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The Infrastructure and Environmental Consequences of Live Music

Matt Brennan

A world where music does not have an environmental impact is a world without music. While there is an abundance of scholarly literature on the values and benefits of music, there is much less on its costs and consequences. The values and benefits of live music in particular are now well known. In an era of digitalization and online streaming, to which the recording industry has been famously maladapted, the economic buoyancy of the live music sector has been seen as a kind of savior. Indeed, live music first outperformed the recording industry in 2008 (in the UK) and by some estimates will achieve a total global revenue of over \$30 billion by 2022.¹ In addition to offering a substantial stream of income for many musicians and businesses, the strength of the live music industry has also contributed to the renewal of urban areas, led to increases in tourism, bolstered national economies, and enhanced the musical lives and communities of many people.

Yet the cultural value and commercial successes of live music come with many hidden costs and consequences. These can be economic, social, human—and, crucially, environmental. In fact, while the live experience is often held up as a special form of immediate connection (for both musicians and fans), especially at a time when music is increasingly experienced as ubiquitously mediated through digital channels, the media format of the concert is only possible via all the infrastructural relations that underpin it, including transport and travel as well as energy consumption in performance spaces and waste management at festivals. In attending to such factors, one organization estimates that the UK music industries emit at least 540,000 tons of carbon dioxide equivalents (also known as greenhouse gas equivalents) into the atmosphere each year. The live music sector accounts for the vast majority—roughly 75 percent—of those emissions.² There can therefore be no doubt about the material consequences and environmental costs of live music. Still, most of the systems of transport, travel, energy, and waste that contribute to this situation are taken for granted in the musical world.

One way of uncovering those costs is to focus on the infrastructures that make concert activities possible. By examining both infrastructures themselves as well as the infrastructural imaginaries (i.e. the “ways of thinking about what infrastructures are, where they are located, who controls them, and what they do”) that underpin the relationships that musicians, fans, and various stakeholders cultivate with live music, it becomes clear that there is no single solution to lowering the environmental toll of this sector. Rather, mitigating the consequences of concertgoing requires distributed and extended forms of awareness and response-ability.³

The focus in this chapter is on the UK live music industry. But the lessons have global import. Without wishing to glorify this industry (the transgressions of which are real), live music in the UK may be setting promising precedents that lead to infrastructural imaginaries which encourage individual and collective action, not only for other live music industries throughout the world, but for other musical realms such

¹ Sanchez (2018).

² Bottrill et al. (2008: 2).

³ The quote on and notion of infrastructural imaginaries comes from Parks (2015: 355). On response-ability, see Haraway (2016). On extended producer and consumer responsibility, see Lepawsky (2018).

as recording and consumer electronics. If we clearly need more efficient and sustainable musical infrastructures, a significant part of the equation involves developing critical infrastructural imaginaries.

Infrastructural Imaginaries and Live Music Ecologies

It has not been typical for the music industries (let alone fans) to focus on the un-glamorous and even downright ugly aspects of live music’s infrastructural conditions and environmental consequences. Whether in a rural field or an urban stadium, though, most concerts require high-specification performance spaces and equipment (in many cases such infrastructure is temporary and transported from site to site), not to mention the tremendous carbon cost of audiences traveling to and from an event.⁴ Rather than confronting such issues, industry reports and commentators are more concerned to portray the positive value of music, through metrics that represent its beneficial economic, social, and cultural contributions. Despite the ever-growing media attention to climate crises, the music industries in recent years have, if anything, only become more preoccupied with championing the financial benefits of music for the wider UK economy in relation to tourism as a growth area as well as general social cohesion and overall quality of life.

In describing the UK live music sector in 2016, for example, an executive at the multi-national concert-promotion corporation Live Nation extolled the virtues of this industry’s growth: “For the first time, the total spending generated by concerts, festivals and other live events hit almost £4 billion as music tourism shot up 11% on the previous year. Our live music industry is a success story and we’re right to shout about it.”⁵ Even a single summertime greenfield festival in Scotland, called T in the Park, is said to have contributed £40 million to the Scottish economy.⁶

UK Music, meanwhile, which is the key government lobbying organization for the UK music industries, publishes an annual report titled “Wish You Were Here: The Contribution of Live Music to the UK Economy.” The 2017 edition of this report boasted that “more people than ever are enjoying live events and that music tourism is responsible for a record contribution to our economy,” and that “live music is creating more jobs and revenue and attracting more tourists right across the UK.”⁷ Karen Bradley (the government’s Secretary of State for Culture, Media, and Sport at the time) welcomed the figures, noting that musicians “drew more than 30 million people to live music concerts and festivals in the UK last year ... Four out of ten people going to those events were music tourists ... Music and the creative industries are central to our post-Brexit future. Live events in the UK draw visitors from across the

⁴ My reference to the social and cultural value (in addition to the economic value) of live music aligns a wider body of research in UK arts and humanities which aims to assess the different forms of value of culture brings to society in a public policy context (political will for funding for the UK arts and cultural sectors is increasingly based on their perceived economic, social, and cultural benefits to society). According to the Arts and Humanities Research Council, “the term ‘cultural value’ includes all the societal benefits that arts and culture can bring including impact on the economy, on communities and cities, and impact on health and wellbeing” (AHRC 2018). Somewhat confusingly, the terms “cultural” and “social” value are sometimes used interchangeably in policy discourse.

⁵ UK Music, “Wish You Were Here: The Contribution of Live Music to the UK Economy,” (London: UK Music, 2017).

⁶ “T in the Park Festival ‘Worth £40m’ to Scots Economy,” BBC, <http://www.bbc.com/news/uk-scotland-scotland-business-17461056>.

⁷ UK Music, “Wish You Were Here: The Contribution of Live Music to the UK Economy,” (London: UK Music, 2017), p.3.

globe to spend their money here.”⁸ Julian Guerrero Orozco and Shain Shapiro, in a white paper on music tourism entitled “Music is the New Gastronomy,” see even more room for growth:

Music tourism—as a specific sector of the tourism sector—is emerging, but not wholly understood. Unlike gastronomy or cultural tourism, music tourism is less defined, less organised and as a result, less lucrative. We believe this should change ... We need to try to define what music tourism is, why it matters and outline case studies that demonstrate the value of music to the tourism sector, and how it can be monetised to increase visitor numbers, hotel stays and other indicators.⁹

The optimism of these and related discourses were well summarized in a statement that Shapiro made during a 2017 event designed to increase cooperation across various music subsectors in Leeds. “Music,” he said, “makes cities, towns and places better. Music makes cities wealthier. Music makes cities more vibrant. Music creates jobs and skills. Music promotes social inclusion. And music is everywhere.” Paul Latham of Live Nation registers something similar regarding the successes of the live music industry: “it’s not just about the jobs, the tourists and the tremendous shot in the arm that live events give the UK economy. It’s about the ability of live shows to unite and uplift people.”¹⁰

The ambitious plans and celebratory rhetoric found in the preceding examples are commonplace throughout the discourses of the music industries, and they rest on the assumption that music makes a necessarily positive contribution to society. But is this always the case, particularly from an environmental perspective? If we exercise an infrastructural imaginary and apply an ecocritical lens to the live music sector, we quickly realize that, like any other industry, this one is underpinned by material systems and practices that often go unnoticed. Such infrastructures have significant effects on both local and global environments—but not necessarily for the better. This is not a popular line of inquiry for those who advocate for music in the face of cuts to arts funding and education that routinely threaten access to musical opportunities, and when factors such as gentrification and property development threaten the existence of music venues and spaces for cultural performance. Against this backdrop, research into the environmental effects of live music’s infrastructures can be at best unwelcome—and at worst met with open hostility. Such issues can become especially acute in contexts where music events are marketed as sites where alternative ideas of utopian communities are performed. From the 1960s onward, for instance, music festivals became represented not just as events where fans gathered together through their shared musical tastes, but also through a shared political ideology aligned in theory (though not always in practice) with hippie counterculture, escaping routines of mundane life, experimenting with alternative ways of living, and “getting back to nature.”

There are exceptions, of course. On this front, Radiohead’s carbon audits for their 2003 and 2006 North American tours offered a critical perspective on live music that presaged similar research elsewhere in the creative industries. Furthermore, in

⁸ Ibid, p.8.

⁹ Guerrero Orozco, Julian, and Shapiro, Shain. 2018. White paper on Music and Tourism. Colombia: Sound Diplomacy and ProColumbia.

¹⁰ UK Music, “Wish You Were Here: The Contribution of Live Music to the UK Economy,” (London: UK Music, 2017).

recent years researchers have drawn attention to the sustainability of music production and consumption from a range of disciplinary perspectives. The work of Meaghan Jones in sustainable event management, and of Judith Mair and Jennifer Laing in sustainable tourism, propose applied models for good practice that encouraged the environmental sustainability of live music events.¹¹ Meanwhile, Joanne Cummings has provided a useful overview of existing research literature in the greening of music festivals.¹² Mark Pedelty offers a more polemical critique of the gaps between the rhetoric of environmental justice espoused by stadium rock bands such as U2 and events such as Live Earth, on the one hand, and the environmental effects of these concerts in practice, on the other.¹³ This literature forms part of a broader environmental turn across different spheres of music scholarship such as ecomusicology, applied ethnomusicology, and popular music studies.¹⁴

My own research on the live music sector has been largely collaborative and organized under the umbrella of the Live Music Exchange, a research and knowledge-exchange hub led by myself, Adam Behr, Martin Cloonan, Simon Frith, and Emma Webster.¹⁵ In recent years, we have used the concept of a “live music ecology” to make sense of the live music sector, subsequently noticing that “ecology” has also become a commonplace term in music policy documents, replacing previous correlative notions such as creative industry “quarters” and “clusters.”¹⁶ However, our goal is not merely to replace one buzzword with another. The ecological approach to live music proposed here places an analytical emphasis on three factors:

- (1) the *materiality* of the buildings in which live music happens and its surrounding infrastructures;
- (2) the *interdependence* between the actors and infrastructural materials who operate by intention within a music scene as well as those that operate outside of given music scenes (e.g. regulators and licensing boards) but which nevertheless have a significant impact on live music;
- (3) the *sustainability* of live music culture, where all the factors above contribute to the character and meet the needs of those living in a given

¹¹ Meaghan Jones, *Sustainable Event Management* (London: Routledge, 2014); Judith Mair and Jennifer Laing, "The Greening of Music Festivals: Motivations, Barriers and Outcomes. Applying the Mair and Jago Model," *Journal of Sustainable Tourism* 20, no. 5 (2012).

¹² Joanne Cummings, "The Greening of the Music Festival Scene : An Exploration of Sustainable Practices and Their Influence on Youth Culture," in *The Festivalization of Culture*, ed. Andy Bennett, Jodie Taylor, and Ian Woodward (London: Routledge, 2014).

¹³ Mark Pedelty, *Ecomusicology: Rock, Folk, and the Environment* (Philadelphia: Temple University Press, 2012).

¹⁴ See, for example, Aaron S. Allen and Kevin Dawe, eds., *Current Directions in Ecomusicology* (London: Routledge, 2016); Jeff Todd Titon, "Sustainability, Resilience and Adaptive Management for Applied Ethnomusicology," in *The Oxford Handbook of Applied Ethnomusicology*, ed. Svanibor Pettan and Jeff Todd Titon (Oxford: Oxford University Press, 2015).

¹⁵ For outputs stemming from the Live Music Exchange network, see for example Simon Frith et al., *The History of Live Music in Britain 1950-1967: From Dance Hall to the 100 Club* (Farnham: Ashgate, 2013).

¹⁶ Adam Behr et al., "Live Concert Performance: An Ecological Approach," *Rock Music Studies* 3, no. 1 (2016); John Holden, "The Ecology of Culture: A Report Commissioned by the Arts and Humanities Research Council's Cultural Value Project," (Swindon: Arts and Humanities Research Council, 2015); Adam Behr, Matt Brennan, and Martin Cloonan, "Cultural Value and Cultural Policy: Some Evidence from the World of Live Music," *International Journal of Cultural Policy* (2014).

musical ecosystem—ideally without, as the World Commission on Environment and Development once put it, “compromising the ability of future generations to meet their own needs.”¹⁷

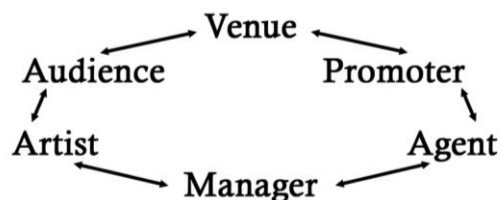


Figure 1. Simple live music ecology

A simple diagram can help illustrate the ecology of key actors in the live music sector (see figure 1).¹⁸ The most obvious actors in the ecology are the *artist* and the *audience*, who come together in the *venue* to share a live musical experience. However, there are other actors behind the scenes. First, the artist’s *manager* takes care of business-to-business negotiations on the artist’s behalf and liaises with the agent, promoter, and venue. The *agent* has expert knowledge of appropriate promoters within a particular geographical territory and books tour dates for the artist while securing the best fee that they can (with guidance from the artist and their manager), earning a percentage of the fee in the process. The *promoter* is traditionally the local expert who is in charge of booking the venue, producing and managing the logistics of a concert, and bearing the financial risk (offering an artist a guarantee against ticket sales).

However, in reality the actors involved in creating a live music event are much more complex. If one thinks of a concert in terms of its infrastructural dependencies and environmental consequences, then each actor’s network stretches outwards. For example, the audience decides how far they will travel to see their favorite artist in concert and what mode of transport they will use to get to the event—decisions that ultimately account for the majority of that event’s carbon footprint. If the audience is camping at a festival or staying overnight in a city, their consumption choices, particularly accommodation and subsistence, create additional effects. The venue for a live music event is also an important factor, particularly whether it is a permanent or temporary space of live music. In the former case, the venue will likely have access to electricity from a power grid. But in the latter case, it may have to install onsite infrastructures such as electricity as well as water and sewage. The venue’s proximity to public transport and local residents, as well as its agreements with local authorities and councils on its environmental responsibilities and protocol, will also be important

¹⁷ World Commission on Environment and Development (1987). Note that my approach to live music ecology stands in contrast to that of Huib Schippers and the Sustainable Futures for Music Cultures Project funded by the Australian Research Council. Schippers does not place a similar emphasis on materiality, interdependence, and sustainability in his theorization of musical ecosystems. He also uses the term “sustainability” in a different sense, focusing on the sustainability of musical cultures as intangible cultural heritage rather than any concerns relating directly to environmental sustainability. See Huib Schippers, “Applied Ethnomusicology and Intangible Cultural Heritage: Understanding “Ecosystems of Music” as a Tool for Sustainability,” in *Oxford Handbook of Applied Ethnomusicology*, ed. Svanibor Pettan and Jeff Todd Titon (Oxford: Oxford University Press, 2015).

¹⁸ This diagram was originally developed in Matt Brennan and Emma Webster, “Why Concert Promoters Matter,” *Scottish Music Review* 2, no. 1 (2010).

factors. The promoter will liaise with the venue (or in the case of a temporary site, facilitate the installation and demolition of the venue) and work with production suppliers to provide staging, lighting and sound equipment, and so on. In the case of greenfield sites for music, infrastructures such as tents, toilets, trackway, food, waste management, and generators will also have to be procured, each with a range of possible environmental effects that depend on the promoter’s choices in sourcing suppliers. Meanwhile, the artist, manager, and agent will agree touring itineraries, where most often planning a route to mitigate environmental impact will lose out to other priorities such as securing the best fee for each performance. This situation is not helped by the fact that artists are generally able to command higher fees through “exclusivity agreements” in their contract, which state they will not perform within an agreed geographical distance of the concert in question for a specified calendar period (see figure 2). For all of these reasons, the live music industry has clear environmental effects.

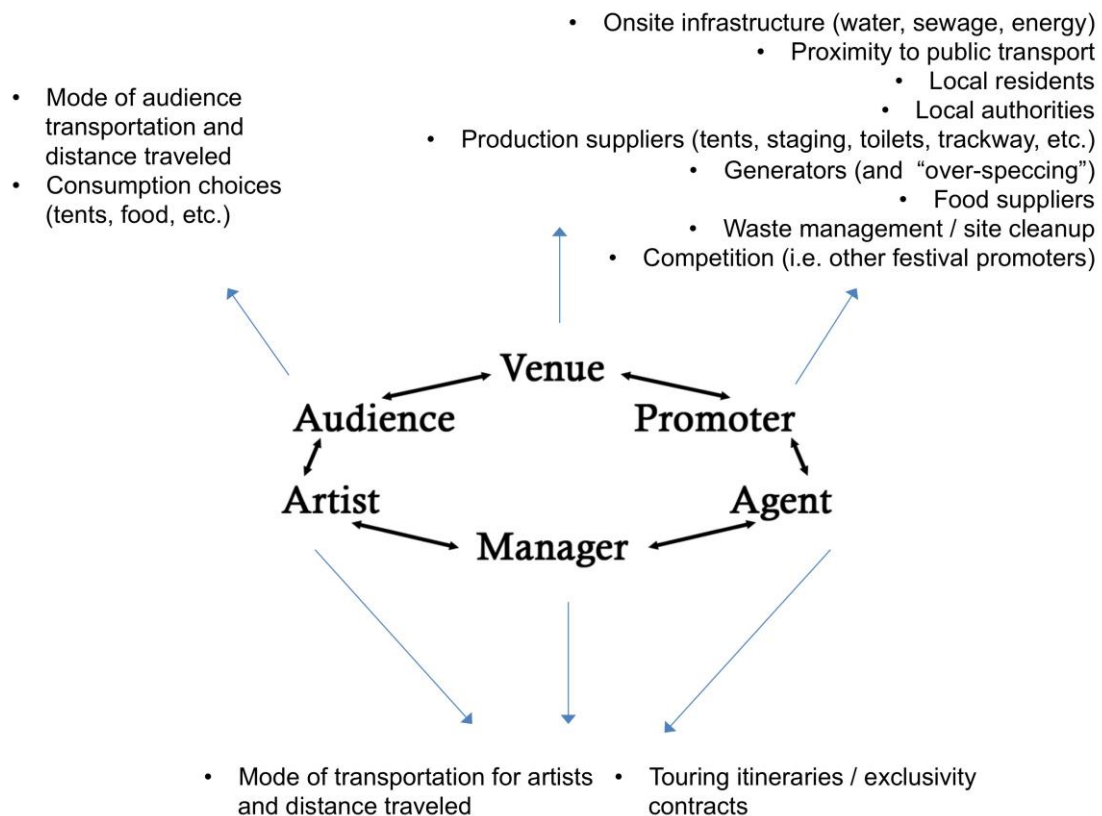


Figure 2. Extended live music ecology

The most important response of the UK music industries to the challenge of environmental sustainability has been to support the research of organizations devoted to developing strategies to reduce the environmental impact of music production and consumption in both live and recorded contexts. One of the earliest reports to assess the environmental impact of the music industries was published by Julie’s Bicycle in 2007, which was then a newly founded charity that went on to become the UK cultural sector’s leading environmental consultancy, steadily expanding both its remit (from music to the creative industries as a whole) and its geographical scope (applying methods developed in the UK to other countries). Indeed, the organization

has become one of the leading global charities attempting to bridge the gap between environmental sustainability and the creative industries.

Based in London, Julie’s Bicycle employs eleven staff members and manages a large network of external collaborative partnerships with funding bodies, the private sector, and higher education institutions. The aim of Julie’s Bicycle is to effect policy changes through engagement between industry and the state, as well as conducting “data collection and research, workshops and training events, quality assurance, capacity building, and thought leadership.”¹⁹ Crucially, the organization has developed tools for calculating the carbon impact of outdoor, greenfield, and venue events—known as Industry Green or IG tools. Since their launch, IG tools have been adopted by over 2000 users in thirty countries worldwide, and have resulted in the foundation of benchmarks and averages for the creative industries. This has allowed Julie’s Bicycle to establish a certification scheme and an external assessment consultancy for sustainable events.

Julie’s Bicycle also produced several free practical guides for event organizers on topics including audience travel, communicating sustainability, and waste and water management at outdoor events. Since music festivals account for the majority of carbon emissions within the music industries, Julie’s Bicycle has a dedicated and ongoing project to engage the music festival community. This project, called Powerful Thinking, is focused on energy consumption at outdoor events and describes itself as “think-do tank which brings together festivals, suppliers and environmental organisations.” According to Powerful Thinking, the UK festival industry’s total known onsite carbon emissions amount to nearly 20,000 tons per year.²⁰ Yet onsite emissions account for only 20 percent of a music festival’s carbon footprint. If audience travel is taken into consideration, the annual figure increases to just under 100,000 tons.²¹ It is worth reiterating that this figure refers exclusively the UK, and that it does not include impacts from equipment transport and crew and artist travel, which are significant contributing factors.²² Indeed, Powerful Thinking’s activities have included mapping energy use and generator efficiency at festivals as well as a report called “The Show Must Go On,” which made a public call for festivals to commit to matching the UK government’s Climate Change Act goal of reducing carbon emissions by 80 percent across all industries.

Outside the UK, there are a number of similar organizations in Europe that focus on live events and environmental sustainability. These include the Green Music Initiative (Germany), Le Collectif des festivals (France), Green Events (Netherlands), Greener Events (Norway), and Energy Efficient Music Culture (with nine partners in twenty-one countries). This is a quickly growing subsector within the events industry.

¹⁹ Julie’s Bicycle presentation slides for Fields of Green roundtable workshop, 16 October 2015.

²⁰ Chris Johnson, “The Show Must Go On: Environmental Impact Report and Vision for the UK Festival Industry” (London: Powerful Thinking / Julie’s Bicycle, 2015).

²¹ It is worth noting the significant disparity between the estimates of 2007 Julie’s Bicycle report (which suggested that the UK music industry was responsible for 540,000 tonnes of GHG emissions per annum, with live music accounting for approximately 75% or roughly 400,000 tones) and the 2015 Powerful Thinking report (which suggested that the UK music festival sector was responsible for just under 100,000 tonnes). The methodologies of each report are not detailed enough to make a meaningful comparative analysis, and overall serve to illustrate just how difficult it is to accurately quantify emissions for such a complex sector.

²² Similar issues of course define musical and artistic festivals such as Coachella and Burning Man, which take place in more and less temporary cities in the deserts of the United States. This is not even to mention the explosion of the music festival circuit worldwide and across all genres.

For example, the ADE Green conference, which is held as part of the annual Amsterdam Dance Event conference and which represents the largest gathering of professionals working on events and environmental sustainability, saw its attendance grow tenfold in three years—from fifty delegates in 2012 to over 500 delegates in 2015. Attendance has been stable ever since.

If the foregoing measures represent some of the infrastructural imaginaries and environmental consequences of live music at a general level, in terms of both the academic literature and industry initiatives, it is useful to examine two specific case studies that illustrate how the relationship between live music and the environment plays out in concrete terms. First, I will discuss the sustainability initiatives of Glastonbury Festival—the largest music festival in the UK. Second, I will discuss the findings of a collaborative academic research project, the UK Live Music Census, which analyzed the economic, social, and cultural value of live music in urban settings, focusing on cities in the UK. These examples highlight that, whereas seasonal festivals and their temporary cities instance a relatively high degree of awareness regarding issues of infrastructure and environment, live music stakeholders in the context of established urban music settings are less concerned with the environmental consequences of sustaining local music scenes—even though the more permanent character of their infrastructures may seem like more consequential avenues for environmental intervention.

Glastonbury Festival

Glastonbury is the largest music festival in the UK, with an annual turnover of £35 million and 177,500 people assembling each year on its all-camping, greenfield site at Worthy Farm in Somerset.²³ Glastonbury’s environmental impact is significant. But so too are its ambitions towards minimizing that impact. According to Ben Challis, a music industry lawyer who acts as General Counsel for the festival (and who is also a founding director of Julie’s Bicycle), the motto of the festival is “Love the farm. Leave no trace.” Festival organizers have enacted a broad range of sustainability initiatives. These include onsite composting, onsite recycling, pollution awareness campaigns, onsite water reservoirs, nearby sewage treatment, the promotion of public transport, solar panel arrays to generate onsite power, and bio-tractors running on biodiesel that is made from recycled vegetable oil. Challis freely admits that the last of these “makes very little difference but grabs headlines.” Such efforts illustrate that, in addition to reducing its environmental footprint, a secondary aim for the festival is to exploit its high profile in the media to raise awareness about the environmental impact of human activities, including producing and attending Glastonbury itself.

According to its staff, green initiatives and sustainability are embedded in the culture and history of Glastonbury Festival, and this ethos extends from the festival management to participants and audience. However, there are also immense practical challenges for a festival of Glastonbury’s size. The festival site is enormous: nearly five kilometers wide and one-and-a-half kilometers deep, surrounded by an eight-kilometer perimeter fence. The temporary tented population of the festival is the size of a mid-sized city. Furthermore, the site is remote—far away from key infrastructures such as water, sewage, power, and public transportation (especially bus

²³ The following account is based on a presentation delivered by Ben Challis to the Fields Of Green research team on 16 October 2015. The festival is actually set to move away from Worthy Farm for the first time in its history in 2019. See also <http://www.glastonburyfestivals.co.uk/information/green-glastonbury>

and rail services). And the festival site is a working organic dairy farm during the rest of the year. Given the scale and complexity associated with transforming a farm field into a temporary city with modern infrastructural amenities, it is unsurprising that Glastonbury’s sustainability strategies are a combination of both a top-down overview strategy and decentralized, semi-autonomous initiatives organized by each festival area and stage.

Onsite energy generation is a key contributor to the carbon emissions of any festival, and the most attention-grabbing solution that Glastonbury has developed is the Orion Solar Generator, a purpose-built box trailer containing batteries, solar panels, solar charge controller and power inverter—everything needed to take power from the sun and give it to the stage. The Orion Generator is used by the Theatre and Circus Fields as well as the Shangri-La stage in combination with modern sound amplification and lighting technologies that require substantially less energy to run than older, less efficient (but still widely used) equipment. When installed in 2010, Orion was the largest private solar electricity-generating system in the UK, producing enough electricity to meet the annual demand of forty average homes.²⁴ The system, installed on the roof of Worthy Farm’s cowshed, contains more than 1100 solar photovoltaic modules. The power can be used either in Worthy Farm’s buildings or, when there is more supply than demand, exported to the grid. With the benefit of the UK government’s “feed-in tariff” scheme to encourage renewable energy uptake, the payback time for the system is expected to be about nine years, and the system is designed to keep operating for at least twenty years. The festival has also used more traditional approaches to reducing its power use. These include: coordinating with the festival’s temporary power and event infrastructure suppliers to make efficiencies where possible (leading to an 8 percent reduction); promoting power sharing, reducing bunker bin orders, and analyzing festival infrastructure (1 percent reduction); increasing the number of onsite renewables (2 percent reduction); and implementing a “Switch Off” public-relations campaign for attendees to encourage energy-saving behavior.

With audience travel accounting for 80 percent of the festival’s carbon emissions, public transport is another substantial issue for the festival. The festival’s current location on Worthy Farm is ill placed in this regard, with only limited access to rail services. There is only one small train station, which is not very close to the site, and networked services have long been at capacity for the festival. Bus travel is therefore prioritized and a dedicated allocation of 30,000 tickets is provided for those traveling by bus (you have to get on the bus to get your ticket). Bus is also deliberately the easiest way to get onsite. Audience members who arrive by bus are dropped very close to the main entrance, with car parking lots located further away. The year 2011 was the first time that car numbers dropped—the year after the bus drop-off was moved to the main gate. (Car numbers have continued to drop marginally in subsequent years.) Bicycling to the site is also promoted by Glastonbury. Ticket holders who arrive at the Festival by public transport or bicycle are given a Green Traveller lanyard, which provides vouchers for discounts on meals, solar showers, solely provided for Green Travellers, as well as access to clean compost toilets (a coveted amenity for attendees). However, knowing that many attendees still prefer to travel by car, the festival uses public service announcements to encourage motorists to carpool and ride-share, and festivalgoers arriving by car are

²⁴ (Guardian, Steven Morris 2010).

also encouraged to check that their tires are inflated to the right pressure to allow the car to run efficiently and burn less fuel.

From a carbon emissions perspective, it is onsite energy use as well as audience and artist travel that create a far greater environmental impact than waste production at a festival. However, since Glastonbury’s waste production is far more visible (not least because it is easier to photograph, film, and document in the media) it tends to capture more attention. To this end, the festival works closely with its traders in order to reduce onsite waste. All food waste produced by onsite traders is composted. All onsite coffee, tea, sugar, and chocolate is fair trade, and all cutlery reusable or is compostable. The festival also works with the food salvage company Eighth Plate to redistribute excess food. Glastonbury organizers encourage traders to minimize packaging, to use biodegradable cups, plates, and cutlery, to use LED lighting and solar panels, to know where their stock comes from, and to use local, low-impact, ethical, and fair trade sourcing wherever possible. Glastonbury also initiated a successful Green Traders awards scheme that promotes fair trade, organic, and free-range products. The winners of this award are well publicized at the festival, and Gold winners in both the food and non-food categories are given a free stall for the following year. The award is therefore keenly pursued by traders.

Influencing audience behavior is even more important—but also more challenging. In its publicity material, Glastonbury discourages audiences from leaving tents and other camping gear behind and from bringing environmentally damaging items such as sky lanterns. For sewage waste, the festival uses solar showers and composting toilets, and has invested money in local sewage plants to reduce the distance sewage waste from the festival has to travel to be treated. Urine is another challenge. Peeing into ditches, streams, and hedges may be an accepted part of festival behavior (particularly among male attendees) but it causes problems. In 2000, high levels of ammonia were recorded in rivers downstream from the festival, and the festival was fined £10,000 in 2003 after sewage leaked into the local River Whitelake. Rubbish is yet another issue. Here the festival coordinates 40,000 color-coded bins for recycled and other trash. In addition to this, as audience members enter the site stewards hand festivalgoers a black bag (for non-recyclable waste) and a green bag (for recyclable items) to fill up with their own waste and help in with ongoing clean-up efforts. Left-behind tents (and tent pegs, which can harm the livestock on the farm) remain major challenges. For this and other issues each year, Glastonbury recruits a colorfully costumed and volunteer “Green Police” force to remind festivalgoers to behave responsibly towards the environment.

Despite all these initiatives and good-practice guides, the environmental impact from travel, energy, and waste caused by the festival is still significant, and there are various “Glastonbury aftermath” films online, showing what the festival site looks like after it ends. In the past, the festival producers have actually authorized broadcasters such as the BBC to make these films in order to raise audience awareness about environmental sustainability issues.

The UK Live Music Census

The UK Live Music Census was a collaborative project that ran between 2016 and 2018, the goal of which was to measure the economic, social, and cultural value of live music. It also included a component that investigated infrastructural dimensions of the live music sector. The aims of the census were twofold: to assess the cultural, social, and economic state of live music in cities across the UK; and to address a gap

in the existing knowledge base by developing an agreed methodology with which to conduct live music censuses. To achieve the second objective, our research team conducted a series of focus groups with key stakeholders across the music industries to ensure that our survey design addressed would produce data that was both relevant and credible across the sector. One of the invited participants was a representative from Julie’s Bicycle, who advised us on the most essential questions regarding the relationship between live music, cities, and environmental sustainability. The result of the discussion was to collect data on travel behavior. Full details on the research findings of the census can be found in the project’s final report.²⁵ What follows is a summary of that report, with a focus on the findings concerning infrastructure and environmental impact.

The census, which surveyed over 4400 people throughout the UK across four categories—audiences, musicians, venue staff, concert promoters—took place in the spring of 2017. We examined the role of live music and live music venues as a catalyst for travel: live music has to happen at a particular time and in a particular place and so can be a driver of “music tourism.”²⁶ As one respondent put it, “the main reason I usually visit other cities and towns is for gigs. Gig trips in the UK and abroad are a great way to get to know other cities and see a side to them others don’t.” To better understand live music’s role in motivating travel, the census asked audiences and musicians about the distances traveled to attend and perform. The median distance traveled by audience respondents for the last event that they attended prior to the census was about thirty kilometers roundtrip (fifty-two percent traveled thirty kilometers or more).

In terms of travel to rehearsals and performances by musicians, the median distance traveled each month to perform live music by musician respondents who self-identified as professional is close to 500 kilometers; for semi-professionals the distance traveled was over ten kilometers, and by amateurs it was over thirty kilometers. Working musicians (mid-career) travel the furthest per month at more than 250 kilometers compared to emerging musicians who, at about 60 kilometers per month, travel the least. However, many respondents to the musician survey pointed out the difficulty of providing an estimate of average distance traveled per month, due to variability in the locations of their engagements and the additional factor of whether rehearsals should be counted within the monthly total. The census data therefore supports research conducted by organizations such as UK Music, which suggest that live music is a significant catalyst for travel, and this movement of people can have both economic and cultural benefits for a more detailed discussion of perceived benefits, see the full report for the census findings in the bibliography). However, the corresponding carbon emissions impact is less frequently discussed. Forty percent of all musician respondents, for instance, cited insufficient late-night public transportation as having had an extreme, strong, or moderate impact on their live music events in the past year. Given their frequent need to transport musical equipment, it is unsurprising that 81 percent of all respondents to the musician survey use a car or van as the main form of transport to travel to live music events at which they are performing. Audiences respondents also tended to travel to live music events

²⁵ Emma Webster et al., “Valuing Live Music: The UK Live Music Census 2017 Report,” (Edinburgh: University of Edinburgh, 2018).

²⁶ Cf UK Music’s *Wish You Were Here* reports which demonstrate the economic value of ‘music tourism’ (UK Music 2017b).

by car or van (69 percent), with the second and third most popular transport options being train (53 percent) and walking (33 percent).

We also asked venue staff respondents to disclose whether their place of work had any environmental sustainability initiatives in place. Here there is much room for improvement, with 61 percent of venues in the survey lacking an up-to-date environmental policy. Meanwhile, while a majority of concert promoters saw environmental sustainability as being extremely, very, or somewhat relevant, over one-third of respondents to the promoter survey believe that environmental sustainability is not at all or not very relevant to their organization.

According to the evidence collected in the 2017 UK Live Music Census, environmental sustainability is rarely a top priority for city-based venues, promoters, audiences, or musicians. Although examples of good practice in this sector do exist, and are emerging, critical infrastructural imaginaries are nevertheless relatively underdeveloped in comparison to the initiatives of the seasonal festival circuit. Our concluding report from the census made a formal recommendation that promoters incorporate no-cost and low-cost initiatives towards environmental sustainability, and for researchers and industry to work together to identify and promote best practice in this area.²⁷

Conclusion

To focus on the infrastructures and infrastructural imaginaries of live music is inevitably to raise questions about strategies geared toward reducing its environmental impact. Unfortunately, there are no easy solutions to greening live music. As a participant at a roundtable workshop put it, “the most sustainable festival is the one that doesn’t take place.”²⁸ The same applies to live music in urban settings—indeed to live music events of any kind. So what can be done, and by who? The second part of this question is important. Audiences clearly have a role to play. But they may view environmental issues primarily as the responsibility of the concert or festival promoter. Musicians also shoulder some of the responsibility through their touring practices as well as their travel and equipment shipping choices. But musicians may also absolve themselves of responsibility by thinking of themselves as itinerants—touring entertainers who are not obliged to think about local issues.²⁹ Governments at local, regional, and national levels also have responsibilities as they negotiate the regulations that the live music industry must abide by in order to organize events. But governments may equally shift these responsibilities back onto festival and concert organizers, musicians, or audiences. Ultimately, the problems of live music are distributed among both producers and consumers. The same can be said about any potential responses to those problems.

It is worthwhile to end by comparing the live music industry with the recorded music industry and its associated consumer electronics sector. For it is here where we may initiate a mutually beneficial dialogue regarding the infrastructural imaginaries and environmental sustainability of music writ large.

Audience travel is the most significant factor in the environmental consequences of live music. Onsite greenhouse gas equivalents matter too, but less so.

²⁷ Webster, Emma, Matt Brennan, Adam Behr, Martin Cloonan, and Jake Ansell. "Valuing Live Music: The UK Live Music Census 2017 Report." Edinburgh: University of Edinburgh, 2018.

²⁸ Fields of Green roundtable workshop, 16 October 2015.

²⁹ By contrast, some artists are beginning to take a leading role in minimizing the environmental impact of their concerts. See for instance Jack Johnson’s “All At Once” “Jack Johnson All at Once 2014 Impact Results,” (Reverb, 2014).

Yet it is concert organizers and music organizations that have taken on and advocated for extended producer responsibility with regard to mitigating the effects of live music. With regard to the consumer electronics needed to play recordings, by contrast, the purchasing, usage, and disposal practices of consumers are the *least* significant factors in the environmental effects of recorded music. The real issues lie further up the supply chain—long before electronics such as listening devices ever reach the hands of consumers—with as much as 90 percent of the greenhouse gases associated with the life cycle of certain devices being generated through resource extraction and product assembly.³⁰ Yet device manufacturers obscure the environmental realities of their infrastructures, and they do very little to change the widespread misconception that extended consumer responsibility is an effective way of reducing the environmental consequences of electronic waste. This inverse relationship between consumer and producer contributions to greenhouse gas equivalents in the live and recorded industries is remarkable.³¹

Responsibility may be practiced on an individual level: properly disposing of unwanted recordings and devices, taking the bus to a concert or rehearsal, having a solar-powered shower, peeing in a compost toilet, or helping to clean up after a festival. In Donna Haraway’s work, though, the issue is less individual responsibility than collective response-ability. It is less about a liberal duty to govern oneself and one’s choices than it is “open[ing] passages for a praxis of care and response . . . on a wounded terra.”³² It seems that the live and recorded music industries could learn something from one another when it comes to the distribution and extension of both consumer and producer response-abilities. The live music industry clearly needs to find ways of influencing audience travel behavior, while the recorded music industry clearly needs to find ways of lobbying gadget manufacturers to disclose and improve their practices.

One significant step along this passage toward fostering change in cultural attitudes toward extending accountability over the environmental impact of music—both live and recorded—is to build not just better infrastructures but critical infrastructural imaginaries that focus our attention on and enhance our potential to respond to these realities. Such imaginaries will consider not only the cultural and commercial benefits of live music, but also to the hidden environmental costs that underpin music as an industry and cultural practice. It is encouraging that various festivals and organizations have taken this response-ability upon themselves. Indeed, the kind of collective effort on display in the live music sector could be used as a model for music’s recording and consumer electronics industries. The next step, of course, is to further develop infrastructural imaginaries that encourage communities of practice in which music lovers of all kinds may open materially consequential pathways toward environmental sustainability.

³⁰ See Lepawksy (2018: 130, 143, 144), from whom I am also adopting the notions of extended producer and consumer responsibility.

³¹ Of course, the devices of the contemporary consumer electronics industries are not exclusively music devices. This means that music’s contribution to the pollution of this sector is actually far lower than 10 percent. But music’s contribution cannot be ignored, especially given the symbolically important role of music in marketing these devices as well as the ways that such devices function as the primary music machines of many listeners.

³² Haraway (2016: 105).

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