



# 2018 FIFA World Cup™ Greenhouse gas accounting report

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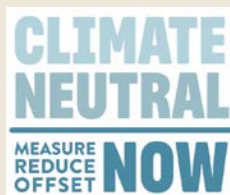
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The Climate Neutral Now initiative represents a global community of organisations committed to becoming climate neutral by the second half of the 21st century. In 2016, FIFA has joined the campaign lead by United Nations Climate Change Secretariat's (UNFCCC), becoming the first international sports organisation to do so.



2018 FIFA World Cup™  
**Greenhouse gas accounting report**



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## Acronyms and abbreviations

2018 FWC	2018 FIFA World Cup Russia™
BCs	Broadcasting Compound
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalents
DEFRA	Department for Environment, Food & Rural Affairs
FCC	FIFA Confederations Cup
FFF	FIFA Fan Fest
FFHF	Football for Hope Festival
FIFA	Fédération Internationale de Football Association
FWC	FIFA World Cup™
GHG	Greenhouse gas
GJ	Giga joule
GRI	Global Reporting Initiative
GWP	Global Warming Potential
HFC-23	Hydrofluorocarbon
HFC-134a	Hydrofluorocarbon
IBC	International Broadcast Centre
IEA	International Energy Agency
ha	Hectare
IPCC	Intergovernmental Panel on Climate Change
kg	Kilogram
LOC	Local Organising Committee for the 2018 FIFA World Cup Russia
MWh	Megawatt hour
n/a	Not applicable
N <sub>2</sub> O	Nitrous oxide
PMA	Participating Member Associations
SF <sub>6</sub>	Sulfur hexafluoride
t	tonne
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

# EXECUTIVE SUMMARY

The FIFA World Cup™ is an international football competition for the senior men’s national teams of FIFA’s member associations that takes place every four years. Its popularity is truly global, bringing excitement to communities around the world and uniting people from different backgrounds through the common language of football. The next FIFA World Cup will take place in the Russian Federation from 14 June to 15 July 2018.

Staging the tournament entails transporting millions of people to the matches and fan fests, ensuring their health and safety, dealing with waste in the stadiums, recruiting and training thousands of volunteers, providing an event that is accessible for everyone and broadcasting the matches in over 200 countries. This scale inevitably has an impact on society, the environment and the climate.

As the organisers of this mega-event, FIFA and the Local Organising Committee are committed to protecting and conserving the environment. One important part of understanding the environmental impact is to understand the greenhouse gas (GHG) emissions caused by the preparation and staging of the competition. For this purpose, FIFA and the LOC teamed up with experts to estimate the projected GHG emissions resulting from the 2018 FIFA World Cup in Russia.

The GHG accounting and reporting procedure used for this report is based on the Greenhouse Gas Protocol, the most widely used international accounting tool for government and business leaders to understand, quantify and manage greenhouse gas emissions. Where activity data for the 2018 FIFA World Cup inventory was lacking, assumptions and extrapolations were made, in general, based on the activity data from the ex-ante carbon footprint of the 2014 FIFA World Cup Brazil™. The choice

of assumptions and emission factors followed a conservative approach. Emission factors were derived from international databases such as ecoinvent (version 3.1), the Department for Environment, Food & Rural Affairs (DEFRA) (2016) and the International Energy Agency (IEA).

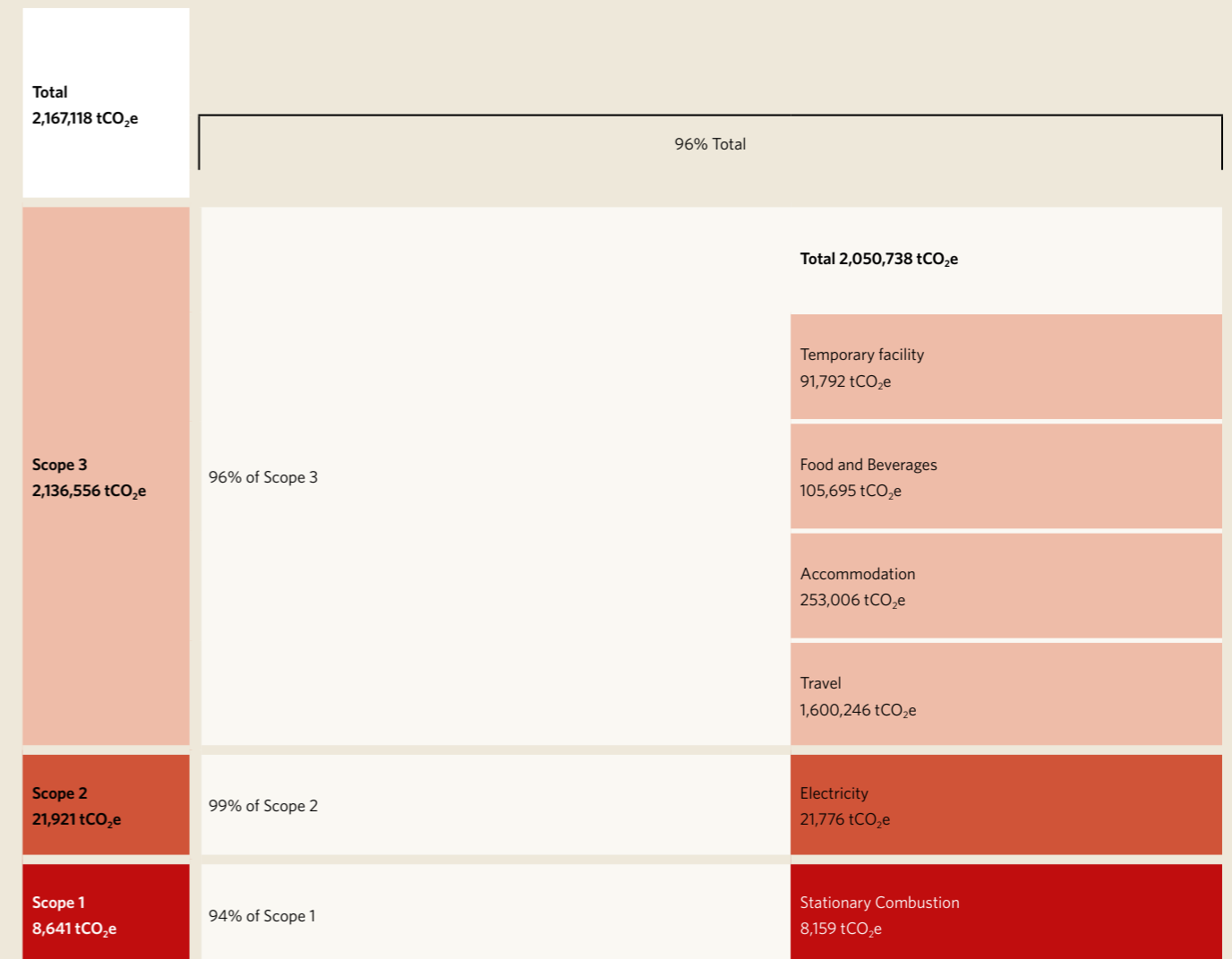
The system boundaries were set to follow the “Operational Approach” and the included activities were chosen based on the boundaries set in the GHG estimations for the 2014 FIFA World Cup in Brazil. The reporting period was divided into two periods; the preparation period from 18 July 2015 to 13 May 2018 and the FWC period from 14 May 2018 to 22 July 2018.

The total GHG emissions for both reporting periods are estimated to be 2,167,118 tonne carbon dioxide equivalents (tCO<sub>2</sub>e). The majority are indirect emissions (Scope 3), mainly from travel (1,600,246 tCO<sub>2</sub>e) and accommodation (253,006 tCO<sub>2</sub>e) for attendees of the matches in Russia, including the general public, officials and staff. A significant fraction of the estimated emissions result from food and beverages (105,695 tCO<sub>2</sub>e) in stadiums and the construction of temporary facilities (91,792 tCO<sub>2</sub>e) at all official sites of the competition, including stadiums, fan fests, the international broadcast centre and offices. 56% of the total estimated emissions for the 2018 FIFA World Cup originate from the travel of international attendees.

90% of the total emissions of the 2018 FWC are estimated to be generated during the FWC period (1,943,327 tCO<sub>2</sub>e). During the FWC period, the FWC matches are estimated to have the largest climate impact (1,843,184 tCO<sub>2</sub>e), followed by FIFA Fan Fests (95,910 tCO<sub>2</sub>e), Football for Hope Festival (1,463 tCO<sub>2</sub>e) and the FWC Banquet (467 tCO<sub>2</sub>e). While some aspects of this carbon footprint are

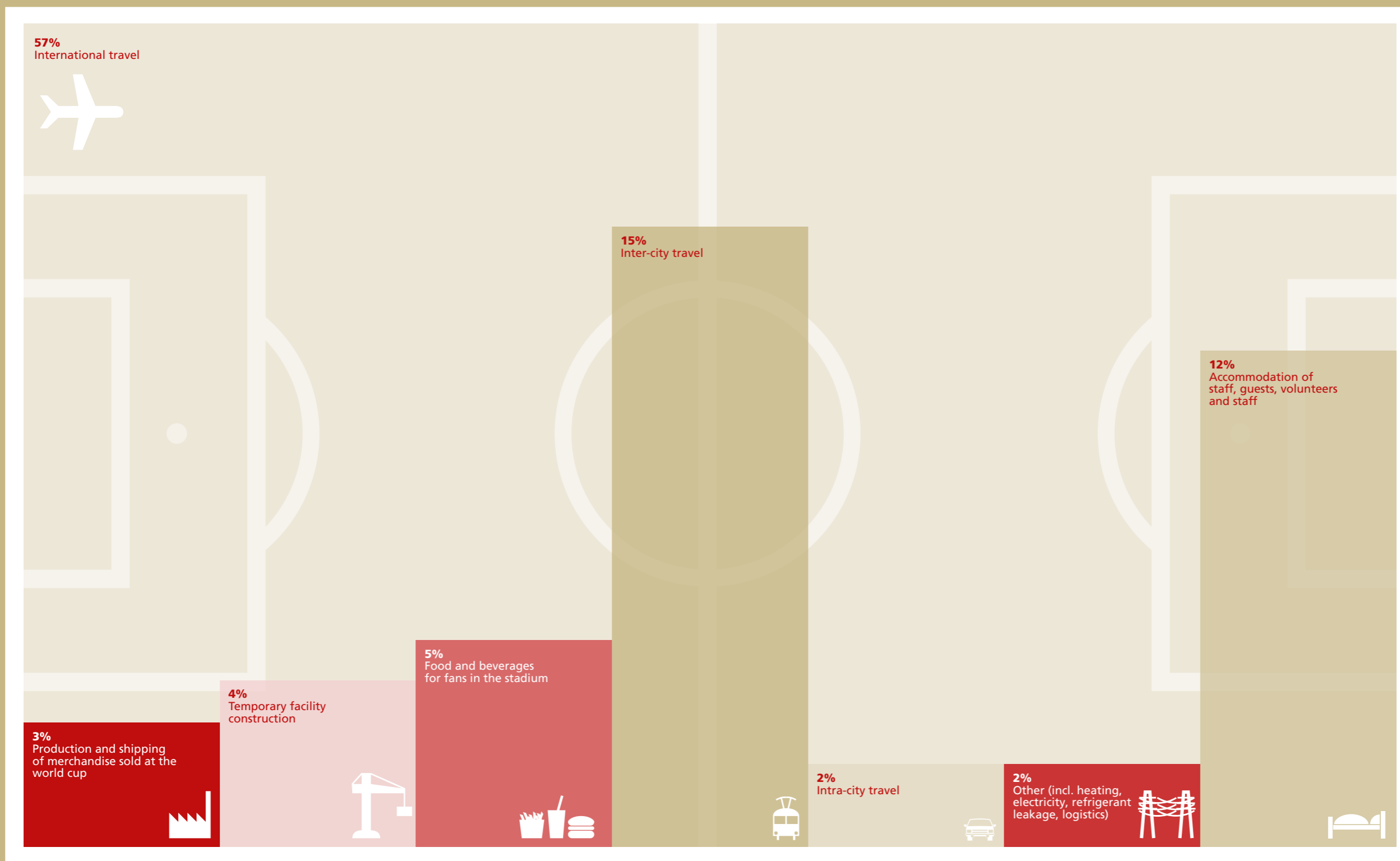
comparable to the estimated carbon emissions of the 2014 FIFA World Cup, it is important to note that there are differences between Russia and Brazil,

which have a significant quantitative impact on the emissions but do not allow conclusions on the quality of the organisation of the competition.



**Figure 1:** The total GHG emissions for the 2018 FWC, including the preparation period and the FWC period, per scope and main emissions sources for each scope

## Hot spots of carbon emissions of the 2018 FIFA World Cup™



The FIFA World Cup™ is an international football competition for the senior men's national teams of FIFA's member associations that takes place every four years. Its popularity is truly global, bringing excitement to communities around the world and uniting people from different backgrounds through the common language of football. The next FIFA World Cup will take place in the Russian Federation from 14 June to 15 July 2018.

As the organisers of the FIFA World Cup, FIFA and the Local Organising Committee (LOC) recognise that the preparation and staging of an event of this scale can have negative impacts on the environment. To understand this impact, FIFA and the LOC teamed up with experts to estimate the projected GHG emissions resulting from the 2018 FIFA World Cup in Russia.

*GHG accounting covers the time period between 07.2015 and 07.2018, including preparation and staging of the tournament.*

# 1. INTRODUCTION

The FIFA World Cup™ is an international football competition for the senior men's national teams of FIFA's member associations that takes place every four years. Its popularity is truly global, bringing excitement to communities around the world and uniting people from different backgrounds through the common language of football. The next FIFA World Cup will take place in the Russian Federation from 14 June to 15 July 2018.

Staging the tournament entails transporting millions of people to the matches and fan fests, ensuring their health and safety, dealing with waste in the stadiums, recruiting and training thousands of volunteers, providing an event that is accessible for everyone and broadcasting the matches in over 200 countries. This scale inevitably has an impact on society, the environment in the host country and the climate.

As the organisers of this mega-event, FIFA and the Local Organising Committee are committed to protecting and conserving the environment. One important part of understanding the environmental

impact is to estimate the greenhouse gas (GHG) emissions caused by the preparation and staging of the competition.

This report presents the system boundaries, methodology, data inventory and results of the GHG accounting of the 2018 FWC. The assumptions that have been made for the largest emission sources are presented in the Annexe.

## 1.1 Reporting period

The 2018 FWC will take place from 14 June to 15 July 2018 in 11 host cities throughout Russia. The event preparations started 25 July 2015 and include the FIFA Confederations Cup Russia 2017 (FCC) between 17 June and 2 July 2017. Therefore, the reporting period was divided into two phases: the preparation period and the FWC period (Figure 2). To include all possible preparations, the start date of the preparation period was set to one week before, 18 July 2015. The FWC period was defined as 14 May 2018 to 22 July 2018. The start date of the FWC period was set to include when the core competition

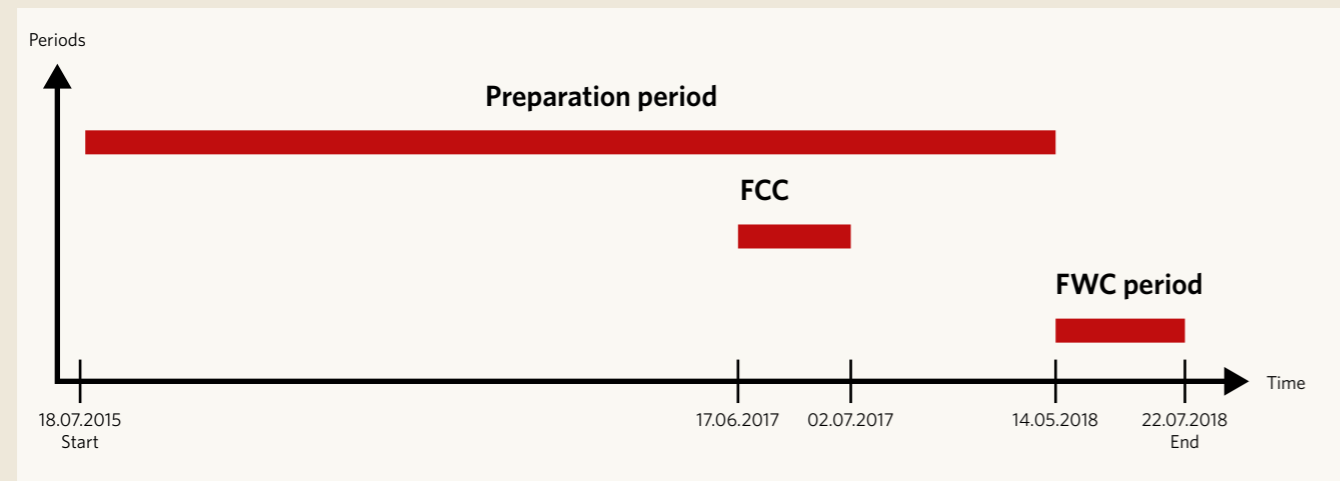


Figure 2: The start and end dates of the preparation period and the FWC period of the 2018 FWC GHG accounting.

teams arrive in the host cities. The preliminary competitions organised across the world to qualify for the 31 available spots at the 2018 FWC were not included in the accounting.

## 1.2 System boundaries

Previous emissions estimates for FWCs have been conducted in 2006, 2010, 2011 and 2013 (FIFA, 2006; FIFA, 2010; FIFA, 2011 and MGM Innova, 2013). In 2013, a thorough study of the 2014 FWC Brazil was conducted and published. Based on the 2014 FIFA World Cup™ Brazil Carbon Footprint, the organisational and operational boundaries presented below were determined.

### 1.2.1 Organisational boundaries

To determine the organisational boundaries of the GHG accounting, generally two different approaches

can be chosen (WRI and WBCSD, 2004). The reporting entity can choose to account for and report their GHG emissions according to either the equity share and financial control or according to the operational control approach.

The operational control approach was chosen for the 2018 FWC GHG accounting. Under the operational control approach, a company accounts for 100% of the GHG emissions from operations over which it has control. The events and activities where FIFA has operational control are presented in Table 1. Compared to the organisational boundaries set in 2014, the category "Team Workshop" has been added to the preparation period and the International FIFA Fan Fests are excluded from the FWC period, since no International FIFA Fan Fests are planned to take place in 2018. FIFA and LOC operations are included in both periods.

Preparation period - 25 July 2015 to 13 May 2018
Preliminary Draw for the 2018 FIFA World Cup Russia and Banquet
Draw for the FIFA Confederations Cup Russia 2017 and Banquet
Final Draw for the 2018 FIFA World Cup Russia and Banquet
Team Workshop for the 2018 FIFA World Cup Russia
FIFA Confederations Cup Russia 2017 matches
FIFA Confederations Cup Banquet
2017 Football for Hope Forum
FIFA and LOC operations
FWC period - 14 May to 22 July 2018
2018 FIFA World Cup matches
2018 Football for Hope Festival (FFHF)
FIFA Fan Fests (FFF)
FIFA World Cup Banquet
FIFA and LOC operations

Table 1: Events and activities included in the 2018 FWC GHG accounting



### 1.2.2 Operational boundaries

According to the Greenhouse gas Protocol (GHG Protocol) emissions are divided into direct and indirect emissions (WRI and WBCSD, 2004). Direct emissions are emissions originating from sources owned or controlled by the reporting entity. Indirect emissions are generated as a consequence of the reporting entity's activities, yet they occur at sources owned or controlled by another entity. In this GHG accounting, FIFA is the reporting entity.

The direct and indirect emissions are divided into three scopes:

- Scope 1: All direct greenhouse gas emissions, such as emissions from combustion in owned or controlled boilers and vehicles.
- Scope 2: Indirect greenhouse gas emissions from the generation of purchased electricity, heat or steam consumed by the company.
- Scope 3: Other indirect emissions, such as emissions from the extraction and production of purchased materials and fuels, vehicles not owned or controlled by the reporting entity, outsourced activities and waste disposal.

The GHG Protocol requires companies to report a minimum of scope 1 and scope 2 emissions. Reporting on scope 3 emissions are optional. The company may want to focus on accounting for and reporting those activities that are relevant to their business and goals, and for which they have reliable information.

For the 2018 FWC, all emission sources under FIFA's direct operational control were included as well as indirect emissions that were considered to be material to the organisation and staging of the event in Russia (see Figure 3 for inclusion/exclusion

decision process). The included activities are presented in Table 2. The attendee categories are described in Annexe II.

Table 2 not only indicates all included activities and emission sources but also highlights the approach by which emissions per activity, for the preparation period as well as the FWC period, were determined. For example, some activities could be evaluated based on actual "activity data" for 2015 or estimates for 2018 provided by FIFA or the LOC. For activities where no data and estimations were available, emissions were modelled and therefore calculated based on external data sources and assumptions.

### 1.3 Data inventory

The data inventory process focused on collecting data for hot spot emission sources in the FWC period, i.e. the activities with the potentially larger emissions. Activity data was collected from FIFA and LOC personnel. The data included both actual activity data from 2015 and estimated data in 2018. Where data was lacking estimations were made based on data available in the reports 2014 FIFA World Cup™ Brazil Carbon Footprint and 2014 FIFA World Cup™ - Estimate of carbon footprint of the FIFA World Cup TV productions, available statistics and assumptions. The preparation period was modelled based on the distribution of emissions in 2014.

The choice of assumptions and emission factors has followed a conservative approach. Emission factors were derived from credible sources such as ecoinvent (version 3.1), Department for Environment, Food & Rural Affairs (DEFRA) (2016) and the International Energy Agency (IEA).

Activities	Category	Preparation period	FWC period
<b>Scope 1</b>			
Stationary combustion	Event venues	Modelled	Activity data
Refrigerant leakage	Event venues	Modelled	Activity data
<b>Scope 2</b>			
Electricity	Event venues and FIFA offices	Modelled	Activity data
<b>Scope 3</b>			
Leased facilities	Event venues and LOC offices	Modelled	Activity data & Modelled
Food and beverages	Event venues	Modelled	Modelled
Waste	Event venues	Modelled	Modelled
Water	Event venues	Modelled	Modelled
Production of energy carriers <sup>1</sup>	Event venues and FIFA and LOC offices	Modelled	Activity data
Travel	Attendees and FIFA and LOC personnel	Modelled	Activity data & Modelled
Accommodation	Attendees and FIFA and LOC personnel	Modelled	Modelled
Temporary facility construction	Event venues	Modelled	Activity data & Modelled
Logistics <sup>2</sup>	Cross-event activities	Activity data & Modelled	Modelled
Printed matter	Cross-event activities	n/a	Modelled
Online media	Cross-event activities	n/a	Modelled
Merchandise	Cross-event activities	n/a	Modelled

Table 2: The included activities in 2018 FWC GHG accounting and the data source per period

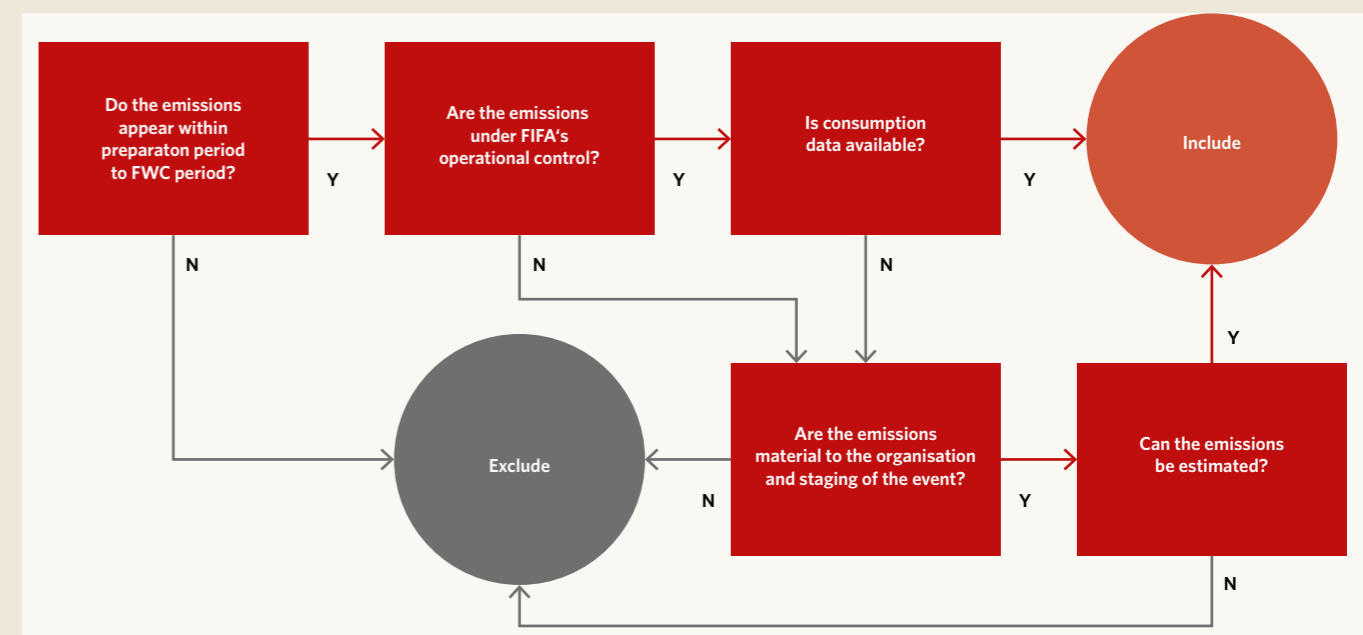


Figure 3: Inclusion (Y) and exclusion (N) decision process for emission sources in the 2018 FWC GHG accounting<sup>3</sup>

1 Production of energy carriers include the indirect emissions associated with fuels, electricity and heat (e.g. extraction, transports, construction of infrastructure etc.)  
 2 This category includes international and domestic travel and power consumption in the warehouse.  
 3 Emissions are considered to be material according to the GHG Protocol i.e. by its inclusion or exclusion it can be seen to influence any decisions or actions taken by users of it (WRI and WBCSD, 2004)

### 1.4 Methodology

The GHG accounting and reporting procedure is based on the GHG Protocol A Corporate Accounting and Reporting Standard – Revised Edition, the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. It was developed in a partnership between The World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) in 2004.

The GHG accounting was based on the GHG Protocol’s principles of:

- Relevance: An appropriate inventory boundary that reflects the GHG emissions of the company and serves decision-making needs of users.
- Completeness: Accounting all emission sources within the chosen inventory boundary. Any specific exclusion is disclosed and specified.

Personnel at the 2018 FWC offices in Russia	Number of employees				
	18 July '15 – 31 Dec '15	2016	2017	1 Jan '18 – 13 May '18	14 May '18 – 22 July '18
FIFA	15	30	38	41	41
LOC	110	310	544	700	1125

**Table 3:** Total number of employees at FIFA and LOC in 2015 and expected number of employees for 2016-2018 in Russia

GHG	GWP (100 years)
CO <sub>2</sub>	1
CH <sub>4</sub>	25
N <sub>2</sub> O	298
HFC-134a	1,430
HFC-23	14,800
SF <sub>6</sub>	22,800

**Table 4:** Applied global warming potentials. Source: IPCC Fourth Assessment Report (AR4) (2007)

- Consistency: Meaningful comparison of information over time and transparently documented changes to the data.
- Transparency: Data inventory sufficiency and clarity, where relevant issues are addressed in a coherent manner.
- Accuracy: Minimised uncertainty and avoided systematic over or under quantification of greenhouse gas emissions.

#### 1.4.1 Method for extrapolations and estimations

Where activity data of the 2018 FWC inventory was lacking extrapolations were made. Generally, activity data from the 2014 FIFA World Cup™ Brazil Carbon Footprint was used. Due to the data inventory focusing on the FWC period, the preparation period was entirely estimated. It was assumed that the distribution between emissions associated with preparation and implementation will remain the same as for the 2014 FWC. Therefore, the emissions of the FWC period were extrapolated to the preparation period by using the percentage distribution of the preparation period in 2014.

For FIFA and LOC operations emissions were extrapolated based on the specific actual employee emissions for the year 2015 and the expected number of employees for the period 2016-2018 (Table 3).

#### 1.4.2 Global warming potentials

Global warming potential (GWP) is a measure of the climate impact of a GHG compared to carbon dioxide over a time horizon. GHGs have different GWP values depending on their efficiency to absorb long wave radiation and the atmospheric lifetime of the gas. The GWP values used in the GHG accounting are the six greenhouse gases covered by the Kyoto Protocol and are presented in Table 4.

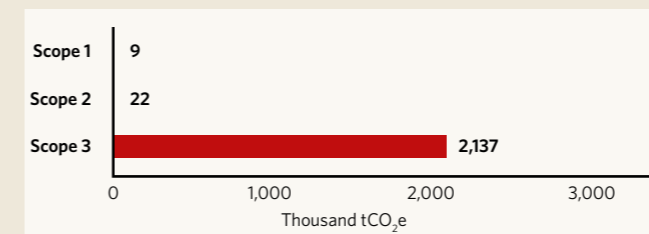
## 2 RESULTS

In this chapter the results of the 2018 FWC GHG accounting are presented.

### 2.1 Emissions per scope

The GHG accounting of the 2018 FWC shows that the total event is expected to generate 2,167,118 tCO<sub>2</sub>e

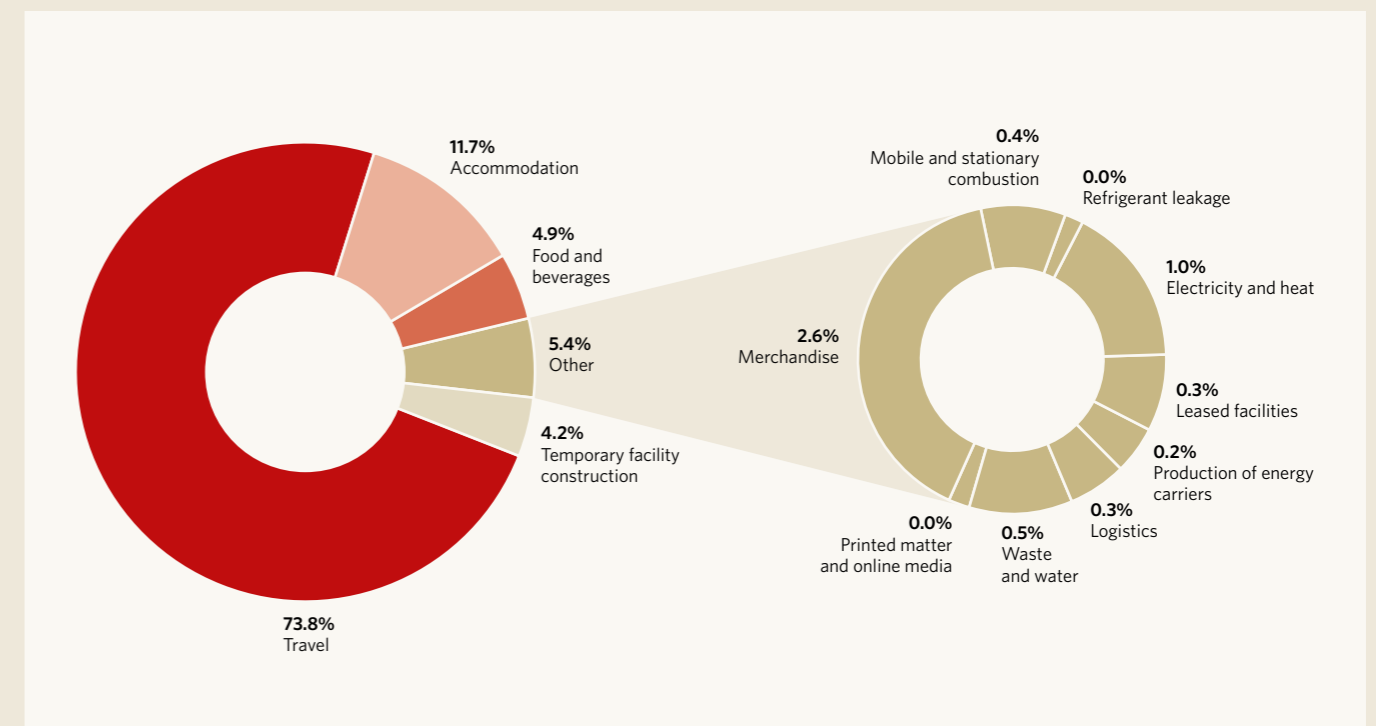
(Table 5). The majority (99%) of which are estimated to be Scope 3 emissions (Figure 4). Overall, attendee travel is estimated to be the emission source with the largest climate impact, followed by accommodation, temporary facility construction, and food and beverages (Figure 5).



**Figure 4:** Emissions per scope

Scope	tCO <sub>2</sub> e	% of total
Scope 1: Direct GHG emissions	8,641	0.4%
Scope 2: Indirect GHG emissions from purchased electricity, heat and steam	21,921	1.0%
Scope 3: Other indirect GHG emissions	2,136,556	98.6%
<b>Total</b>	<b>2,167,118</b>	<b>100%</b>

**Table 5:** Results by scope



**Figure 5:** The distribution of emission sources for the 2018 FWC

Main emission sources combining 95% of the total GHG emissions are travel, accommodation, food and beverages and temporary facilities' construction. Of the remaining 5% of total emissions, the main contributors are merchandise, electricity, stationary combustion and waste and water. Figures 6-7 show the GHG emissions per scope and activity across both periods for the 2018 FWC. Under the scope 3 emission category, 74% stems

from travel, 12% from accommodation, 5% from food and beverages and 4% from temporary facilities.

### 2.2 Emissions from travel

Looking into the emissions from travel, the results show that emissions from international travel of attendees dominate and represent 99% of the total travel emissions. Figure 8 shows that attendees cause 77% of their travel-related emissions through

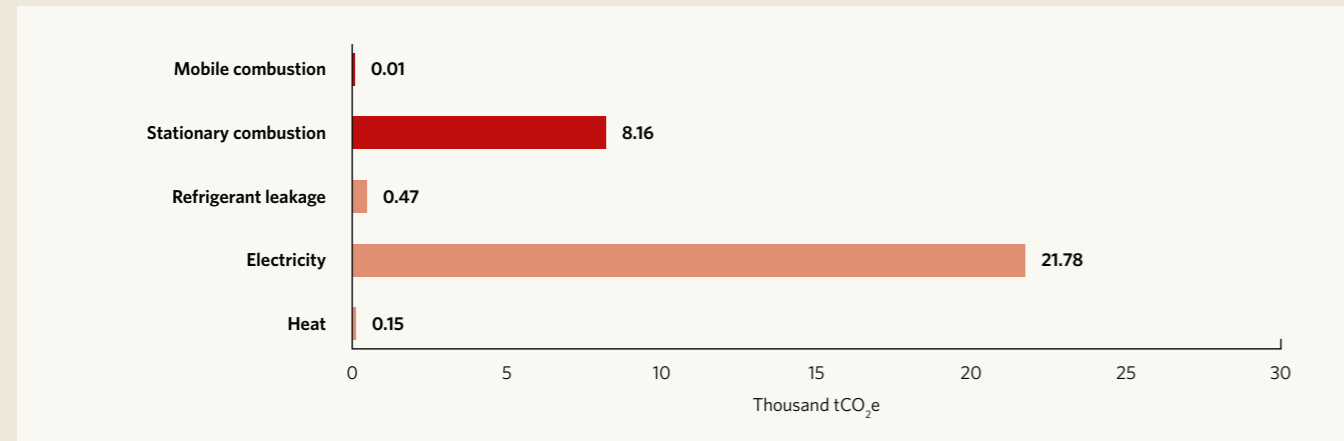


Figure 6: Sources of GHG emissions, scope 1 (dark red) and scope 2 (light red)

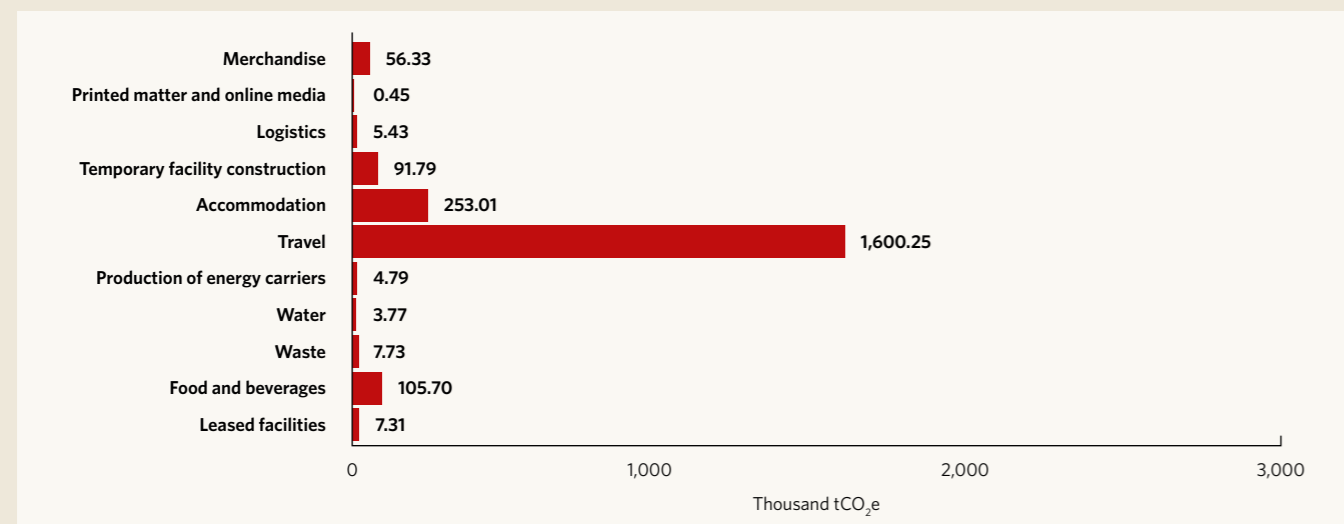


Figure 7: Sources of GHG emissions, scope 3

international travel and 21% through inter-city travel between host cities. Travel by FIFA and LOC personnel for preparation and organisation of the event are not included in the figure.

### 2.3 Emissions per period

Comparing the preparation and the actual FWC period's impact on the climate, 90% of the GHG emissions are caused by the FWC period even though the preparation period is for a longer time period. For both periods, the GHG emissions will consist mainly of scope 3 emissions (Table 6).

### 2.4 Emissions from FWC period

During the FWC period, the FWC matches are estimated to generate the largest proportion of GHG emissions (Figure 10). One reason for that is because of the chosen accounting approach, which assumed that attendees' primary reason to travel to Russia would be to attend FWC matches. No attendees were assumed to travel international or inter-city only because of FIFA Fan Fests, Football for Hope Festival and the FWC Banquet, except for delegate members attending the Football for Hope Festival. Table 7 shows the emissions per activity and event in the FWC phase. The FIFA and LOC category consists of emissions related to preparation and organisation of the event within the FWC period. In total, the FWC period will generate approx. 1,943,000 tCO<sub>2</sub>e. Similar

Scope	Preparation period	% of period	FWC period	% of period	Total
Scope 1	2,242	1.0%	6,399	0.3%	8,641
Scope 2	6,926	3.1%	14,995	0.8%	21,921
Scope 3	214,622	95.9%	1,921,934	98.9%	2,136,556
<b>Total</b>	<b>223,791</b>	<b>100%</b>	<b>1,943,327</b>	<b>100%</b>	<b>2,167,118</b>

Table 6: Results by scope and period

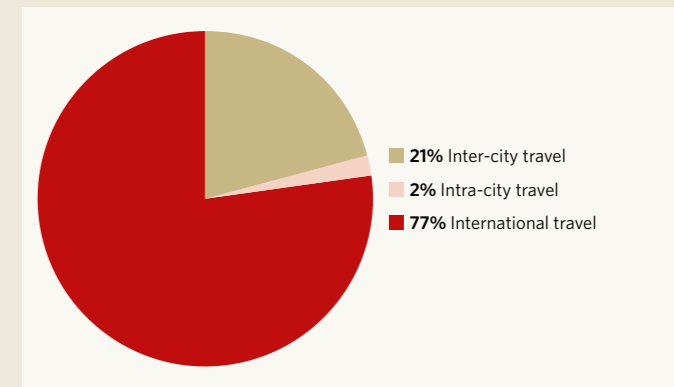


Figure 8: Distribution of emissions from attendees' travel

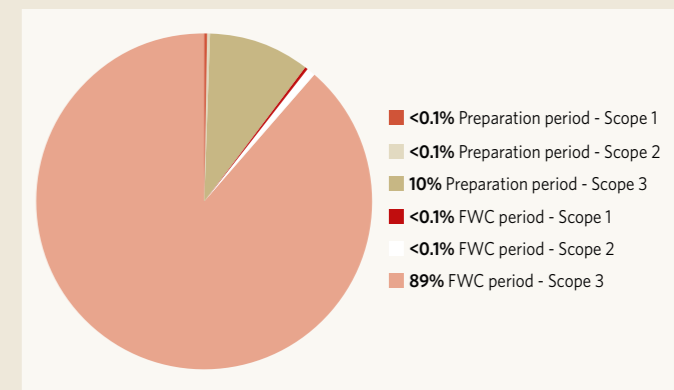


Figure 9: The GHG emissions distribution per scope and period. The displayed numbers show the GHG emission distribution between the preparation period and the FWC period.

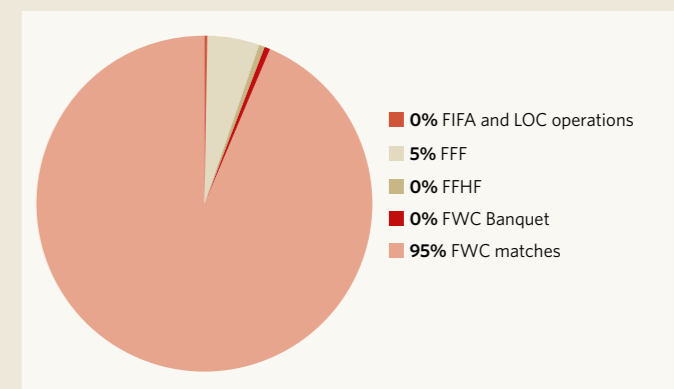


Figure 10: Emission distribution during the FWC period

to the overall GHG emissions of the event, travels of attendees will have the largest climate impact within the FWC period.

FIFA Fan Fests has a large expected number of attendees (8,210,300), which results in greater emissions from food and beverages, waste and water

compared to the other events. The estimates of waste and water were made with a conservative approach, assuming an average waste and water consumption per attendee and day. However, that every expected attendee would spend a full day at FIFA Fan Fests sites is possible, but is unlikely. For food and beverages, one

Activities	FWC matches <sup>4</sup> (tCO <sub>2</sub> e)	FFF (tCO <sub>2</sub> e)	FFHF (tCO <sub>2</sub> e)	FWC Banquet (tCO <sub>2</sub> e)	FIFA and LOC (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)	% of period
<b>Scope 1</b>	<b>6,395</b>	-	-	-	<b>3</b>	<b>6,399</b>	<b>0.3%</b>
Mobile combustion	-	-	-	-	3	3	<0.1%
- Petrol	-	-	-	-	3	3	<0.1%
Stationary combustion	6,223	-	-	-	-	6,223	0.3%
- Diesel	6,223	-	-	-	-	6,223	0.3%
Refrigerant leakage	172	-	-	-	-	172	<0.1%
- R410a	58	-	-	-	-	58	<0.1%
- R134a	114	-	-	-	-	114	<0.1%
<b>Scope 2</b>	<b>12,514</b>	<b>2,405</b>	<b>62</b>	-	<b>13</b>	<b>14,995</b>	<b>0.8%</b>
Electricity	12,514	2,405	62	-	13	14,995	0.8%
- Grid	12,514	2,405	62	-	13	14,995	0.8%
<b>Scope 3</b>	<b>1,824,274</b>	<b>93,505</b>	<b>1,385</b>	<b>460</b>	<b>2,287</b>	<b>2,911,843</b>	<b>99.3%</b>
Leased facilities	2,124	-	-	1	413	2,538	0.1%
Food and beverages	28,893	72,333	67	26	-	101,318	5.2%
Waste	1,623	4,193	4	1	40	5,861	0.3%
Water	792	2,047	2	1	19	2,861	0.1%
Production of energy carriers	3,038	337	9	-	2	3,386	0.2%
- Diesel	1,285	-	-	-	-	1,285	<0.1%
- Electricity grid	1,753	337	9	-	2	2,100	<0.1%
Travel	1,441,215	8,431	563	5	1,663	1,451,876	74.7%
- International	1,120,366	0	463	0	-	1,120,829	57.7%
- Inter-city	299,330	0	84	0	-	299,413	15.4%
- Intra-city	21,519	8,431	16	5	-	29,971	1.5%
- Unspecified distance	-	-	-	-	1,663	1,663	0.1%
Accommodation	216,593	1,220	319	81	151	218,365	11.2%
Temporary facility construction	68,789	4,944	438	351	-	74,522	3.8%
Other cross-event activities <sup>5</sup>	61,206	-	-	-	-	61,206	3.1%
- Logistics <sup>6</sup>	4,419	-	-	-	-	4,419	0.2%
- Printed matter	143	-	-	-	-	143	<0.1%
- Online media	311	-	-	-	-	311	<0.1%
- Merchandise	56,333	-	-	-	-	56,333	2.9%
<b>Total GHG emissions</b>	<b>1,843,184</b>	<b>95,910</b>	<b>1,463</b>	<b>467</b>	<b>2,304</b>	<b>1,943,327</b>	<b>100%</b>

**Table 7:** Results of the FWC period per event and activity. Exact numbers have been rounded.

<sup>4</sup> The FWC matches category includes emissions from power consumption at the IBC, BCs, media centres, venue specific training sites, temporary facility construction at the IBC and intra-city emissions from helicopter travels.

<sup>5</sup> The emissions in this category are allocated to FWC matches, but origin from all events.

<sup>6</sup> This category includes international and domestic travels and power consumption in the warehouse.

meal and two beverages were assumed per attendee, which is also considered as a conservative approach for the type of event FIFA Fan Fests are.

The estimated travel emissions of the FWC period per event and attendee category are presented in Table 8. The attendee categories are further explained in the Annexe II. The international travel

of general public at the FWC matches is estimated to generate the largest GHG emissions of the event (Figure 11).

The second largest emission source within the FWC period is accommodation. The emissions from hotel nights of general public are estimated to have the largest climate impact within the emission source,

FIFA World Cup event	Attendee category	International (tCO <sub>2</sub> e)	Inter-city (tCO <sub>2</sub> e)	Intra-city (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)
FIFA World Cup matches	General public	571,275	194,201	13,188	778,664
	Group Sales Customers	282,995	56,848	1,517	341,360
	Hospitality	19,453	11,628	2,937	34,017
	VIP/VVIP	88,294	15,111	703	104,108
	Media	19,405	7,200	441	27,045
	FIFA and LOC personnel	311	576	20	906
	PMA and referees	10,609	986	47	11,642
	Fans travelling with PMAs	12,5870	11,697	552	138,119
	Venue Operations Personnel	0	0	1,577	1,577
	Volunteers	2,155	1,084	519	3,757
Total (tCO <sub>2</sub> e)	1,120,366	299,330	21,500	1,441,196	
FIFA Fan Fests	General public	0	0	8,163	8,163
	Media	0	0	10	10
	FIFA and LOC personnel	0	0	1	1
	Volunteers	0	0	144	144
	Venue Operations Personnel	0	0	113	113
	Total (tCO <sub>2</sub> e)	0	0	8,431	8,431
Football for Hope Festival 2018	General public	0	0	13	13
	Media	0	0	0	0
	FIFA and LOC personnel	0	0	0	0
	Festival delegate members	463	84	1	548
	Volunteers	0	0	2	2
	Venue Operations Personnel	0	0	0	0
Total (tCO <sub>2</sub> e)	463	84	16	563	
FIFA World Cup Banquet	Invited guests (including VVIP, VIP and PMA)	0	0	3	3
	Media	0	0	1	1
	FIFA and LOC personnel	0	0	0	0
	Volunteers	0	0	1	1
	Venue Operations Personnel	0	0	0	0
	Total (tCO <sub>2</sub> e)	0	0	5	5

**Table 8:** Estimated GHG emissions of attendees' travel per event during the FWC period

followed by Group Sales Customers, PMA and referees and Hospitality (Figure 12). Temporary facility construction and food and beverages are also estimated to have a relatively large impact in the 2018 FWC. In the FWC period, the temporary construction of FWC matches and

FIFA Fan Fests are estimated to generate the most emissions (Figure 13). As discussed above, the increased number of expected attendees at FIFA Fan Fest sites will result in FIFA Fan Fests being the event with the highest estimated emissions from food and beverages (Figure 14).

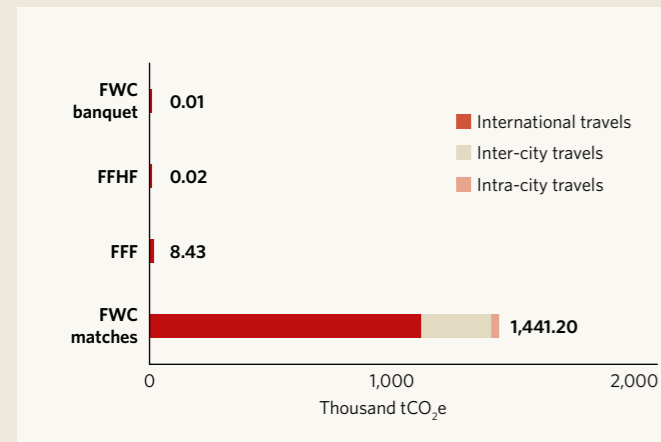


Figure 11: Total GHG emissions from travel of attendees per event in the FWC period

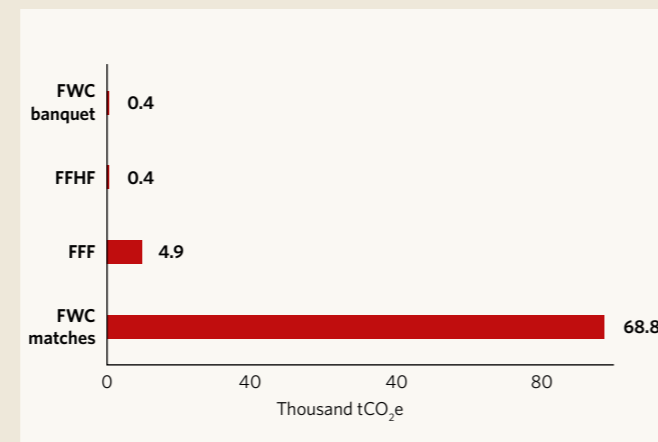


Figure 13: The estimated GHG emissions per event in the FWC period from temporary facility construction

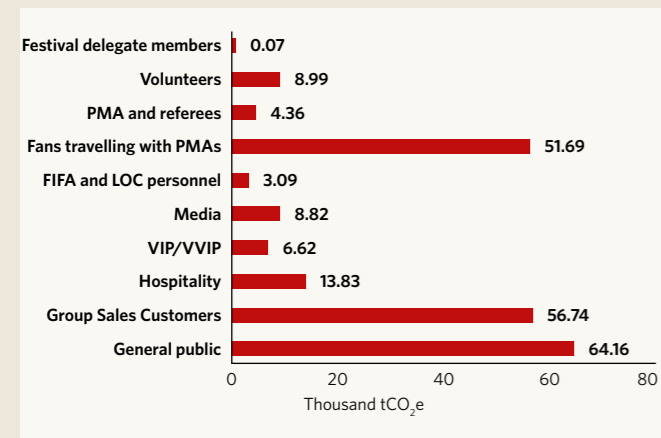


Figure 12: The GHG emissions per attendee category from accommodation in the FWC period

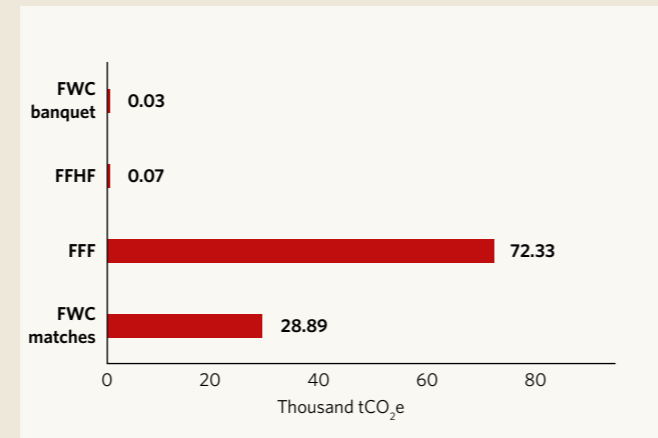


Figure 14: Estimated GHG emissions per event in the FWC period from food and beverages

### 2.5 Emissions from preparation period

Overall, it is estimated that the preparation events will have the largest climate impact of the preparation period (Figure 15). Similar to the overall results, attendee travel is estimated to be the largest emission source (Table 9). It was not possible to estimate the GHG emissions per event within the preparation period. The emissions from FIFA and the LOC consist of the climate impact related to the preparation and organisation of the event during the preparation period.

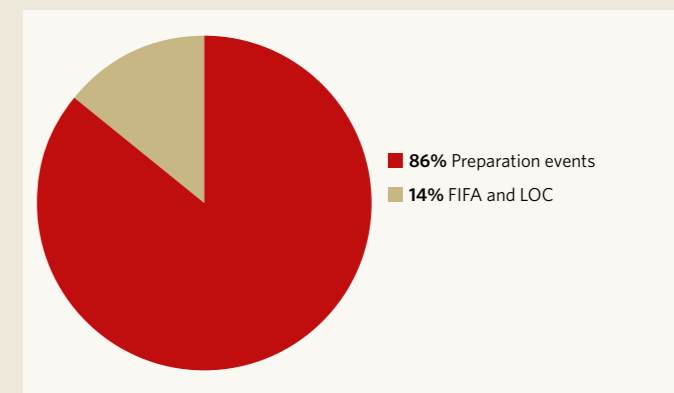


Figure 15: Distribution of emissions in the preparation period

Activities	Preparation events (tCO <sub>2</sub> e)	FIFA & LOC (tCO <sub>2</sub> e)	Total (tCO <sub>2</sub> e)	% of period
<b>Scope 1</b>	<b>2,235</b>	<b>7</b>	<b>2,242</b>	<b>1.0%</b>
Mobile combustion	-	7	7	<0.1%
- Petrol	-	7	7	<0.1%
Stationary combustion	1,936	-	1,936	0.9%
- Diesel	1,936	-	1,936	0.9%
Refrigerant leakage	299	-	299	0.1%
<b>Scope 2</b>	<b>6,628</b>	<b>298</b>	<b>6,926</b>	<b>3.1%</b>
Electricity	6,628	153	6,781	3.0%
- Grid	6,628	153	6,781	3.0%
Heating	-	145	145	0.1%
- District heating	-	145	145	0.1%
<b>Scope 3</b>	<b>184,581</b>	<b>30,042</b>	<b>214,622</b>	<b>95.9%</b>
Leased facilities	4	4,771	4,774	2.1%
Food and beverages	4,377	-	4,377	2.0%
Waste	1,653	216	1,870	0.8%
Water	807	106	913	0.4%
Production of energy carriers	1,328	71	1,399	0.6%
Travel	124,413	23,957	148,370	66.3%
- International	91,586	-	137,865	40.9%
- Inter-city	27,245	-	52,567	12.2%
- Intra-city	5,582	-	5,582	2.5%
- Unspecified distance	-	23,957	23,957	10.7%
Accommodation	33,720	921	34,641	15.5%
Temporary facility construction	17,269	-	17,269	7.7%
Other cross-event activities	1,010	-	1,010	0.5%
- Logistics	1,010	-	1,010	0.5%
<b>Total GHG emissions</b>	<b>193,444</b>	<b>30,347</b>	<b>223,791</b>	<b>100%</b>

Table 9: Results of the preparation period per event and activity. Exact numbers have been rounded.

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## ANNEXE I: ASSUMPTIONS

The following assumptions were made for the largest emission sources during the FWC period.

### Travels

It was assumed that attendees’ primary reason to travel to Russia is to attend the FWC matches. No attendees were assumed to travel international or inter-city only because of FFF, FFHF or the FWC Banquet, except for delegate members attending FFHF.

### FWC matches

FIFA Ticketing provided the total number of projected attendees per match, including the host city of the match, type of match (first round, round of 16, quarter-final, semi-final, third place and final) and type of attendee. Based on the data, the following assumptions were made:

- 5% of the total seating capacity was assumed to be seat kills
- 100% of the projected tickets allocated to media, VIP/VVIP and PMA were assumed to be used by the respective attendee category
- 50% if the projected tickets for hospitality were assumed to be used by hospitality ticket holders, the rest was assumed to be used by the general public
- Other complimentary and contingency tickets were assumed to origin from 80% general public and 20% Group Sales Customers

Attendee category	Attendance per match
PMA and referees	118
FIFA and LOC personnel	50
Venue Operations Personnel	4000

**Table 10:** The assumed number of attendance per match.  
Source: 2014 FIFA World Cup™ Brazil Carbon Footprint (2013)

- 25% of the projected tickets for Group Sales Customers were assumed to origin from Group Sales Customers and 75% from general public. The assumption was made based on the information that 80% of one of the attendee groups within the Group Sales Customer category would come from outside Russia.

In addition, the attendance per match presented in Table 10 was assumed. The assumption was based on data provided in the 2014 FIFA World Cup™ Brazil Carbon Footprint.

The number of volunteers per host city was provided by the LOC. It was assumed that the same volunteers will work during the whole FWC period.

The number of tickets per attendee was assumed the same for all attendee categories as in the GHG estimation of the 2014 FWC, except for media where an updated number was provided from FIFA. For Group Sales Customers, the same number as for the general public was assumed (Table 11).

Table 12 presents the assumed origin of attendees per attendee category. The origin of general public, VIP/VVIP, media, FIFA and LOC personnel and Venue Operations Personnel was assumed the same as in 2014 FIFA World Cup™ Brazil Carbon Footprint. Based on information from FIFA, South Pole Group assumed the origin of Group Sales Customers and

Attendee category	Number of tickets per attendee
General public	2
Group Sales Customers	2
Hospitality	4
VIP/VVIP	2
Media	5.3

**Table 11:** The assumed number of tickets per attendee

hospitality. The LOC provided information regarding the planned origin of volunteers. In Table 13, the assumed origins of international attendees are presented. The assumptions are the same as presented 2014 FIFA World Cup™ Brazil Carbon Footprint, where the assumed origin was reflecting historical numbers. The origins of the PMAs was determined based on the number of slots made available by FIFA to national teams (Table 14). Referees were assumed to have the same origin as the PMAs. Group Sales Customers were assumed to have the same regional origin as general public. LOC provided an estimated distribution of mode of transport for international attendees (Table 15). The distribution was applied for general public, media and volunteers. For PMAs, referees, hospitality, VIP/VVIP and FIFA and LOC personnel, 100% of flights were assumed. For PMAs, referees, hospitality and VIP/VVIP, business class travel was assumed. Travel for other attendee categories was assumed to be in economy class.

In Table 16, the determined average distances from international flight hubs to Moscow are shown. The following assumptions were made for inter-city

Attendee category	International	Inter-city	Intra-city
General public	18.6%	14.6%	66.9%
Group Sales Customers	80.0%	10.0%	10.0%
Hospitality	50.0%	0.0%	50.0%
VIP/VVIP	50.0%	50.0%	0.0%
Media	50.0%	50.0%	0.0%
PMA and referees	97.0%	3.0%	0.0%
FIFA and LOC personnel	10.0%	20.0%	70.0%
Volunteers	5.0%	20.0%	75.0%
Venue Operations Personnel	0.0%	0.0%	100.0%

Table 12: The assumed origin of attendees

travels of general public, Group Sales Customers, hospitality, VIP/VVIP, FIFA and LOC personnel, PMA and referees:

- All attendees with an international origin were assumed to travel two return journeys between host cities, of which one of the journey originates in Moscow.
- All attendees with an inter-city origin were assumed to travel two return journeys between any two host cities.

Volunteers were expected to have a different travel pattern to attendees and therefore the following assumptions were made:

- All volunteers coming from abroad were assumed to travel one return journey from Moscow to another host city.
- All volunteers with an inter-city origin were assumed to travel one return journey between any two host cities.

The LOC provided an expected distribution of means of transport per host city. The distribution was applied for all attendee categories. The average

Attendee category	Africa	Asia	Caribbean	Central America	Europe	North America	South America	Oceania
General public	5%	10%	2%	3%	40%	15%	20%	5%
Group Sales Customers	5%	10%	2%	3%	40%	15%	20%	5%
Hospitality	5%	10%	2%	3%	40%	15%	20%	5%
VIP/VVIP	5%	10%	2%	3%	40%	15%	20%	5%
Media	5%	10%	2%	3%	40%	15%	20%	5%
PMA and referees	16%	14%	4%	4%	42%	4%	14%	2%
FIFA and LOC personnel	0%	0%	0%	0%	100%	0%	0%	0%
Volunteers	5%	10%	2%	3%	40%	15%	20%	5%

Table 13: The assumed regional origin of international attendees.

Region	Number of slots
Africa	5
Asia	4.5
Europe	13
North America, Central America and the Caribbean	4
Oceania	1
South America	5
Russia	1
<b>Total</b>	<b>32</b>

Table 14: Number of slots made available per region

Mode of transport	Distribution
Flight	95%
Rail	2%
Car	1%
Bus	2%

Table 15: Expected mode of transport for international travels

Region	International hub composition	Average distance to Moscow (km)
Africa	Johannesburg, South Africa	7,225
	Cape Town, South Africa	
	Accra, Ghana	
	Cairo, Egypt	
Asia	Beijing, China	6,649
	Tokyo, Japan	
Caribbean	San Juan, Porto Rico	10,052
Central America	Panama City, Panama	10,969
	San José, Costa Rica	
	San Salvador, El Salvador	
Europe	London, England	2,290
	Paris, France	
	Amsterdam, Netherlands	
	Frankfurt, Germany	
North America	Atlanta, USA	9,604
	Chicago, USA	
	Los Angeles, USA	
South America	São Paulo, Brazil	11,562
	Bogotá, Colombia	
	Rio de Janeiro, Brazil	
Oceania	Sydney, Australia	14,685

Table 16: The estimated average distance per region

distribution is presented in Table 17. For intra-city travel, all attendees were assumed to travel an average distance of 120 km per attendee and match. The average distribution per mode of transport was provided by the LOC. For hospitality and VIP/VVIP, 50% car and 50% bus was assumed (Table 18).

#### FIFA Fan Fests

For FIFA Fan Fests, all attendees were assumed to be local and only intra-city journeys were accounted for. FIFA provided the expected number of attendees per host city and day. For host cities where a spectator interval was given, the highest number was assumed. 25 fan fests days per host city was accounted for. The LOC provided the expected number of volunteers per host city. A return distance of 20km per attendee and day was assumed.

#### Football for Hope Festival

FIFA provided the expected numbers of attendees at the Football for Hope Festival. The origins of delegation members was provided by FIFA based on data from 2014 Football for Hope Festival (75% international, 16% inter-city and 9% intra-city). For delegation members with international and inter-city origin the following assumption were made:

- All international delegation members will travel one return journey from Moscow to a host city.
- All inter-city delegation members will travel one return journey between any two host cities.

For intra-city travels an average distance of 42km per attendee and day was assumed based on the Festival Operational Plan in 2014. Five days of the event was assumed based on information from 2014 FIFA World Cup™ Brazil Carbon Footprint.

#### FWC Banquet

The expected number of attendees at the FWC Banquet was assumed to be the same as presented in the report 2014 FIFA World Cup™ Brazil Carbon Footprint. In addition, the same average distance of 50km per attendee and day was assumed.

#### FIFA and LOC operations

The expected journeys made by FIFA and LOC personnel during the FWC period were estimated based on activity data of 2015, which was extrapolated by using expected increase of number of employees.

#### Accommodation

Accommodation was only accounted for attendees arriving by international or inter-city transportation. The same expected accommodation preferences as for 2014 FWC were assumed for the general public, FIFA and LOC personnel, hospitality, VIP/VVIP, media and volunteers (MGM Innova, 2013, pp. 60-61). Group Sales Customers were assumed to have the same accommodation preferences as the

Mode of transport	Distribution
Flight	67%
Rail	27%
Car	3%
Bus	3%

**Table 17:** The average expected distribution of modes of transport for inter-city journeys

Mode of transport	Distribution
Flight	0%
Rail	1%
Car	9%
Bus	90%

**Table 18:** The average expected distribution per mode of transport for intra-city travels

general public. The assumed number of bed nights per event and ticket is presented in Table 19. For example, for general spectators that are assumed to attend 2 matches, 6 bed nights were assumed. Volunteers and FIFA and LOC personnel at FWC matches were assumed to stay for the whole FWC period. 25 hotel nights per attendee were assumed for volunteers and FIFA and LOC personnel attending FIFA Fan Fests. For Football for Hope Festival and FWC Banquet it was assumed that attendees stay for the duration of the event and one additional night. PMAs and referees were assumed to stay from the first day of the FWC period until one day after elimination. PMAs will stay at base camps, which were assumed to be equal to a five-star hotel. Referees were also assumed to stay at five-star hotels. Delegation members at the Football for Hope Festival were assumed to stay for the duration of the event and one night extra at five-star hotels.

The expected hotel nights for FIFA and LOC personnel during the FWC period were estimated based on activity data of 2015 provided by FIFA and the LOC, which was extrapolated by using the expected increase in the number of employees.

Attendee category	Number of bed nights per event and ticket			
	FWC matches	FFF	FFHF	FWC Banquet
General public <sup>8</sup>	3	0	1	1
Group Sales Customers	3	0	0	0
Hospitality	3	0	0	0
VIP/VVIP	3	0	0	0
Media	3	0	1	1

**Table 19:** Expected number of bed nights per event and ticket.

<sup>8</sup> For the FWC Banquet the general public consists of delegates and guests.

#### Temporary facility construction

The GHG emissions from temporary facility construction for the FWC Banquet were estimated from actual data of a similar event. For all other events during the FWC period, estimates were made based on the emissions per spectator derived from 2014 FIFA World Cup™ Brazil Carbon Footprint. In 2018, it is planned that the International Broadcast Centre will be located in an existing building. The included emissions for the International Broadcast Centre was therefore limited to cover emissions from equipment, e.g. furniture and cables. The data was assumed to be the same as in 2014 and were derived from the report 2014 FIFA World Cup™ – Estimate of the carbon footprint from FIFA World Cup TV production.

#### Food and beverages

At FWC matches, one meal and two beverages per attendee were assumed, except for Hospitality and VIP/VVIP where one dinner buffet and two beverages per attendee were allocated. For FIFA Fan Fests and the Football for Hope Festival, one meal and two beverages were assumed per attendee. Attendees at the FWC Banquet were assumed to have a three-course dinner per attendee.



# ANNEXE II: DEFINITIONS OF ATTENDEE CATEGORIES

## Definitions

Attendee category	Definition
Festival delegate members	Representatives and young people from NGOs attending the Football for Hope Festival 2018 in Russia.
General public	Consists mainly of fans from all over the world.
Group Sales Customers	A group of attendees consisting of, for example, Commercial Affiliates, Branded Licensees, FIFA Football Community and Media Right Licensees.
Hospitality	Spectators who acquired a special ticket package that provides added services (food and parking) or are part of the service package granted to commercial affiliates of the FIFA World Cup. The special ticket packages can be sold to individuals or companies.
VIP	FIFA and LOC guests who have access to the VIP Lounge and VIP seats.
VVIP	FIFA and LOC guests who are granted the best seats (Honour Tribune) and exclusive services in the VVIP Lounge.
Media	Includes press, commentators, TV observers, photographers supporting media crews and Host Broadcasters.
FIFA and LOC personnel	FIFA and LOC personnel attending the events only. Another set of FIFA and LOC personnel is considered for preparation and organisation of the 2018 FWC.
PMA	Includes all delegation members of the national teams that have qualified for the 2018 FIFA World Cup in Russia.
Referees	Full refereeing team consisting of the field referees, assistant referees, fourth official and reserve referees.
Venue Operations Personnel	Venue operations and maintenance personnel, event access and security, food and beverage vendors, merchandise vendors and other necessary operational personnel.
Volunteers	A part of a supporting staff group working under coordination of FIFA and the LOC.

**Table 20:** Definitions of attendee categories