**Carbon Management and Climate Change**

**‘Defining Carbon Neutrality’**

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The festival discussed within this case study has been anonymised and will be referred to a ‘Festival X’.

**1. Executive Summary**

This report provides an analysis of current actions taken by Festival X to minimise greenhouse gas emissions, and proposes a strategy for achieving carbon neutral status. Whilst the Festival has done well to tap into renewable energy sources to some extent, and encourage food and beverage vendors to adopt more sustainable business practices, more must be done to reduce reliance on diesel generators, encourage the take home and re-use of camping equipment, and promote more sustainable methods of transport both on and off site. Key recommendations include developing a partnership with a carbon neutral consultant, such as the Carbon Trust. The report also suggests the organisation should calculate, reduce and offset emissions by following the Greenhouse Gas Protocol’s 3 scope methodology. An evaluation of the costs and benefits is also discussed.

**2. Rationale**

Since its humble beginnings in 1970, Festival X has prided itself with a clean and green ethos, embodied in the festivals latest motto ‘love the farm, leave no trace’. Festival X’s commitment to working alongside environmental charities such as Green Peace and WaterAid, as well as gifting sizeable annual donations to them and similar bodies, are just some of the ways in which the festival demonstrates its support to the environment[[1]](#endnote-1).

2016 saw 120,000 festival goers attended Festival X - 80 times its 1970 capacity[[2]](#endnote-2). Throughout the years, certain measures have been taken to sustainably support this growing number, enabling the festival to keep true to its green commitments. Despite these efforts however, the annual mass migration of people enjoying the live music experience continues to contribute to the rise of greenhouse gas levels. Greenhouse gas emissions associated with the UK music industry is estimated at a minimum of 540,000 tones CO2e per annum, of which 75% is attributed to live music performances and festivals[[3]](#endnote-3).

At a time when greenhouse gas levels within the atmosphere are at a record high[[4]](#endnote-4), becoming a carbon neutral organisation could provide Festival X with a fresh opportunity to demonstrate its commitment to the environment.

Norwegian success story Hove Festival has proved that achieving carbon neutral status is possible for large scale music events. Having signed up to the United Nations ‘Environment Programme Climate Neutral Network’ in 2008[[5]](#endnote-5), Hove is the only large scale music festival to achieve carbon neutral status to date. This success was driven by action aimed at both minimising and offsetting climate impacts. Given the right approach is adopted, Festival X has the opportunity to experience the same success, and lead the UK music industry towards a cleaner and greener future.

**3. The Approach**

To achieve carbon neutrality, Festival X must adopt a three step approach. This includes: (i) Calculating and measuring emissions, (ii) Developing a feasible strategy for reducing emissions, (iii) Offsetting remaining greenhouse gas emissions by working with high quality carbon offset projects. A blended approach such as this will help to bridge the gap between internal emission reductions and meeting a zero net emissions objective.

It is recommended that Festival X selects a suitable partner that can assist them in making a credible claim of carbon neutrality, such as the Carbon Trust[[6]](#endnote-6)[[7]](#endnote-7).

**4. Stakeholders**

The sustainability of an organisation often depends on its ability to provide wealth, value or satisfaction for all of its primary stakeholders[[8]](#endnote-8). Therefore, a stakeholder management strategy must be implemented to engage stakeholders and develop a universal understanding of what impact achieving carbon neutrality will have on the organisation. With the correct communications, through the correct channels, the strategy will also create transparency and help to manage expectations. Stakeholders include:

**Internal:** Event Director; Artist Liaison Manager; Stage Manager; Sound and Lighting Manager; Traffic Manager; Marketing and Advertising Manager; Ticketing Manager; Digital/Website Manager; Community Liaison Manager; On-site Waste Handling Manager; Hospitality Manager; Shareholders.

**External:** Sponsors; Local Community; Attendees/Audience; Contractors and Suppliers; Artists/Acts; Regulating Authorities; Local Transport Companies; Relevant interest groups and charities.

**5. Setting the Parameters**

To calculate the carbon footprint, boundaries must be identified. An organisational footprint, as opposed to a product footprint, is recommended. By using the Greenhouse Gas Protocol, the festival can categorise emissions under three distinct organisational scopes[[9]](#endnote-9). These include:

**Scope 1:** Direst emissions from activities within the organisation’s control.

**Scope 2:** Indirect emissions from electricity, heat or steam, purchased and used.

**Scope 3:** Any other indirect emissions outside of the organisations direct control.

Calculating operational emissions rather than emissions embedded within a product lifecycle is recommended for several reasons, these include[[10]](#endnote-10): (i) defining clear boundaries for calculating cradle to gate emissions can be problematic (ii) difficulties will arise when sourcing robust data to define a product lifecycle (iii) maintenance and replacement can lead to under or over compensation (iv) disposal and end of life can be difficult to track (v) the approach provides limited scope for comparison with other strategies due to the variations in methodology.

Operational emissions of Festival X have been identified as:

**Scope 1**: On-site transport; Diesel generators used to power food and beverage vendor equipment; Refrigerant losses from food and beverage storage facilities.

**Scope 2**: Stage lighting; Campsite lighting; Powering of audio and video equipment.

**Scope 3**: Transport to and from the festival for attendee; Transport to and from the festival for artist; Waste from food and beverage vendors; Waste disposal of abandoned tents.

**6. Recommendations for Reducing Greenhouse Gas Emissions:**

For Festival X to obtain carbon neutral status, the organisation must target the main drivers of greenhouse gasses, working to reduce or completely eliminate emissions. This can be achieved through a number of solutions:

**Scope 1**

**On-site transport:** Tractors, tankers and trucks all contribute to on-site transport emissions at Festival X[[11]](#endnote-11). These vehicles are used during the installation and set-up of the festival site, for maintenance purposes during the event itself, as well as the clean-up operation afterwards. Whilst efforts have been made to encourage the use of bio-diesel, this use is not widespread. Bio-diesel boasts of a net increase carbon dioxide, as the carbon dioxide released with the burning of the fuel is absorbed from the atmosphere during the growing period of the crops used to make the fuel[[12]](#endnote-12). To date, electric vehicles on-site are underutilised, with no official mention of them in the festival’s fleet. Electric cars not only remove dependency on fossil fuels, but can assist with wider system management; as new battery technologies are installed in electric vehicles, they have the potential to support the intermittency issue of some of the festivals on-site renewable energy sources and support vehicle to grid services[[13]](#endnote-13). It is therefore recommended that Festival X only permit the use of bio-diesel or electric vehicles, in order to achieve zero emissions from on-site transport.

**Diesel Generators for food and beverage vendors:** All food and beverage vendors are supplied with power by Aggreko – a global leader in temporary power solutions. Vendors are prohibited from bringing their own generators onsite. Considering the festivals environmentally friendly approach, Aggreko only provides bio-diesel generators, which require an average of 600,000 litres of waste vegetable oil fuel across the entire event[[14]](#endnote-14). Therefore, no further action is recommended.

**Refrigerant losses from food and beverage vendors**: Vendor refrigeration requirements are unavoidable. Since the Montreal Protocol[[15]](#endnote-15) encouraged the reduction of ozone depleting substances such as chlorofluorocarbons, the use of hydrofluorocarbons has increased, and whilst a reasonable alternative, they can also be powerful emitters of greenhouse gasses[[16]](#endnote-16). To best manage refrigeration leaks, which can cause an increase in carbon dioxide and other greenhouse gas emissions, good refrigeration management should be encouraged. To support cost effective, innovative solutions to on-site refrigeration, festival organisers have introduced ‘cold rooms’ from Hobbs Refrigeration, rather than relying on smaller, individual refrigeration units that are less efficient[[17]](#endnote-17). This ensures refrigeration units are maintained to a suitable standard and refrigerant losses are minimised.

**Scope 2**

**Stage lighting:** On average, this accounts for a third of all electricity consumed throughout the period of a festival[[18]](#endnote-18). Presently, stages are powered by a combination of diesel and biodiesel generators. Despite having installed 1,116 solar panels in 2010, the UK’s largest private solar power installation, during the festival these panels will only replace 6 diesel generators[[19]](#endnote-19). When the festival does not run, Festival X feeds surplus energy back into the grid. As Festival X is already connected to the National Grid[[20]](#endnote-20), the most effective way of reducing carbon emissions from stage lighting would be to source a supply from a green electricity provider, where energy is generated through renewable technologies, rather than fossil fuels.

**Campsite lighting:** As with many outdoor events, Festival X uses the same diesel generators to meet night time demand as it does day time demand. For campsite lighting, generators are generally used for an average of 8 hours per day, between 11pm and 7am. This leads to periods of low load; if the generator is larger than what is truly required, the festival could be using more fuel to deliver the same amount of power. Whilst using a grid connection may be suitable for the festival zone where a connection already exists, installing extensions to underground cabling to provide power from the grid to the campsite is likely to incur huge costs to the organisation. Alternatively, this smaller demand could instead be met by introducing a photovoltaic solar power system, converting sunlight into solar energy during the day, and storing it in a battery bank for when it is required for use. The power stored within the battery bank could therefore replace the diesel generators that operate throughout the night period. Whilst it may be difficult to accommodate the solar panels within the festival zone, PV solar panels could comfortably line the parameter of the camping zone.

**Powering of audio and video equipment:** A similar approach can be taken to power audio and video equipment, as is recommended for stage lighting. Additionally, other methods could be used to promote the use of sustainable energy sources, specifically for smaller stages. Reaction Sound System (RRS), who already appear at 8 festivals across the UK, use pedal power to generate the electricity used to provide sound. Occasionally, RSS will allow the charge level to drop to engage the audience and provide them with the opportunity to reflect on where the energy is coming from[[21]](#endnote-21). Where Festival X can follow in the footsteps of other festivals, it also has the opportunity to lead the industry by introducing new technologies; Smart-flooring company Pavegen provides a clean technology, installing smart flooring tiles which have the ability to generate off-grid electricity. As festival goers walk and dance on the tiles, the weight results in the vertical displacement of electric-magnetic induction generators, causing a rotatory movement that subsequently generates electricity[[22]](#endnote-22). This kind of audience participation not only helps to meet the festivals green energy goals, but can also help to engage festival goers and create an awareness of fossil fuel alternatives.

**Scope 3**

**Transport to and from the festival for artist:** Extensive entourages and busy schedules mean that emissions from this source cannot be easily controlled. Instead a suitable carbon offsetting project should be utilised. More details on this can be found within section 7 of this report.

**Transport to and from the festival for attendee:** On average, audience travel is responsible for two-thirds of a festival’s emissions, with three quarters finding car travel as the easiest form of transport[[23]](#endnote-23). Whilst audience travel is impacted by a number of complex choices from local authorities, travel operators and the festival goers themselves, Festival X has the opportunity to offer travel incentives that could work to reduce emissions. Offering food and beverage vouchers for those who opt to car share could reduce the number of cars on the road, as could a partnership with local and national travel operators, where those purchasing tickets are entitled to discounted public transport. Although introducing such incentives won’t entirely eliminate emissions, engaging the audience around the environmental impacts of travel to and from the festival could help to create an awareness of low carbon travel in general. Other efforts could be made by encouraging travel partners to use vehicle supported by biodiesel or electricity. Despite introducing such incentives however, overall emissions from this source cannot be fully controlled, and a suitable carbon offsetting project should also be utilised.

**Waste from food and beverage vendors:** Festival X has already made positive strides to reduce waste; banning plastic and polystyrene cutlery and crockery supplied by food vendors; making compostable plates and cutlery made from wood and cardboard mandatory; ensuring all food waste is composted; asking all food vendors to supply sauces in bottles rather than individual sachets. There is currently no obligation placed on beverage vendors to use biodegradable plastic cups such as those made from corn starch. However, the festival has recently launched a sustainable stainless steel cup initiative, issuing a limited number to festival goers who were willing to pay a £5 deposit for the use of a reusable steel cup. Although the production of steel is carbon and energy intensive, this assessment has adopted an operational approach rather than a product footprint approach, and so the production of this product can be discounted. It is therefore recommended that Festival X increases the number of reusable steel cups in circulation, and supports the mandatory use of biodegradable plastic cups.

**Waste disposal of abandoned tents:** Whilst the waste from tents and camping equipment is largely unavoidable, Festival X is committed to minimising waste and efficiently managing on-site waste collection. This is supported by 15,000 recycling bins and a 1,200 strong recycling volunteer team. In 2014, the team collected 11.2 tonnes of clothing, tents and sleeping bags ready for recycling, diverting it from landfills. To bolster the festivals current efforts to reduce such waste, Festival X should consider engaging in Eco Action Partnership’s ongoing campaign ‘Love Your Tent’[[24]](#endnote-24), alongside other major UK festivals such as V Festival. This campaign aims to change the behaviour of festival goers and encourages the take home and re-use of tents and equipment. Small initiatives such as this could yield big results, and Festival X should unite with the numerous other UK festivals in order to develop a stronger voice.

**7. Carbon Offsetting**

For carbon emissions that cannot be eliminated or reduced, a valid carbon offsetting strategy will work as compensation. At Festival X, some carbon emissions, largely from transport, will need to be offset by certified projects. The carbon market works by allowing individuals and organisations to purchase carbon credits, produced by projects which work to reduce, prevent or capture greenhouse gasses[[25]](#endnote-25).

Despite festival organisers having already planted on-site fruit trees in an effort to offset emissions, this activity is currently not part of a defined strategy. A robust methodology, such as that produced by the Carbon Trust should be followed, defining specific requirements that Festival X wishes offsets to comply with, and then finding suitable providers that can meet these requirements[[26]](#endnote-26). The maximum contribution from carbon offsetting would be determined following a calculation of total carbon emissions from direct and indirect sources, minus the sum achieved via carbon reduction activities.

Possible offset projects vary from solar development schemes in Madagascar[[27]](#endnote-27), supported by My Climate, to something more local such as partnering with the Woodland Trust and investing in a UK forestry project[[28]](#endnote-28). Festival X could also offer those purchasing tickets to pay an additional fee which directly contributes to an offset project of their choice (from a predetermined list of projects) – this kind of consumer engagement would help to raise an awareness of environmental issues at point of purchase. Research suggests that 48% of festival goers would be willing to pay a higher price for a greener ticket[[29]](#endnote-29). The remaining cost of offsetting would then be absorbed by the festival.

Voluntary offsetting is often an integral part of an organisations carbon neutrality strategy, however, Festival X must be careful that such projects do not detract from emission reduction plans. Due diligence must also be applied when selecting a suitable project; Festival X must be careful to select a project where the carbon credits are accounted for and registered, to prevent double counting, and select a project that provides a guarantee for underperformance, as insurance.

It is therefore recommended that Festival X integrates a carbon offsetting project as part of its strategy to achieve carbon neutrality.

**8.** **Costs and Benefits**

**Costs:**

* Power from the grid will incur a significant cost. Green tariffs supported only by renewable sources could be more expensive when compared against non-renewable tariffs. However, the budget allocated to running diesel generators can be easily transferred to cover this.
* Although the initial costs associated with the implementation of low emission on-site vehicles will be significant, these vehicles could lead to overall cost savings over time. Government grants are also available to support a switch, and these should be investigated and considered[[30]](#endnote-30).
* The installation of renewable technologies would come at an initial cost, but would also be an investment to enable future savings. The cost of solar panels and their installation in the campsite zone would be significant, yet money saved by not using diesel generators would in part compensate for this.
* Offsetting those emissions that cannot be reduced or eliminated would come at a price. The cost per tonne can vary from project to project.
* Costs would also be incurred for the recruitment of a suitable carbon management consultant.

**Benefits:**

* Carbon Neutral status would enable Festival X to join the Carbon Neutral Network, strengthening the initiative which works to catalyse the response to climate change[[31]](#endnote-31).
* Acting now would be a way of Festival X meeting anticipated future legislation, in its own way, at its own pace.
* From a CSR perspective, Festival X would be demonstrating its commitment to mitigating against environmental damage and climate change.
* Being carbon neutral would be a way of Festival X differentiating itself from other festivals, strengthening its marketing strategy. Research shows 36% of festival goers said that green issues would influence their choice of festival[[32]](#endnote-32).
* Relying on more renewable energies would limit Festival X’s need to engage with fossil fuels, where the market is volatile and costs often fluctuate.
* Festival X has the opportunity to become a UK industry leader, and encourage other festivals to work towards a carbon neutral status.

**9. Summary**

Key actions include:

* Develop a partnership with a suitable carbon neutral consultant
* Assess carbon emissions across scopes 1, 2 and 3
* Implement recommended measures to reduce emissions
* Select an appropriate carbon offset project(s)
* Continue to monitor emission related activities, taking appropriate action if required

Achieving carbon neutral status will be a positive change for Festival X, bringing with it a number of benefits for the organisation, the local community and for the wider environment. Yet for real change, collective action throughout the industry is required. With this, Festival X has the opportunity to lead by example, and instigate a revolution of cleaner, greener festivals.

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