



Monitoring The Release Of Carbon At Public And Corporate Events: Approaches, Difficulties, And Ideal Conditions

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Abstract: This abstract discusses the concept of carbon footprints in public events and the methodologies used to analyze and mitigate them. It emphasizes the importance of understanding the environmental impact of events and adopting eco-friendly practices. The abstract references studies like Julie's Bicycle guide and the Glastonbury Festival's carbon footprint, and highlights the need for interdisciplinary research, stakeholder collaboration, and data-sharing initiatives. It also discusses the impacts of increased carbon emissions on air quality, climate change, public health, and socio-economic factors.

Keywords: Stakeholder collaboration for carbon footprint reduction

1. Introduction:

A carbon footprint is the total amount of greenhouse gases (GHGs) that a person, group, activity, occasion, or product releases into the environment over the course of its existence. When it comes to public events, the carbon footprint includes all greenhouse gas emissions that are related to the preparation, running, and cleanup of the event. This covers emissions from a range of sources, including energy use, waste production, transportation, and catering.

Beyond the benefits to the environment, analyzing carbon emissions from public events is important because it can lead to financial savings, increased public participation, better policy, and the encouragement of innovation. Stakeholders can gain a number of tactical and strategic benefits as well as contribute to a more sustainable future by recognizing and reducing the carbon footprint of events.

2. OBJECTIVES:

The main objectives of the research papers are :

- Measuring the amount of emissions
- Finding the Main Sources of Emissions
- Evaluation of the Effects on the Environment
- Creation of Strategies for Mitigation
- Encouragement of Eco-Friendly Behaviors

- Standards and Policy Guidance Development: Education and Public Awareness

3. Literature Review:

3.1. Burritt, Roger & Schaltegger, Stefan & Zvezdov, Dimitar. (2011). Carbon Management Accounting: Explaining Practice in Leading German Companies. Australian Accounting This guide offers a way for figuring out how much energy, transportation, production materials, and audience travel contribute to the carbon footprint of live events. It provides useful resources to help event planners quantify and lower their carbon footprint.

3.2. "The Carbon Footprint of the Glastonbury Festival" (2010):

A thorough analysis of the carbon impact of the UK's largest music festival, Glastonbury Festival. It was discovered that waste management and energy use were the next biggest contributors to emissions, after audience travel.

3.3. "Life Cycle Assessment of the FIFA World Cup 2014 in Brazil" :

This study's life cycle assessment (LCA) of the 2014 FIFA World Cup revealed that building infrastructure and domestic and international transportation were major contributors to carbon emissions.

3.4. The Scottish Government's "Greener Events Guide" (2012) offers mitigation strategies.

This resource offers tips on how to lessen an event's carbon footprint, such as utilizing renewable energy sources, cutting trash, and supporting environmentally friendly transit choices.

3.5. Meegan Jones' "Sustainable Event Management: A Practical Guide" (2014):

The book emphasizes the significance of incorporating sustainability into all facets of event planning and execution and offers a variety of sustainable event management techniques.

3.6. A Greener Festival's "Environmental Impacts of Music Festivals: A Case Study of Glastonbury" (2015):

This study looks at garbage production, water use, and local ecological implications in addition to carbon emissions as environmental repercussions of music events. It offers suggestions for reducing these effects.

3.7. Environmental Research Letters' article "Sustainability and Environmental Impacts of Festivals: A Review" was published in 2018.

An extensive analysis of how festivals and big events affect the environment, emphasizing the importance of sustainable practices and the potency of various mitigation techniques.

3.8. "Carbon Footprint and Environmental Impact of the Edinburgh Festivals" (2016):

This study examined the collective carbon footprint of the Edinburgh, Scotland, festival series in order to shed light on the environmental effects of cultural events.

4. Analyzing various types of events (concerts, festivals, sports events, etc.) and their carbon footprints:

A number of elements need to be taken into account when analyzing the carbon footprints of different events, such as concerts, festivals, and sporting events. These considerations include venue infrastructure, energy usage, transportation, and waste management. The following provides a broad summary of how each kind of event affects carbon emissions:

4.1. Musical performances:

Venue Energy Consumption: At music venues, energy consumed for climate control sound systems, and lighting can have a major impact on carbon emissions.

Artist and Crew Travel: Touring artists and their crews frequently use buses, airplanes, or numerous automobiles to travel vast distances between venues, which adds to the carbon emissions from their travels.

Audience Transportation: Whether they use their own cars or not, concertgoers' travel to and from the venue adds to the carbon footprint.

Festivals: Venue Infrastructure: Owing to the use of energy and construction materials, temporary infrastructure including stages, tents, and lighting is frequently needed at festivals. As a result, these structures may have substantial carbon footprints.

Travel by Artists and audience: Just like during concerts, emissions from festival travel may come from both the artists and the audience.

Below attached are the figures quoted from "Managing Carbon Footprint at Music Festivals: A Study at Glastonbury Festival:

Mode of Transportation	Distance	Emission Factor (per km)	Carbon Emission Produced (per person)
Plane	564.77 km	0.29 kg CO ₂ e	96.9299 kg CO ₂ e
Camper van	635.7 km	0.21 kg CO ₂ e	133.497 kg CO ₂ e
Car	635.7 km	0.17 kg CO ₂ e	108.069 kg CO ₂ e
Taxi	635.7 km	0.15 kg CO ₂ e	95.355 kg CO ₂ e
Coach	638.91 km	0.12 kg CO ₂ e	76.6692 kg CO ₂ e
Train	643.04 km	0.0044 kg CO ₂ e	32.04616 kg CO ₂ e
Bike	712.93 km	0	0

(Source: Adapted from Department of Business, Energy & Industrial Strategy of the UK, 2008)

Food and Beverage: Producing and distributing food and beverages at festivals can have a significant carbon footprint, particularly if non-local or out-of-season products are served.

Waste Generation: Festivals produce a lot of waste, and improper waste management techniques can lead to increased emissions from disposal and transportation.

4.2. Athletic Events:

Venue Energy Usage: Lighting, climate control, and scoreboard operation in sports arenas and stadiums use a significant amount of energy.

Travel by Players and Fans: When athletes and fans travel to and from sporting events, they can have a major impact on carbon emissions, particularly when those events involve international players or attendance.

Infrastructure: Building and upkeep of sports facilities, including access roads and parking lots, can have a significant carbon impact on transportation infrastructure.

refreshments and products: Making and distributing refreshments and products can increase emissions, much like concerts and festivals do.

Imperfections in the Text:

1. **Data Availability:** A major obstacle to thorough carbon footprint assessments is the lack of data, particularly when it comes to particular emissions sources like attendee travel patterns or supply chain emissions for event infrastructure and products.
2. **Established procedures:** It is challenging to compare study results across industries and studies due to the absence of established procedures for calculating event carbon footprints. More thorough analysis and benchmarking may be facilitated by establishing standard frameworks and measurements.
3. **Long-Term Impact Assessment:** Knowledge of the long-term environmental effects of events, such as habitat loss, ecological disruption, and resource depletion brought on by venue building and changes in land use, is lacking. These effects extend beyond the events' immediate carbon emissions.
4. ****Intersectional Analysis:** Literature Gaps** There is a dearth of study on the intersectional effects of events, such as the ways in which environmental sustainability and social equality are integrated into event management and planning. This disparity emphasizes the necessity for more comprehensive methods of event sustainability.

By filling in these gaps, interdisciplinary research, stakeholder collaboration, and data-sharing initiatives might improve our comprehension of event carbon footprints and guide more efficient mitigation tactics.

5. **Methodology used to measure carbon emissions from public events.**

A multi-step methodology is used to measure carbon emissions from public events, taking into account different sources of emissions over the event's lifespan. Here is a broad strategy that is frequently employed:

- 5.1. **Scope Definition:** Specify the parameters of the evaluation, such as the sources and activities of emissions that will be covered. By making a distinction between Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased electricity), and Scope 3 (other indirect emissions), this frequently complies with the Greenhouse Gas Protocol's rules.
- 5.2. **Information Gathering:** - Indirect Emissions (Scope 1): Compile information on fuel usage for automobiles, generators, and other equipment utilized during the occasion. This covers emissions from generators and vehicles used during setup, use, and maintenance while on site.
- 5.3. **Emission Factors:** Using the proper emission factors, convert activity data (such as fuel and power use) into carbon dioxide equivalent (CO₂e) emissions. These variables could change based on the kind of fuel, the intensity of emissions from the electrical grid, the manner of transportation, and other elements.
 - 5.3.1. **Indirect Emissions (Scope 2):** Compile information on the amount of electricity used for sound systems, lighting, HVAC (heating, ventilation, and air conditioning), and other equipment during venue operations.
 - 5.3.2. **Indirect Emissions (Scope 3):** Gather information on additional indirect emissions sources, such as participant and attendee travel (by air, road, or rail), emissions related to the production and transportation of food and beverages, emissions from waste disposal, and emissions from the development and upkeep of infrastructure.

5.4. Allocation: Based on pertinent activity data, allocate emissions to the event. Assign transportation emissions according to the number of people attending the event, or divide the amount of electricity consumed according to the percentage of the venue used for the event.

5.5. Measurements: Compute the event's overall carbon footprint by adding up all of the emissions from all pertinent sources that fall inside the specified parameters. This covers all emissions produced by operations both before and after the event, as well as any emissions generated during the event itself.

Event planners may efficiently monitor and control the carbon emissions linked to their events by adhering to a systematic approach such as this one, thereby supporting wider initiatives aimed at reducing global warming and advancing sustainability.

6. Carbon emission of some events in Ahmedabad :

There are various carbon emission calculators available online for measuring the carbon footprint of a particular event. MY CLIMATE application is used in order to calculate the carbon footprint data from different events based on the data collected.

6.1 Methodology to collect the data :

- Note the size of the hall / party plot used for the event.
- Count the number of days for the event that was held for.
- Note the Total number of attendees in the event.
- Separate the number of laborers and organizers.
- Note the heated and air conditioned area of the venue.
- Input the collected data in the given boxes and note the empirical values.

As mentioned, below given are some empirical values of the data collected as above.

6.1.1 CO₂-emissions from your 3-day event with 300 participants with 1000 m² of heated area and 500 m²

Total Carbon emission: CO₂ amount: 71.1 t

Venue : Baghban Party plot

The emissions are caused within the following categories:



Ring ceremony:

Mobility	32.9 t
Accommodation	25.8 t
Catering	4.8 t
Energy	3.9 t
Materials	2.9 t
Transport	0.000 t
Waste	0.808 t

6.1.2. CO₂-emissions from your 1-day event with 30 participantsCO₂ amount: 16.4 t

For a 3 days event : 16.4 t x 3 = 49.2 t

Venue :

The emissions are caused within the following categories:

**Wedding:**

Mobility	3.1t
Accommodation	0.000 t
Catering	0.160 t
Energy	13.0 t
Materials	0.098 t
Transport	0.000 t
Waste	0.027 t

6.1.3. CO₂-emissions from your 1-day event with 3000 participantsCO₂ amount: 419.1 t

The emissions are caused within the following categories:

**Wedding:**

Mobility	297.5 t
Accommodation	0.000 t
Catering	16.0 t
Energy	93.1 t
Materials	9.8 t
Transport	0.000 t
Waste	2.7 t

6.2. Factors affecting the carbon footprint in the three different events :

Location, catering, gifts, transportation, flowers, DJ music, pictures, and trash minimization. The site and venue are the first aspect of sustainability in events that are discussed. In order to optimize the use of natural resources, they advise selecting an outdoor space and cut down on energy use, or pick a LEED-certified location if the event must take place indoors owing to the season. Additionally, customers can select venues near public transportation, which lowers transportation expenses and pollution while also removing the possibility of intoxicated driving.

A percentage of the fees collected by certain venues are also donated to the community via community centers, museums, parks, and natural areas. Alternative lighting options for the venue, such as LED/solar lighting or candles made of soy, beeswax, or recyclable materials, can cut expenses and energy use. Additionally, Choosing a location that already engages in sustainable business practices also guarantees that they will support the creation of a green event.

7. Results and Discussion:

As seen in the above cases, a clear comparison of the emission of carbon footprint can be done based on the collected and researched data.

Larger is the number of attendees in the event, more is the carbon emission noted. Additionally, various factors like transportation to and from the venue also plays a major role in the emission. As observed, the transportation of the guests, arranging the materials needed, raw materials to prepare the setup, all these also affect the air quality as well as finances. Furthermore, organic and locally available food and vendors not only cuts the cost and satisfies the needs of the event, but also it will suffice the urgent situations and help the environment stay healthy.

Some impacts of increased carbon emission in the city are :

The neighborhood and the surrounding environment may be greatly impacted by the carbon emissions from city events. These are a few of the main effects:

1. **Condition of the Air:** Poor air quality in the city can be caused by high carbon emissions from event-related activities like trash management, venue operations, and transportation. Resident respiratory disorders and other health concerns may worsen as a result, especially for vulnerable groups including children, the elderly, and people with pre-existing medical diseases.
2. **Climate Change:** Events' carbon emissions add to the atmosphere's buildup of greenhouse gases, which causes climate change. Rising sea levels, more frequent and intense heatwaves, extreme weather, and disturbances to ecosystems and biodiversity are just a few effects that may arise from this. Climate change may increase the likelihood of flooding, heat-related illnesses, and infrastructure damage in cities.
3. **Local Environmental Degradation:** Events can also cause habitat damage, soil erosion, and waterway contamination, among other forms of local environmental degradation. For instance, poor waste management techniques used during events may cause trash, contaminate water sources, and damage wildlife habitats.
4. **Public Health:** In addition to air quality, other health issues including noise pollution, light pollution, and the spread of infectious diseases are also impacted by carbon emissions from events. Large-scale events may also provide safety hazards, such as accidents or injuries caused by crowds, which could put a pressure on the region's medical resources.
5. **Social and Economic Effects:** Cities and their citizens may face serious social and economic repercussions as a result of climate change and environmental deterioration brought on by carbon emissions. These could include rising healthcare expenses, lost livelihoods in industries impacted by climate change (including tourism and agriculture), community displacement brought on by rising sea levels or extreme weather, and disturbances to regional economies.
6. **Community Well-Being:** The general health and standard of living of city dwellers might be impacted by carbon emissions from events. People who are directly impacted by environmental dangers or who confront social and economic vulnerabilities may experience higher stress and anxiety as a result of concerns about environmental sustainability and climate change.

Events must be planned with cooperation from municipal authorities, corporations, and community members to mitigate the effects of carbon emissions. Promoting environmentally friendly transportation options, enhancing energy efficiency in event operations, putting in place waste reduction and recycling programs, encouraging green procurement practices, and spreading awareness of the significance of environmental sustainability and climate action are a few strategies to lessen these effects.

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