



Department of Economics and Finance
Chair of Sustainable Development, Energy and Climate

THE ENVIRONMENTAL IMPACT OF THE MUSIC INDUSTRY

SUPERVISOR
Prof. Aldo Ravazzi Douvan

CANDIDATE
Elisa Sartori

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Introduction

The music industry stands as a colossal force, both economically and culturally. As an industry, it generates a GVA¹ larger than 170 billion \$ in the US and 81.9 billion € in Europe and the UK, increasing every year². The cultural impact of music transcends quantification, as it has historically spearheaded paradigm shifts with profound societal implications³.

Everything comes at a cost, though. Music is not only a powerful influence on culture and society; it is also a significant source of environmental impact. According to a study by the University of Glasgow, the music industry produces approximately 540,000 tons of greenhouse gas emissions annually, equivalent to the annual emissions of 60,000 households⁴. For instance, The New Statesman estimates that Olivia Rodrigo's breakout song, "Driver's License" had so many Spotify streams since January 2021 that it produced a greater impact than flying from London to New York and back 4,000 times⁵. Moreover, the environmental impact extends beyond carbon emissions, including waste production, water-intensive operations, and potential damage to fragile ecosystems where live events are staged.

Nevertheless, a world where music does not have an environmental impact is a world without music⁶. To avert this dire outcome, the industry is recognizing the importance of the ESG principles⁷ and making strides towards a greener future, pledging to reduce greenhouse gas emissions to net zero by 2050 and achieve a 50 percent reduction by 2030.

Therefore, the thesis focuses on two of the most important components of the music industries, recorded music and live music, and considers their current state from the perspective of environmental sustainability. Through a blend of quantitative data and qualitative case studies, it seeks to offer

¹ Gross Value Added (GVA) is the measure of the value of goods and services produced in an area, industry, or sector, minus the cost of inputs and raw materials used to produce them.

² Stoner, R. and Dutra, J. (2020). The U.S. Music Industries: Jobs & Benefits - Executive Summary. RIAA. Available at: <https://www.riaa.com/reports/the-u-s-music-industries-jobs-benefits-economists-incorporated> [Accessed: 12 March 2024].

³ European Commission. (2021). Creative Europe 2021-2027 programme brings €2.44 billion to support the cultural and creative sectors. Available at: <https://culture.ec.europa.eu/news/creative-europe-2021-2027-programme-launch> [Accessed: 12 Mar. 2024].

⁴ Energy5 (2023) The Carbon Footprint of the Music Industry: Challenges and Solutions. Energy5. Available at: <https://energy5.com/the-carbon-footprint-of-the-music-industry-challenges-and-solutions> [Accessed: 12 March 2024].

⁵ Osmanski, S. (2023). Is Streaming Bad for the Planet? A Deeper Look Into Netflix, Spotify, and More. Brightly. Available at: <https://brightly.eco/blog/environmental-impact-streaming> [Accessed: 12 March 2024].

⁶ Brennan, M., 2020. The Environmental Sustainability of the Music Industries. In: *Cultural Industries and the Environmental Crisis: New Approaches for Policy*, chapter 4.1. DOI: 10.1007/978-3-030-49384-4_4. Available at: <https://www.researchgate.net/publication/344356742>(<https://www.researchgate.net/publication/344356742>

⁷ ESG stands for Environmental, Social, and Governance, encompassing criteria used to evaluate a company's ethical impact and sustainable practices.

insights into how the music industry can navigate its challenges to promote environmental sustainability while continuing to thrive economically and enrich the global cultural fabric.

1. The Music Industry's Impact on Economy and Society

1.1 Economic contribution of music in Europe

Gross value added. In a recent study, Oxford Economics⁸ estimates that the music sector supported a 81.9 billion € gross value-added contribution to GDP in the EU27 and UK in 2018. To give an indication of scale, this is larger than the GDP of 9 out of the 27 EU countries (Luxembourg, Bulgaria, Croatia, Slovenia, Lithuania, Latvia, Estonia, Cyprus, Malta) in the same year. Furthermore, the aforementioned study shows that the direct impact of the sector is 41% of the total, 37.5 billion €. To put this into perspective, this figure is 1.5 times greater than the combined GDP contribution of the wine and beer manufacturing sectors in both the EU27 and the UK in 2018.

GDP multiplier. The music sector's expenditure on inputs of goods and services from the rest of the economy stimulated a 22.8 billion € contribution to GDP at firms in the sector's European supply chain. This indirect impact was 28% of the total impact. Out of the total economic impact, 26% (21.6 billion €) was generated through wages paid by the music industry and its supply chain, known as the induced impact. This includes spending by employees on everyday items like food and clothing, which supports further economic activity along these products' supply chains. The GDP multiplier is a measure used to determine how much a sector boosts broader economic activity. A high GDP multiplier suggests a sector heavily relies on external procurement (e.g., buying raw materials), whereas a low multiplier indicates a largely self-sufficient sector, conducting most of its procurement internally. The music industry, with its high degree of self-sufficiency in procurement, typically shows a higher direct and lower indirect economic impact, resulting in a lower multiplier. This report found the music sector's GDP multiplier to be 2.2, indicating that for every €1 generated by the music industry in the EU27 and UK, an additional 1.20 € is stimulated in the wider economy. This reflects the sector's tendency to reinvest in itself (for example, record companies investing in artists) rather than spending extensively with external suppliers. Consequently, much of the music sector's economic contribution is considered direct Gross Value Added (GVA), rather than being attributed to indirect or induced impacts.

Jobs. In 2018, Oxford Economics estimated that the music sector played a significant role in the employment landscape of the EU27 countries and the UK, supporting jobs for approximately 2.0 million individuals. This means that the livelihood of one out of every 119 people living in these

⁸ Oxford Economics. (2020). The economic impact of music in Europe. Available at: <https://www.oxfordeconomics.com/resource/the-economic-impact-of-music-in-europe/> [Accessed: 06 May 2024].

countries is linked to the music industry. Specifically, within the EU27, the sector was responsible for the employment of around 1.7 million people, translating to one in every 121 people working within these countries being employed thanks to the music industry. It is important to note that the aggregate figures for total employment across the EU27 and UK are not simply the sum of individual estimates for each region. However, direct employment numbers within the sector allow for such a comparison.

Direct employment within the music sector across both the EU27 and the UK was estimated at 1,305,000 individuals. This figure represents a significant portion of the job market, being 2.1 times the employment within the information service activities sector, 24% higher than that in the European audiovisual sector, and 16% greater than the number of jobs in the motor vehicle manufacturing industry in these countries during the same year. Among those employed by the music sector, the largest group (50%) consisted of performers and music authors in the EU27 and the UK. Additionally, in 2018, record companies and recording studios were estimated to employ 44,850 and 13,800 individuals, respectively. An interesting aspect of employment within this sector is the discrepancy between the number of roles and the actual number of individuals employed, with 1,434,000 roles being filled by 1,305,000 people. This situation arises because some individuals occupy multiple roles within the industry, for instance, an artist who both writes and performs their music. To calculate total employment figures, individuals who simultaneously worked as a performer and a songwriter or author were counted a single time, highlighting the multifaceted nature of employment within the music sector and its significant contribution to the job market in the EU27 and the UK.

Procurement. The music sector's procurement from the rest of the economy (excluding intra-sector purchases) was estimated to have supported a total of 368,000 jobs throughout its external supply chain in the EU27 and UK in 2018. Additionally, wage payments by music industry firms and their supply chains were believed to have driven the creation of 336,000 jobs across these countries. According to Oxford Economics, the European music sector boasted an employment multiplier of 1.5 that year, indicating that every 1,000 employees within the sector supported an additional 500 jobs in the wider EU27 and UK economies. This reflects the labour-intensive nature of the sector and the high degree of intra-music sector procurement. Some of the sub-segments in the music sector are estimated to have a higher employment multiplier. For instance, the employment multiplier for record companies was 2.7, meaning that for every 1,000 jobs at record companies, 1,700 other jobs are supported elsewhere in the economy.

Exports. Extra-EU exports in 2018 were estimated to be 140 billion €⁹. The music sector within the European Union (EU27) and the United Kingdom contributed significantly to this number by generating a total of 5.0 billion € from the sale of physical goods alone. This impressive figure includes a diverse array of products, with 2.0 billion € originating from the export of sound recording and reproduction apparatus, encompassing essential items such as headphones, speakers, and microphones, designed for the sophisticated recording of sound. Additionally, the sector saw €1.0 billion in revenue from the export of music-enabled technological devices, including the latest smartphones, tablets, and laptop computers, highlighting the integration of music consumption into everyday technology. The traditional *media* of recorded music, CDs, and vinyl records, also made a substantial contribution, bringing in 960 million €, while the export of musical instruments, a cornerstone of music creation, added another 680 million € to the sector's export revenues, showcasing the breadth and vitality of the physical goods market within the music industry.

Shifting the focus to the digital domain, the export value of intangible goods, such as music streaming services, further underscores the sector's global economic impact. Collectively, record companies, music publishers, and music streaming services amassed 4.7 billion € from their digital exports, reaching audiences beyond the EU27 and UK. Within this digital realm, record companies led with 2.3 billion € in export revenues, followed by music publishers who garnered 1.1 billion €, and audio music streaming services, which contributed slightly over 1.2 billion €. This robust performance in the digital export market reflects the evolving landscape of music consumption and the industry's successful adaptation to global digital trends.

In total, the music sector's exports from the EU27 and UK amounted to an impressive 9.7 billion € in 2018, underscoring its significant role in the broader European economy. To put this into perspective, the music sector's export earnings were 1.9 times larger than those of the European audiovisual sector for the same year¹⁰ and 13% more than the exports of all European GI-protected wines¹¹, illustrating the music sector's remarkable capacity to generate economic value and its standing as a key player in Europe's export economy¹².

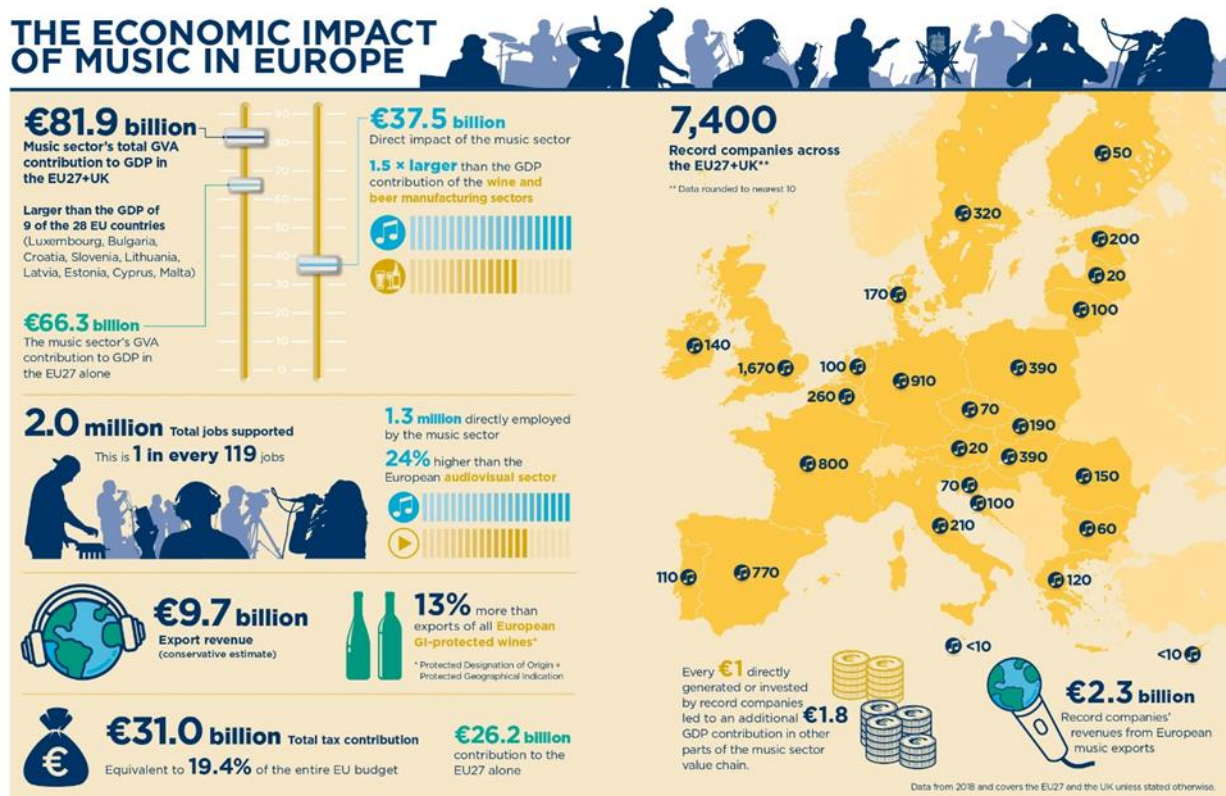
⁹ Eurostat , statistics explained; Available at: <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:HighlightImageExtraEUtrade.png> [Accessed: 14 March 2024].

¹⁰ AV Data 4 Europe. (n.d.). *Key Data > AV Data 4 Europe*. Available at: <https://avdata4europe.eu/key-data/>. [Accessed: 29 April 2024]

¹¹ European Commission. (2019). Study on the economic value of EU quality schemes, geographical indications (GIs) and traditional specialities guaranteed (TSGs).

¹² Oxford Economics. (2020). The economic impact of music in Europe. Available at: <https://www.oxfordeconomics.com/resource/the-economic-impact-of-music-in-europe/> [Accessed: 14 March 2024].

[Fig. 1 – The Economic Impact of Music in Europe]



[Source: Oxford Economics]

1.2 How Music Affects Society

Music's intrinsic value extends far beyond its economic contribution. In the third book of "The Republic", written around 360 BC, Plato attributes to music a powerful influence on the personality of its audience. He, along with his peers, believed in the Greek concept that music holds a strong educational value. According to their view, music, through its various modes, could enhance positive traits in people and diminish negative ones. This early philosophical perspective, that music may positively shape how we act, feel, and behave, still holds in our present day and time and is evident across different cultures¹³.

The historical narrative of music as a vehicle for social transformation is rich and varied. During pivotal moments such as the American Civil Rights movement, music emerged as a unifying force, rallying individuals around the ideals of justice and equality. Iconic songs like "We Shall Overcome"

¹³ Rabinowitch, T-C. (2020) The Potential of Music to Effect Social Change. Sage Journals. Available at: <https://journals.sagepub.com/doi/full/10.1177/2059204320939772> [Accessed: 14 March 2024].

and Bob Dylan's "The Times They Are A-Changin'" became anthems of the movement, encapsulating the collective yearning for change and serving as tools for communication and solidarity among activists¹⁴.

The critique of societal norms and political systems through music continued into the latter part of the 20th century with the rise of punk music, which expressed the disillusionment and frustrations of a generation. This tradition of using music as a medium for social commentary and activism persists today, with artists like Kendrick Lamar and Childish Gambino addressing contemporary issues of racial injustice, police brutality, and inequality.

Kendrick Lamar, through his album "To Pimp a Butterfly", offers a profound exploration of themes such as racial identity, systemic inequality, and the African American experience. His song "Alright" has become an anthem for the Black Lives Matter movement, capturing the collective hope amidst the struggles against racial injustice. The refrain, "We gon' be alright", echoes as a rallying cry for resilience and solidarity, demonstrating music's capacity to inspire hope and perseverance¹⁵.

Childish Gambino, the musical pseudonym of Donald Glover, further illustrates this tradition with his striking track "This is America". The song and its accompanying music video provide a potent commentary on gun violence, racism, and the black experience in America. Through stark imagery and lyrical content, Gambino highlights the contradictions of the American dream, juxtaposing joyful music and dance with violent and distressing themes. This stark contrast serves not only to engage listeners but also to provoke reflection on the systemic issues plaguing society¹⁶.

Beyond these examples, many other artists contribute to this tradition across genres and eras. Beyoncé's "Formation" celebrates black culture and addresses police brutality, encouraging listeners to take pride in their heritage and stand up against injustice¹⁷. Similarly, Lady Gaga's "Born This Way" has become an empowering anthem for the LGBTQ+ community, promoting self-acceptance and equality¹⁸.

¹⁴ The Martin Luther King Jr. Research and Education Institute. (n.d.). Songs and the Civil Rights Movement. Stanford University. Available at: <https://kinginstitute.stanford.edu/songs-and-civil-rights-movement> [Accessed: 14 March 2024].

¹⁵ Peterson, J. (2016). "Kendrick Lamar and the Movement for Black Lives." *The Journal of African American Studies*, 20(3), 323-339.

¹⁶ Gomez, L. (2018). "Donald Glover's 'This is America': A Cultural Analysis." *The Atlantic*. Available at <https://www.theatlantic.com/entertainment/archive/2018/05/donald-glovers-this-is-america/559805/> [Accessed: 06 May 2024]

¹⁷ Carter, M. (2017). "Music as Social Commentary: Analyzing Beyoncé's 'Formation'." In *Sounds of Resistance: The Role of Music in Social Change* (pp. 142-160). Oxford: Oxford University Press.

¹⁸ Rodriguez, P. (2012). "Music as a Platform for Political Discourse: A Case Study of Lady Gaga's 'Born This Way'." In *Voices of the Unheard: Music, Media, and Political Expression* (pp. 88-107). New York: Routledge.

The influence of music as a tool for social change also extends globally. For instance, the Nigerian musician Fela Kuti used Afrobeat as a platform to oppose military dictatorship and corruption in Nigeria, embedding political messages within his music to educate and mobilize his audience against oppression¹⁹.

Music festivals and benefit concerts often serve as platforms for raising awareness and funds for social causes. The 1985 Live Aid concert for famine relief in Ethiopia and the more recent Global Citizen Festival, which advocates for an end to extreme poverty, are prime examples of how music events can bring global attention to pressing issues, uniting artists, and audiences in common causes.

One of the first and most important benefit concerts is The Concert for Bangladesh. It is a landmark event in the history of music and humanitarianism. The concert was organized by George Harrison and Ravi Shankar in 1971 to raise funds for the millions suffering from the devastating effects of the Bangladesh Liberation War and the ensuing humanitarian crisis. Held at Madison Square Garden in New York City, the concert brought together an unprecedented lineup of legendary musicians, including Bob Dylan, Eric Clapton, and Ringo Starr. The electrifying performances showcased the power of music to inspire change and unite people for a noble cause. The proceeds from the concert, along with subsequent album and film releases, contributed significantly to relief efforts.

Live Aid, organized by Bob Geldof and Midge Ure is another groundbreaking event featuring performances in both London's Wembley Stadium and Philadelphia's John F. Kennedy Stadium. The concert was broadcast globally and reached an estimated 1.9 billion viewers in over 150 countries, and hosted iconic performances by some of the biggest names in music, including Queen, U2, Led Zeppelin, and Madonna, and successfully raised about 125 million \$ for famine relief²⁰.

Yet another pivotal event was the Freddie Mercury Tribute Concert for AIDS Awareness in 1992, following the death of the iconic Queen frontman due to AIDS-related complications. The concert, held at Wembley Stadium in London, featured performances by remaining Queen members and guest appearances by major artists, including David Bowie, Elton John, and George Michael. It served as a global platform to pay tribute to Mercury's legacy, raise awareness about the AIDS epidemic, and mobilize support for research and prevention efforts. The event significantly contributed to changing

¹⁹ Thompson, A. (2016). "Afrobeat's Revolutionary: Fela Kuti and the Protest Movement in Nigeria." *Journal of African Cultural Studies*, 28(1), 104-117.

²⁰ Denselow, R. (1986). "Live Aid: Rocking the World for a Good Cause." *The Guardian*.

public perceptions about AIDS and highlighted the urgent need for compassion and action in the face of the crisis²¹.

The Global Citizen Festival, a more recent initiative, harnesses the power of music festivals to address the issue of extreme poverty globally. Launched in 2012, the festival is an annual event taking place in New York City's Central Park. It operates on a unique model where tickets are not bought but earned through engaging in actions, such as signing petitions, sharing messages on social media, and writing letters to politicians, which support Global Citizen's campaigns on sanitation, education, gender equality, and more. These actions are designed to educate users about the systemic causes of extreme poverty and encourage practical steps toward making a difference. The festival has featured performances by artists such as Beyoncé, Coldplay, and Ed Sheeran and has made significant strides in advocating for policy changes and securing commitments from world leaders to end extreme poverty by 2030. The 2019 edition of the festival managed to secure commitments worth 1.6 billion \$, which aimed to impact the lives of 650 million people²².

Furthermore, the music's role in environmental advocacy is an emerging area where its potential for societal impact is being realized. Musicians and artists are increasingly lending their voices to the cause of climate change, using their platforms to highlight the urgency of environmental issues and advocate for sustainable practices. This extension of music's influence into environmental activism illustrates its versatility as a tool for societal engagement and underscores the broad scope of issues that music can address.

In conclusion, music's intrinsic value lies in its ability to shape individuals, unite communities, and drive social change. From its philosophical roots in ancient Greece to its role in contemporary social movements, music has consistently demonstrated its power to influence society in profound and lasting ways. As a universal language, music transcends cultural and linguistic boundaries, embodying the collective aspirations, struggles, and hopes of humanity. Its enduring impact on society reaffirms the belief that music is not just a reflection of culture but a force that can shape the world for the better.

²¹ Smith, R., & Johnson, K. (1992). "Rocking Against AIDS: The Freddie Mercury Tribute Concert." *Journal of Popular Culture*, 26(3), 123-134.

²² Johnson, H., & Smith, A. (2013). "Music Festivals as a Vehicle for Global Change: A Case Study of the Global Citizen Festival." *Journal of Cultural Management and Policy*, 3(2), 22-35.

2. The Role Of Music In Realising The SDGs

“If the SDGs are to be realized by 2030, as the UN hopes, the global community will need to pull out all stops. This means exploring less established, more unconventional ways to advance sustainable development, such as through music and sound.”

CATHERINE GRANT²³

[Fig. 2 – Sustainable Development Goals]



Source: United Nations

On 27 September 2015, the governments of the 193 Member Countries of the United Nations signed the UN Agenda 2030 for Sustainable Development. The agenda sets out 17 Sustainable Development Goals, SDGs, which are part of a broader program of action consisting of 169 associated targets to be achieved in the environmental, economic, social, and institutional domains by 2030. The objectives set for sustainable development have a global validity, and they concern and involve all countries and

²³ theacademic.com. (2024). How music and sound can help advance the UN’s Sustainable Development Goals - The Academic. Available at: <https://theacademic.com/how-music-and-sound-can-help-advance-sdgs/>. [Accessed: 29 April 2024]

components of society, from private companies to the public sector, from civil society to information and culture operators²⁴.

Upon the release of Agenda 2030, Shain Shapiro²⁵, the founder of Sound Diplomacy²⁶, expressed his surprise at the omission of the music industry from the discussion targets, which meant it would not be included in government policy and spending. Taking matters into his own hands and with the support of the Sound Diplomacy team, alongside ten UN agencies and various private sector partners, including the Association of Independent Music and the International Music Council, Shapiro directed the creation of the “Guide to Music and UN Sustainable Development Goals”²⁷. This report, later published by the UN, outlines essential music-based actions for governments, offering significant support in achieving the SDGs.

The Chief of Strategic Communications Campaigns at the UN headquarters Nanette Braun insisted that involving music participants in the conversation is motivated by the fact that “*the reach of music is enormous... it has a very special place because of the relationship between artists and audiences and because of the amplification role that the music industry has or can have*”²⁸.

The rest of this chapter is dedicated to explaining how and why music can facilitate the realization of Agenda 2030, with the help of remarkable examples for each goal.

2.1 Aligning the Music Industry with the 17 Sustainable Development Goals (SDGs)

GOAL 1: No poverty

As of 2015, approximately 736 million individuals still lived on less than US\$1.90 daily²⁹. The World Bank has indicated that COVID-19's repercussions forced an additional 150 million people into

²⁴ Agenzia per la coesione territoriale, The UN Agenda 2030 for Sustainable Development. Available at: <https://www.agenziacoesione.gov.it/comunicazione/agenda-2030-per-lo-sviluppo-sostenibile/?lang=en> [Accessed: 15 March 2024]

²⁵ Shain Shapiro is the founder and CEO of Sound Diplomacy. He is a recognized expert in the field of music and urban development, with extensive experience in advising governments and organizations on music-related policies and strategies. Shapiro has been instrumental in advocating for the integration of music and sound into urban planning and development initiatives worldwide.

²⁶ Sound Diplomacy is an organization that specializes in advising governments, cities, and organizations on the use of music and sound to foster economic development, cultural growth, and social inclusion.

Sound Diplomacy. Economic Impact & Social Value Assessment. Available at: <https://www.sounddiplomacy.com/services/economic-impact-social-value-assessment> [Accessed: 15 April 2024]

²⁷ Center for Music Ecosystems. *Your Guide to Music and the SDGs*. Available at: <https://www.centerformusicecosystems.com/sdgs>. [Accessed: 19 March 2024]

²⁸ Pasti da Porto, V.C. (2022). Sustainability and Inclusion: How SDGs may be implemented in the Music Industry. Available at: <http://dspace.unive.it/bitstream/handle/10579/23246/868325-1269353.pdf?sequence=2> [Accessed: 19 March 2024]

²⁹ World Bank (2022) Poverty and Shared Prosperity 2022. Data Visualization. Available at: <https://www.worldbank.org/en/publication/poverty-and-shared-prosperity> [Accessed: 15 March 2024]

severe poverty, erasing decades of advancement³⁰. By enhancing skills, fostering social cohesion, and generating awareness and funds for anti-poverty initiatives, music plays a vital role in the global effort to achieve this goal.

The global establishment of a strong intellectual property framework is one of the many ways to leverage music's potential. Music piracy is widespread in many areas of our world, and musicians do not receive the recognition or rights they deserve as professionals. Organizations such as the World Intellectual Property Organization (WIPO), in collaboration with the United Nations Development Programme (UNDP), UN-Habitat, and other entities, are working towards integrating robust intellectual property protections into all national industrial policies. This effort would ensure that intellectual property is appropriately valued and protected, giving artists the correct retribution for their work.

Promoting fairness in music accessibility is another vital measure. Combating profit-driven secondary ticket sales and establishing fair play policies in music venues globally are necessary steps to ensure that everyone has equitable access to music experiences.

Additionally, globalizing after-school music programs would help children fill their time and minds with creativity. These efforts would affect target 1.4 which states "By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance."

There are many successful initiatives in action, like "Musicians in Exile"³¹ and "Playing for Change"³² but the most interesting case study is "El Sistema".

"El Sistema" is a musical educational model, conceived and promoted in Venezuela by José Antonio Abreu, a Venezuelan musician and former minister of culture. The Abreu System gained international fame not only for creating 200 orchestras and talents like Gustavo Dudamel but also for its ability to engage and uplift young people from the marginalized communities of Venezuelan favelas. Most young musicians in El Sistema come from economically and socially disadvantaged backgrounds,

³⁰ Sánchez-Páramo, C., Hill, R., Mahler, D.G., Narayan, A., and Yonzan, N. (2021) 'COVID-19 leaves a legacy of rising poverty and widening inequality', Let's Talk Development, 7 October. Available at: <https://blogs.worldbank.org/developmenttalk/covid-19-leaves-legacy-rising-poverty-and-widening-inequality> [Accessed: 15 March 2024]

³¹ Jack, M. (2022) 'Musicians in Exile: the Glasgow orchestra helping rebuild the lives of refugees', *Time Out*. Available at: <https://www.timeout.com/news/musicians-in-exile-the-glasgow-orchestra-helping-rebuild-the-lives-of-refugees-071122> [Accessed: 15 March 2024]

³² Playing For Change Official Website. Available at: <https://www.playingforchange.com/about>. [Accessed: 19 March 2024]

and through musical discipline and commitment, they are given the opportunity to escape the nihilistic realities of the barrios.

The project's declared objective, as stated by its leader, José Cuesta, to "El Universal" in June 2007, was "to contribute to improving the living conditions of children and youths in Venezuela, especially the most disadvantaged." From numerous studies conducted, he concluded that participation in the program improved school attendance and reduced juvenile delinquency. The project's financing bank calculated that for every dollar invested in El Sistema, there would be about 1.7 dollars in social dividends³³. The rationale, as explained by Abreu in a 2005 interview with "La Repubblica", is that playing in an orchestra is much more than studying music. It means "joining a community, a group that recognizes itself as interdependent." Therefore, the importance of this method is not solely artistic; through it, music takes on a primary role in intellectual progression and social redemption.

GOAL 2: Zero hunger

Goal 2 of the United Nations' Agenda 2030 aims to end hunger, ensure food security, and promote sustainable agriculture. In this pursuit, the transformative potential of music emerges as a powerful tool, with its universal appeal and emotive resonance. Music can raise awareness, educate, foster collaboration, and preserve culture. But how can this be exploited?

First, the tradition of staging large-scale concerts to raise awareness about global hunger and inequality can be expanded. Despite decades of such events, the potential for impact has yet to be fully realized. Any nation with access to a stadium has the potential to host an event that brings attention to this critical issue.

In the current times, the most significant music event for this objective is the Global Citizen Festival³⁴. This annual event, part of the broader Global Citizen movement, aims to mobilize action towards ending extreme poverty, which includes combating hunger as a critical component. The festival brings together top artists, world leaders, and global citizens in a 24-hour live concert hailing from 6 continents, to raise awareness and encourage actionable commitments from governments, corporations, and individuals towards achieving the United Nations Sustainable Development Goals, specifically aiming to objectives of Goal 2.

Furthermore, the opportunity to redistribute food after concerts presents a practical approach to addressing hunger directly. By establishing partnerships with food suppliers and caterers, food

³³ Lubow, A. (2007) 'Conductor of the People', *The New York Times Magazine*, 28 October. Available at: <https://www.nytimes.com/2007/10/28/magazine/28dudamel-t.html> [Accessed: 19 March 2024]

³⁴ Global Citizen. Take Action. [Online] Available at: <https://www.globalcitizen.org/en/take-action/> [Accessed: 15 April 2024].

originally intended for live events can be redirected into the local food supply chain, benefiting those in need. This initiative encourages a policy of zero food waste at both large and small concerts, creating civic opportunities to provide meals to the community.

In the heart of Florida, another notable initiative took root. The St. Augustine Amphitheatre transformed its grounds into an exemplary urban farm, utilizing waste generated by its events to cultivate a bounty of fruits and vegetables. This initiative not only supplies fresh produce for artists and their teams but also generously supports local homeless shelters and schools with weekly produce deliveries.³⁵ Imagine the transformative potential of stadiums, arenas, and even parking lots worldwide were repurposed into urban farms. These spaces, often criticized for their environmental impact and occasional disuse, could become epicentres of community engagement and local food production.

Goal 3: Good health and wellbeing

Several studies point to the positive impact that music has on our health and well-being. Having a music education has been shown to enhance cognitive development in early childhood. Studying music boosts academic performance, particularly in science and mathematics. Additionally, music can delay the onset of dementia and is an effective treatment for the condition. Yet, music is only considered tangential in the current health and wellbeing policies.

Some examples that highlight the cruciality of music are “Music at Work Week”³⁶, “The New Note Orchestra”³⁷ and the English National Opera initiative to help Covid-19 patients to use breathing techniques taught by sopranos³⁸. However, the most significant initiative seems to be “Music & Memory”.

“Music & Memory” programs harness the profound connection between music and personal memories to enhance the lives of individuals with Alzheimer's and other forms of dementia. By creating personalized playlists, these initiatives tap into the unique musical preferences of each patient, evoking memories and emotions that can lead to remarkable moments of clarity and joy. This approach not only provides comfort and reduces agitation among those affected but also offers a non-pharmacological means to improve their overall quality of life³⁹.

³⁵ The Amp. Sustainability. Available at: <https://www.theamp.com/venue-info/sustainability> [Accessed: 15 April 2024].

³⁶ foundinmusic. *Music At Work Week / Workplace Wellbeing*. Available at: <https://www.foundinmusic.com/music-at-work-week> [Accessed: 19 March 2024]

³⁷ New Note. *What We Do*. Available at: <https://www.newnote.co.uk/what-we-do/> [Accessed: 19 March 2024]

³⁸ ENO Breathe | English National Opera. Available at: <https://www.eno.org/breathe/>. [Accessed: 19 March 2024]

³⁹ Music and Memory. (2012). *Music and Memory*. Available at: <https://musicandmemory.org/> [Accessed: 19 March 2024]

Goal 4: Quality education

Research has consistently shown that music education enhances memory, attention, and linguistic skills, laying a solid foundation for learning across all subjects⁴⁰. The discipline of learning to play an instrument or to understand musical theory cultivates habits of mind such as concentration, perseverance, and creativity. These skills are transferable, positively impacting students' performance in areas as varied as mathematics, science, and language arts, thus contributing to a more comprehensive education.

Unfortunately, music education is not as central as it should be. In Italy, for example, music is taught only for 3 years in middle school. Because of this dire data, many interesting initiatives were born in the country to make up for the laziness of the institutions. A good example is “Orchestra Italiana - Scuola di Musica Popolare di Forcella”. Situated in the Forcella neighbourhood of Naples, the Forcella Popular Music School operates as a community-based initiative aimed at providing music education to children and teenagers from difficult socio-economic backgrounds⁴¹.

By offering free or low-cost music education to children and teenagers, the Forcella Popular Music School addresses educational inequalities and provides opportunities for personal growth and development. The initiative ensures that access to quality music education is not restricted by socio-economic circumstances, thus contributing to SDG 4's goal of ensuring inclusive and equitable education for all. It particularly helps target 4.7 which states: “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development”.

Goal 5: Gender equality

Only 16% of UK registered songwriters are female, and in 2022, over 80% of festival headliners were men or male-led bands⁴². Merely 2% of the top 400 songs on the North American charts in the past three years were produced by women. While progress towards gender equality in the music industry is slow, the potential impact is significant. The greater representation of women both on and off stage

⁴⁰ Nnenna, U., & Extension, K. P. (2023). The impact of music education on cognitive development and academic achievement in adolescents. *Journal of Adolescent Education*, 9, 16-19.

⁴¹ Sanitànsamble. Chi siamo. [Online] Available at: <https://sanitansamble.it/chi-siamo-2/> [Accessed: 15 April 2024].

⁴² Sky News. (2024). Why are only 17% of UK festival headliners female in 2023? [Online] Available at: [https://news.sky.com/story/why-are-only-17-of-uk-festival-headliners-female-in-2023-12854240#:~:text=Across%2010%20festivals%20this%20summer.one%20in%20six%20\(18%25\)](https://news.sky.com/story/why-are-only-17-of-uk-festival-headliners-female-in-2023-12854240#:~:text=Across%2010%20festivals%20this%20summer.one%20in%20six%20(18%25)) [Accessed: 15 April 2024].

serves to reinforce the importance of gender balance. By promoting gender equality in music, equality is promoted throughout society, fostering mutual respect across genders, and providing increased opportunities for women, thus paving the way for widespread gender equality.

In some sectors of the music industry, the amount of women working alongside men needs significant improvement. Establishing an international gender monitoring system for the entire music industry could offer comprehensive insights, facilitating efforts to enhance female representation and diversify employment prospects. Additionally, expanding monitoring initiatives to encompass LGBTQI+, transgender, queer, non-binary, and BIPOC communities would ensure a more inclusive approach to addressing disparities.

However, amidst these challenges, several initiatives have emerged to champion gender equality and pave the way for a more inclusive future. Among the plethora of incredible initiatives, Keychange and SheSaid.So stand out as examples of progress, demonstrating the tangible impact of resolute efforts to address gender disparities.

Keychange, an international initiative supported by the Creative Europe Programme of the European Union, has emerged as a pioneer by encouraging festivals and music organizations to commit to gender parity in programming, staffing, and beyond. Notably, influential festivals such as Reeperbahn Festival and Iceland Airwaves have embraced Keychange's mission, implementing gender-equal line-ups and proving that conscious programming can lead to engaging and commercially successful events⁴³.

Similarly, SheSaid.So has emerged as a global force in promoting gender diversity within the music industry. Founded by Andrea Magdalina, SheSaid.So operates a network of women across 13 global chapters, providing a platform for collaboration, advocacy, and skill-building. Through events, talks, capacity-building sessions, and curated playlists, SheSaid.So empowers women in various roles within the music ecosystem, from producers and sound engineers to composers and radio hosts⁴⁴.

Goal 6: Clean water and sanitation

Cultural festivals can have a deep impact on creating innovative practices to improve local infrastructures. This entails devising strategies to improve access to essential services such as clean water, sanitation, and civic infrastructures on a global scale. Several music festivals explicitly

⁴³ Music Innovation Hub. Keychange. Available at: <https://musicinnovationhub.org/keychange-en/> [Accessed: 15 April 2024].

⁴⁴ She Said So. Manifesto. [Online] Available at: <https://www.shesaid.so/manifesto> [Accessed: 15 April 2024].

promote clean water initiatives, such as the H2-OH Festival and Reading Festival in the UK, which use community activities during the events to engage people in water conservation efforts⁴⁵.

This work has a longstanding history, with festivals like the Dranouter Festival in Belgium installing wastewater management systems over a decade ago. The festival, attracting approximately 75,000 attendees over three days, historically faced significant environmental challenges, particularly in managing the large volume of wastewater generated by attendees. Recognizing the detrimental impact on the nearby Douvebeek River, where water was traditionally discharged without treatment, the festival organizers decided to implement a pilot-scale activated carbon filtration system that successfully treated a portion of the shower wastewater, achieving a remarkable 90% reduction in chemical oxygen demand and suspended solids⁴⁶.

Furthermore, in 2017, WaterAid collaborated with the Glastonbury festival to establish a 'Toilet of Dreams', an eye-catching toilet that had the aim to raise awareness on the lack of sanitation problem. As Jo Lehmann, the media officer for WaterAid, explained “*A sign was displayed outside the Toilet of Dreams, explaining that one in three children globally don’t have access to decent toilets. Without [toilets], children get sick, drop out of school, and aren’t able to fulfill their potential and achieve their dreams.*”⁴⁷.

Goal 7: Affordable and clean energy

Like any sector involved in processing natural resources into a sellable product, the music industry is a significant consumer of energy. From global touring to the energy needed for streaming services, the supply chain of the music industry uses a substantial amount of energy. The energy cost of music is considerable. According to a joint study by the Universities of Oslo and Glasgow, it is estimated that storing music in the United States alone generates between 200 and 350 million kg of greenhouse gas equivalents⁴⁸. However, there are solutions within the music industry that could be adopted by other sectors to enhance energy efficiency, reduce expenses, and offer models that support the goal of sustainable energy for all. The two most important solutions could be the use of solar panels in

⁴⁵DJMag.com. (2019). *Human waste from Reading Festival will be used to power homes*. Available at: <https://djmag.com/news/human-waste-reading-festival-will-be-used-power-homes>. [Accessed: 19 March 2024]

⁴⁶Boeykens, C., Van Den Berghe, F., Van Passel, S., & Vandecasteele, J. (2008). Sustainable wastewater treatment of temporary events: The Dranouter Music Festival case study. Available at: https://www.researchgate.net/publication/23466203_Sustainable_wastewater_treatment_of_temporary_events_The_Dranouter_Music_Festival_case_study [Accessed: 19 March 2024]

⁴⁷Highlights_admin (2017). *Kicking the Porcelain Throne up Several Notches*. [online] WEF Highlights. Available at: <https://news.wef.org/kicking-the-porcelain-throne-up-several-notches/> [Accessed: 19 March 2024].

⁴⁸Brennan, M. and Devine, K. (2020) ‘The cost of music’, *Popular Music*, 39(1), pp. 43–65. Available at: https://www.researchgate.net/publication/340343742_The_cost_of_music [Accessed: 29 April 2024]

music venues, with the purpose of selling excess energy back to the grid to discount neighbours' energy costs, and the repurposing of festivals infrastructures for other events.

On a EU level, it is worth to mention the European Initiative for Upscaling Energy Efficiency in the Music Event Industry (EE Music)⁴⁹, a program designed to significantly reduce carbon emissions within the music event sector. By engaging in a collaborative effort with more than 2,200 stakeholders, including event organizers, venue owners, artists, and service providers, the initiative focused on monitoring and optimizing energy consumption across various events. The intensive effort led to a substantial reduction in carbon emissions, achieving a total decrease of 17.8 million kg of CO₂.

Goal 8: Decent work and economic growth

Music can serve as a powerful tool to achieve goal 8, provided that music, recognized both as a right and a piece of intellectual property, receives the same legal protection as any other type of property. However, the reality in many countries falls short of this, with piracy prevalent through illegal mixtape production or the failure to pay for music played live or on the radio. Strengthening advocacy and illustrating the benefits that music brings to communities, along with the approval of a UN resolution that mandates the treatment of intellectual property rights, particularly creative rights, as property rights, could significantly boost musicians' incomes. This increase in revenue has the potential to promote decent work and spur economic growth worldwide.

Another improvement could be recognizing the artist as a small business entrepreneur, deserving of access to finance, educational and vocational training opportunities, and ultimately respect for their work.

A notable example is “The Sound Initiative” in Cambodia⁵⁰. It is a pioneering music and industry development training program, focusing on equipping young Cambodian songwriters with vocational training, guiding them through the process of registering their works. Additionally, the initiative collaborates with venues to offer artists platforms to perform and earn from their original music, as opposed to covering existing songs. This effort is fostering a vibrant creative scene within the country. By advocating for the fair compensation of original music, The Sound Initiative aims to underline the value of creative work and its potential to drive economic growth in Cambodia. Through these

⁴⁹ greener-events.com. *EE Music*. [online] Available at: <https://greener-events.com/eemusic> [Accessed: 19 March 2024].

⁵⁰ The Sound Initiative. *The Sound Initiative*. Available at: <https://www.thesoundinitiative.com/> [Accessed: 19 March 2024]

endeavors, the program is not only nurturing talent but also contributing to the broader goal of promoting economic development through the arts.

Goal 9: Industry, innovation and infrastructure

The music industry is a leader in embracing technological advancements, ranging from AI innovations and contactless payments to algorithms that tailor content and democratize access. It often pioneers new technologies in production, distribution, and communication. However, these advancements tend to benefit developed countries with the capability to capitalize on them, rather than enhancing infrastructure and accessibility globally. Despite this, several initiatives are pointing to a more positive scenario.

In a suburb of Seoul (Korea), Platform Chang-dong 61⁵¹ represents a significant investment by the city government into a music-centric infrastructure project. This initiative aims to cultivate new opportunities throughout the extensive supply chain of the music industry. Featuring a variety of facilities, including a new arena, AI laboratories, production spaces, and venues for testing and performances, the project is designed to dissect and understand the music creation process. It also aims to establish environments and programs that foster innovation within the industry. This development draws inspiration from the phenomenal success of K-Pop (Korean Pop), which stands as one of the most effective and lucrative government interventions in the realm of popular music to date. By doing so, Platform Chang-dong 61 aspires to replicate and build upon the success formula of K-Pop (Korean Pop), promoting further growth and innovation in the music industry⁵².

Goal 10: Reduce inequality

According to a recent study by University College London and the World Health Organisation, “Engaging in artistic activities such as singing and dancing from a young age can reduce social inequalities and encourage healthy behaviours”⁵³. Through music, individuals from diverse backgrounds can come together to celebrate shared experiences, fostering a sense of belonging and solidarity. Furthermore, music empowers marginalized communities to voice their concerns and advocate for social change, challenging systemic inequalities and promoting greater equity.

⁵¹ Seoul Metropolitan Government. (Year). Platform Changdong 61. Available at: <https://world.seoul.go.kr/platform-changdong-61/> [Accessed: 15 April 2024].

⁵² NPR. (2015). How the South Korean Government Made K-pop a Thing. Available at: <https://www.npr.org/sections/codeswitch/2015/04/13/399414351/how-the-south-korean-government-made-k-pop-a-thing> [Accessed: 15 April 2024].

⁵³ University College London (UCL). (2019). World's largest study into impact of arts on physical and mental health. [Online] Available at: <https://www.ucl.ac.uk/news/2019/oct/worlds-largest-study-impact-arts-physical-and-mental-health> [Accessed: 15 April 2024].

First, it is essential to ensure that music development programs are available in all communities, regardless of their economic status or location. Community centres should be equipped with facilities for music creation, including writing, recording, and producing music, as well as spaces for DJing and vocal performances.

Secondly, it is important to advocate for music support that is inclusive of all genres, rather than favouring certain styles over others. Prioritizing building infrastructure that offers equal opportunities for all music genres, whether it is rap, DJing, classical violin, or any other style, is crucial for the promotion of social fairness within the industry.

A paper of 2021 by Professors Lewis, Rodgers, and Woolcock highlights music's unexploited potential in these matters. The study provides a detailed analysis of the role of music as a form of protest in the Global North. Historical movements have leveraged music to shape public opinion and influence policy, addressing pressing issues such as racism, inequality, and war. Iconic musicians and bands have utilized their platforms to broadcast messages of dissent and calls for change, resonating with broad audiences and mobilizing collective action. In contrast, the Global South has seen music as a dynamic tool of resistance and identity formation. Music here is deeply intertwined with political struggles and societal transformations. Artists frequently emerge as pivotal figures in resistance movements, using their art to challenge oppressive regimes and advocate for social reform. This form of musical expression is not only a reflection of cultural identity but also a catalyst for political and social change⁵⁴.

Goal 11: Sustainable cities and communities

Integrating music into urban development can foster community engagement and enhance cultural inclusion, making cities more vibrant and cohesive. Music tourism, for example, boosts local economies by attracting visitors and investments, revitalizing neighbourhoods, and promoting cultural diversity.

An fascinating study presented by Sound Diplomacy in September 2019 offers an insightful analysis of the intersection between music, culture, and urban development⁵⁵.

The central thesis of the report is that music and cultural infrastructure are not merely aesthetic enhancements but foundational elements that contribute to the sustainability and vibrancy of urban

⁵⁴ David Lewis, Dennis Rodgers & Michael Woolcock (2021) The Sounds of Development: Musical Representation as A(nother) Source of Development Knowledge, *The Journal of Development Studies*, 57:8, 1397-1412, DOI: 10.1080/00220388.2020.1862800

⁵⁵ Sound Diplomacy. (2019). *This Must Be the Place*. Available at: <https://www.sounddiplomacy.com/this-must-be-the-place> [Accessed: 15 April 2024].

environments. The conventional urban planning paradigms often sideline these cultural elements, focusing predominantly on technological and economic factors.

To substantiate its arguments, the report outlines ten core principles essential for the development of future cities. For instance, one principle highlights that buildings should serve as creative platforms, not just assets, suggesting a shift towards spaces that facilitate cultural engagement and community interaction. Another principle asserts that future cities should support diverse and inclusive communities, with music and culture embedded in the fabric of residential experiences.

Several case studies are presented throughout the report to illustrate the practical applications and benefits of integrating cultural elements in urban settings. One notable example is London's cultural infrastructure planning initiative, which maps out the cultural resources and needs of the city to better integrate these elements into its overall development strategy. This case study demonstrates how cultural planning can enhance community engagement, economic development, and urban regeneration⁵⁶.

The report also provides a comprehensive vision of what future cities could look like when they are designed with music and cultural infrastructure in mind. It envisions cities that are not only technologically advanced but also rich in cultural opportunities, fostering environments where communities can thrive both economically and socially.

Goal 12: Responsible consumption and production

The music industry, along with its comprehensive ecosystem, presents an exemplary case for examining methods to enhance production procedures and advocate for conscientious consumption. Music production is notably resource-intensive, with significant carbon emissions associated with its operations. To give a sense of scale, the annual electricity usage of a mid-sized recording studio in Los Angeles can produce carbon emissions equivalent to driving a car around the Earth's equator approximately 10 times. On a positive note, there has been a notable reduction in plastic consumption within the industry, attributed largely to the decline in CD production and the rise of streaming platforms. However, the proliferation of streaming services has led to a substantial increase in electricity consumption for data storage purposes, resulting in a significant rise in greenhouse gas emissions.

⁵⁶ Greater London Authority. Cultural Infrastructure Plan and Toolbox. Available at: <https://www.london.gov.uk/programmes-strategies/arts-and-culture/space-culture/cultural-infrastructure-plan-and-toolbox> [Accessed: 15 April 2024].

Recognizing and addressing the environmental impacts of music production and consumption can contribute to the collective effort toward adopting more sustainable practices and supporting broader societal responsibility initiatives.

Shapiro in its “Guide to Music and the SDGs”⁵⁷ suggests the creation of a Responsible Music Ecosystem Production and Consumption Charter. By aligning objectives across the industry, from live events to streaming and instrument manufacturing, consumers can make informed choices, selecting products and services from entities committed to responsible practices in music production and distribution.

The rapid growth of music streaming platforms has heightened concerns about their environmental footprint. With the scope of mitigating it, a useful action can be to integrate sustainable practices into Content Delivery Network (CDN) operations to moderate energy consumption.

Firstly, optimizing data centre operations and embracing green hosting solutions are essential steps toward sustainability. By improving server configurations, enhancing cooling systems, and transitioning to renewable energy sources, streaming platforms can significantly reduce their carbon footprint. Secondly, leveraging advanced compression techniques and efficient CDN caching mechanisms helps minimize data transfer and bandwidth usage. These measures not only enhance performance but also contribute to lower energy consumption. Lastly, adopting multi-CDN strategies, along with HTTP/3 and QUIC protocols, further enhances efficiency and resilience in content delivery, reducing energy usage across the network infrastructure⁵⁸.

Goal 13: Climate action

Numerous organizations within the music industry are actively directing efforts to address the climate emergency, with an increasing focus on mitigating ecological impact across live events and festivals. From European festivals advocating for green energy to initiatives led by Music Declares Emergency, Julie’s Bicycle, and A Greener Festival, the sector is progressively aligning its practices with COP26⁵⁹ targets. This joint effort entails initiatives such as providing environmentally conscious food at festivals, maintaining rooftop beehives at venues, transitioning to renewable energy sources for

⁵⁷ Center for Music Ecosystems. Your Guide to Music and the SDGs. Available at: <https://www.centerformusicecosystems.com/sdgs> [Accessed: 15 May 2024].

⁵⁸ CacheFly. Turn the Beat Around: Using Green CDNs in Music Streaming Services. Available at: <https://www.cachefly.com/news/turn-the-beat-around-using-green-cdns-in-music-streaming-services/> [Accessed: 15 April 2024].

⁵⁹ COP26 refers to the 26th Conference of the Parties, a global United Nations climate summit, held in Glasgow in 2021.

music file servers, and implementing sustainable beverage containers at events. Music emerges as a significant force in addressing the urgent global challenge of our time.

The main actor of this change is public funding. For music to serve its purpose in this challenge, governments should support all sectors and structures of the value chain, not only concert halls and classical music teaching. Moreover, a significant solution could be to stop all investments in firms that do not take action and redirect the funds to the ones that can make a difference.

A significant example in Europe is the “Music Declares Emergency” initiative⁶⁰. It originated from a group of musicians in the United Kingdom and has subsequently garnered support from over 2,700 signatories. These individuals are dedicated to mitigating their carbon emissions, recognizing the urgent need to address the ongoing climate crisis. The Music Declares platform offers a variety of guides tailored to venue owners, music industry professionals, musicians, and fans, detailing strategies for reducing carbon footprints. This initiative has exerted considerable influence in Europe, prompting some of the world's most renowned artists to adopt environmentally sustainable practices. Examples include Billie Eilish's decision to eliminate plastic bottles from her performances and Radiohead's commitment to powering their tours with renewable energy sources.

Goal 14: Life below water

While it may appear tangential, music possesses several avenues through which it can contribute to this goal. Firstly, music continues to serve as a powerful platform, amplifying awareness and broadening the reach of environmental issues. Additionally, music festivals are taking proactive steps, such as banning plastic bottles, which frequently contribute to marine pollution and ecosystem damage. Furthermore, certain companies are innovating sustainable production processes aimed at reducing water consumption in the creation of vinyl records.

An initiative that leverages sound for sustainable development in an exceptionally intriguing way is the Australian project “River Listening”⁶¹. Through the use of hydrophone audio recordings, researchers can detect the presence or absence of certain species, enabling them to non-invasively assess the health of rivers and implement measures for improvement.

River Listening goes beyond scientific research by actively involving local communities in freshwater conservation efforts. For instance, communities are empowered to create augmented reality “sound

⁶⁰ Music Declares Emergency. Declaration. Music Declares Emergency. Available at: https://www.musicdeclares.net/gb/declaration?_x_tr_sl=en&_x_tr_tl=it&_x_tr_hl=it&_x_tr_pto=sc [Accessed: 15 April 2024].

⁶¹ River Listening. About. River Listening. Available at: <http://www.riverlistening.com.au/about.html> [Accessed: 15 April 2024].

walks”⁶² along rivers. Utilizing a dedicated app, participants can stroll along the riverbanks while immersing themselves in underwater soundscapes and hearing local narratives about life both above and below the water surface. By creatively engaging with sound, communities develop a deeper understanding and appreciation for their local river ecosystems. By inspiring people to explore and care for underwater life, this remarkable initiative contributes significantly to the sustainability of freshwater environments⁶³.

Goal 15: Life on land

Through meticulous site selection for festivals aimed at minimizing environmental impact, as well as the widespread implementation of venue greening initiatives such as urban gardens and solar energy utilization, numerous decisions within the music industry's supply chain actively contribute to and have the potential to achieve the targets outlined in SDG 15. Integrating music as a vehicle to advocate for conservation efforts, protection of endangered species, and other environmental concerns remains a valuable asset globally. However, it is within the music industry's supply chain where the solutions lie to inspire and exert influence in addressing these challenges.

One real-world example is the initiative "One Tree Planted." This organization collaborates with artists, bands, and music festivals to raise awareness and funds for reforestation efforts. For instance, during music tours, artists may commit to planting one tree for every ticket sold or donate a percentage of their concert proceeds to support reforestation projects. For example, in 2020, the band Coldplay pledged to plant a tree for every ticket sold on their world tour, planting over 5 million trees in three years. Similarly, Ed Sheeran donated a portion of his concert earnings to support reforestation efforts in Brazil's Atlantic Forest. By partnering with the music industry, "One Tree Planted" not only helps combat deforestation and restore ecosystems but also engages and educates audiences about the importance of conserving life on land.

Goal 16: Peace, justice, and strong institutions

According to the Institute for Policy Innovation, piracy reached its pinnacle and cost the music industry \$12.5 billion USD annually, resulting in the loss of 71,060 jobs in the US alone.⁶⁴ In nations lacking robust mechanisms to safeguard intellectual property and workers' rights, these challenges

⁶² 100 Ways to Listen. Soundwalks. 100 Ways to Listen. Available at: <http://www.100waystolisten.org/soundwalks.html> [Accessed: 15 April 2024].

⁶³ The Academic. How Music and Sound Can Help Advance SDGs. The Academic. Available at: <https://theacademic.com/how-music-and-sound-can-help-advance-sdgs/> [Accessed:15 April 2024]

⁶⁴Music Business Worldwide (2014). Why does the RIAA hate torrent sites so much? - Music Business Worldwide. [online] Music Business Worldwide. Available at: <https://www.musicbusinessworldwide.com/why-does-the-riaa-hate-torrent-sites-so-much/>. [Accessed: 16 April 2024]

are exacerbated, hindering job creation due to inadequate support systems. However, the intricate ecosystem underpinning the music economy and its global stakeholders offers potential solutions and insights to foster peace, justice, and improved institutions worldwide. As UK Music Managers Forum CEO Annabella Coldrick articulated in the *Journal of Music*, "If the global music publishing business were a house, its plumbing would be the leakiest, most bizarre, inefficient, and complicated imaginable"⁶⁵.

Establishing, comprehending, and fortifying such institutions within the music industry could generate a substantial economic influx for millions of creators worldwide. Nevertheless, effective functioning necessitates justice policies that remain absent in numerous countries. As highlighted in the drill music documentary "Terms and Conditions,"⁶⁶ distinguishing between art, freedom of speech, and criminal activity is imperative. The documentary underscores the importance of delineating these concepts, cautioning against their conflation. It emphasizes that while law enforcement should address actual incitements to violence or criminal activities, there exists a dangerous gray area where music with a particular energy is unjustly assumed to incite violence.

A great initiative that helps achieve this goal is The Uganda Child Soldiers Music Therapy Program utilizes music therapy to help children affected by armed conflict heal from trauma and rebuild their sense of self.⁶⁷ By providing a safe space for expression and communication through music, the program offers participants a unique avenue for processing their experiences and fostering resilience. Through communal music-making, children find solace and support, empowering them to overcome the psychological scars of war and envision a brighter future.

Goal 17: Partnerships to achieve the goal

The structures, regulations, ordinances, laws, and resolutions aimed at integrating music as a partner in a straightforward and accessible manner are not effectively optimized to align with the Global Goals. Disparities in funding and criminalization among music genres contribute to the reinforcement of racial, ethnic, and gender boundaries, despite music's potential as a tool for dismantling them. The global partnership for sustainable development should prioritize music integration at its core, whether by featuring music at high-level summits to foster cultural connections (with equitable compensation

⁶⁵ The Journal of Music | News, Reviews and Opinion. (n.d.). 2020 – Where is the Money in Today's Music World? [online] Available at: <https://journalofmusic.com/opinion/2020-where-money-today-s-music-world> [Accessed: 16 April 2024].

⁶⁶ Wikipedia contributors. Terms and Conditions May Apply. Available at: https://en.wikipedia.org/wiki/Terms_and_Conditions_May_Apply [Accessed: 8 May 2024]

⁶⁷ AP NEWS. (2018). Former child soldiers help Uganda's rebel abductees heal. Available at: <https://apnews.com/article/b7c5431cf2614fd1a18832e29417c70b>. [Accessed: 16 April 2024]

for artists), establishing festivals and sustainable urban development infrastructure to support them, or ensuring sustainability throughout the music supply chain.

An interesting startup contributing to the achievement of Goal 17 is Melosity⁶⁸. Founded in 2015 in Ireland, Melosity is a music collaboration platform that facilitates online collaboration among musicians worldwide. By leveraging digital technology, Melosity enables musicians to collaborate on music projects regardless of geographical location, fostering a global network of creative collaboration. Through its platform, Melosity promotes the goal by facilitating partnerships and collaborations among musicians from diverse backgrounds, thereby boosting international cooperation and fostering a sense of global community within the music industry.

⁶⁸ F6S. *Melosity*. Available at: <https://www.f6s.com/company/melosity> [Accessed: 8 May 2024]

3. The Recording Industry: Environmental Considerations

“The cost of listening to recorded music has never been lower - but the environmental cost has never been higher”

Kyle Devine⁶⁹

The recording industry is a subsection of the music industry that deals specifically with the production and subsequent promotion and distribution of music⁷⁰. Its specific declinations have been shaped by successive developments in the *medium* through which music is accessed, spanning from the inception of the phonograph in the 1920s to the contemporary landscape dominated by music streaming platforms.

As the industry evolves, with advancements in technology and changes in consumer behaviour, so too does its ecological footprint. This encompasses a broad spectrum of activities, from the energy-intensive processes of music production and recording studios to the carbon emissions associated with the digital distribution of music and the physical waste generated by promotional materials.

Moreover, the transition from physical formats, such as vinyl records and CDs, to digital streaming platforms has shifted the environmental considerations from manufacturing and material waste to the energy consumption of data centres that power streaming services. This nuanced landscape presents both challenges and opportunities for mitigating environmental impacts, making it imperative to explore sustainable practices within this industry sector. In doing so, it is crucial to balance the cultural value and economic significance of music with the imperative of environmental sustainability, aiming to reduce the carbon footprint while fostering innovation and creativity in music production, promotion, and distribution.

This chapter delves into the comparative environmental footprints of the current main music consumption *media*: vinyl, CDs, and streaming. Each *medium* offers distinct environmental considerations, from resource utilization and energy consumption to waste generation and carbon emissions, underscoring the complex relationship between music consumption practices and environmental sustainability.

⁶⁹ University of Glasgow. (2019) *Music consumption has unintended economic and environmental costs*. Available at: https://www.gla.ac.uk/news/archiveofnews/2019/april/headline_643297_en.html [Accessed: 8 May 2024]

⁷⁰Pastukhov, D. (2024). *The Mechanics of Recording Industry: A Brief History & Its Functions*. Available at: <https://soundcharts.com/blog/mechanics-of-the-recording-industry> [Accessed 12th March 2024].

3.1 Vinyl Records: A Retro Renaissance and its Environmental Implications

The introduction of the vinyl record, in the 1950s, marked a significant shift in the era of recorded music. Unlike the previous acoustic era, characterized by phonographs and gramophones operating without electricity, the vinyl record propelled the industry into the electrical analogue era, while also leading in what can be called “the plastic era”, which comprehends LP records, 45s, cassettes, and CDs⁷¹.

With the adoption of vinyl records, consumers not only began consuming electricity for playback but also polyvinyl chloride (PVC) to produce records. This specific polymer of plastic is at the core of the environmental concerns regarding the use of this *medium*. Under ideal circumstances, characterized by low oxygen levels and minimal movement, discarded PVC materials could endure for centuries before decomposition. However, the prevailing conditions found in most landfill sites, which include diverse soil acidity levels and fluctuating temperatures, may induce discarded vinyl records to leach plasticisers: additives integrated into plastics to confer flexibility and resilience. Consequently, PVC materials could persist way beyond the lifespan of the landfill itself or potentially migrate into the surrounding environment, thereby working as pollutants.

A recent study by Sharon George and Deirdre McKay, professors at Keele University, disclosed that vinyl records comprise approximately 135 grams of PVC material, contributing to a carbon footprint equivalent to 0.5 kg of CO₂ emissions. This estimation is based on an assumed emission rate of 3.4 kg of CO₂ per every kilogram of PVC material⁷².

To this day, the peak year of production of vinyl records in the USA is 1977, when the recording industry sold 344 million albums, used 58 million kg of plastic, and therefore produced 140 million kg of GHGs⁷³.

During the 1980s and 1990s, the landscape of music consumption underwent a seismic shift as vinyl records experienced a precipitous decline in popularity. Statistics from the Recording Industry Association of America (RIAA)⁷⁴ reflect this change: in 1980, vinyl records accounted for

⁷¹ Brennan, M., 2020. The Environmental Sustainability of the Music Industries. In: pp.37-49. doi: 10.1007/978-3-030-49384-4_4. Available at: https://www.researchgate.net/publication/344356742_The_Environmental_Sustainability_of_the_Music_Industries/references [Accessed: 12 April 2024]

⁷² George, S., & McKay, D. (2019, January 18). The environmental impact of music: digital, records, CDs analysed. Keele University. Available at: <https://www.keele.ac.uk/about/news/2019/january/music/environmental-impact.php> [Accessed: 9 April 2024]

⁷³ Brennan M, Devine K. The cost of music. *Popular Music*. 2020;39(1):43-65. doi:10.1017/S0261143019000552

⁷⁴ Recording Industry Association of America. U.S. Sales Database. Available at: <https://www.riaa.com/u-s-sales-database/> [Accessed: 12 April 2024]

approximately 50% of music sales in the United States. However, by the mid-1990s, their market share had plummeted to a mere 5%. Conversely, cassette tapes and CDs surged in popularity, with CDs overtaking as the dominant format by the early 1990s.

Even if there were and there are no structural and technological reasons, vinyl records rose again in the last decades. Driven by a resurgence of interest in tangible music formats, an appreciation for the distinctive sound quality of vinyl, and a desire to establish a more personal connection to music, the revival of LPs and 45s peaked in the 2020s.

One notable catalyst was the acclaimed artist Taylor Swift, whose impact on vinyl sales was widely acknowledged by industry publications and record stores. Swift's album "Midnights," released in 2022, achieved a historic milestone by outselling CDs, a feat not accomplished since 1987. In the United States alone, approximately 600,000 vinyl copies were sold, with an additional 80,000 sold in the United Kingdom at the time of this record-breaking achievement⁷⁵.

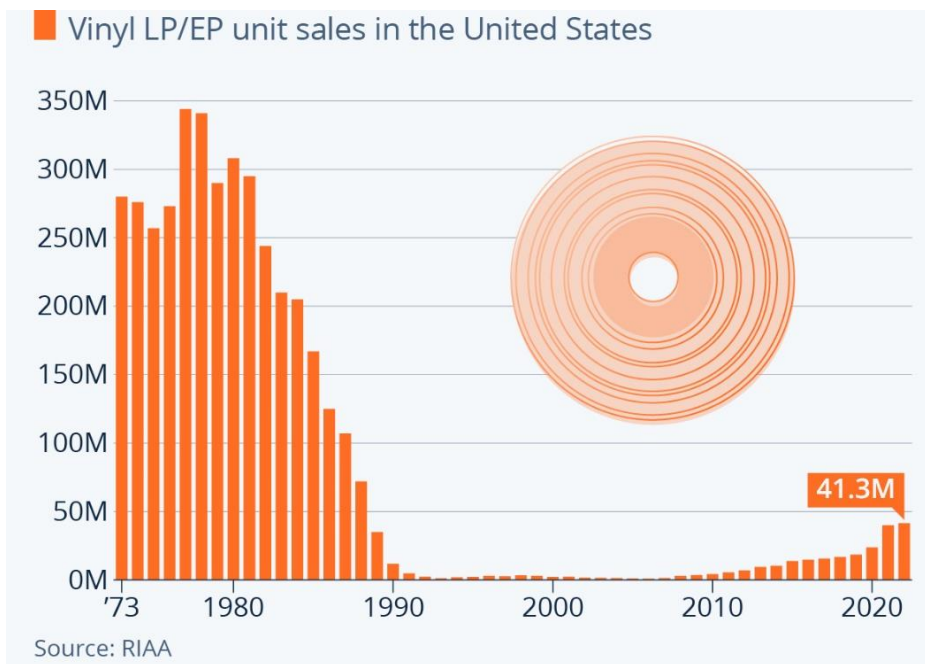
In its latest annual revenue report for 2023, the Recording Industry Association of America (RIAA) disclosed that the US recording industry dispatched 43.2 million vinyl records⁷⁶. Based on these figures, it is estimated that vinyl production in the US for the same year consumed roughly 7.3 million kg of PVC plastic, leading to the emission of approximately 43.2 million kg of greenhouse gases (GHG)⁷⁷, not taking transport and packaging into account.

⁷⁵ Euronews (2022) *Taylor Swift's 'Midnights' breaks a new record and rides the wave of vinyl revival*. Available at: <https://www.euronews.com/culture/2022/12/28/taylor-swifts-midnights-breaks-a-new-record-and-rides-the-wave-of-vinyl-revival> [Accessed: 12th April 2024].

⁷⁶ Recording Industry Association of America (2023) *2023 Year-End Music Industry Revenue Report*. Available at: <https://www.riaa.com/reports/2023-year-end-music-industry-revenue-report-riaa/> [Accessed: 12th April 2024]

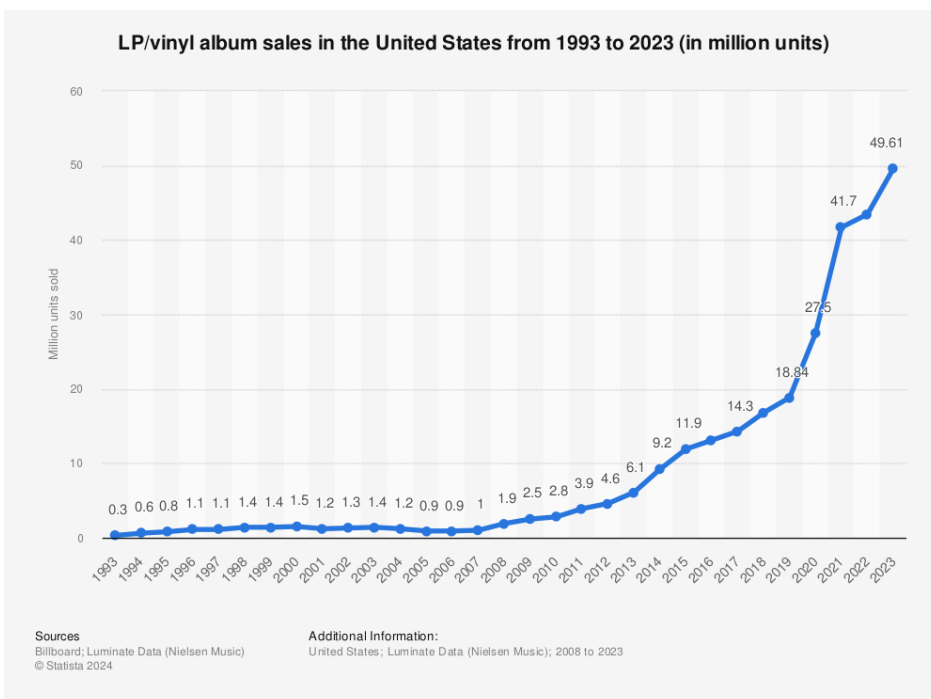
⁷⁷ These calculations are based on the methodology used by Matt Brennan and Kyle Devine in "The cost of music" but updated for 2023 data by myself.

[Fig. 3 – Vinyl LP/EP Unit Sales in the USA]



Source: Recording Industry Association of America (RIAA)⁷⁸

[Fig.4 – LP/EP Album Sales in the USA from 1993 to 2023]



⁷⁸ Recording Industry Association of America (RIAA). (2020) *Vinyl LP/EP unit sales in the United States*. Available at: <https://www.riaa.com> [Accessed: 8 May 2024]

Source: Statista⁷⁹

In the pursuit of sustainable solutions, innovative approaches are emerging. A group of eight Dutch companies has embarked on a project aimed at eco-friendly vinyl production, exploring alternatives to traditional PVC materials. However, at a prominent industry conference held in Los Angeles in 2019, where the Green Vinyl Records prototype recordings⁸⁰ were unveiled, scepticism abounded. Critics derided the recordings for their subpar audio quality and perceived inferiority. Despite such criticism, one of the group's leaders lamented the reluctance of vinyl enthusiasts to embrace change⁸¹. This contradiction is intriguing, as vinyl collectors are often stereotyped as environmentally conscious individuals, shedding light on a fascinating aspect of contemporary discourse: the clash between perception and reality, revealing a nuanced picture of human behaviour.

3.2 Compact Discs: an unfortunate decline

Compact discs were made available to the public in 1982, jointly developed by Sony and Phillips. Their success is due to a level of convenience and durability that had never been seen before, allowing listeners to enjoy high-quality audio recordings virtually anywhere.

CDs are composed of layered polycarbonate and aluminium, materials that exhibit a relatively lower environmental impact compared to polyvinyl chloride (PVC), and they are manufactured using fewer resources in comparison to vinyl records. However, the recycling of CDs presents a significant challenge due to their composite nature, made of complex and economically unviable materials to separate for recycling purposes. Furthermore, CDs are often stored in fragile polycarbonate cases, which, despite being composed of a single material, are not extensively recycled. Contrary to initial perceptions of durability, CDs are not as resilient as commonly believed: they are easily damaged by direct exposure to sunlight and heat, and warped by fast-changing temperatures, scratches, and fingerprints. The result is millions of kg of CD being discarded in landfills and becoming e-waste every year⁸².

⁷⁹ Statista. (2024) *LP/vinyl album sales in the United States from 1993 to 2023*. Data from Billboard and Luminate Data (Nielsen Music). Available at: <https://www.statista.com> (Accessed: 8 May 2024).

⁸⁰ Green Vinyl Records. Available at: <https://greenvinylrecords.com/> [Accessed: 9 April 2024]

⁸¹ Devine, K. (2020, January 28). Nightmares on wax: the environmental impact of the vinyl revival. *The Guardian*. Available at: <https://www.theguardian.com/music/2020/jan/28/vinyl-record-revival-environmental-impact-music-industry-streaming#comments>. [Accessed: 9 April 2024]

⁸² Keele University. The environmental impact of music: digital, records, CDs analysed. Available at: <https://www.keele.ac.uk/about/news/2019/january/music/environmental-impact.php>. [Accessed: 16 April 2024]

In the year 2000, CDs reached their peak production in the USA, with sales surpassing 942.5 million albums, nearly three times the number of vinyl albums sold during their most successful year. It has been estimated that the production of CDs alone in that year consumed 61 million kg of plastic, resulting in the generation of 157 million kg of CO₂ equivalent⁸³. Despite the lower environmental impact of an individual CD compared to a vinyl LP, the widespread success of CDs contributed to significantly higher pollution emissions and a greater overall impact on the planet.

The mid-2000s witnessed a digital revolution in the music industry, marked by the advent of MP3 players, digital downloads, and streaming services. This transformation posed a significant challenge to the longstanding dominance of CDs. Over time, the success of CDs steadily declined, as evidenced by the latest report from the Recording Industry Association of America (RIAA) in 2023, which estimated that only 37 million CDs were shipped that year⁸⁴, resulting in the consumption of 7.3 million kg of plastic and the emission of 43.2 million kg of CO₂ equivalent⁸⁵. Despite the resurgence of interest in vinyl records, with their production levels now comparable to CDs, it is worth noting that CDs have a significantly lower environmental impact. Given this environmental perspective, perhaps there is merit in considering a revival of CDs rather than solely focusing on vinyl records. Such a shift could offer a more environmentally sustainable option for music enthusiasts, while also acknowledging the enduring value and appeal of physical media in the digital age.

3.3 Digital download vs Streaming: Carbon footprint

Since the development of the MP3 coding format in 1993, which marked the beginning of “the data era”⁸⁶ in music, there has been a transformative shift in how music is consumed. This era marked a significant pivot from physical media to digital formats, starting with the ascendance of digital downloads.

Pioneered by platforms such as Apple's iTunes, which launched in 2001, digital downloads allowed consumers to purchase individual songs or entire albums directly over the Internet with unprecedented convenience and accessibility. The popularity of portable digital music players, most notably the iPod, further fuelled this trend.

According to data from the Recording Industry Association of America (RIAA), digital downloads in the United States reached their peak in 2012, with 1.4 billion music singles purchased, accounting

⁸³ Brennan M, Devine K. The cost of music. *Popular Music*. 2020;39(1):43-65. doi:10.1017/S0261143019000552

⁸⁴ RIAA. 2023 Year-End Music Industry Revenue Report | RIAA. Available at: <https://www.riaa.com/reports/2023-year-end-music-industry-revenue-report-riaa/> [Accessed: 16 April 2024]

⁸⁵ These calculations are based on the methodology used by Matt Brennan and Kyle Devine in “The cost of music” but updated for 2023 data by myself.

⁸⁶ Brennan M, Devine K. The cost of music. *Popular Music*. 2020;39(1):43-65. doi:10.1017/S0261143019000552

for 77.8% of that year's total sales volume. While direct comparisons between digital downloads and physical formats such as vinyl and CDs are not feasible due to their inherently different natures, it is possible to compare their environmental impacts in terms of greenhouse gas (GHG) emissions per megabyte. Typically, a song encoded at standard quality using the common MP3 format might result in a file size of approximately 2.16 megabytes per song. For higher-quality audio streams, the file sizes could be larger, potentially reaching up to 10 MB or more per song. Intending to be optimistic, I will consider that a single download weighs 2.16 megabytes⁸⁷. Given that 1 megabyte generates 20 grams of CO₂⁸⁸, it can be estimated that in 2012, digital downloads in the US generated 64.8 million kg of carbon emissions. This data actually shows that digital downloads are the greenest way of listening to music. Moreover, it is essential to note that I am specifically referring to digital downloads of individual tracks, whereas a LP or CD can contain as many as 12 tracks each⁸⁹.

However, the latest report from the Recording Industry Association of America (RIAA) highlights a significant decline in digital downloads in the US, with only 142 million music singles purchased in 2023, with a total decrease of almost 90%. By the same reasoning as the previous paragraph, it can be estimated that in 2023 digital downloads generated 6.1 million kg of CO₂.

This sharp decline can be largely attributed to the introduction of streaming platforms, which gained massive popularity in the mid-2010s. This shift represents a fundamental change in the music industry's business model, moving from a commodity-based system—focused on the sale of physical and downloadable music to a service-oriented model. In this contemporary framework, music is accessed as a transient experience via cloud storage. For a modest monthly fee of approximately \$9.99, just over 1% of the average weekly salary in the USA, consumers can enjoy unlimited, ad-free access to an extensive library of recorded music across platforms such as Spotify, Apple Music, YouTube, and Amazon.

Streaming rapid rise to mass adoption is numerically incredible. Globally, streaming accounted for 67% of recorded music revenues in 2023, as the number of users of paid streaming subscriptions offered by Spotify and other platforms continued to soar. Starting at 8 million in 2010, the number of users of paid music subscriptions passed 100 million in 2016, 250 million in 2018 and 500 million in 2021. In 2023, paid streaming services added 78 million new users compared to the previous year, bringing the total number of users to 667 million, 15 years after the European launch of Spotify rang

⁸⁷ Wiwatowska, A. (2021). How Much Data Does Spotify Use? WhistleOut. Available at: <https://www.whistleout.com.au/MobilePhones/Guides/How-Much-Data-Does-Spotify-Use#:~:text=How%20much%20data%20downloading%20on> [Accessed: 16 April 2024].

⁸⁸ Thijs Biersteker. (n.d.). Thijs Biersteker —MB > CO₂. [online] Available at: <https://thijsbiersteker.com/mbco2> [Accessed: 16 April 2024]

⁸⁹ These calculations are done by myself and are based on given data.

in the streaming era.⁹⁰In the US alone, there are a remarkable 96.8 million paid music streaming subscribers. This figure stands in stark contrast to the scenario in the first half of 2014 when there were only 7.7 million music streaming users in the country⁹¹.

Streaming music from home may seem environmentally benign at first glance, due to the dematerialization of the activity and the consequent elimination of the environmental concerns of plastic consumption. However, the infrastructure supporting this service contributes significantly to environmental degradation.

Every stage of music streaming is energy intensive. Globally located server farms house extensive rows of hard drives that store vast amounts of data, including text messages, photos, and the contents of music streaming platforms like Spotify and Apple Music. These hard drives consume significant amounts of energy both to power and to cool. Data centres, which host these servers, require large amounts of energy to operate efficiently. While situating data centres in colder regions like Iceland may help leverage natural cooling, the environmental costs of their operation remain significant.

When a song is streamed, data travels from these server farms to more local access networks via underground and undersea cables, which also require energy. Once local, data are cached on a nearby server to reduce errors and lags for future streams. As the song reaches your device, it relies on a Wi-Fi or other internet connection, as well as a charged phone or laptop. Although this process might seem "invisible" compared to the tangible manufacturing of vinyl, it still incurs substantial energy costs. The global proliferation of data centres has led to a sharp increase in energy demands, raising sustainability and environmental concerns associated with this modern *medium*.

On a per-unit basis, streaming has a significantly lower carbon footprint than any physical format. Estimates suggest that an hour of media streaming emits approximately 55 grams of CO₂ equivalent. To give a sense of scale, New Statesman data analysis shows the carbon footprint of Spotify streams of Olivia Rodrigo's hit single "Drivers License" since January 2021 is greater than flying from London to New York and back 4,000 times, or the annual emissions of 500 people in the UK.

⁹⁰ Statista Infographics. Infographic: A Decade of Growth for Music Streaming. Available at: <https://www.statista.com/chart/24506/users-of-paid-music-streaming-subscriptions/> [Accessed: 8 May 2024]

⁹¹ Statista. (2019). U.S. paid music subscribers 2019 | Statista. [online] Available at: <https://www.statista.com/statistics/707103/paid-streaming-music-subscribers-usa/> . [Accessed: 16 April 2024]

[Fig. 5 – Comparative Analysis of Streaming Music CO₂ Emissions]

Tonnes of CO₂ emissions



Source: Sharon George, Keele University; Atmosfair; WorldBank

THE NEW STATESMAN

Source: The New Statesman

In contrast, CDs emit over three times this amount, while vinyl and cassettes release over 2 kg of CO₂ per unit. Despite these savings, the dramatic increase in our music consumption has offset these environmental benefits. From 1977 to 2016, carbon emissions from recorded music formats in the US increased by 45%, totalling over 2 million kg per year, with digital formats accounting for 94% of that figure.

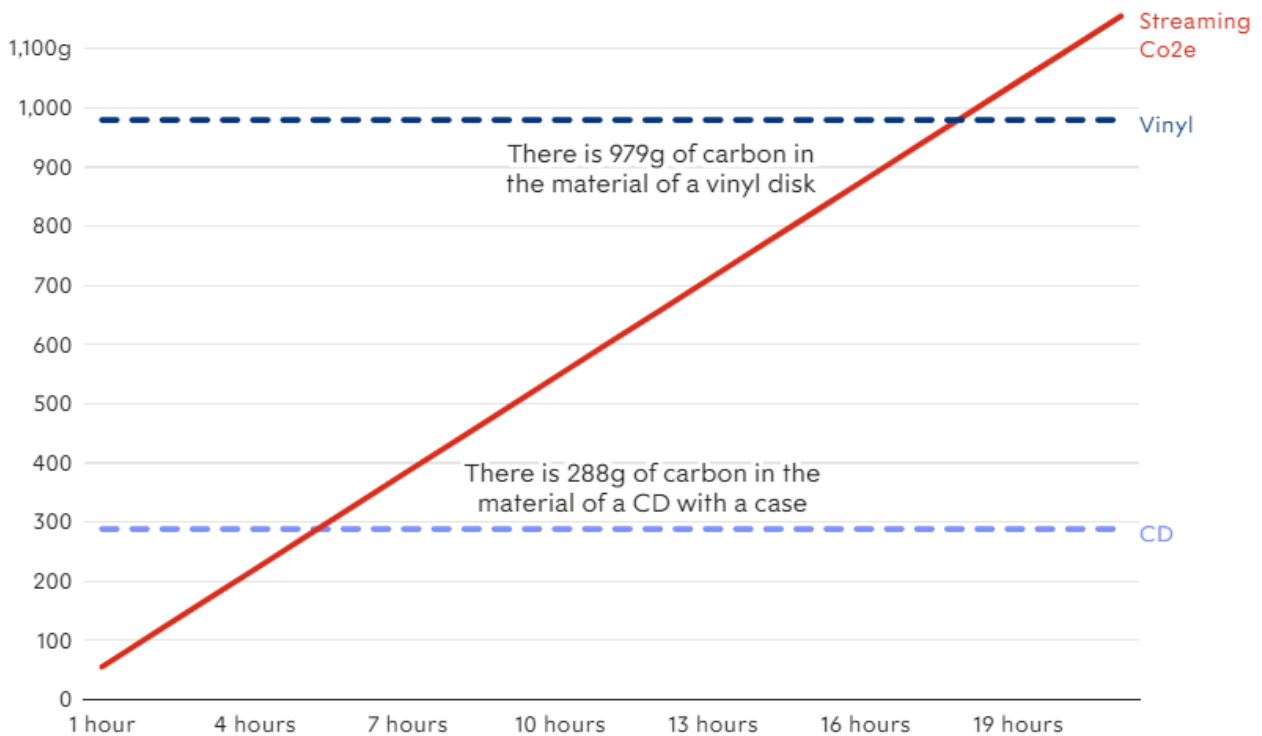
The 42 % of the abovementioned emissions, approximately 70 billion kg of CO₂, is directly produced by the listener. User-side emissions primarily arise from streaming rather than downloading. If all songs were downloaded and not repeatedly streamed, there would be an 80% reduction in CO₂ emissions from the second listening onward. In other words, the environmental impact would be mitigated after the first listen. Furthermore, because downloading has a lesser impact on battery life, choosing to download rather than stream music would eliminate an additional 47 million kg of CO₂. These are approximate figures that do not account for the emissions from servers related to downloads as distinct from streaming, but even considering this, the difference remains significant.

In 2019, Sharon George and Deirdre McKay found out that if you listen to an album more than 27 times, it is more environmentally efficient to purchase the CD rather than stream it. By October 2021, George had revised this calculation with updated carbon reporting figures for plastics (used in both CDs and their cases) and media streaming. She concluded that streaming an album for just five hours generates as much carbon as the plastic used in a CD. For vinyl records, this comparative duration is 17 hours⁹².

⁹² Peirson-Hagger, E. and Swindells, K. (2021). How environmentally damaging is music streaming? [online] New Statesman. Available at: <https://www.newstatesman.com/environment/2021/11/how-environmentally-damaging-is-music-streaming>. [Accessed: 16 April 2024]

[Fig. 6 – Grams of CO₂ Emissions per Hour of Streaming Music, CD or Vinyl]

Grams of CO₂-equivalent emissions per hour of streaming music, compared to the plastic of a CD or vinyl album



Source: Sharon George, Keele University

THE NEW STATESMAN

Source: The New Statesman

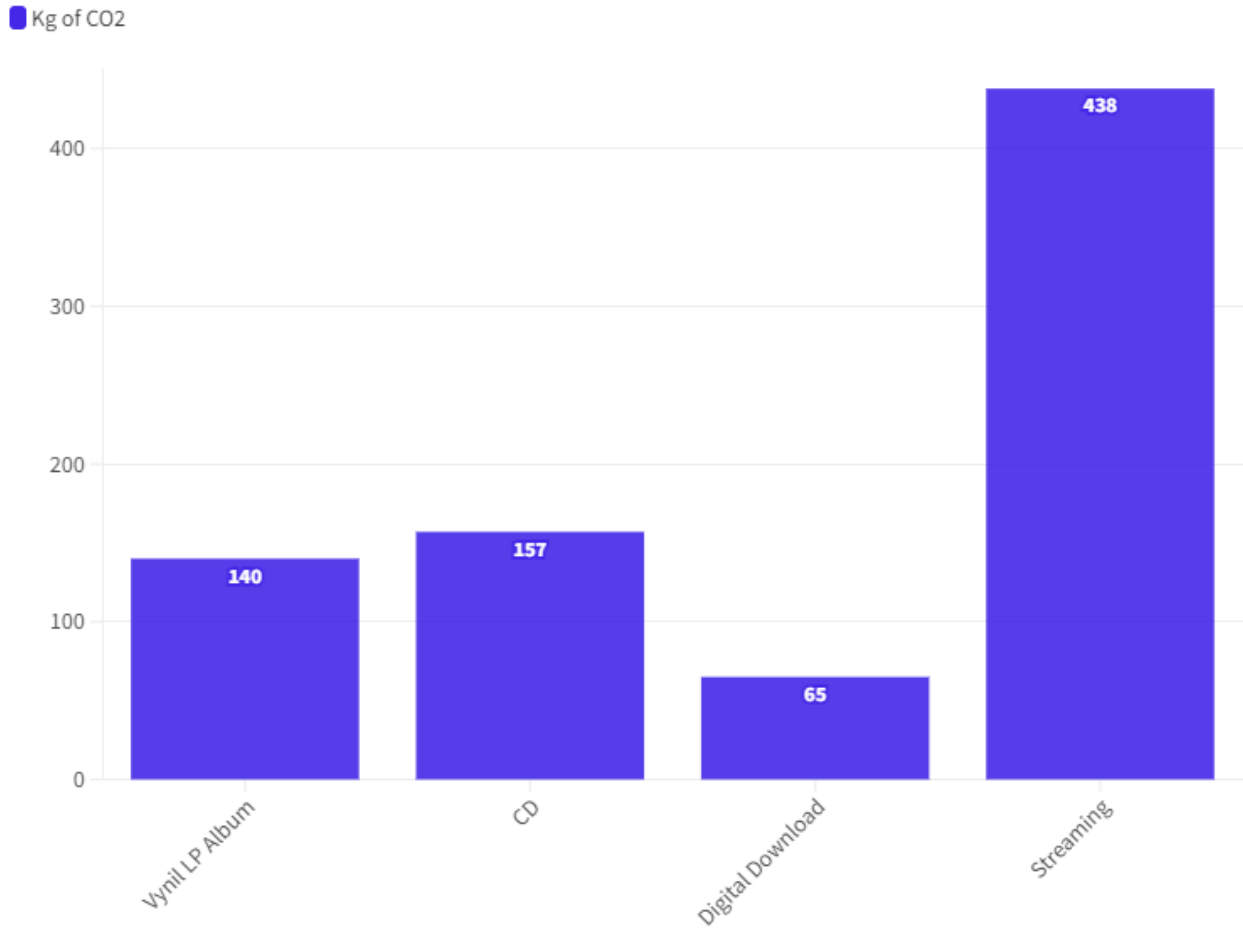
To compare streaming’s carbon emissions to the ones of the aforementioned *media*, George considers the carbon footprint from a volume of streams perspective. According to the Luminate Music Report of 2023, in the US the number of on-demand audio streams was 5.7 billion⁹³. The amount of megabytes used to stream a song depends on the audio quality and on the overall length of the song; for simplicity purposes, I will consider the average quantity: 3,84 megabytes⁹⁴. Using the same proportions used for digital downloads, it can be estimated that in 2023 music streaming in the US

⁹³ Peoples, G. (2024). U.S. Music Consumption Saw Double-Digit Growth in 2023 as Streaming Surged, Sales Rebounded. [online] Billboard. Available at: <https://www.billboard.com/pro/2023-u-s-year-end-luminate-music-report-streaming-rises-sales-rebound/> [Accessed: 16 April 2024].

⁹⁴ Gordon, O. (2023). How much Data Does Spotify use - Ultimate Guide 2023. Talk Home Blog - Stories, Lists, Tips & Tricks. Available at: <https://blog.talkhome.co.uk/technology/how-much-data-does-spotify-use/> [Accessed: 16 April 2024]

generated 437.8 million kg of CO₂⁹⁵. This data effectively shows that music streaming is the most polluting *medium* of music consumption in the history of recorded music.

[Fig. 7 – Carbon Emissions of LP, CD, Digital Downloads and Streaming in Their Peak Years]



Source: Our elaboration

⁹⁵ These calculations are done by myself and are based on given data.

4. Live Music: Sustainability on Stage and Beyond

The live music sector is the strand of the wider music industry that stages shows, tours, and festivals, runs venues, sells tickets, and works with frontline artists on monetizing their live performances⁹⁶. According to the latest Cognitive Market Research, the global live music market generated 58.9 billion dollars in 2023 (more than the GDP of countries like Latvia, Croatia, and Costa Rica) and will grow at a compound annual growth rate (CAGR) of 6.2% from 2023 to 2030⁹⁷.

The roots of the live music industry trace back centuries when musical performances were central to cultural and social gatherings like the *symposia* in Ancient Greece. Over time, technological advancements, coupled with shifts in consumer behavior, have revolutionized the landscape. From the emergence of concert halls in the 17th century to the rise of mega music festivals in the 20th and 21st centuries, the industry has continually adapted to meet the demands of an ever-changing audience. As spectators become increasingly environmentally conscious, the need for sustainable practices within music festivals and touring has gathered significant attention.

Although its influence may seem intangible, the live music industry's environmental impact is significant. According to an assessment conducted by the environmental consultancy Julie's Bicycle, the UK music sector emits an estimated 540,000 tons of carbon dioxide equivalent⁹⁸ into the atmosphere each year. Remarkably, the live music sector accounts for the vast majority, approximately 75%, of these emissions⁹⁹.

In a recent study by the startup Musicians For Sustainability, it has been estimated that live music events in the US can generate up to 53 million kg of waste each year, thereby producing 400 million kg of carbon emissions. Moving to Europe instead, it has been assessed that in the UK touring produces at least 85 million kg of CO₂ which must be added to the 25 million kg from music festivals¹⁰⁰.

⁹⁶ CMU Library. (n.d.). Live Music. Available at: <https://cmulibrary.com/livemusic/#:~:text=The%20live%20music%20sector%20is,on%20monetising%20their%20live%20performances.&text=Promoters%20are%20the%20primary%20risk%20takers%20in%20live%20music.> [Accessed: 18 April 2024]

⁹⁷ Cognitive Market Research. *Live Music Market Report*. Available at: <https://www.cognitivemarketresearch.com/live-music-market-report> [Accessed 9 May 2024].

⁹⁸ Carbon dioxide equivalent (CO₂e) is a measure expressing the global warming potential of different greenhouse gases in terms of an equivalent amount of carbon dioxide (CO₂).

⁹⁹ Bottrill, C., G. Lye, M. Boykoff, and D. Liverman. 2008. *First steps: UK music industry greenhouse gas emissions for 2007*. Oxford: Julie's Bicycle.

¹⁰⁰ Powerful Thinking. (2017). *The Powerful Thinking Guide 2017*. Available at: <https://www.powerful-thinking.org.uk/resources/powerful-thinking-guide-2017/> [Accessed: 9 May 2024].

In light of this, the rest of this chapter delves into the concept of sustainability in the live music industry, examining the environmental footprint of music festivals and touring, with the aid of a case study and a comparative analysis.

4.1 Environmental Footprint of Music Festivals

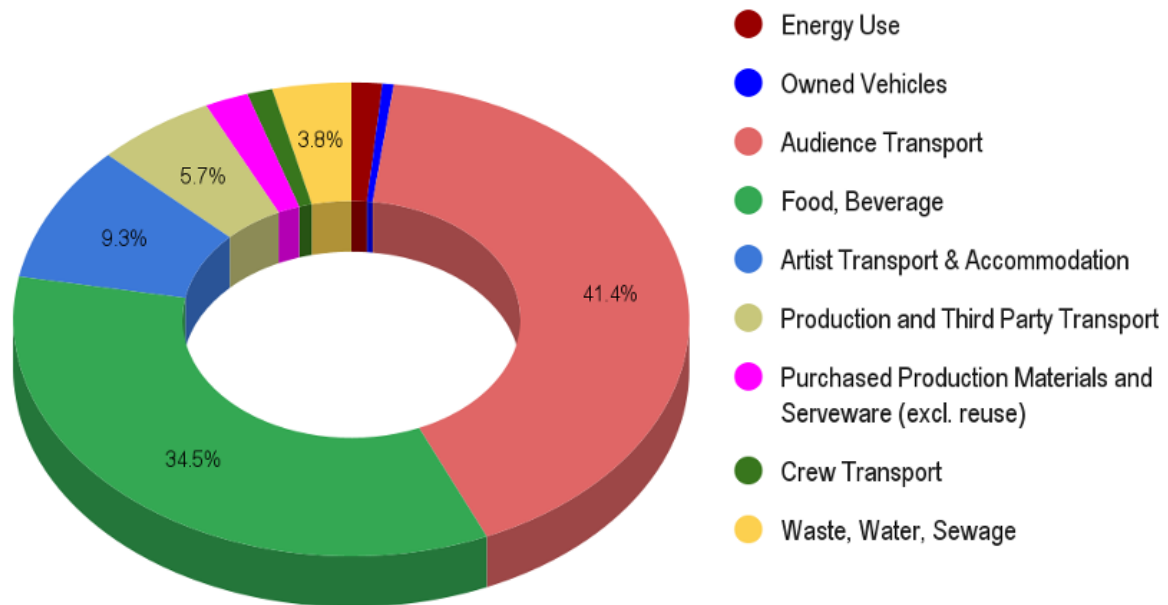
Festivals play a pivotal role within the cultural sector, providing a space for creative experiences, nurturing talent, and cultural innovation. However, like any event requiring significant movements of people, logistics, and resources, they also have a substantial environmental impact.

Carbon analyses within the festival sector, over the past fifteen years, have primarily emphasised the significance of audience travel, with findings consistently indicating that over 80% of festival emissions stem from that. However, many of these studies have tended to concentrate on a restricted range of emissions sources, frequently omitting those linked to food and beverages, production materials, merchandise, or the broader transportation of production load and suppliers to the event site. Conversely, recent data from European and UK festivals collected by A Greener Festival¹⁰¹, indicates that audience transport, whilst still the largest single contributor, represents not more than 41% of the total footprint. When accounting for all mobility emissions, adding artist travel, production, supplier, and trader travel, this amount increases to on average 58% of an event's total carbon impact. Artist travel-related emissions make up nearly 10%, while the emissions associated with wider supply chain transport represent over 5% of the average footprint.

The production and consumption of food and beverages emerged as the second most significant source of emissions, accounting for 34% of the average carbon footprint. This proportion is substantially affected by the nature of menu offerings, including meat-based or plant-based options, and the volume of beverages sold during the events. Eliminating meat from menus has been shown to notably decrease the average food-related emissions per person, with reductions observed in some cases by up to a third.

¹⁰¹ A Greener Future. *Carbon Impacts Assessment*. Available at: <https://www.agreenerfuture.com/carbonimpactsassessment> [Accessed: 9 May 2024].

[Fig. 8 – Carbon Footprint Breakdown by Activity for Live Events]



Source: A Greener Future

Festival sustainability becomes even more challenging when we look at the energy consumption of these events. A sizable music festival can consume up to 30,000 megawatts of electricity over a weekend, which is about the same as a small city¹⁰². Music festivals are primarily powered by generators that run on diesel fuel¹⁰³. For major festivals, the average consumption of diesel fuel amounts to approximately 0.49 liters per person per day, while for small to medium-sized festivals, this figure decreases to about 0.26 liters per person per day. To illustrate those numbers with a tangible example, it is interesting to take into consideration Coachella, the most famous music festival in US. With 600,000 daily attendees, the festival would thus require 299.649 liters of diesel fuel, which, according to data from the U.S. Energy Information Administration, can produce 809.054 kg of carbon dioxide every day; it would take approximately 15,000 trees to absorb that amount of carbon emissions.

The main reason why diesel generators are used at these outdoor events is because they are often being hosted in the middle of green outdoor spaces, with no access to readily available electricity or

¹⁰² FestivalPro. (2022). *Managing Electricity Demand and Supply for Music Festivals*. Available at: <https://www.festivalpro.com/festival-management/2117/news/2022/10/10/Managing-Electricity-Demand-and-Supply-for-Music-Festivals.html> [Accessed: 9 May 2024].

¹⁰³ Joule Case. *Energy and Carbon Impact of Various Outdoor Events*. Available at: <https://www.joulecase.com/blog/energy-and-carbon-impact-of-various-outdoor-events> [Accessed: 9 May 2024].

outlets. However, advancements in battery technology are challenging this reliance on diesel. While batteries were once inefficient and expensive, recent years have seen significant improvements, driven by the rise of electric vehicles and home energy storage systems. These advancements suggest that batteries will become increasingly compact, efficient, and affordable in the coming decade, potentially offering a more sustainable alternative to diesel generators for powering outdoor events; if these batteries are charged by solar installations or other renewable sources, they can bring emission reductions to 100%.

The profound environmental impact of music festivals is most evident in the significant generation of waste, posing a tangible challenge to sustainability efforts. In 2020 it was reported that 23,500 tonnes of waste had been generated over the year at music festivals alone in the UK. Additionally, continuing to take the UK as a paradigm, the management of festival waste imposes a substantial financial burden, amounting to approximately 10 million £ annually. Of particular concern is the limited recyclability of festival waste, with only an average of 20% being eligible for recycling, while the remaining portion accumulates in landfills worldwide¹⁰⁴. A primary contributor to this waste dilemma is the abandonment of tents by festival attendees. Despite the opportunity for on-site camping to enhance the immersive festival experience, a substantial number of attendees neglect to retrieve their tents upon departure. An estimated 250,000 tents are left abandoned at festivals across the UK each year, constituting a significant portion of festival waste. Comp-A-Tent's research indicates that a staggering 77% of camping tents used at festivals are abandoned, resulting in a colossal 900 tonnes of non-recyclable or repurposable waste¹⁰⁵. Furthermore, littering exacerbates the environmental impact of festivals, with the volume of litter left behind equating to approximately 8,000 wheelie bins per festival.

4.2 Case Study: Sustainability Efforts at Glastonbury Festival

The Glastonbury Festival, acknowledged as the largest music festival and a pinnacle of performing arts in the United Kingdom, is situated amidst the picturesque Somerset countryside in England. Since its inception in 1970, the festival has burgeoned into a cultural icon, celebrating its 55th year in 2024 with a record ticket sale of 210,000 tickets¹⁰⁶. Alongside showcasing live music performances by

¹⁰⁴ Powerful Thinking. (2020). *The Show Must Go On*. Available at: <https://www.powerful-thinking.org.uk/resources/> [Accessed: 9 May 2024]

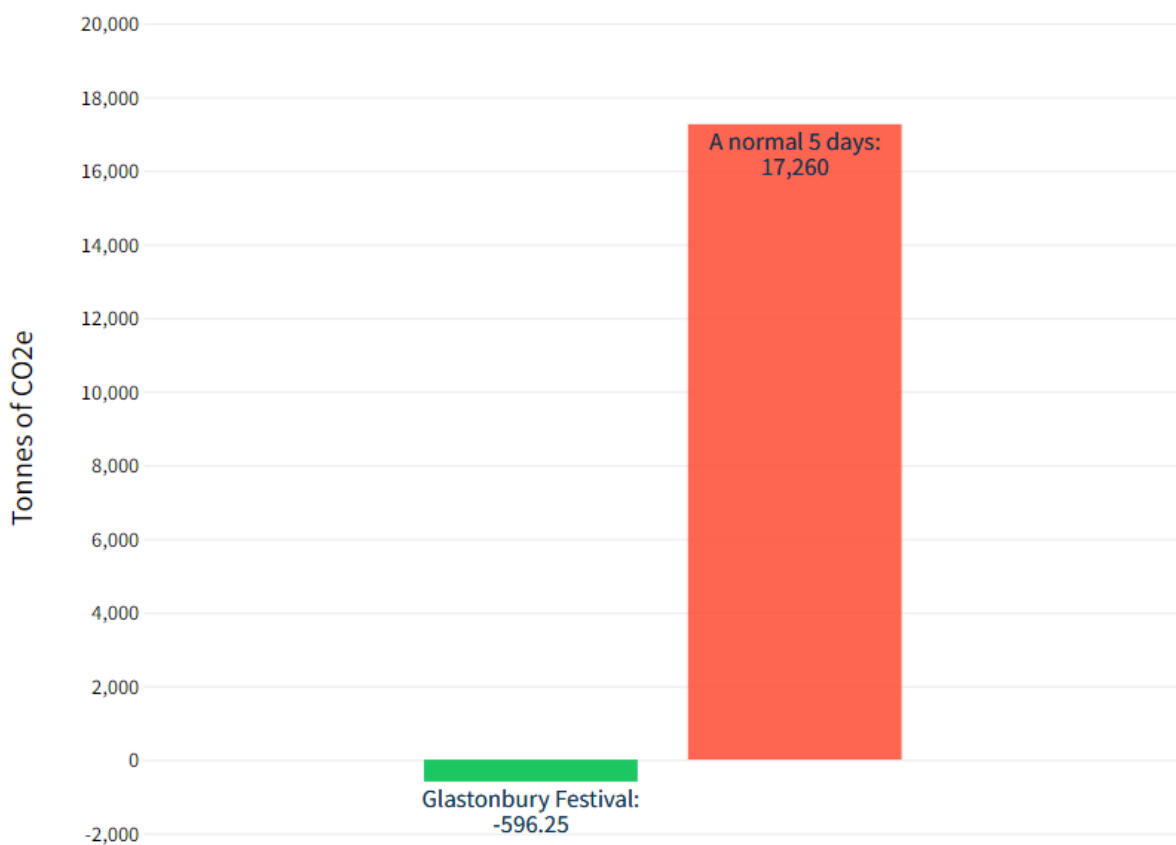
¹⁰⁵ Comp-A-Tent. *Research on Festival Tent Waste*. Available at: <https://www.wastemanaged.co.uk/festival-waste-management-guide> [Accessed: 9 May 2024].

¹⁰⁶ BBC News. (2023). *Glastonbury Festival introduces reusable cups in sustainability drive*. Available at: <https://www.bbc.com/news/uk-england-somerset-67454066> [Accessed: 9 May 2024].

internationally acclaimed artists, the festival boasts an eclectic array of entertainment including dance, comedy, theatre, circus, and cabaret acts. This diverse lineup annually draws millions of music enthusiasts, artists, and spectators, solidifying its status as a key economic driver in the United Kingdom, generating an estimated £168 million in local economic benefits¹⁰⁷. Despite facing huge environmental challenges, the festival is a great example of how live events can have a beneficial rather than detrimental impact on the planet.

A recent study by The Eco Experts¹⁰⁸ states that Glastonbury, the biggest UK music festival, which attracts more than 200,000 attendees and creates 2 million kg of rubbish each year, actually has a net positive impact on the climate, producing a carbon footprint of -596.25 tonnes (-596,250 kg) of CO₂e. To provide context, if these attendees did not go to Glastonbury, the same 200,000 fans would collectively generate 17,260 tonnes (17.26 million kg) of CO₂e over five days.

[Fig. 9 – Comparison of CO₂e Emissions: Glastonbury Festival vs. Normal Five-Day Activities]



Source: The Eco Experts

¹⁰⁷ Glastonbury Festival. (2023). *Economic Impact Summary 2023*. Available at: <https://www.glastonburyfestivals.co.uk/information/educational-resources/economic-impact-summary-2023/> [Accessed: 9 May 2024].

¹⁰⁸ The Eco Experts. (2022). *Glastonbury Festival Carbon Impact Analysis*. Available at: <https://www.theecoexperts.co.uk/glastonbury-festival-carbon-impact> [Accessed: 9 May 2024].

First and foremost, Glastonbury Festival has made significant strides in waste management, aiming to minimize its environmental footprint through innovative recycling and waste reduction programs. In 2019, Glastonbury took a decisive step towards reducing plastic consumption by implementing a ban on single-use plastic bottles, effectively eliminating millions of disposable plastic items from the festival site. Building upon this initiative, the festival has continued to enforce new policies, such as permitting only compostable packets for crisps sales since 2022 and prohibiting the sale of disposable vapes as of 2023¹⁰⁹. The festival mandates the use of compostable or reusable serve-ware, such as plates, cutlery, and drinking straws, and requires market stalls to utilize FSC-assured wood for cutlery. Additionally, traders using charcoal for cooking must ensure its sustainability, with packaging meeting compostable standards and sourced either locally or certified by the FSC¹¹⁰. The festival has an on-site recycling plant, the largest events-run facility in the UK, that allows hand-separation of waste for single-stream recycling, and 1,200 eco-friendly compost toilets on-site that yield tons of nutrient-rich compost annually. Around half of all waste created by the festival is reused or recycled which adds up to 1 million kilogram of rubbish, while only 914,000 kg would be recycled otherwise, meaning that an extra 86,000 kg of waste is not wasted, saving up to 38,500 kg of CO₂e. Additionally, there has been a significant decrease in the amount of camping equipment left behind, with over 98% of tents being taken home from the past three events thanks to the implementation of a new scheme from sporting goods retailer Decathlon, which offered to buy back used tents. Anyone who purchased the retailer's most popular festival tent, the Quechua MH100 Two Person Tent, could return it for a 29.99£ gift card, in a scheme called 'No Tent Left Behind'¹¹¹.

Secondly, Glastonbury Festival prioritizes the use of renewable energy sources to power its stages, infrastructure, and facilities, thereby reducing reliance on fossil fuels and mitigating carbon emissions. Since 1984, Glastonbury Festival's Green Fields area has operated exclusively on renewable energy sources, including solar, wind, and pedal power, alongside diligent monitoring and recording of energy consumption and emissions. Over the years, the festival has endeavored to establish a fossil fuel-free standard throughout its operations. This goal was achieved in 2023, marking a significant milestone as the festival transitioned to relying entirely on renewable fuels and

¹⁰⁹ Glastonbury Festival. *Sustainability Impact Summary*. Available at: <https://www.glastonburyfestivals.co.uk/information/sustainability/impact-summary/> [Accessed: 9 May 2024].

¹¹⁰ The Forest Stewardship Council (FSC) is a global non-profit that promotes responsible forest management by certifying products from sustainably managed forests and supply chains. Its label ensures adherence to strict environmental, social, and economic standards.

¹¹¹ Verdict. (2023). *Glastonbury's Green Clean-Up: How the Festival is Going Green*. Available at: <https://www.verdict.co.uk/glastonbury-green-clean-up/> [Accessed: 9 May 2024].

energy sources. This transition involved the adoption of lower-impact, fossil-fuel-free electricity, and the integration of solar photovoltaic and battery hybrid systems into its infrastructure.

The festival's sustainability efforts include harnessing clean energy from its 1316 250kWp solar panels¹¹² installed in 2010. This substantial renewable energy system, among the largest in the UK, produces 205,700 kilowatt-hours (kWh) of electricity annually. This results in an impressive reduction of 100,900 kg of CO₂e emissions each year. Even after accounting for the 30,000 kWh required for the festival's operations, 175,700 kWh of renewable energy remains annually, translating to a saving of 86,100 kg of CO₂e emissions. Moreover, all on-site generators utilize sustainable, renewable, palm oil-free HVO fuel, derived from waste cooking oil: the festival transforms around 4,500 liters of cooking oil into biofuel every year, which powers 10-12% of the event, 1500 kg of CO₂e. A temporary 300kWh wind turbine has been used to power food stalls in the Williams Green market area, generating zero carbon emissions. As an additional measure to minimize their environmental impact, the festival has employed 185 LED towers on the site, since 2013. According to the manufacturers of these lights, their low-energy design enables them to illuminate a set for 500 hours using only one tank of fuel.

Additionally, Glastonbury Festival prioritizes promoting greener travel options, with a significant number of attendees arriving by coach, train, or bicycle each year, thereby reducing the event's overall carbon footprint. The organizers increased the cost of car tickets by 50% over four years, and have partnered with National Express to transport people to Glastonbury from around 75 places across the UK. Only 50% of the attendees arrive by car. The result of these initiatives is a saving of 19.6 million kg of CO₂e.

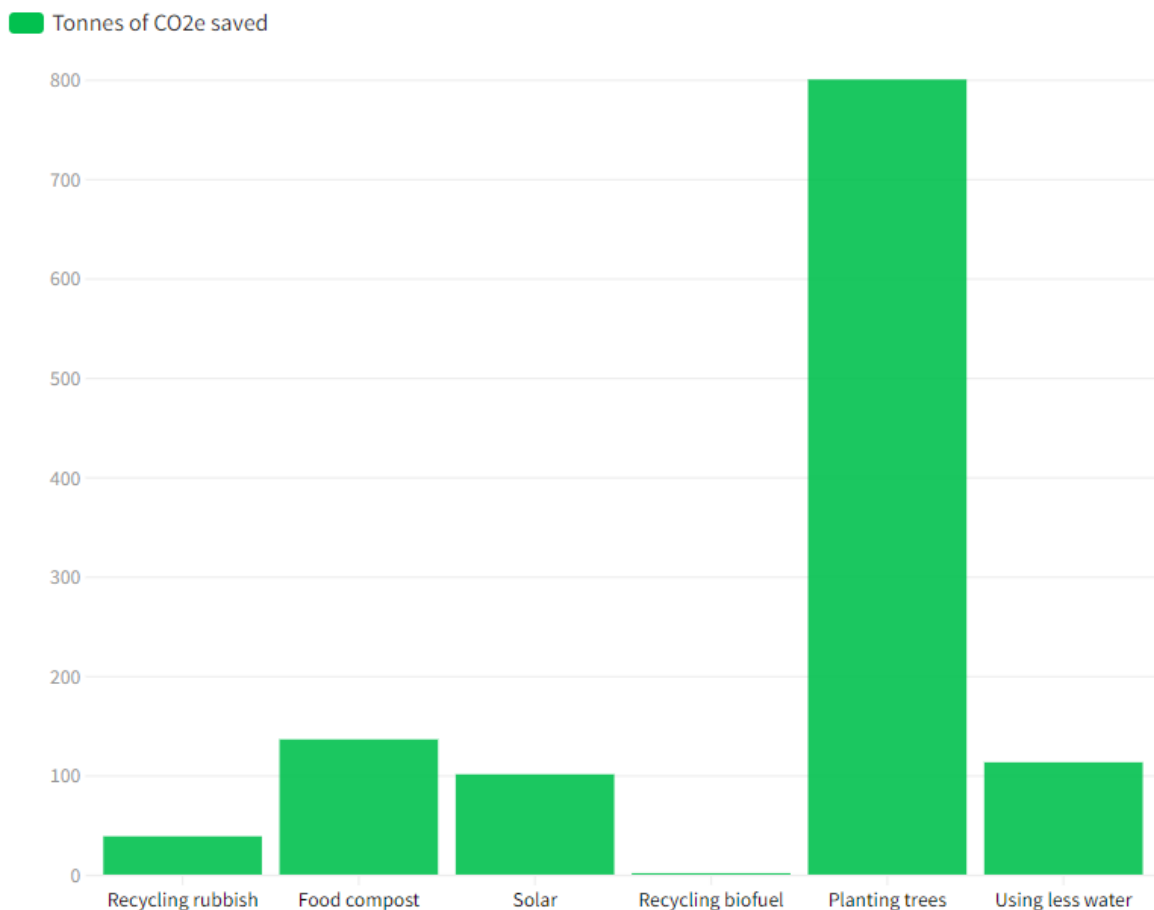
During the festival, a total of 13.6 million litres of water are utilized, drawn from two underground reservoirs specifically constructed for the event. While the volume of water consumption may seem substantial, it signifies a significant reduction compared to what attendees would typically utilize. According to the Energy Saving Trust, the average individual consumes 142 litres of water per day, totaling 142 million litres over the course of the festival. Consequently, attendees at Glastonbury employ ten times less water, resulting in a saving of 128.4 million litres. Apart from the evident environmental advantages of water conservation, a vital and finite resource, this practice also mitigates carbon emissions. Typically, the supply of one litre of water to households emits 0.88 grams of CO₂e, indicating that the festival's conservation efforts save approximately 113,000 kg of CO₂e.

¹¹² A 250 kWp solar panel system is a solar photovoltaic (PV) system capable of producing up to 250 kilowatts of peak power (kWp) under optimal sunlight conditions

Thus, while Glastonbury's water supply accounts for 12,000 kg of CO₂e emissions, this represents a 90% reduction compared to attendees remaining at home¹¹³.

[Fig. 10 – Methods Glastonbury Festival Uses to Reduce CO₂e Emissions]

How Glastonbury saves CO₂e



Source: The Eco Experts

In conclusion, Glastonbury Festival exemplifies a holistic approach to sustainability, integrating environmental, social, and economic considerations into its operations and ethos. By championing waste reduction, renewable energy adoption, and community engagement, Glastonbury sets a precedent for large-scale events to embrace sustainability as a core value. As the festival continues to evolve and innovate, its commitment to sustainability serves as an inspiration and catalyst for positive

¹¹³ The Eco Experts. *Glastonbury's Carbon Footprint: Analyzing the Festival's Environmental Impact*. Available at: <https://www.theecoexperts.co.uk/blog/glastonbury-carbon-footprint> [Accessed: 9 May 2024].

change, demonstrating the transformative power of collective action towards a more sustainable and equitable future.

4.3 Touring's Environmental Toll

[Fig. 11 – Annual Carbon Emissions: UK Music Touring vs. Spotify Streaming Service]

Annual emissions of UK music touring	85,000 tonnes
Annual emissions of Spotify streaming service (2021)	353,054 tonnes

Source: Julie’s Bicycle

Music tours have been an integral part of the music industry for decades, serving as a primary means for artists to connect with their fans and showcase their talent on a global scale. Originating from the early days of traveling minstrels and troubadours, modern music tours have evolved into large-scale productions, often spanning multiple continents and attracting millions of attendees each year. With the decline in recording artists' earnings from approximately \$1.50 per record to merely \$0.003 to \$0.005 per online stream, touring has increasingly become a crucial source of income for artists and their staff.

Touring wields significant economic influence, transcending the boundaries of the entertainment sector to invigorate local economies and support diverse businesses. Notably, the 2023 Worldwide Top 100 Tours demonstrated substantial growth, with total grosses surging by 46% to reach 9.17\$ billion from the previous year's 6.28 billion \$¹¹⁴, with Taylor Swift’s “The Eras Tour” being the most successful with a gross revenue of 905.42 million \$. In a recent study by Oxford Economics it is stated that if an out-of-town attendee were to spend 100.00 \$ on a concert ticket, the local economy would benefit from an additional 334.92 \$ in spending, resulting in a total spending impact of 434.92 \$¹¹⁵.

While music tours offer considerable economic advantages, they also pose a substantial environmental impact, contributing to carbon emissions, waste generation, and resource depletion. Unfortunately, comprehensive data on this issue remains scarce. However, a 2010 study conducted by Julie’s Bicycle on the UK music industry revealed that the annual greenhouse gas emissions from artists touring in the UK and British acts touring overseas totaled approximately 85 million kg of

¹¹⁴ Pollstar. (2023). *The Great Return Becomes a Golden Age: 2023's Top Tours See Massive Historic Growth*. Available at: <https://news.pollstar.com/2023/12/16/the-great-return-becomes-a-golden-age-2023s-top-tours-see-massive-historic-growth/> [Accessed: 9 May 2024].

¹¹⁵ Recording Academy. Oxford Economics Reveals Findings on the Fiscal Impact of Live Music. Available at: <https://www.recordingacademy.com/advocacy/news/oxford-economics-reveals-findings-fiscal-impact-live-music> [Accessed: 9 May 2024].

CO₂e¹¹⁶. This figure is roughly equivalent to the emissions generated by around 38,000 flights from London to New York¹¹⁷.

The primary contributor to the substantial carbon footprint of music tours is transportation. Typically spanning several months and featuring performances held almost nightly or every few days, these tours can encompass from 50 to 100 shows. Given the inherent demands of such tours, rapid transportation methods are often employed, including the regrettable reliance on private jets, which emit 4.5 to 14 times more CO₂ than commercial airliners on a 500-kilometer trip¹¹⁸. According to a study by Julie's Bicycle, a UK-based environmental organization, the average European music tour produces approximately 19.5 tonnes of CO₂ emissions per show, with travel accounting for the majority of emissions.

Aside from transportation, energy consumption constitutes another significant aspect of the environmental impact of music tours. The elaborate setups and technical requirements of modern concerts necessitate substantial electricity usage, much of which is sourced from fossil fuels, contributing to carbon emissions. Since the 1980s, as outdoor events gained popularity, the events industry has adopted a 'plug and play' approach. In this model, event organizers anticipate that power will be inexpensive and easily accessible. Power companies, in response, provide generators that include a considerable margin of extra capacity. This contingency ensures a dependable energy supply, often calculated based on imprecise or incorrect estimates of power needs. Watt-Now, an innovative company based in Holland, has been actively gathering energy data from events while collaborating with event organizers to explore energy-saving and renewable energy options. Over two years (2014–2015), they analyzed 270,000 data points from outdoor events across Holland. Their findings revealed that 77% of the generators they monitored were operating at less than 20% of their capacity. This finding aligns closely with recent data from the Glastonbury Festival and the University of West England (UWE), which also demonstrated that the majority of generators were significantly oversized for their intended use

Adopting energy-efficient technologies is pivotal in reducing consumption. For instance, switching to LED lighting can reduce power use by up to 75% compared to traditional lighting systems.

¹¹⁶ Creative Industries Policy and Evidence Centre, 2022. *Creative Industries and the Climate Emergency: The Path to Net Zero*. Available at: <chrome-extension://efaidnbmnmbpcajpcgglefndmkaj/https://www.culturehive.co.uk/wp-content/uploads/2022/10/Creative-Industries-and-the-Climate-Emergency-The-Path-to-Net-Zero-PEC-Research-Report.pdf> [Accessed: 9 May 2024]

¹¹⁷ A one-way flight from London to New York emits roughly 2.2 metric tons (2,200 kg) of CO₂ per passenger.

¹¹⁸ The Guardian, 2023. 'Flying shame: the scandalous rise of private jets', The Guardian, 26 January. Available at: <https://www.theguardian.com/environment/2023/jan/26/flying-shame-the-scandalous-rise-of-private-jets> [Accessed: 9 May 2024]

Similarly, using modern, energy-efficient sound systems can significantly decrease energy draw and environmental impact. Integrating renewable energy sources such as solar panels and biodiesel generators also plays a crucial role. These alternatives not only reduce dependence on fossil fuels but can also offer operational cost savings. For example, solar panels can provide up to 100% of the power needed for lighting at daytime events, drastically cutting fuel costs.

Monitoring and adjusting energy consumption in real time is another key strategy. Employing systems that provide live feedback on energy use allows for immediate adjustments, ensuring efficiency throughout the event. This monitoring can lead to a 10-20% reduction in overall energy use by enabling precise control over power distribution. Education and communication are also vital. Training event staff, vendors, and attendees on energy-saving practices can lead to more sustainable behavior, reducing energy waste across the board¹¹⁹.

4.4 Comparative Analysis: Taylor Swift's "The Eras Tour" and Coldplay's "Music of the Spheres Tour"

In the realm of global music tours, the challenge of reconciling spectacular performances with environmental sustainability has become increasingly critical. Artists and event organizers face the pressing task of minimizing their environmental footprint while meeting the high expectations of fans. This section delves into a comparative analysis of Taylor Swift's "The Eras Tour" and Coldplay's "Music of the Spheres Tour", highlighting the stark differences in their approaches to environmental sustainability.

Taylor Swift's "The Eras Tour" stands as a monumental celebration of her extensive musical career, with 152 shows across five continents showcasing songs from across her discography in a live performance format that spans from her country roots to her latest pop and indie ventures. The tour has been highly anticipated, drawing massive crowds and generating a significant economic impact. Ticketmaster experienced a crash due to the overwhelming number of fans attempting to purchase tickets, which, according to Business Insider¹²⁰, are priced 2,321% higher than those for Swift's Reputation Tour in 2018. The spending by fans on hotels, restaurants, transportation, and other expenses linked to the tour has significantly boosted the US economy. This economic impact, attributed to Swift's tour, was so substantial that it prompted comments from the US Federal Reserve

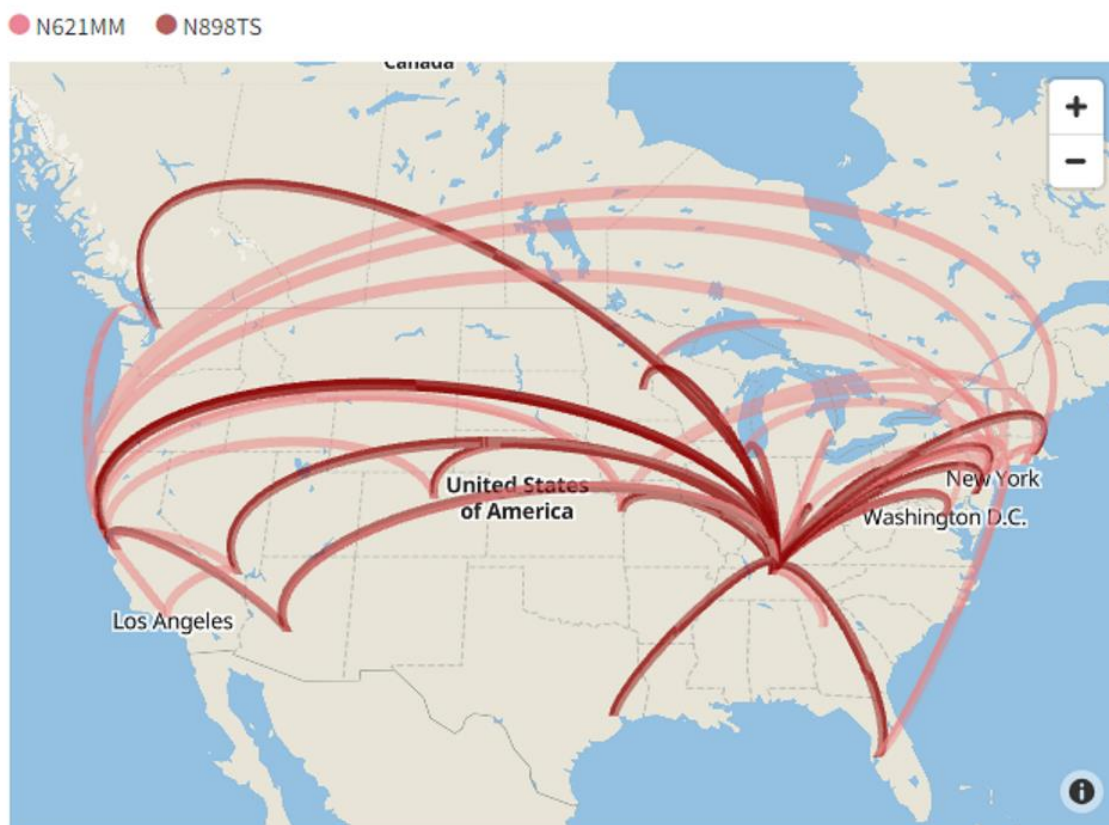
¹¹⁹ Powerful Thinking. (2017). *The Powerful Thinking Guide 2017*. Available at: <https://www.powerful-thinking.org.uk/resources/powerful-thinking-guide-2017/> [Accessed: 15 May 2024].

¹²⁰ Business Insider, 2023. Resale price for Taylor Swift's Eras tour much higher than Reputation ticket, says Pitchfork report. Available at: <https://www.businessinsider.com/resale-price-taylor-swift-eras-tour-reputation-ticket-pitchfork-report-2023-8> [Accessed: 15 May 2024].

on the phenomenon¹²¹: it has become the highest-grossing tour on record, with a gross of more than 1.1 billion \$ so far¹²².

However, behind the glitz and the numbers lies a less glamorous reality: the environmental impact of her frequent air travel. The tour requires her to travel extensively around the world, involving frequent flights for herself, her team, and their equipment. Regrettably, this relentless air travel is a major source of carbon emissions, exacerbating climate change and environmental harm. A UK-based organization, Yard, monitored the private jet flights of various celebrities and ranked them according to their emission levels, placing Taylor Swift at the top of the list. Yard's research revealed that in 2022, Swift's total flight emissions amounted to 8,293.54 tonnes, which is 1,184.8 times higher than the annual emissions typically generated by an average individual¹²³.

[Fig. 11 – Taylor Swift's flight path during Leg 1 of the Eras Tour]



Note: Many of Taylor Swift's private jet flights depart from her adopted hometown of Nashville.

¹²¹ Medium, 2022. Fossil Fuel-ed Fame: The Environmental Impact of Stadium Tours. [online] Available at: <https://medium.com/chasing-purple-skies/fossil-fuel-ed-fame-the-environmental-impact-of-stadium-tours-2e946f42d365> [Accessed: 15 May 2024].

¹²² The tour, started the 17 March 2023, will end the 8 December 2024.

¹²³ Yard, 2023. Worst Celebrity Private Jet CO₂ Emission Offenders. Available at: <https://weareyard.com/insights/worst-celebrity-private-jet-co2-emission-offenders> [Accessed 15 May 2024].

Source: Business Insider

The map shown above, sourced from Insider, depicts Taylor Swift's flight patterns over the past year during her Eras Tour, distinguished by the use of her two private jets, as indicated by different colors. It highlights that most of her flights originate from or return to Nashville, Swift's chosen home base. Typically, she returns home after each concert and remains there until she needs to travel for her next performance.

In response to the environmental impact of her tour, Taylor Swift has pledged to address her carbon emissions by acquiring over twice the necessary carbon credits to offset her environmental footprint. Not all emissions can be effectively reduced or avoided, particularly those that have already been released into the atmosphere. Carbon compensation addresses this issue by supporting environmental projects that either reduce or remove CO₂ from the atmosphere, thus counterbalancing the emissions produced by activities like touring. This process often involves initiatives such as reforestation, the promotion of renewable energy sources, or enhancements in energy efficiency. For Taylor Swift, this entails purchasing carbon credits that finance these types of projects, guaranteeing that for every tonne of CO₂ generated by her tour, an equivalent tonne is offset measurably and credibly. Each carbon credit corresponds to one tonne of CO₂ that has been either reduced or removed from the atmosphere¹²⁴. Even if these credits should be verified by independent third parties to confirm their validity and impact, the Washington Post¹²⁵ found that these companies often overestimate their emission reductions, rendering Swift's alleged attempts at climate cutback questionable.

Furthermore, it is crucial to acknowledge that the practice of polluting followed by offsetting is not an ideal approach to addressing climate issues. True sustainability involves preventing pollution in the first place, rather than merely attempting to mitigate its effects after the fact. This proactive stance requires a fundamental shift in how we conceive of and manage environmental responsibilities. Instead of relying on compensatory measures like carbon offsets, which often only provide a temporary solution, a more effective strategy involves integrating sustainable practices into the core operations of industries and everyday life.

Coldplay has emerged as a leader in environmental sustainability within the concert industry, joining the ranks of artists like Billie Eilish, Jack Johnson, and Dave Matthews Band, who are equally

¹²⁴ Green Earth, 2023. Taylor Swift's Eras Tour: Its Carbon Footprint and Offset Strategies. Available at: <https://www.green.earth/blog/taylor-swifts-eras-tour-its-carbon-footprint-and-offset-strategies> [Accessed 15 May 2024].

¹²⁵ The Washington Post, 2024. Climate coal offsets carbon Rockefeller. Available at: <https://www.washingtonpost.com/business/2024/04/16/climate-coal-offsets-carbon-rockefeller/> [Accessed 15 May 2024].

committed to eco-friendly initiatives. Their "Music of the Spheres Tour", which began in 2022, has set new standards for sustainable touring practices. This tour marks a significant advancement in how concerts can minimize environmental impact, establishing a new benchmark for the industry.

The tour has achieved remarkable environmental milestones, including a 47% reduction in CO₂ emissions compared to their previous stadium tour in 2016-17. This substantial decrease underscores Coldplay's commitment to integrating sustainable logistics and advanced green technologies into their events. Additionally, the tour boasts that 66% of all waste generated has been diverted from landfills, further contributing to its sustainability credentials.

A standout feature of the tour is the planting and support of five million trees, aimed at reaching maturity, one for each concert-goer, through a collaboration with One Tree Planted. This initiative not only underscores the band's commitment to reforestation but also enhances their overall environmental legacy. In terms of energy use, the tour is powered entirely by renewable sources, with each show generating an average of 15 kWh from in-venue solar installations, kinetic dance floors, and power bikes. This energy not only fuels performances on the "C-stage" each night but also provides power for the crew's phones, laptops, and equipment.

Moreover, the tour has made significant contributions to local communities by donating 3,770 meals and 73 kg of toiletries from tour catering to help those who are homeless or unsheltered. Financially, Coldplay has supported several environmental organizations, including the Sustainable Food Trust, Sea Shepard, and ClientEarth, furthering their impact beyond the music scene.

In essence, Coldplay's "Music of the Spheres Tour" is pioneering a new era of climate-conscious performances, demonstrating that large-scale tours can be both spectacular and sustainable. This tour serves as a blueprint for how artists can effectively contribute to environmental conservation while engaging with global audiences¹²⁶.

¹²⁶ Medium, 2022. Fossil Fuel-ed Fame: The Environmental Impact of Stadium Tours. [online] Available at: <https://medium.com/chasing-purple-skies/fossil-fuel-ed-fame-the-environmental-impact-of-stadium-tours-2e946f42d365> [Accessed: 15 May 2024].

Conclusion

In conclusion, this thesis examined the significant impact of the music industry on economic, social, and environmental fronts. The findings highlight how the industry not only stimulates economic growth but also poses significant environmental challenges, from the lifecycle impacts of physical media production to the carbon footprint of digital streaming services.

The thesis has illustrated the substantial economic contributions of the music industry, highlighting its capacity to generate employment, stimulate economic growth, and contribute significantly to GDPs across nations.

Moreover, the discussion of the environmental impacts associated with different music *media*, from the production of physical media to the digital streaming of songs, emphasizes the urgent need for the industry to adopt more sustainable practices. The shift from physical formats to digital ones, while reducing material waste, has introduced new challenges in terms of energy consumption and carbon emissions, necessitating innovative solutions to mitigate these effects.

Socially, music has proven to be a powerful medium for education, cultural preservation, and social cohesion. It has the unique ability to transcend cultural and geographic boundaries, fostering a sense of community and shared experience among diverse populations. The case studies presented from various global movements and moments in history where music played a central role in advocating for social change and justice have been particularly compelling.

As we look towards the future, it is clear that the music industry holds tremendous potential to contribute positively to sustainable development goals. However, realizing this potential will require concerted efforts from all stakeholders, including musicians, producers, policymakers, and consumers. By embracing ethical practices, pursuing technological innovations, and fostering an inclusive industry culture, the music industry can continue to thrive economically while also advancing societal well-being and environmental sustainability.

This thesis contributes to a broader understanding of the intricate relationship between music and sustainability and highlights the industry's responsibility to leverage its influence for positive change. The path toward a sustainable and equitable music industry is complex and challenging but also offers numerous opportunities for impactful developments.

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