

# Music streaming has a far worse carbon footprint than the heyday of records and CDs – new findings

April 8 2019

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Emission accomplished. Credit: Nicoleta Ionescu

It is easy to get nostalgic for the era when most music lovers bought LPs. They would save their pennies for a Saturday trip to the local record

store, before heading home clutching their glorious new vinyl in a plastic bag to drop the needle on the turntable and listen on repeat. This anachronistic ritual will be resurrected on [International Record Store Day](#) on Saturday April 13, as consumers queue to buy exclusive limited edition vinyl releases from their favourite artists. Launched a decade ago, this annual event is an industry drive to boost ailing independent record stores in an age when most people stream music online.

But is it actually true that earlier generations placed a greater value on recorded [music](#) than music fans in the present day? We are loath to succumb to the mythology of a "golden age" for music and lend credence to baby boomers moaning of bygone days when music somehow mattered more than it does now. We decided to investigate the numbers to see if they told a different story. As it turns out, they do – and it's far worse than we expected.

We conducted archival research on recorded music consumption and production in the US, comparing the economic and environmental costs of different formats at different times. We [found that](#) the price consumers have been willing to pay for the luxury of owning recorded music has changed dramatically.

The price of a phonograph cylinder in its peak year of production in 1907 would be an estimated US\$13.88 (£10.58) in today's money, compared to US\$10.89 for a shellac disc in its peak year of 1947. A vinyl album in its peak year of 1977, when The Sex Pistols' Never Mind The Bollocks came out, cost US\$28.55 in today's money, against US\$16.66 for a cassette tape in 1988, US\$21.59 for a CD in 2000, and US\$11.11 for a digital album download in 2013.

This fall in the relative value of recorded music becomes more pronounced when you look at the same prices as a proportion of weekly salaries. Consumers were willing to pay roughly 4.83% of their average

weekly salary for a vinyl album in 1977. This slips down to roughly 1.22% of the equivalent salary for a digital album during its 2013 peak.

With the advent of streaming, of course, the business model of consuming recorded music changed: what used to be a commodity industry, where people bought copies to own, is now a service industry in which they buy temporary access to a music experience stored in the cloud. For just US\$9.99 – barely 1% of the current average weekly salary in the US – consumers now have unlimited ad-free access to almost all recorded music ever released via platforms such as Spotify, Apple Music, YouTube, Pandora and Amazon.

## **The environmental angle**

Yet if consumers are paying an ever lower price for their music, [the picture](#) looks very different when you start to look at [environmental costs](#). Intuitively you might think that less physical product means far lower carbon emissions. In 1977, for instance, the industry used 58m kilograms of plastic in the US. By 1988, the peak year for cassettes, this had dipped slightly to 56m kg. When CDs peaked in 2000, it was up to 61m kg of plastic. Then came the big digital dividend: as downloading and streaming took over, the amount of plastics used by the US recording industry dropped dramatically, down to just 8m kg by 2016.

But if these figures seem to confirm the notion that music digitalised is music dematerialised – and therefore more environmentally friendly – there's still the question of the energy used to power online music listening. Storing and processing music in the cloud depends on vast data centres that use a tremendous amount of resources and energy.

It is possible to demonstrate this by translating plastic production and the electricity used to store and transmit digital audio files into greenhouse gas equivalents (GHGs). This shows that GHGs from recorded music

were 140m kg in 1977 in the US, 136m kg in 1988, and 157m kg in 2000. By 2016 it is estimated to have been between 200m kg and over 350m kg – and remember that this is only in the US.

Obviously this is not the last word on the matter. To truly compare past and present, if it were even possible, you would have to factor in the emissions involved in making the devices on which we have listened to music in different eras. You would need to look at the fuel burned in distributing LPs or CDs to music stores, plus the costs of distributing music players then and now. There are the emissions from the recording studios and the emissions involved in making the musical instruments used in the recording process. You might even want to compare the emissions in live performances in the past and the present – it starts to look like an almost endless enquiry.

Even if the comparison between different eras ultimately came out looking different, our overriding point would be the same: the price that consumers are willing to pay for listening to recorded music has never been lower than today, yet the hidden environmental impact of that experience is enormous.

The point of this research is not to ruin one of life's greatest pleasures, but to encourage consumers to become more curious about the choices they make as they consume culture. Are we remunerating the artists who make our favourite music in a way that accurately reflects our appreciation? Are streaming platforms the right business model to facilitate that exchange? Is streaming music remotely from the cloud the most appropriate way to listen to music from the perspective of environmental sustainability? There are no easy solutions, but taking a moment to reflect on the costs of music – and how they have changed over history – is a step in the right direction.

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Provided by The Conversation

Citation: Music streaming has a far worse carbon footprint than the heyday of records and CDs – new findings (2019, April 8) retrieved 26 April 2024 from <https://phys.org/news/2019-04-music-streaming-worse-carbon-footprint.html>

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