



Manchester 2023 Allianz Para Swimming World Championships

Event Impact Report - November 2023

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UK Sport's Sustainability Strategy

UK Sport's Ten Year Strategic Plan sets out various ambitions, including No.3 to inspire positive change, where environmental sustainability plans sit.

UK Sport's Environmental Sustainability Strategy was launched at the end of March 2023.

Overall, UK Sport's vision is to "*accelerate the progress of high-performance sport in addressing collective environmental impact*," and is based on three priorities:

1. Operations
2. Capability and Decision Making
3. Influence and Platform

It's a foundational plan that runs from 2023-2025 and includes the following actions:

- Ensure that every major event invested in has calculated its potential environmental impact and puts in place an action plan to reduce negative impacts and implement initiatives that have a net positive impact.
- Engage with venues, cities and regions during event bidding and hosting to incorporate environmental sustainability targets.

UK Sport's Measurement Objectives

UK Sport want to use TRACE to pilot measuring the impact of two events:

- Manchester 2023 Allianz Para Swimming World Championships
- 2023 ICF Canoe Slalom World Championships

These events are each slightly different therefore will enable a good pilot to give benchmarks for each type of event (indoor/outdoor and para/non-para) and help understand whether TRACE will work if rolled out amongst other events/sports in future.

UK Sport want to use TRACE to measure the final impact of both events and carry over key learnings and considerations for the continual improvement of sustainability performance in future.

isla.

isla is the UK's most trusted, independent industry body offering the event sector thought leadership, data driven insights and empowerment tools that define a successful pathway to Net Zero emissions for all industry stakeholders.

Founded by event professionals and industry leaders, isla's goal is to accelerate the event industry transition to a net zero future.

trace

by isla.

TRACE is the definitive carbon measurement platform for sustainable events.

The TRACE platform helps you measure and minimise carbon at live, hybrid and digital events.

Sustainable events are more achievable with recommendations to shape decision making and planning stages.

Event overview

Event Name: Manchester 2023 Allianz Para Swimming World Championships

Event Dates: 28th July – 6th August 2023

Event Location: Manchester, United Kingdom

Event Venue: Manchester Aquatics Centre

Event Details:

- Championships start with training & classification days 28th - 30th July
- Followed by 7 competition days, 2 sessions per day; heats in the morning and finals in the evening
- Event is attended by up to 1,200 athletes & team officials, 350 spectators and guests per session.
- Total number of people on site for the duration was 6,800.
- Event is broadcast live and media will be in attendance.



Key Partners

The 11th edition of the Para Swimming World Championships was hosted in partnership with UK Sport and Manchester City Council at the Manchester Aquatics Centre, home of the British Para Swimming National Performance Centre.

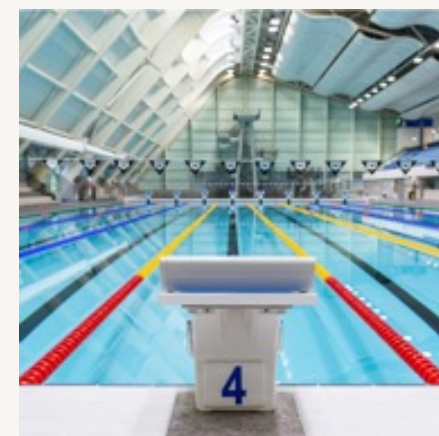


In line with Manchester City Council's commitment to achieve net-zero carbon emissions by 2038, sustainability, energy efficiency and decarbonisation have been at the heart of Manchester Aquatics Centre's recent regeneration. Over £3m in investment was secured for New Green Technologies, funded by the National Public Sector Decarbonisations Scheme, to reduce carbon emissions.

The existing gas heating system has been replaced by high efficiency, all electric Air Source Heat Pumps. 1006 solar panels have been installed, enough to power more than 100 homes, alongside a battery system that will allow the MAC to use solar energy even on Manchester's cloudier days.

A Building Management System, energy efficient lighting and new air handling units have also been introduced to preserve heat and reduce emissions. To date over £30 million has been invested into the Council's Estates Carbon Reduction Programme and emissions from energy use across Council buildings has reduced year on year since 2014-15, and by almost two thirds between 2010 and 2022.

These combined decarbonisation and energy efficiency measures will result in an annual saving of 500 tonnes of carbon each year - which would fill over 100 Olympic-sized swimming pools. These decarbonisation measures will maintain this progress and ensure that the MAC contributes to the health and wellbeing of our city as well as those who use its world-class facilities.



Event sustainability objectives and goals

Measure baseline

goal:

Measure the carbon and waste footprint of PSWC 2023, to create a baseline and to understand largest causes of impact.

action taken:

The PSWC team, key suppliers and a TRACE specialist worked together from May through until October 2023 to:

- identify the project measurement boundary
- identify suppliers to engage with to request data
- brief suppliers using TRACE virtual training sessions (for key suppliers) and TRACE templates/briefing emails
- bi-weekly check in calls to review progress and answer any questions that arose
- collate and input data into TRACE to measure final emissions
- develop this report with final calculations and largest causes of impact

Identify areas for improvement

goal:

Assess the carbon and waste footprint of PSWC 2023 as well as the overall measurement process, to identify areas of improvement for other UK Sport events, and future PSWC events

action taken:

The PSWC team, key suppliers and a TRACE specialist worked together from May through until October 2023 to:

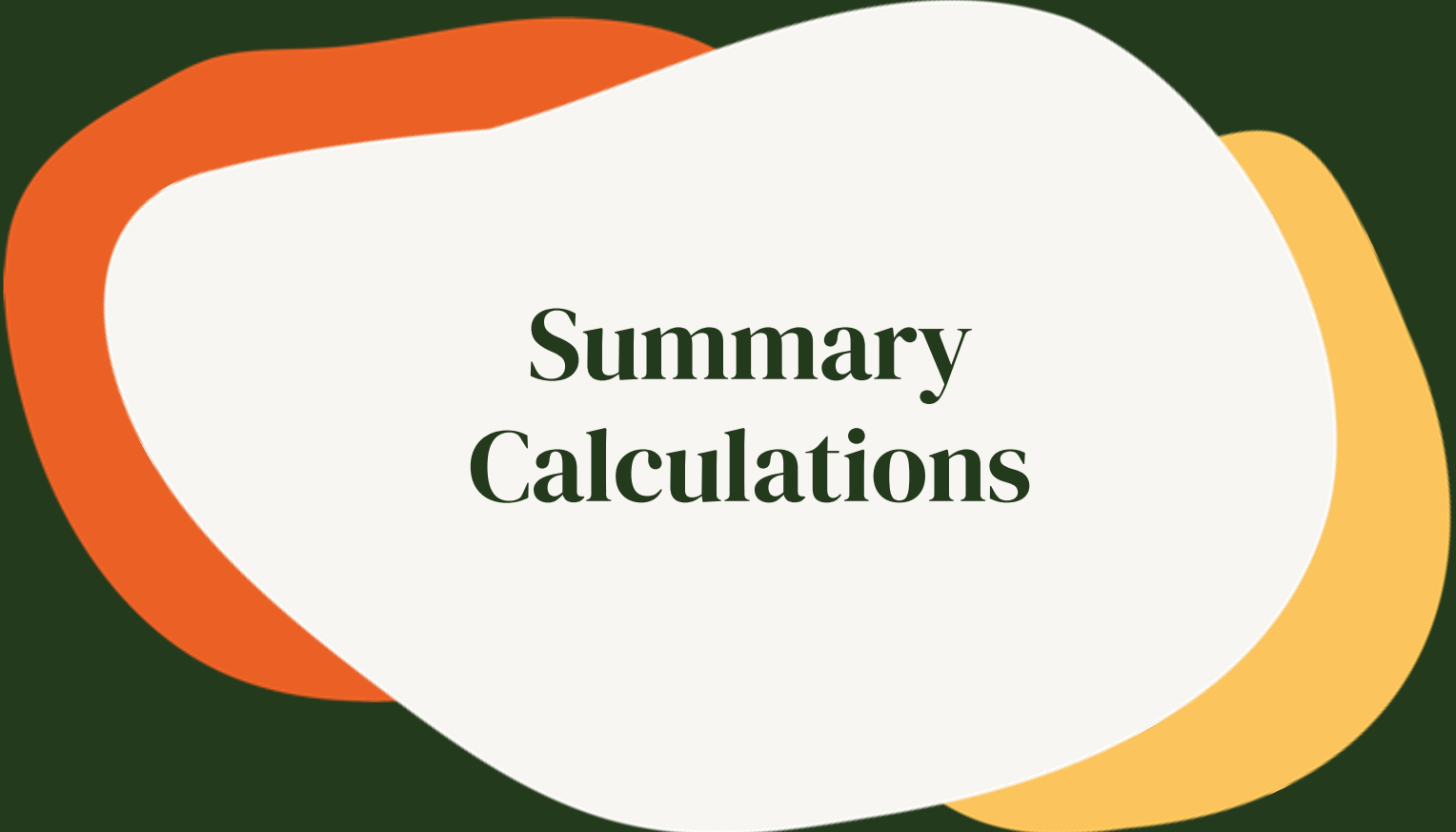
- use TRACE to see the impact of various decisions throughout the project process – to help assist with decision making
- kept note of ways to improve processes and procedures
- establish a Sustainability Sub group with membership from all stakeholders to develop a sustainability action plan and discuss data capture.
- include sustainability as part of the social impacts agenda item for all Stakeholder Board Meetings and Local Organising Committee Meetings.
- develop this report post event to review our key learnings from the overall measurement process and what we would change to improve sustainability performance for the future



Measurement Boundary

Measurement boundary

Area	Detail
Venue Energy Use	Electricity use (renewables) and gas usage data was provided by Manchester Aquatics Centre.
Temporary Energy Use	Litres of HVO was tracked for use in generators on site from Agreko.
Production Build	Elements in this section such as materials for tent/flag/branding structures, medals, uniforms and merchandise were tracked.
Graphics	Elements in this section such as materials for tents, flags, branding, backdrops, scrim, floor decals and other ad hoc signage were tracked.
Catering	Catering for staff, volunteers, athletes and the VIP space was tracked. No spectator catering was tracked.
Waste	General waste and mixed recycling data was provided by Manchester Aquatics Centre.
Production Transport	Contractor transport, couriers and overseas shipping/freight was tracked by the PSWC team.
Staff and Volunteers Travel & Accommodation	PSWC, Volunteers, Athletes, Officials and Supplier Staff travel and accommodation was collected and included in the Staff Travel section by PSWC team.
Spectators Travel & Accommodation	Spectator travel data was obtained through an on-site survey conducted by Manchester Metropolitan University Volunteers, plus a post event virtual survey. Accommodation was also tracked using data obtained from the survey data. It was estimated roughly 30% of attendees travel data was obtained via surveys.



Summary Calculations

Overview of event in numbers

How did we do?

Total Attendees

6800

In Person

0

Virtual

Carbon Footprint

1910.69 tCO₂e

Total carbon footprint

280.98 kgCO₂e

Average carbon footprint per attendee

Waste Footprint

2.68 tonnes


Total Waste Footprint

0.39 kg

Average waste per attendee

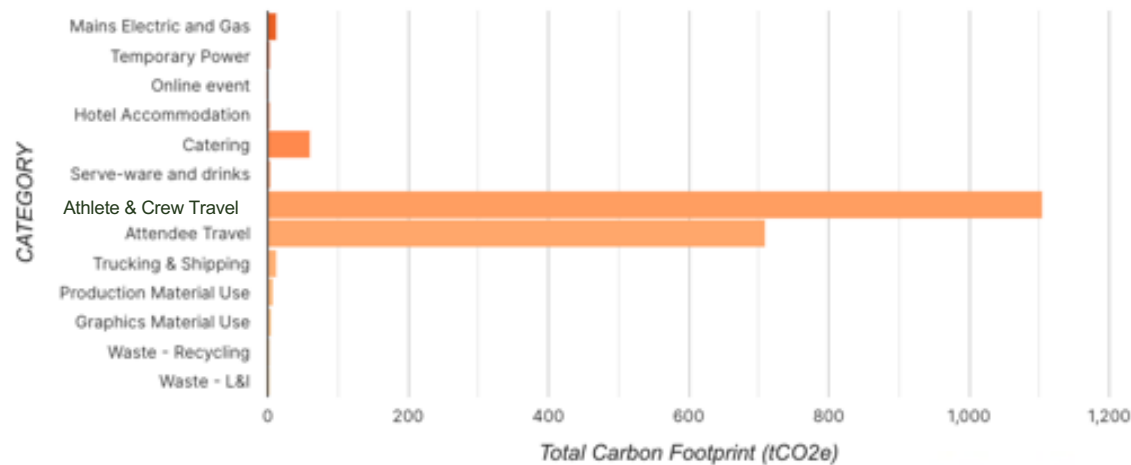
This is the equivalent of

 CO₂ equivalent from 955.3 cars on the road for one year

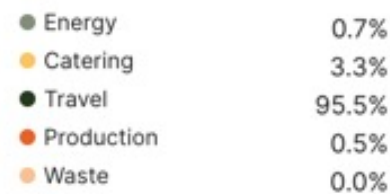
 The carbon sequestered by 9553.4 tree seedlings grown for 10 years

Overview of event in numbers

Emissions breakdown by category



Carbon Footprint by Category



Scope 1

9.53 tCO2e

Scope 2

0.00 tCO2e

Scope 3

1901.16 tCO2e

Overview of event in numbers

Mains electric & gas – 10.984 tCO₂e

Temporary power – 0.879 tCO₂e

Online event – NA

Hotel accommodation – 0.913 tCO₂e

Catering – 60.792 tCO₂e

Serve-ware & drinks – 2.245 tCO₂e

Crew travel – 1,103.715 tCO₂e

Attendee travel – 710.026 tCO₂e

Trucking & Shipping – 11.609 tCO₂e

Production & Material use – 6.05 tCO₂e

Graphics Material use – 3.429 tCO₂e

Waste recycling – 0.027 tCO₂e

Waste landfill & incineration – 0.3 tCO₂e



In more detail

Energy

How did we do?

The newly refurbished Manchester Aquatics Centre used new green technologies installed to reduce the venues carbon emissions; including a 100% renewable energy source for electricity. However, some gas was used on site from a fossil fuels source, which contributed nearly 11 tonnes of CO₂e.

Some generators were required for surplus power, however the amount required was reduced (from 4 generators to 3) by installing additional house power (from the venues renewable energy source). Generators ran on 100% HVO fuel plus, with an agreed running schedule to reduce running time and emissions.

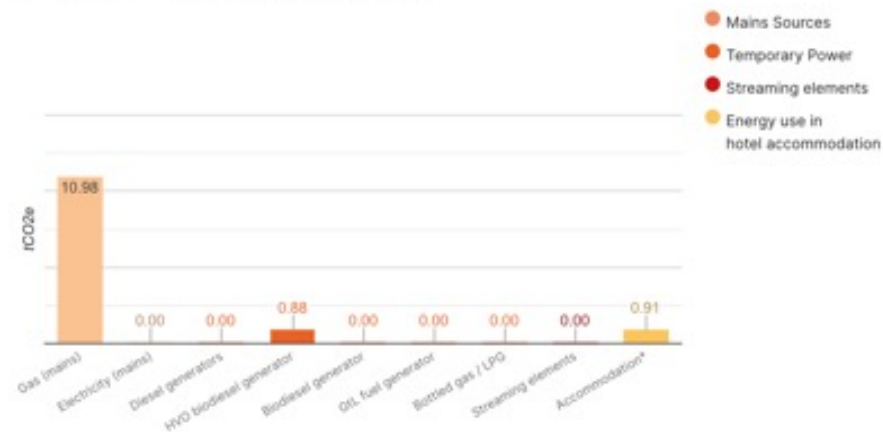
0.91 tCO₂e was emitted from accommodation used by athletes and spectators. It was assumed all hotels were on a fossil fuels energy source, in future, prioritise hotels with renewable energy source.

What does this mean?

Some carbon savings were made from the above choices:

- Using green electricity at Manchester Aquatics Centre instead of fossil fuel source (27.45 tCO₂e) saved **27.45 tCO₂e**
- Switching from 4 to 3 generators saved **0.29 tCO₂e**
- Switching from diesel (9.47 tCO₂e) to HVO (0.88 tCO₂e) generators saved **8.59 tCO₂e**
- Total saved **36.33 tCO₂e** – the equivalent of 84,489 miles driven by an average gasoline-powered passenger vehicle

Breakdown of Energy categories



Total Energy emissions

12.78 tCO₂e

Contribution to overall emissions

0.67%

Energy emissions per attendee

1.88 kgCO₂e

Waste

How did we do?

Throughout the project planning stages, the team implemented a waste hierarchy of reduce, reuse, recycle. This approach reduced the amount of waste produced significantly.

The total amount produced on site was 2.68 tonnes of waste; predominantly coming from general waste produced by your spectators on site (classed as 'everything else'). Serveware waste is fairly high compared to graphics and built items – coming from crew catering single use paper plates and cups.

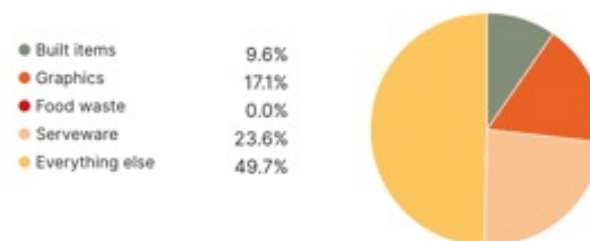
Compared to a recent report ([The Temperature Check Report](#) by isla) which looks at a cross section of data from 127 events, the average waste produced in the UK per attendee at an event is 2.14kg per person. PSWC waste per attendee was 0.39kg way below the existing industry benchmark.

What does this mean?

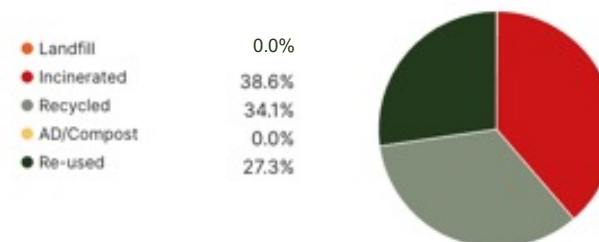
Despite the amount of waste produced (which was overall low compared to the industry benchmark) **0% of waste went to landfill** – with any general waste that couldn't be recycled incinerated for energy.

For more detail on how these graphs are calculated – see appendix graphic on 'where does waste come from'.

Where did waste come from? (by weight)



Where did waste go? (by weight)



Total waste

2.68 tonnes

Waste per attendee

0.39 kg

Total Waste emissions

0.06 tCO₂e

Contribution to overall emissions

0.0%

Waste emissions per attendee

0.01 kgCO₂e

Production: Build

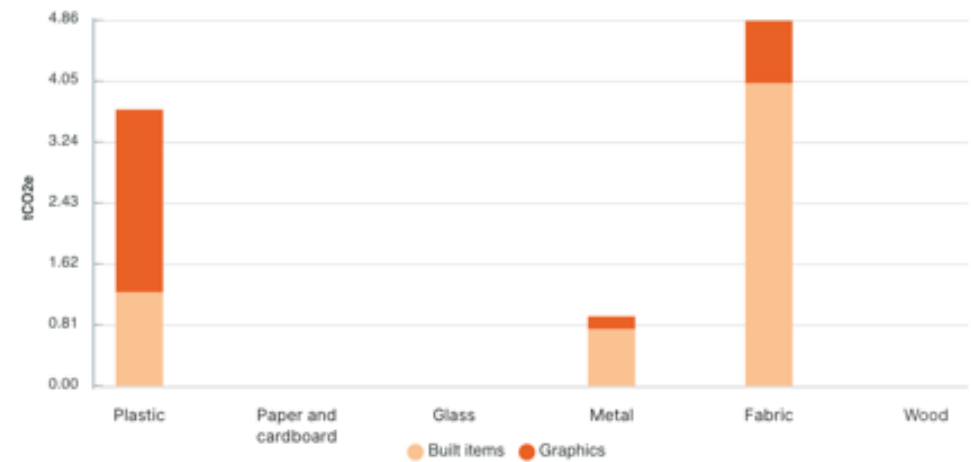
How did we do?

The PSWC team prioritised using hired equipment (such as staging, rigging and flag frames) and then some higher value items were purchased with intention to reuse again future (tent/marquee frames), ensuring very little was produced new for the production build.

Some carpet was used and was disposed of (252 kgs) which alone produces 1.255 tCO₂e (the equivalent of 2,919 miles driven by an average gasoline-powered passenger vehicle).

The fabric emissions in this section came from merchandise (bags, hats, t-shirts, swim bags), and metal from pull up banner frames and pin badges. However, volunteer workforce uniform orders were heavily monitored and reduced (from an initial 1500 to 1225) to prevent waste. By reducing the number of uniforms ordered **0.25 tCO₂e** was saved. Plus, mostly these items are kept by volunteers as keep sakes.

Production materials emissions breakdown



Total Production emissions

9.48 tCO₂e

Contribution to overall emissions

0.5%

Production emissions per attendee

1.39 kgCO₂e

Production: Build

What does this mean?

The majority of emissions in this section came from fabrics used to produce merchandise. Spectators at events like this often want to keep mementos so we know merchandise will be required in future. There is already close management of order quantities in place.

The PSWC team's hands are tied when it comes to the location of where these items are sourced from and get embroidered. Potentially an opportunity to influence material type and location of sourcing for these items in future.

The waste and (plastic) emissions produced from carpet were quite high. There's an opportunity here to consider alternatives such as deciding whether the carpet is really needed (or would plain base flooring be sufficient) or whether to repurpose or recycle the carpet post event.

Pull up banner frames can be repurposed/recycled – consider thinking through the logistics of how this can work either through storing these frame in between events or partnering with a repurposing partner.

Material Type	Usage (tonnes)	Emissions (tCO2e)
Plastic	0.77	3.69
Paper and cardboard	0.00	0.00
Glass	0.00	0.00
Metal	0.53	0.93
Fabric	0.64	4.86
Wood	0.01	0.00
Total	1.95	9.48

Percentage of assets hired or made from reclaimed materials

11.5%

Percentage of materials reused, donated, repurposed

60.6%

Percentage of assets made from recycled materials

1.1%

Percentage of materials recycled post event

39.1%

Production: Graphics

How did we do?

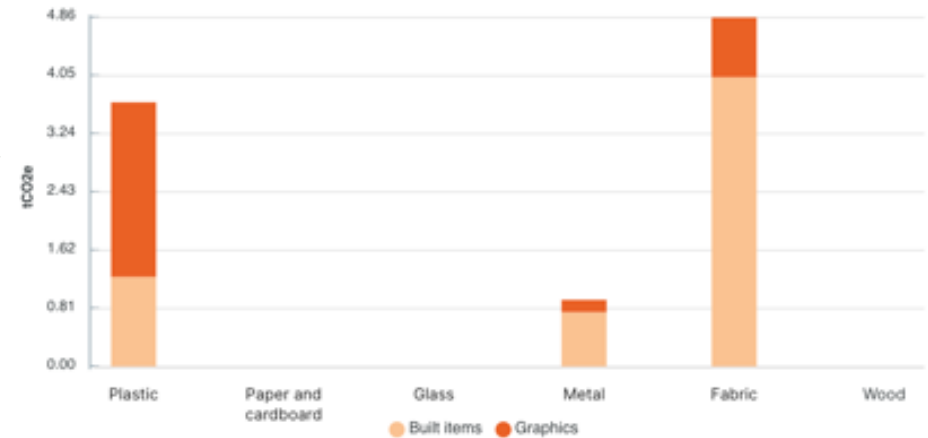
Graphics emissions came mostly from plastic (2.43 tCO₂e) from materials like backdrops, scrim, floor graphics, as well as from fabric (0.83 tCO₂e) from things like flags, hanging banners, lanyards, table skirts. All these were made of virgin material.

What does this mean?

A great deal of graphics were recycled post event, however only 1.1% of anything new produced was made of recycled materials. Despite this emissions from production overall were quite low - reduction tactics were used throughout the project such as:

- A considered branding plan, reduced branding where possible and recyclable materials used, including a reduction of window decals of 40sqm which reduced emissions by **0.04 tCO₂e**
- Onsite printing was reduced of start lists and results. A QR code was included on accreditations to provide access to digital start lists and results.
- A digital programme was developed instead of printed programme.
- E ticketing and communication to spectators that tickets need not be printed at home.
- Lanyards were made from PET recycled plastic and due to the branded design were kept as mementos by all accredited attendees.

Production materials emissions breakdown



Percentage of assets hired or made from reclaimed materials

11.5%

Percentage of materials reused, donated, repurposed

60.6%

Percentage of assets made from recycled materials

1.1%

Percentage of materials recycled post event

39.1%

Food & beverages

How did we do?

Catering was measured for staff, volunteers, athletes and the VIP space. Although emissions for catering were just 3.6% of the overall project's emissions, quite a high volume of meat meals were served, including beef and lamb. Of the 60.79 tCO₂e produced from meals, 57.3 tCO₂e came from meat meals (94%).

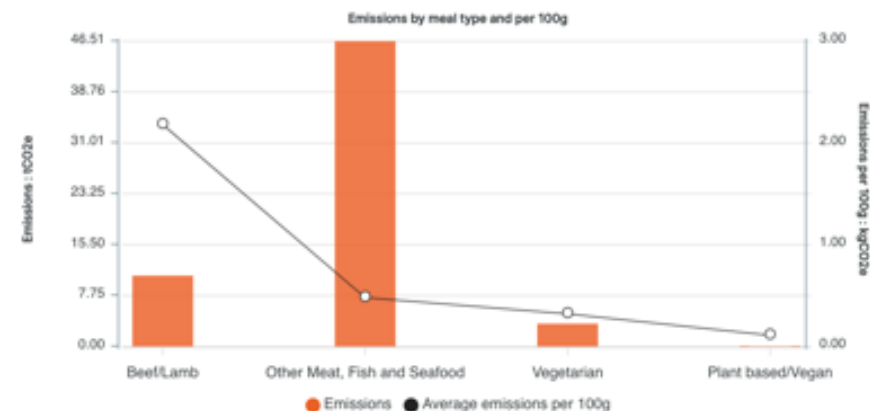
Emissions from drinks were low 2.12 tCO₂e, and serveware although it contributed a significant amount of waste (23.6% of the waste produced) had low emissions too 0.12 tCO₂e

What does this mean?

Emissions from food could be reduced by offering more vegetarian or vegan options. Some sustainable practices were applied such as:

- Reusable water bottles provided to all volunteers and drinking fountains available for water refills for volunteers, athletes and spectators.
- No bottled water provided to volunteer workforce or athletes reducing water order by approximately 25,000 bottles (2.0358 tCO₂e) on the same event held in 2019, which saved **0.2498 tCO₂e**. For the minimal amount of sealed water required, cartons were used. In addition to this, bottled water was replaced by canned water in the venue café.

Emissions by meal type and per 100g



Food Type	Emissions (tCO2e)	Portions	Emissions per 100g (kgCO2e)
Beef/Lamb	10.79	1260	2.18
Other Meat, Fish and Seafood	46.51	20514	0.48
Vegetarian	3.47	2919	0.32
Plant based/Vegan	0.02	35	0.11

Drink Choice	Emissions (tCO2e)	Quantity	Emissions per drink (kgCO2e)
Soft drinks	0.2247	4300	0.05
Wine	0.0285	20	1.42
Water	1.7860	13166	0.14
Beer/Cider	0.0824	160	0.59
Tea/Coffee	0.0000	0	0.00
Spirits	0.0000	0	0.00

Total F&B emissions
63.04 tCO₂e

Contribution to overall emissions
3.3%

F&B emissions per attendee
9.27 kgCO₂e

Total Food emissions
60.79 tCO₂e

Total Beverages emissions
2.12 tCO₂e

Total Serveware emissions
0.12 tCO₂e

Staff & Athlete Travel

How did we do?

In this section we include the measurement of staff, volunteers, officials and athlete's travel. The biggest area of impact as expected was flights contributing to 59.94% of the overall emissions within this area. We assumed all athletes would travel in economy class.

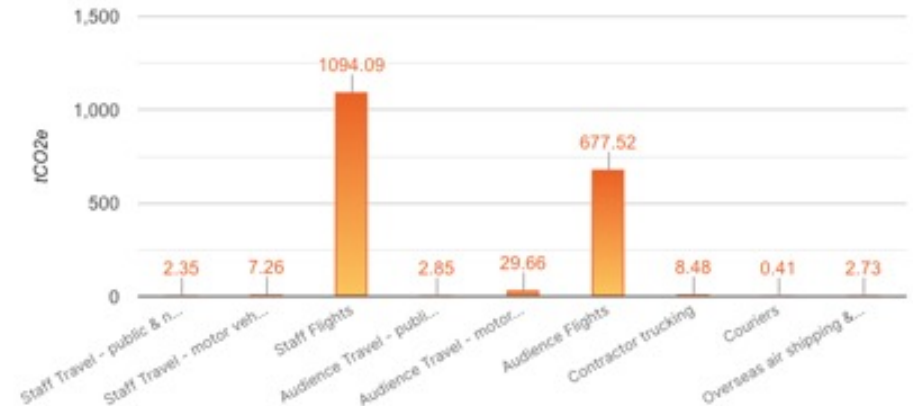
Ground travel was predominantly via public transport (1,592 journeys totalling 2.35 tCO₂e) over motor vehicles (708 journeys totalling 7.26 tCO₂e).

What does this mean?

As anticipated, staff, volunteers, officials and athlete's is a high emissions contributor for events of this scale. Despite this best efforts were applied to reduce emissions in this area such as:

- Approximately 60% of workforce based in Manchester or Greater Manchester, therefore travel emissions would be lower and public transport more likely to be used.
- Local accommodation used for all client groups with 2 out of 5 team hotels within walking distance. The average distance from hotel zone to venue only 1.4km.
- Efficient transportation plan with grouped airport transfers where possible instead of individual transfers per team arriving and departing.

Emissions by transport type



Carbon Footprint by Category

Energy	0.7%
Catering	3.3%
Travel	95.5%
Production	0.5%
Waste	0.0%



Travel and Transport emissions

1825.34 tCO₂e

Contribution to overall emissions

95.5%

Travel emissions per attendee

268.43 kgCO₂e

Spectator (Audience) Travel

How did we do?

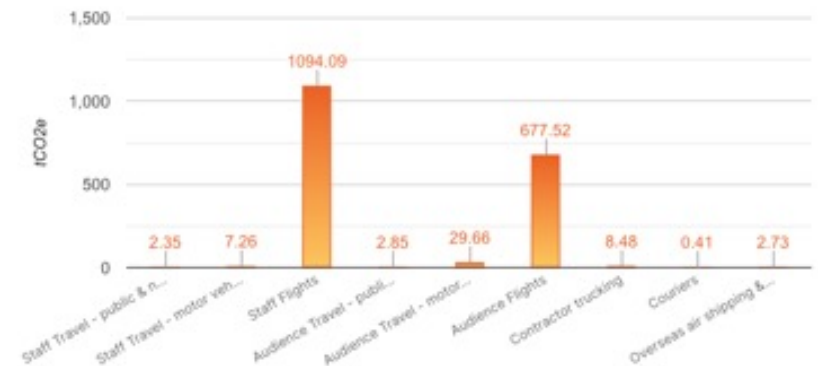
This section just looks at spectator travel, which was obtained through an on-site survey, as well as a post event virtual survey. Overall, roughly 30% of spectator travel data was captured.

Spectator flights contributing to 37.12% of the overall emissions within this area. We assumed all spectators would travel in economy class. Spectator ground travel was similar with a similar number opting for public transport (484 journeys totalling 2.85 tCO₂e) over motor vehicles (406 journeys totalling 29.66 tCO₂e).

What does this mean?

Travel emissions for the whole event equated to 1,825.34 tCO₂e (this alone would take 30,182 tree seedlings grown for 10 years to offset) and an estimated 268.43 kgCO₂e per person.

Emissions by transport type



Carbon Footprint by Category



Travel and Transport emissions

1825.34 tCO₂e

Contribution to overall emissions

95.5%

Travel emissions per attendee

268.43 kgCO₂e

Kit Transport

How did we do?

Kit transportation contributed 11.62 tCO₂e for the entire project. This included 2.73 tCO₂e emitted from international freight with most merchandise coming from China or Bulgaria via cargo ship.

What does this mean?

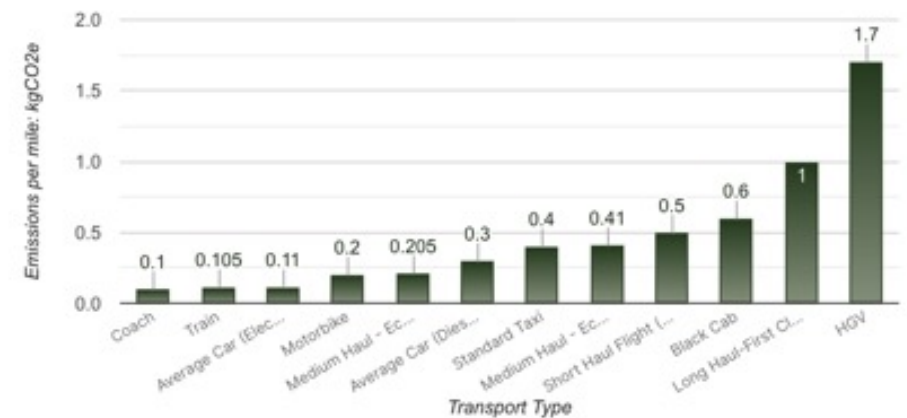
Emissions in this area mostly came from diesel vans. Although most of these vans were local some were traveling from Madrid and Paris. Quite a significant number of International Federation partners are based internationally. For future events discussing procurement of IF partners early on with the International Federation from a sustainability perspective could really help reduce emissions.

Some sustainable practices were applied in this area such as:

- Local suppliers used where possible for example accreditation lanyards sourced from a local company who delivered to the event via an electric vehicle.
- Medals produced in the UK reducing shipping emissions.

Emissions per mile for different transport types

This graph shows the emissions of different transport choices to help when planning transport



Transport Type	Emissions (tCO2e)	Percentage of Transport Total	Journeys	Emissions per journey (kgCO2e)	Mileage	Emissions per mile (kgCO2e)
Contractor trucking	8.48	0.51%	69	122.84	13725.70	0.62
Couriers	0.41	0.02%	7	58.00	880.88	0.46
Overseas air shipping & freight	2.73	0.16%	19	143.54	45082.34	0.06

Transport Emissions

Transport Type	Emissions (tCO2e)	Percentage of Transport Total	Journeys	Emissions per journey (kgCO2e)	Mileage	Emissions per mile (kgCO2e)
Staff Travel - public & non-emitting transport	2.35	0.13%	1592	1.48	25319.82	0.09
Staff Travel - motor vehicles	7.26	0.40%	708	10.26	22378.41	0.32
Staff Flights	1094.09	59.94%	1973	554.53	3028728.99	0.36
Audience Travel - public & non-emitting transport	2.85	0.16%	484	5.88	63533.33	0.04
Audience Travel - motor vehicles	29.66	1.62%	406.6666666666667	72.93	95814.67	0.31
Audience Flights	677.52	37.12%	793.3333333333334	854.02	1878431.30	0.36
Contractor trucking	8.48	0.46%	69	122.84	13725.70	0.62
Couriers	0.41	0.02%	7	58.00	880.88	0.46
Overseas air shipping & freight	2.73	0.15%	19	143.54	45082.34	0.06

Overall potential reduction opportunities

Carbon emissions reductions

Here is a collated list of all of the reduction tips for each core pillar. We have estimated the potential carbon emissions saving if each tip is implemented to give you an idea of the total reduced footprint that may be possible for this event by making a few key changes.

However, these tips just focus on your biggest sources of emissions in each area, and many more reductions could be made. Check out proseed, for best practice guidance on how to reduce your carbon footprint across your events.

Area	Change	Reduction (tCO2e)	Reduction (%)
Energy	Reduce gas use by up to 10% by monitoring temperatures at your venue more closely, keeping doors closed, or using more energy efficient buildings.	1.098	0.06%
Energy	Hotels use a lot of power for lighting, heating, laundry etc. Switch to eco hotels with renewable energy suppliers, or aim to reduce accommodation requirements by 10%	0.646	0.03%
Catering	Provide 100% plant based catering for staff and audience	45.378	2.37%
Travel and Transport	Your biggest cause of road transport emissions is audience travel, so you could aim to rescue this by 1/3rd by encouraging guests to car share or use public transport through information or incentives.	9.788	0.51%
Travel and Transport	Flying has a big carbon footprint. Aim to reduce emissions from staff flights by 1/3rd by doing virtual site visits and meetings during the planning phases, using more local crew, booking trains instead of flights or flying economy rather than business class.	361.049	18.9%
Production	Reduce new build elements by 25% by either reducing requirements or using more hired, reclaimed or reused items	1.513	0.08%
Overall reduction	If you do all of the above	419.472	21.95%

Additional sustainability wins!



- From the volunteer travel survey, we found that 85% of respondents knew the event was trying to be more sustainable with 100% of respondents happy to support and see further sustainability measures at future events they volunteer at.
- RugBee transformed into Manny the Bee! Rugby League World Cup mascot repurposed and transformed into Manny the Bee reducing production and waste emissions.
- 12 members of the Local Organising Committee attended Carbon Literacy training prior to the event.



Review of Objectives

Objectives reviewed

Measure baseline

goal:

Measure the carbon and waste footprint of PSWC 2023, to create a baseline and to understand largest causes of impact.

outcome:

PSWC has been measured for carbon and waste impact

- Carbon emissions produced: **1,910.69 tCO₂e**
- Waste produced: **2.68 tonnes**

Through various practices applied throughout the project we have managed to save approximately **36.8698 tCO₂e**

Identify areas for improvement

goal:

Assess the carbon and waste footprint of PSWC 2023 as well as the overall measurement process, to identify areas of improvement for other UK Sport events, and future PSWC events

outcome:

See following slides for suggestions on ways to improve the measurement process, data quality, and accuracy of overall footprint.

Areas for improvement

Supplier Engagement

- Starting the measurement process early in the project ensured that the project's overall sustainability objectives were engrained throughout. Suppliers were engaged from early stages ensuring they prioritised sustainable choices, and knew what was expected of them from day one. Maintaining this approach will be key for future success.
- Work through a clear and defined plan of how to obtain spectator travel data through ticket purchasing partner like See Tickets. Ensure the registration form is capturing the right data needed for accurate measurement into TRACE. Due to high numbers of spectators, making provision of basic travel data mandatory will be a critical part of accurate understanding of spectator travel details.
- Allow ample time from the completion of the event to when the final report is required for the collation of data. The collection from suppliers often takes longer than anticipated. Despite clear deadlines from engaged suppliers, some data was provided late. Work with suppliers throughout the data collection stages to ensure they're aware of their deadlines and responsibilities.

Ownership

- Having a Sustainability Focal in the PSWC team was critical to the success of this measurement project. Katie's knowledge of the project, tied with her passion for sustainability as well as her excellent relationships with all the suppliers was integral to leading the process from start to finish. However, it was a substantial amount of work for Katie to take on in addition to her existing responsibilities.
- In future, when UK Sport measure events it's recommended there is a dedicated 'Sustainability Focal' as part of the project team. This will need to be someone with oversight and leadership, and the bandwidth within the workforce to influence the procurement process and operational delivery, including on site during build live and derig to ensure sustainability is still high priority and suppliers on site are engaged.

Areas for improvement

Circularity

- Continue to exercise the waste hierarchy and hire vs buy for future events. Consider what is happening with any items purchased (roller banners etc) to see if they can be recycled or repurposed. Consider graphics too – potentially generically branding them for use at future year's events.
- The waste and emissions produced from carpet were quite high. This could be addressed by using a partner like EventCycle can reduce the amount of event carpet going to waste by taking leftover product post event and repurposing it to people in need (such as local schools, community centres, etc) or Innovate Recycle who recycle carpet into other materials for other uses.
- Serveware waste was 23.6% of the overall waste produced – coming from staff catering, which is quite high. You could reduce this by prioritising reusable serveware (crockery, glassware).

Depth of information

- Some assumptions were made throughout the data collation process such as:
 - What energy source the accommodation that staff and athletes were staying in.
 - Spectator travel data was collected via surveys and roughly 30% of it was obtained.
 - We assumed everyone that flew, travelled in economy class, when there is a possibility there could have been some traveling in higher classes.
- Liaising with suppliers and internal teams (including registration platform) to coordinate obtaining the most accurate data will ensure final calculations are as realistic as they can be.
- Also, look to obtain more detailed segregated waste data would be beneficial in future – i.e. general, glass, plastic, wood, metal, food etc.

Areas for improvement

Travel

- Travel is often the highest contributor of emissions for large scale events of this nature, and often the area we have the least control. The team could send out communications to athletes, spectators and staff to encourage travel in lower carbon methods of transport (prioritising public transport where possible). Also collecting as accurate data as possible will help get a more detailed understanding of exactly where travel emissions are coming from.

**This report was created by isla
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The image features a dark olive green background with a large, light cream-colored shape in the center. The shape is roughly circular but has a jagged, torn-edge appearance on its right side. The word "Appendix" is centered within the cream shape in a dark green, serif font.

Appendix

TRACE Carbon Factor Sources

Area measured	Factor source
Venue energy usage	TRACE uses UN IFI (United Nations International Financial Institutions) harmonised grid factors.
Temporary energy usage	TRACE uses DBEIS (Department of Business, Energy and Industrial Strategy) factors which are globally relevant
Production materials	Uses ICE (Institution of Civil Engineers Material) factors, emissions would be the same internationally, so are globally relevant
Graphics	Uses ICE (Institution of Civil Engineers Material) factors, emissions would be the same internationally, so are globally relevant
Food & Drinks	TRACE uses a standardised approach to food and drink based on average portion weight (food) and serving size (ml). Factors are calculated using an average of factors from C-Level, Avieco, Syntiro Associates, Olympic Organising Committee and We are Albert, so are globally relevant.
Waste	TRACE uses DBEIS (Department of Business, Energy and Industrial Strategy) factors, so are globally relevant for incineration / landfill.
Kit transportation	TRACE uses DBEIS (Department of Business, Energy and Industrial Strategy) factors which are globally relevant. WTT (well to tank) factors are used which consider the entire lifecycle of a fuel, from extraction and production to distribution, and are used to estimate the carbon emissions associated with different fuel types.
Ground transport	TRACE uses DBEIS (Department of Business, Energy and Industrial Strategy) factors which are globally relevant. WTT (well to tank) factors are used which consider the entire lifecycle of a fuel, from extraction and production to distribution, and are used to estimate the carbon emissions associated with different fuel types.
Flights	TRACE uses DBEIS (Department of Business, Energy and Industrial Strategy) for short, medium and long-haul flight factors for different cabin classes which are globally relevant
Accommodation	Uses factors from DBEIS (Department of Business, Energy and Industrial Strategy)
Online & Hybrid	Uses IEA (International Energy Agency) methodology

Waste – where does it come from

