estimate a level of sponsorship funding for each tier, and use these values to calculate the induced emissions. The level of sponsorship funding is based on the total income for marketing rights of the IOC in 2022, when the Beijing Winter Olympics were held. This total was $707m,[31] which averages to about $12m per sponsor. So, for the 2026 Winter Olympics, conservatively, we estimate the sponsorship levels as: tier 1: $15m; tier 2: $12m; tier 3: $9m; tier 4: $6m; tier 5: $3m.[32]

In Table 3.2a, we focus first on the results for the three corporations which are in high carbon sectors with especially large involvement in sport sponsorship deals: oil and gas corporations; manufacturers of cars with internal combustion engines; and airlines. In Table 3.2b, we present results for the two other high carbon companies in the top four sponsorship tiers in Table 3.1d. For comparison, in Table 3.2c, we carry out similar calculations for two lower carbon sponsors of the event.

Table 3.2a Induced GHG emissions estimated for three high carbon sponsors of 2026 Winter Olympics in the sectors of oil and gas, car manufacturing, and airlines

Company	Revenue (billion US$)	GHG emissions (million tCO_2e)	Unit GHG emissions ($kgCO_2e$/$)	Sponsorship value (million $)	Induced GHG emissions (thousand tCO_2e)
Eni	97.7	395	58	12	693
Stellantis	156.9	415	38	12	453
ITA Airways	na	na	25	6	150
Total					*1,296*

Notes
Company data on revenues and GHG emissions is sourced from company reports, as follows:
Eni: revenue (sales) and GHG emissions from p.16-17 of: Annual Report 2024. https://www.eni.com/content/dam/enicom/documents/eng/reports/2024/ar-2024/Annual-Report-2024.pdf
NB Confusingly, Eni labels its Scope 1+2 emissions as its 'carbon footprint', but we have obviously used the total for Scopes 1+2+3.
Stellantis: net revenue and GHG emissions from p.45 of: Expanded Sustainability Statement 2024. https://www.stellantis.com/content/dam/stellantis-corporate/sustainability/esg-disclosures/Stellantis-Expanded-Sustainability-Statement-2024.pdf
ITA Airways have not published GHG emissions data so we use a figure for unit GHG emissions from the Lufthansa Group, which took over ITA in early 2025. NWI/SGR (2025). https://www.sgr.org.uk/publications/dirty-tackle-growing-carbon-footprint-football
Data is from the following years: Eni: 2024; Stellantis: 2024; ITA Airways: 2022. Financial data in euros has been converted to US dollars using an approximate exchange rate of €1=$1.1. GHG emissions include Scope 1, 2, and 3. Figures for Scope 2 are 'market-based' (e.g. incorporating purchase of green energy tariffs), which is often lower than 'location-based'.
NB Figures may not add precisely due to rounding.

Table 3.2b Induced GHG emissions estimated for two other high carbon sponsors of 2026 Winter Olympics

Company	Revenue (billion US$)	GHG emissions (million tCO_2e)	Unit GHG emissions ($kgCO_2e$/$)	Sponsorship value (million $)	Induced GHG emissions (thousand tCO_2e)
P&G	84.0	170	29	15	434
Fincantieri	8.9	17	27	6	162
Total					*596*

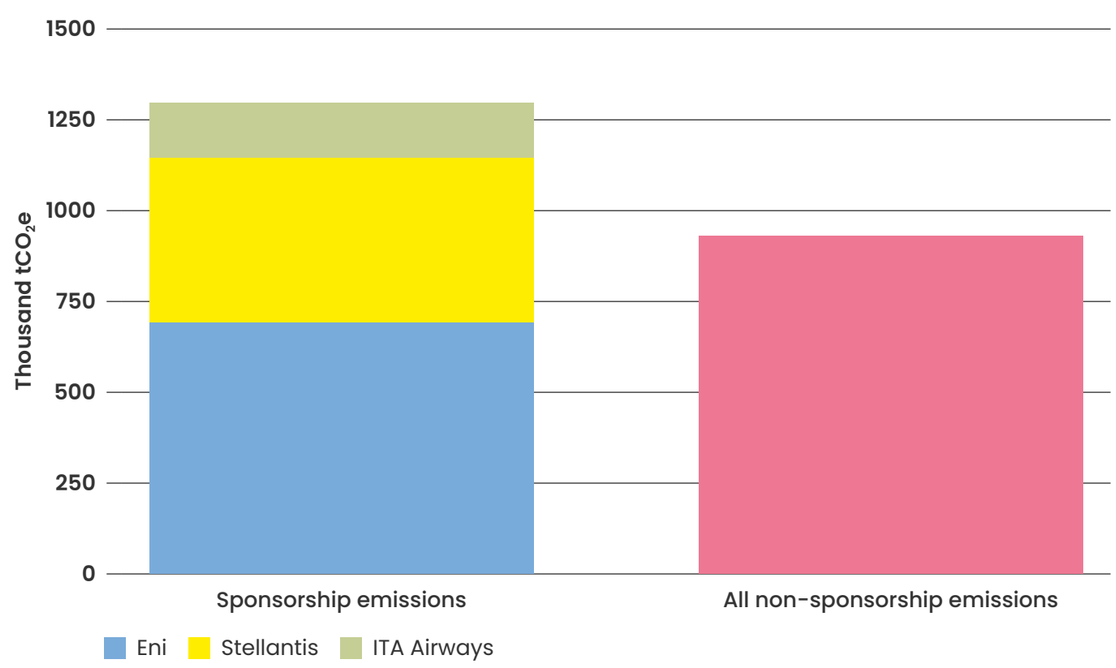
Notes
Company data on revenues and GHG emissions is sourced from company reports, as follows:
Enel: revenue (p.23) and GHG emissions (p.146) from: Integrated Annual Report 2024. https://www.enel.com/content/dam/enel-com/documenti/investitori/informazioni-finanziarie/2024/annuali/en/integrated-annual-report_2024.pdf
Gruppo FS: revenue (p.22) and GHG emissions (p.193-7) from: Integrated Report 2024. https://www.fsitaliane.it/content/dam/fsitaliane/en/Documents/investor-relations/annual_report_2024_eng.pdf
All data is for the calendar year 2024. Figures in euros have been converted to US dollars using an approximate exchange rate of €1=$1.1. GHG emissions include Scope 1, 2, and 3. Figures for Scope 2 are 'market-based' for consistency with Tables 3.2a&b.

Table 3.2c Induced GHG emissions estimated for two lower carbon sponsors of 2026 Winter Olympics

Company	Revenue (billion US$)	GHG emissions (million tCO_2e)	Unit GHG emissions ($kgCO_2e$/$)	Sponsorship value (million $)	Induced GHG emissions (thousand tCO_2e)
Enel	86.8	71	12	12	141
Gruppo FS	18.2	11	8	12	101

Notes
Company data on revenues and GHG emissions is sourced from company reports, as follows:
Enel: revenue (p.23) and GHG emissions (p.146) from: Integrated Annual Report 2024. https://www.enel.com/content/dam/enel-com/documenti/investitori/informazioni-finanziarie/2024/annuali/en/integrated-annual-report_2024.pdf
Gruppo FS: revenue (p.22) and GHG emissions (p.193-7) from: Integrated Report 2024. https://www.fsitaliane.it/content/dam/fsitaliane/en/Documents/investor-relations/annual_report_2024_eng.pdf
All data is for the calendar year 2024. Figures in euros have been converted to US dollars using an approximate exchange rate of €1=$1.1. GHG emissions include Scope 1, 2, and 3. Figures for Scope 2 are 'market-based' for consistency with Tables 3.2a&b.

Figure 3.1 Comparison of estimated sponsorship GHG emissions due to three high carbon deals and all non-sponsorship emission sources at 2026 Winter Olympics



As can be seen by comparing Table 3.2a with figures in Table 2.1, our total estimate for induced sponsorship emissions due to five major high carbon corporations is more than eight times the emissions for 'games planning and delivery' at the Milan Cortina Games, i.e. those under the direct control of the Organising Committee. Put another way, these sponsorship emissions are nearly double the emissions from all other sources. If we focus on just the sponsorship emissions due to the three most commonly partnered high carbon sectors – fossil fuels, airlines, and car-makers – then these emissions are 40% higher than the total due to all non-sponsorship sources.

By far, the largest contributor to these sponsorship emissions is Eni, the oil and gas major. Its unit sponsorship emissions are close to double those

of other high carbon sponsors. This means that our estimate for the total related to its deal – 693 $ktCO_2e$ – is about 40% of the total for the five highest emitting deals or more than half the total of the three more common sporting sponsorship sectors.

While our figures are a preliminary estimate based on data with significant uncertainties, they nevertheless indicate a very large climate impact from marketing deals with high carbon sponsors – one that has been completely neglected by Olympic Organising Committees.

The data in Table 3.2c shows how sponsorship emissions could be much lower if high carbon sponsors were replaced with more climate-conscious companies. We choose two lower carbon sponsors for comparison. Enel is Italy's largest electricity and gas supplier. However, it has transitioned away from fossil fuels in recent years, such that nearly 75% of its electricity generation capacity is now low carbon. This is shown by its unit sponsorship emissions which are 12 $kgCO_2e/\$$ compared with a range of 25 to 60 $kgCO_2e/\$$ for the high carbon companies in Tables 3.2a&b.

In addition, Enel has a decarbonisation strategy which is claimed to be in line with the Paris Climate Agreement.[3334] Meanwhile, Gruppo FS is Italy's largest rail and bus operator whose unit sponsorship emissions are even lower at 8 $kgCO_2e/\$$. These examples demonstrate that lower carbon sponsors are already being used, and that considerable savings in induced emissions can be made if high carbon sponsors were to be completely eliminated from involvement in the Games. Indeed, if the five high carbon corporations in Tables 3.2a&b were replaced by companies with unit sponsorship emissions equal to those of Gruppo FS, then the savings would be 1,463 $ktCO_2e$ – much larger than any of the savings from measures discussed in section 2.2. Indeed, if replacement companies had even smaller carbon footprints, then this saving would be even greater.

Of course, climate change is not the only ethical concern to consider in the selection of suitable sponsors for the Olympics. Indeed, considering some of the other sponsors of Milan Cortina 2026, issues such as healthy food (Coca-Cola) and arms sales (Leonardo) arise.

3.2 Learning from past Winter Olympics to drop today's toxic sponsorship deals

Steve Podborski, the Canadian elite downhill skier, known as one of the "crazy Canucks" for the careless abandon of his skiing style, became the first North American man to win an Olympic downhill medal, at the 1980 Winter Olympics in Lake Placid. But he is also remembered also for another type of boldness – standing up to the tobacco industry.

At the time, the industry was a prominent sponsor of winter sports. But, in 1983, Podborski told the Canadian Ski Association that he didn't want to be associated with the national ski event, the 'Export A' Cup, because of its sponsorship by Canadian company Macdonald Tobacco ('Export A' was one of its cigarette brands). Podborski didn't want to be involved with the promotion of smoking, cigarettes or tobacco – especially as such sponsorship effectively targeted children attracted to the sport. He told the media that he "won't ski through a gate with a tobacco logo on it".[35] In doing so, he helped energise a campaign that would soon see the Olympics make a historic separation from tobacco sponsorship.

The tobacco industry had had a long history of exploiting the Olympics and athletes to promote itself. Olympic athletes were used to promote cigarette brands as far back as the 1910s. The United States Tobacco Company, makers of 'SKOAL' and 'Copenhagen' spitting tobacco, sponsored the 1980 US Winter Olympics Team training facility. Attendees were given company-branded memorabilia and giveaways, in the hopes of building a larger brand following. Their sponsorship continued until the 1984 Winter Olympics.

But opinions were changing thanks to athletes like Podborski. In 1987, physician John Read, who was the father of the Canadian Olympic skier Ken Read, led a campaign for the 1988 Winter Games in Calgary, Canada, to become the first 'smoke-free' Olympics.[36] The campaign achieved success when the Canadian Olympic Committee banned tobacco marketing at the Games.[37]

The IOC also formally cut ties with tobacco companies in 1988, but initially their policy only applied to Olympic branding, not Organising Committees for the Games, nor broadcasters. Indeed, at the time of the Calgary Olympics, Canada as a nation did not have a comprehensive tobacco advertising ban. Canadian television channels, for example, were saturated with advertisements from tobacco companies that still leveraged the Winter Olympics to push their products. Nevertheless, the event itself was playing an integral role in creating the conditions for both a change of opinion, and a change in the law.

In fact, the marketing by 'Big Tobacco' at that time drew international condemnation, with the World Health Organisation (WHO) and a number of international anti-smoking charities decrying the scale of tobacco advertising around a sporting mega-event – just as today voices from the top of the United Nations and the WHO call are calling for an end to fossil fuel marketing. The Canadian Medical Association warned that the extent of tobacco advertising and promotion undermined the Olympic values and promoted smoking to children.

The IOC responded with stronger commitments to eliminate tobacco sponsorship and advertisements. By the 1990s, host cities were required to ensure no tobacco advertising or sponsorship would occur within Olympic venues or associated events. The 1994 Winter Olympics in Lillehammer was the first Games to be considered fully 'tobacco-free'.

However, it took until 2010 for both the Summer and Winter Olympics to become completely free of tobacco involvement – partly due to the multiple relationships between sponsors, sports venues, and national Olympic committees.

In summary, the tobacco advertising bans achieved at the 1988 Winter Olympics in Calgary:

- pushed the IOC to create a more robust stance on tobacco advertising and sponsorship;
- accelerated a national ban on tobacco advertising in Canada, enshrined in the Tobacco Act of 1997; and
- added to the momentum behind the WHO Framework Convention on Tobacco Control.

Tobacco advertising and sponsorship bans led to significant drops in smoking and commensurate drops in premature deaths related to smoking. Today, the number of people killed by the air pollution alone due to the burning of fossil fuels (i.e. excluding climate impacts) is on a par with tobacco.[38]

4. Snow and ice loss due to the GHG emissions of the Winter Olympics

The GHG emissions caused by the Winter Olympics are a direct threat to the future of winter sports themselves, due to their role in melting snow and ice around the world in the coming years. Climate researchers have uncovered two mathematical relationships:

1. **between GHG emissions and the loss of snow cover in the Northern hemisphere; and**
2. **between GHG emissions and the loss of glacier ice mass globally.**

In this section, we use equations derived from this research to estimate the losses caused by the emissions of the Winter Olympics.

On snow cover, researchers have pointed out that there is an approximately linear relationship between cumulative global GHG emissions and the increase in average global surface air temperature change, and between the latter and total snow cover in the Northern hemisphere in May.[39] This leads to the equation in Box 4.1.

Box 4.1 Equation linking GHG emissions and loss of snow cover

A = 2.5 E

E is the total GHG emissions of an activity measured in tonnes of carbon dioxide equivalent (tCO_2e), including Scopes 1, 2 and 3

A is the loss in snow area cover in the Northern hemisphere (using the reference month of May) due to that activity, measured in square metres (m^2)

Regarding the loss of glacier ice mass, a group of European scientists have concluded that there is also an approximately linear relationship between the increase in average global surface air temperature change and the global mass of glacier ice.[40] This leads to the equation in Box 4.2.

Box 4.2 Equation linking GHG emissions and loss of glacier ice mass

M = 15.8 E

E is the total GHG emissions of an activity, measured in tonnes of carbon dioxide equivalent (tCO_2e), including Scopes 1, 2 and 3

M is the loss in global glacier ice mass due to that activity, measured in tonnes (t)

Using key figures for emissions due to the Milan Cortina Games from Tables 2.1 and 3.2a, we estimate the total future losses of snow and ice due to this event in Table 4.1.

Table 4.1. Estimated area of snow loss and mass of glacier ice loss due to selected categories of GHG emissions at the 2026 Winter Olympics at Milan Cortina

Milan Cortina 2026	GHG emissions ($ktCO_2e$)	Area of snow loss[i] (km^2)	Mass of glacier ice loss (million tonnes)
Games planning and delivery[ii]	227	0.6	3.6
Carbon footprint, excluding sponsorship (based on official data only)[ii]	931	2.3	14.7
Eni sponsorship only	693	1.7	11.0
Eni, Stellantis, and ITA Airways sponsorship	1,296	3.2	20.5
Grand total (Official carbon footprint plus five high carbon sponsors)	2,823	7.1	44.6

Notes
i. Northern hemisphere only
ii. Our latest estimate based on FMC26 data from September 2025 – see Table 2.1

The table shows, for example, that the estimated carbon footprint of the 2026 Games – based on official data only, and excluding sponsorship emissions – will eventually lead to a loss of 2.3 square kilometres (km^2) of snow cover and over 14 million tonnes (Mt) of glacier ice. The Eni sponsorship on its own is estimated to lead to losses of 1.7 km^2 of snow cover and 11 Mt of glacier ice, whereas the combined sponsorship of Eni, Stellantis, and ITA Airways leads to figures which are approximately 1.4 times the size of the estimate for the official total. The total losses based on the official carbon footprint plus the five high carbon sponsorship deals are approximately 7.1 km^2 of snow cover and nearly 45 Mt of glacier ice. These are serious impacts from one single event, and will lead to significant impacts to international winter sports.

Related to this discussion are the future losses of snow and ice due to the GHG emissions of individual high carbon companies. So, for example, Eni's total emissions (Scopes 1+2+3) due to its fossil fuel production and related activities in 2024 were 395 million tCO_2e.[41] These will eventually lead to the losses of nearly 1,000 km^2 of snow cover and 6,200 Mt of glacier ice.[42]

5. Conclusions and recommendations

Official data from the 2026 Winter Olympics in Milan Cortina suggests that it will cause GHG emissions of about 930,000 tCO_2e, with the largest contribution – about 410,000 tCO_2e – being due to spectator travel. Based on climate research, this report estimates that the total will cause a loss of 2.3 square kilometres of snow cover and over 14 million tonnes of glacier ice – major impacts on exactly the environment needed to support winter sports.

However, the official data does not include emissions related to sponsorship deals. These emissions arise due increased sales of high carbon goods and services that are promoted by the sponsors of the Games. This report, using a recently published methodology, estimates that high carbon sponsorship deals with three major corporations at the Milan Cortina Games could induce additional emissions of about 1.3 million tCO_2e – about 40% higher than the estimate for the whole Games based on official data. The three companies responsible are: Eni, the Italian oil and gas giant; Stellantis, the international car manufacturer whose brands include Maserati, Lancia, Alfa-Romeo, and Fiat; and ITA Airways, Italy's national airline. Of these, the deal with Eni is responsible for more than half of the total. This report estimates that the emissions of the high carbon sponsorship deals with these three corporations will lead to a future loss of 3.2 square kilometres of snow cover and over 20 million tonnes of glacier ice. The assessment is based on a recently developed methodology, which has yet to be incorporated into GHG accounting standards. It demonstrates that sponsorship emissions are an important but neglected factor in GHG accounting assessments.

Efforts have been made to reduce the GHG emissions and other environmental impacts of the Winter Olympics since 1994. However, it was not until detailed reporting of both direct and indirect emissions was carried out from 2018 onwards that it became clearer how much progress was being made. This report's analysis of this data reveals that the largest consistent reductions which have been achieved have been by avoiding the construction of new infrastructure – especially transportation and venues – often by reusing existing facilities. In total, this has saved approximately 350,000-720,000 tCO_2e for a single Winter Olympics. Use of renewable energy, energy efficient building design, and lower carbon building materials in combination have saved a further 130,000-310,000 tCO_2e for an individual Games. Due to the contested effectiveness of carbon offsets – including by leading climate scientists – we do not count them as contributing to reductions in Winter Olympic emissions.

There are two key areas of emission reduction activity that have been neglected. The first, as implied above, is the replacement of sponsorship deals with high carbon corporations by those with much lower emissions. This could, in the case of the Milan Cortina Games lead to savings of over 1.4 million tCO_2e, if the five sponsorship deals with the highest induced emissions are replaced by more environmentally-friendly options. Since lower carbon corporations are already used as sponsors, this could potentially be achieved without significantly affecting Olympic finances. The second area would be action to reduce the emissions due to spectator travel, mainly by reducing the numbers travelling by air. With spectator travel emissions being around 410,000 tCO_2e, there is also potential for major savings here. Indeed, with ticket revenue being a comparatively small fraction of total income for the Games (13% at Milan Cortina), action could again be taken without creating serious funding issues.

Based on this analysis, we make several recommendations, as follows.

- The International Olympic Committee and individual Games organising committees should end all sponsorship deals with high carbon corporations, especially fossil fuel companies, airlines, and makers of cars with internal combustion engines, and replace them with partnerships with much lower carbon companies.
- Olympic sponsorship deals should only be made with companies that (a) publish comprehensive GHG data on their carbon footprint (including Scopes 1, 2, and 3), (b) have a small carbon footprint, and (c) have credible near-term plans for reducing emissions in line with the global temperature targets in the Paris Agreement.
- The IOC should expand measures that strongly favour local and national spectators using surface public transport. These should include preferential ticket-pricing.
- Olympic organisers should not use carbon offsets to make claims that the Games are in any way 'carbon neutral'.

Today, the Olympic movement stands in relation to fossil fuel and other high carbon sponsorship just as it did to tobacco sponsors in the late 1980s – before bans on tobacco marketing were brought in. The opportunity exists not only to show leadership, but to act in a way that preserves the future of the Winter Olympics, and the well being, health, and livelihoods of its athletes and fans.

The Milan Cortina Games are sponsored by the major oil company Eni, and indeed Canada's own team sponsor is PetroCanada,[43] the retail branch of Suncor, which is heavily involved in highly polluting tar sands production.

This Games should be a watershed leading to no future Winter Olympics ever again being a billboard for promoting fossil fuel pollution. That could start with the 2030 Winter Olympics in the French Alps, if it doesn't the Olympic movement will be torching its own future by fuelling global heating.

Appendix 1. Calculating the GHG emissions of a sponsorship deal

The size of the GHG emissions associated with a sponsorship deal – which we label 'E_s' – are affected by four main factors:

- the value of the sponsorship (or investment) deal (V_s);
- the annual revenue (gross) of the sponsoring company (V_c);
- the annual GHG emissions (scopes 1, 2 and 3) of the sponsoring company (E_c); and
- a measure of the financial return that the sponsor expects from the deal (r).

Researchers have used common economic theory and practice to combine these variables into the following equation:[i]

$E_s = E_c \times V_s / (V_c \times r)$

The financial return required by the sponsor is in this instance called the Weighted Average Cost of Capital (WACC). It is affected by numerous factors, but is often in the region of 7%,[i] so this is the factor we use in this analysis.

Acronyms and abbreviations

BOC22 – Beijing Organizing Committee for the 2022 Olympic and Paralympic Winter Games

FMC26 – Fondazione Milan Cortina: The Organizing Committee for the 2026 Olympic and Paralympic Winter Games

IOC – International Olympic Committee

Winter Olympics – Olympic and Paralympic Winter Games

POC18 – Pyeongchang Organizing Committee for the 2018 Olympic and Paralympic Winter Games

SGR – Scientists for Global Responsibility

SOC14 – Sochi Organizing Committee for the 2014 Olympic and Paralympic Winter Games

VOC10 – Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games

WHO – World Health Organisation

Different estimated figures for emissions due to Eni sponsorship

In 'Olympics Torched' (OT, January 2026), the estimate of the GHG emissions due to the Eni sponsorship deal was 693 $ktCO_2e$, whereas in 'Melting the Winter Olympics' (MWO, May 2025) the estimate was 953 $ktCO_2e$. This is due to different estimates for the value of the sponsorship deal. In OT, the sponsorship deal was estimated to be worth $12 million in a single year, whereas in MWO, it was estimated to be €15 million or $16.5m (using an approximate exchange rate of €1=$1.1). The figure of $12m was the estimated average per sponsor based on the total marketing (sponsorship) income of the IOC in 2022 (the last time the Winter Olympics was held). The figure of €15m ($16.5m) was based on a review of previous research on Olympic sponsorship deals. Because of commercial confidentiality, exact figures are not publicly published. Both estimates are considered to be conservative, so the real figure could easily be higher.

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The New Weather Institute is a think tank cooperative, focused on finding pathways for rapid transition to a fair economy that thrives within planetary ecological boundaries. It established the Cool Down – Sport for Climate Action Network, a global movement mobilising athletes, fans, and sports institutions to demand climate action within and beyond sport: cooldownclimate.org. New Weather Sweden is a sister organisation of the New Weather Institute and leads the Save our Snow campaign.

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Scientists for Global Responsibility (SGR) is a UK-based membership organisation of hundreds of natural scientists, social scientists, engineers, and those in related professions. It promotes science and technology that contributes to peace, social justice, and environmental sustainability. SGR's work includes research, education, and advocacy activities.

sgr.org.uk

Champions for Earth empowers athletes and sportspeople to use their platforms to advocate for climate action. We are a community of current and former athletes across a range of sports and across performance levels who support each other as we stand up for life on Earth.

championsforearth.com

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