

Appendix E: Monitoring of the stadiums and host cities for 2010 FIFA World Cup™

The following monitoring tool is an example of how the greening performance of the 2010 FIFA World Cup™ was monitored and may be adapted for use in other sporting and large events. The use of monitoring is essential in establishing the footprint of an event and the absence of accurate data affects the ability to report on the social and environmental footprint of an event and to gauge whether interventions were successful or not.

A) *Matrix for Stadium monitoring at the host cities*

- 1 Building/Rebuilding of the stadium
- 2 Energy management
- 3 Waste management
- 4 Water management
- 5 Sustainable transport
- 6 Carbon offset
- 7 Sustainable procurement

Summary of indicators for environmental monitoring at the host cities

Themes	Green Goal 2010	National targets for 2010	Interventions	Achievements
1. Upgrade/ Construction of Stadium	Green Design and Construction	x	e.g. - saving of costs - saving of resources - saving of material - saving of waste - saving of energy	e.g. - multi-purpose use - learning from 2010 - achievements after 2010 - use of the stadium after 2010
2. Energy Management	Renewable energy and energy efficiency	5%	e.g. - use of energy saving lighting - periodical lighting - Use of fluorescent lighting	e.g. - use of energy saving lighting - creation of periodical lighting and eco-friendly light system
3. Waste Management	Minimization of Waste in Total - Avoidance, reduction, reuse and recycling of material Composting	20%	e.g. - action plan on waste management - composting system - system on efficient waste separation and compaction	e.g. - feasible transport and recycling of waste - multi-use recycling facilities (MURF) - education of more staff on waste
4. Water Management	Minimization of water usage: - By technology - By practice	10%	e.g. - installation of sustainable sanitary items - dewatering roof construction	e.g. - little use of water - reuse of grey water - use of rain water - collection of water in bins and cisterns

Themes	Green Goal 2010	National targets for 2010	Interventions	Achievements
5. Sustainable Transport	Reduction of emission by using public transport (Park-and-ride) Promotion of non-motorized transport	50%	e.g. - extension of public transport system - park and ride system - attraction of public transport - Transport Action Plan for 2010	e.g. - attraction of population to use train and public transport - sharing of vehicles and taxis - promotion of non-motorized transport - proper park-and-ride system

1. Upgrade/ Construction of Stadium

Construction Process	2008	2009	2010	Beyond 2010 (additional measures)
Recycling of material (type of material, location)				X
Reuse of material (location)				
Construction material and resources from SA				X
Transport of material and resources (distances, transport methods,...)				
Sustainable measures in and around the stadium (ponds for rainwater collection, cisterns, dewatering system at the roof...)				
Green surrounding (planting of trees, urban park, flowers, ponds,...)				

Notes:

- What has already been implemented?
- What is planned to be implemented until 2010 or beyond 2010?
- Matrix as a starting point to get an overview of the situation and infrastructure (stadium and surroundings)
- Next step: creation of an extended matrix due to the current situation of the host city with a separate baseline study
- Creation of an action plan
- Implementation and monitoring process
- Review of the monitoring due to requirements

2. Energy Management

2.1 Energy consumption within a host city and stadia/surroundings

Energy consumption	Per match/ stadium	Per match/ outside and fan parks	Per match/ total	Total whole FWC 2010	Building manage- ment (2006 – 2010)
Floodlights	MWh	MWh	MWh	MWh	MWh
General lighting	MWh	MWh	MWh	MWh	MWh
Private suites (fridge, microwave, TV, lights, fan, air-con, kettle, heating food)	MWh	MWh	MWh	MWh	MWh
Air-conditioning, Ventilation and Heating	MWh	MWh	MWh	MWh	MWh
Office/management (fridge, microwave, TV, lights, fan, air-con, kettle, heating food)	MWh	MWh	MWh	MWh	MWh
Kiosks and food preparation (stove)	MWh	MWh	MWh	MWh	MWh
Hot water in change rooms	MWh	MWh	MWh	MWh	MWh
Media centre (sound system, scoring ads,...)	MWh	MWh	MWh	MWh	MWh
Other	MWh	MWh	MWh	MWh	MWh
Fan Parks/ PVAs (cameras, electricity)	MWh	MWh	MWh	MWh	x
Training sites	MWh	MWh	MWh	MWh	x
Total consumption	MWh	MWh	MWh	MWh	MWh

Notes:

- Different calculations and listings of indicators are possible, e.g. Lifts, refrigerators, ice machines, big screen, broadcasting due to the infrastructure and type of energy to be used

2.2 Energy consumption by means of energy supply

Energy	FWC 2010 (per stadium/match/host city)	Total amount (all matches)	Average
Power	MWh	MWh	MWh
Diesel generators	Diesel litres	liters	liters
Gas	MWh	MWh	MWh
Other energy suppliers (green energy)	x	MWh	MWh

Calculation and conversion: 1kg/l tons of diesel/ oil equivalent (toe) = 11,63 kWh

2.3 Target and outcome for 2010

Energy saving target (amount)	Energy saving target (%)	Saving outcome (amount)	Saving outcome (%)
	10% energy saving		%

3. Waste Management

3.1 Types of waste by amount

Waste management	Per match/stadium	Per match/other venues (PVA, fan parks)	Per match/ total	Total FWC 2010
Recyclables	t or m ³	t or m ³	t or m ³	t or m ³
Glass (bottles, other glass)	t or m ³	t or m ³	t or m ³	t or m ³
Metal (cans)	t or m ³	t or m ³	t or m ³	t or m ³
Paper (cardboard, serviettes)	t or m ³	t or m ³	t or m ³	t or m ³
Plastics (PET, LD)	t or m ³	t or m ³	t or m ³	t or m ³
Non-recyclable (to landfill site)	t or m ³	t or m ³	t or m ³	t or m ³
Organic waste	t or m ³	t or m ³	t or m ³	t or m ³
Construction material and waste	t or m ³	t or m ³	t or m ³	t or m ³
Total	t or m³	t or m³	t or m³	t or m³

Notes:

Options for recycling:

- Recycling by wholesaler in contract with catering
- Extra recycling with special rates for FWC 2010 on long-term basis (prices are per kilo or item)
- Recycling of biodegradable waste on special sites (worm-farm)
- Installation of MURFs (multi-usable recycling facilities) at the stadium

3.2 Waste production by type of waste

Waste	Recyclables	Non-recyclables	Biodegradable waste	Construction material	Waste in total
Amount per match	t or m ³	t or m ³	t or m ³	t or m ³	t or m ³
Amount in total FWC	t or m ³	t or m ³	t or m ³	t or m ³	t or m ³

3.3 Waste calculation per match

Waste in total (per match)	Recyclable waste (per match)	Waste without recyclable (per match)	Waste reduction (per match)
Amount in t or m3	t or m3	t or m3	t or m3
Amount in %	%	%	%

3.4 Target and outcome for 2010 for waste minimization

Waste minimization target (amount)	Target for 2010 (%)	Outcome for 2010 (amount)	Outcome for 2010 (%)
	20% waste saving		%

4 Water Management

4.1 Calculated water consumption

Water consumption	Per match/ stadium	Per match/ other venues (fan parks/ PVAs)	Per match total	Total whole FWC 2010	Construction Process Process (2006 – 2010)	Type of water (rain water, drinkable water, grey water)
Urinals	m ³	m ³	m ³	m ³	m ³	
Toilets	m ³	m ³	m ³	m ³	m ³	
Hand wash basins	m ³	m ³	m ³	m ³	m ³	
Cleaning (buckets)	m ³	m ³	m ³	m ³	m ³	
Catering	m ³	m ³	m ³	m ³	m ³	
Hot Water (Showers & baths)	m ³	m ³	m ³	m ³	m ³	
Pitch Irrigation	m ³	m ³	m ³	m ³	m ³	
Irrigation outside stadium	m ³	m ³	m ³	m ³	m ³	

4.2 Water consumption calculated by type of water

Water consumption	FWC 2010 (per stadia /match/host city)	Total amount (all stadia and matches)	Average
Potable water	t or m ³	t or m ³	t or m ³
Non-potable water	t or m ³	t or m ³	t or m ³
Pitch irrigation	t or m ³	t or m ³	t or m ³

4.3 Calculation for water saving

Water	Water consumption	Re-use of water (greywater)	Water saving
Amount in t or m ³	t or m ³	t or m ³	t or m ³
Amount in %	%	%	%

4.4 Target and outcome for 2010 for water conservation

Water saving target (amount)	Water saving target (%)	Outcome for 2010 (amount)	Outcome for 2010 (%)
	10% saving		%

5 Sustainable Transport

5.1 Overland transport to host city (public visitors only)

Modes of transport	Car/rental car	Airplane	Train	Overland Bus	Minibus-Taxi	Metered Taxi
Spectators	%	%	%	%	%	%

5.2 Transport from location of spectator to stadium (national and international public visitors only)

Transport	Car	Train	Bus	Minibus-Taxi	Metered Taxi	Non-motorized	Motorbike
Spectators	%	%	%	%	%	%	%

5.3 Transport Calculated by Modes of Transport (percentage)

Transport	FWC 2010 (per stadia/ match/host city)	Total amount (all matches and host cities)	Average
Public transport	%	%	%
Private transport	%	%	%
Non-motorized transport	%	%	%

5.4 Transport Divided by Transport and Sustainable Transport

Transport	Transport (total) (to Stadium, from stadium, PVAs, fan parks, hotels)	Sustainable transport (non-motorized/ PT)
Amount of spectators		
Amount in percentage		

5.5 Target and Outcome for 2010

Sustainable transport target (amount)	Sustainable transport target (%)	Outcome for 2010 (amount)	Outcome for 2010 (%)
	50% saving		%

Notes:

- Visitors to the fan parks only are being calculated in separate tables

6. Carbon Offset

6.1 Energy consumption and CO₂ emission during the FWC planning until 2010

Carbon Offset	FWC 2010 (per stadia/match/ host city)	Total Amount (all stadia and matches)	Average
Local Transport	t CO ₂	t CO ₂	t CO ₂
Energy by Accommodation/ Hotel	MWh	MWh	MWh
Stadium Energy	MWh	MWh	MWh
Stadium construction	MWh	MWh	MWh

Notes:

- Conversion: 1kWh energy = 800g CO₂ emission
- Carbon offset excluding international transport
- Calculations see 1.2 and 1.5

6.2 Summary Carbon Footprint/ per Host City

Component	Emissions (tCO ₂ e)	Share (%)
International transport	tCO ₂ e	%
Inter-city transport	tCO ₂ e	%
Intra-city transport	tCO ₂ e	%
Stadia constructions and materials	tCO ₂ e	%
Stadia and precinct energy use	tCO ₂ e	%
Energy use in accommodation	tCO ₂ e	%
Total excluding international transport	tCO ₂ e	%
Total including international transport	tCO ₂ e	%

6.3 Recommendations for Carbon Offset footprint and reduction of CO₂ emission

Carbon Offset	FWC 2010 (per host city/ match/stadia)	Total amount of saving (all matches and host cities)	Average of saving
Renewable energy	%	%	%
Efficient technologies	%	%	%
Compensation of carbon programs	%	%	%
Gold Standard	%	%	%

Notes:

- Carbon offset programs with a duration of more than 10 years beyond 2010
- Purchase of carbon credits
- Programs of compensating carbon emission (Norway, Finland as financial source)

Carbon offset target (amount)	Carbon offset target (%)	Outcome for 2010 (amount)	Outcome for 2010 (%)
A carbon-fair event	%		

B) Conclusion and Summary – Matrix for environmental monitoring

Concluding summary of the targets and outcomes for Green Goal 2010

Green Goal 2010	Target for 2010 (amount)	Target for 2010 (%)	Outcome for 2010 (amount)	Outcome for 2010 (%)
Energy		5% energy saving		%
Waste		20% waste reduction		%
Water		10% water saving		%
Transport		50% use of public transport		%
Carbon Offset		Carbon-fair event		
Sustainable procurement		Sustainable event		