JULIE'S BICYCLE ****

How green is my promo?

Summary

In 2009 860 of the UK's independent record labels delivered over 25,000 promotional CD releases and nearly 9000 promotional digital releases, according to this research. The greenhouse gas (GHG) emissions generated from manufacturing CDs and packaging and transporting them to final recipients are estimated to be ~1686 tonnes of CO2e for the physical releases (649g per CD). In comparison digital delivery is responsible for approximately 79 tonnes for the digital releases (62g per delivery). To provide a music industry context, 1686 tonnes is equivalent to over three times the annual energy, water and waste CO_2e emissions from an arena.

If release numbers stay constant, a complete switch to digital delivery would result in annual emissions of 240 tonnes – a reduction of 86%. This is a conservative estimate because the data provided by the digital service providers was highly variable, therefore our estimate errs on the side of caution. Reductions could be even greater if the providers are operating as efficiently as some reported.

The dramatic reduction in carbon emissions offered by digital delivery is a significant incentive in the switch from physical to digital. However, it also highlights other issues:

- Digital service providers, record labels and consumers can all take actions to reduce the energy consumption of their digital behaviour. This study did not cover the energy use of consumers, and this remains an important topic to address;
- Where physical product remains, it is worthwhile shifting away from jewel cases to lower carbon packaging;
- Recycling CD and jewel cases remains an important intermediate activity.

Introduction

One of the winning 'Big Ideas' at the 2009 AIM AGM was shifting promo delivery to digital from physical CD product. Independent record labels need specific support to make this shift. This research is based on the assumption that promos will be listened to a handful of times, whereas a purchased digital or physical release will be listened to repeatedly. Therefore the investment of physical resources in a promo should be applied proportionately given that it may not be listened to more than once before being disposed of.

In 2010 Julie's Bicycle was commissioned by AIM and the BPI, which together represent all the UK labels, to survey their independent record label members about their promotional releases. The survey covered 2009 and collected data including numbers of physical and digital promo releases, packaging types and location of recipients.

This research estimated that 860 of the UK's independent record labels in the UK delivered over 25,000 promotional CDs in 2009. There has already been a shift to digital delivery, with three of the

record labels we surveyed delivering 100% digital promos. In total nearly 9000 digital deliveries were made in 2009.

Method

- 53 labels responded to the survey which covers the range and scale of independent label activity.
- 40 of the labels surveyed released promos digitally during 2009 – on average 10 releases per label. 50 of the labels surveyed delivered promos using CDs – on average 29 releases per label.

Data was collected from the three digital service providers recommended by AIM: Fastrax, Fatdrop and Soundcloud. They contributed information on electricity use per delivery of a digital file, whether streamed or downloaded. This does not include the energy used by the consumer to stream, download, listen to or store the music. The digital service providers reported difficulties in sourcing reliable data. Demand for digital delivery is growing so quickly that servers are updated regularly: this new infrastructure makes defining a baseline of energy use problematic, especially for music files.

The chart below illustrates the scope of this research:

Out of Scope Production phase	**In Scope** **Delivery phase**	Out of Scope In-use phase
Recording studio Record label office Resulting in digital master	**CD manufacture** **CD packaging manufacture** **Transport of CD from manufacturer to final recipient** **OR** **Delivery of digital file by streaming or download**	Retail and purchase Listening to CD Disposing of CD OR Listening to file Storing file
Assumed to be the same regardless of delivery type, therefore excluded from the scope	**This is the scope of this research**	Out of scope due to lack of data. Data is highly variable according to consumer behaviour.

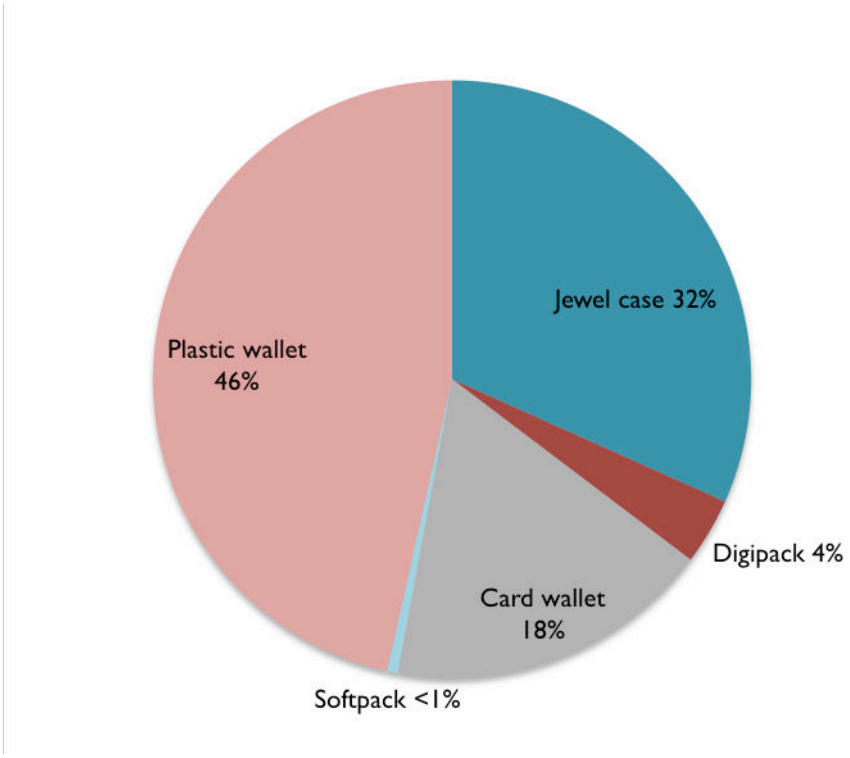
Julie's Bicycle used data from survey participants and the digital providers to calculate the carbon footprint of an average CD delivery and average digital delivery, using Government GHG emission conversion factors[1] and previous research on CD packaging emissions[2]. More detailed information about the methodology can be found in the technical appendix to this document.

[1] DECC/Defra (2010) Environmental reporting: guidelines for company reporting on GHG emissions.
[2] Bottrill et all (2008) First Step. Julie's Bicycle et al (2009) Impacts and Opportunities.

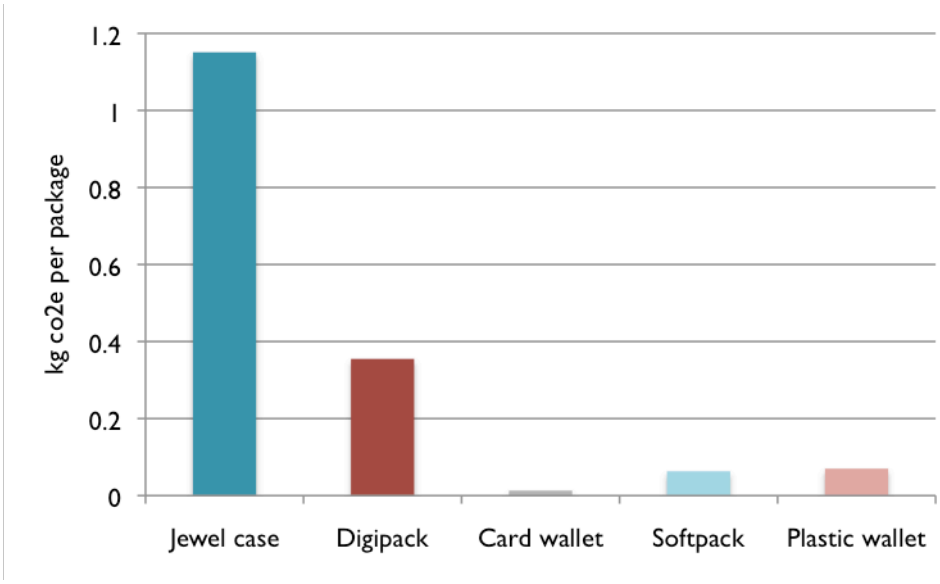
Results

Emissions from CD and CD packaging

The labels that participated in the survey reported the following mix of packaging used for physical promos:



The carbon emissions of the different packaging options are shown in the chart below, from Impacts and Opportunities (2009).

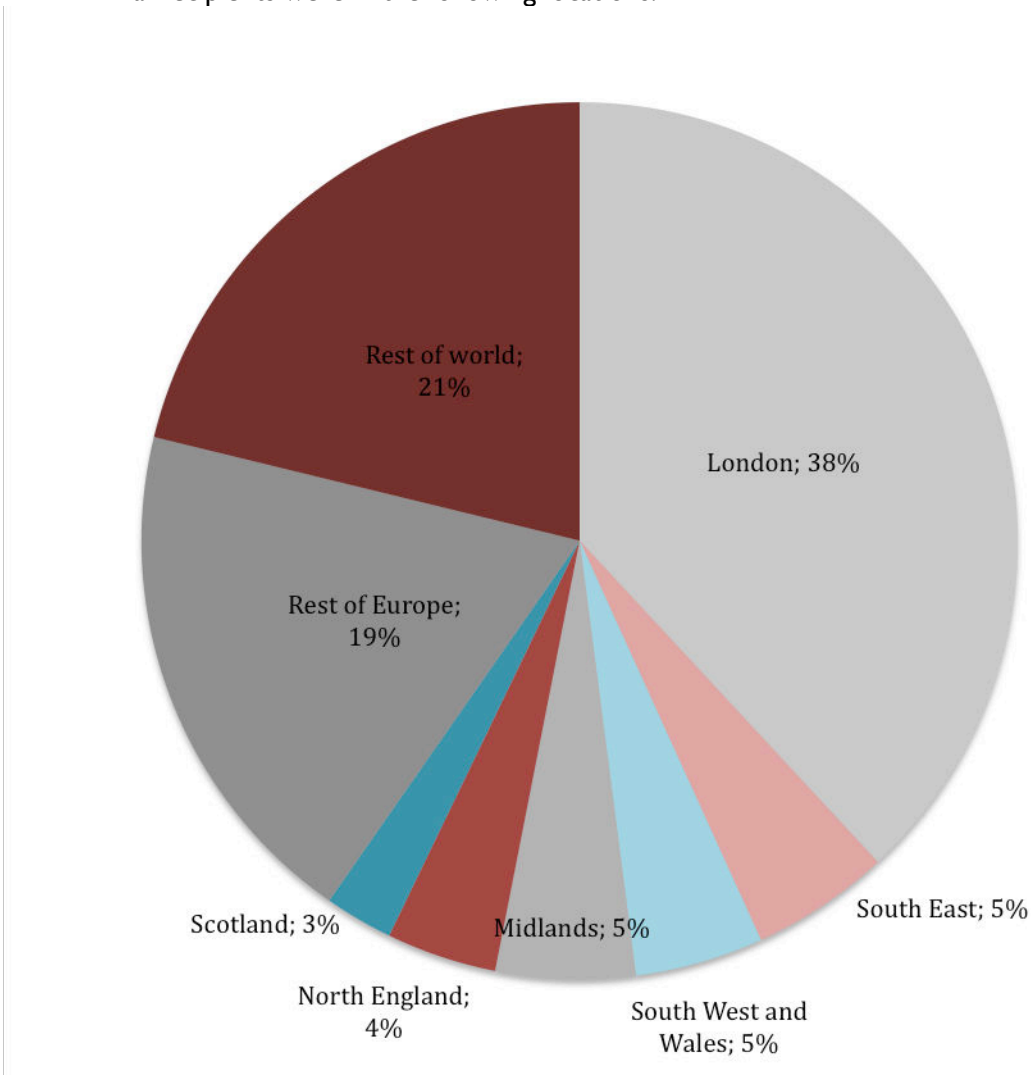


Applying this packaging profile, the emissions per average CD package are 413g CO_2e. Emissions from the manufacture of the CD itself are an additional 200g.

Emissions from CD transport

The survey results reported that the majority of promo packaging was manufactured and collated in the UK. The labels also reported that

- 80% of their pluggers are based in London;
- 80% of promos were delivered by post or international courier;
- Final recipients were in the following locations:



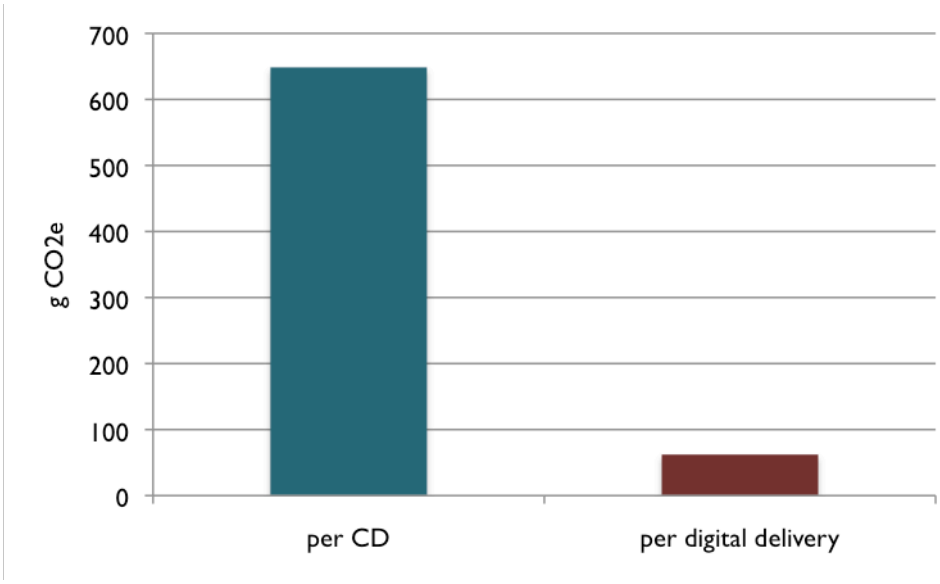
Applying assumptions about distance traveled from manufacturer, via collation and plugger, to final recipient, and assuming road freight for all deliveries apart from airfreight for recipients outside Europe, transport per CD resulted in 35g CO_2e.

Emissions from digital file delivery

Electricity consumption results per delivery were highly variable, reflecting the new and evolving nature of this service. Providers are having to update servers and add infrastructure so often that defining a period for baseline data collection is difficult, and ring-fencing services relevant to music is also complex. Carbon emissions per delivery ranged from 0.6 to 62g CO_2e.

Comparison of emissions

For physical promos, total results for CD, packaging and transport are 649g CO_2e per CD. A digital delivery of 0.6-62g is therefore a reduction of 90-99.9% depending on the efficiency of the digital service provider. Taking a conservative approach, the least efficient provider has been chosen to illustrate the total possible reductions:



Total emissions are estimated to be 1686 tonnes of CO_2e for the physical releases and 79 tonnes for the digital releases. To provide a music industry context, 1686 tonnes is equivalent to over three times the annual energy, water and waste CO_2e emissions from an arena. If release numbers stay constant, a complete switch to digital delivery would result in annual emissions of 240 tonnes – a reduction of 86%.

Recommendations

Switching to digital delivery is achieving a significant reduction in GHG emissions compared to physical CD delivery. This provides further incentive for a continued shift from physical to digital.

This research has highlighted three further issues, explored in more detail below:

- **Reducing** the carbon impact of digital infrastructure and behaviour;
- **Switching** away from jewel cases to lower carbon packaging
- **Recycling** CDs and jewel cases.

Reducing
It is important to recognise that digital delivery still has a carbon impact. Providers, record labels and consumers can all take actions to ensure their IT infrastructure, hardware, devices and behaviour are as efficient as possible and renewably powered. Three organisations are creating and sharing cutting-edge advice: the Chartered Institute of IT has launched a 'Green Challenge'; Climate Savers Computing is a campaign about hardware, behaviour and networks; and the Green Grid is a global consortium working to improve energy efficiency of data centres and computing ecosystems. Our summary of their recommendations is:

For labels and consumers

- Activate power management facilities on your PC/laptop and disable active screen savers
- Turn off unnecessary processes and disable WIFI/Bluetooth drivers if your PC is hardwired
- Switch off and unplug, including monitors, printers, chargers etc
- Turn down monitor brightness and turn up contrast
- Regularly drain your batteries and avoid nickel/cadmium
- Care for your PC, laptop, phone and listening device for as long as possible, then reuse, recycle and reclaim them
- When buying new products use the Energy Star rating. Look out for new green ratings
- Understand where you consume energy at work and at home.
- Once energy demand is well-managed, invest in renewable energy sources

For digital service providers

- Use the Green Grid's power usage effectiveness rating to understand your energy use
- Consider the effectiveness of your server, storage, networking equipment, power equipment, cooling equipment, and management and application software capabilities.
- Once energy demand is well-managed, invest in renewable energy sources

Switching
As long as promo delivery remains physical, it is hugely valuable to switch packaging types and avoid jewel cases. This can cut emissions from the packaging by a maximum of 99% in the case of switching from a jewel case to a cardboard wallet. Four of the survey participants reported that they have consciously switched packaging to lower carbon alternatives. Julie's Bicycle Industry Green mark for CD packaging supports and rewards record labels in choosing lower carbon packaging

Recycling
A positive result from the survey was that 80% of participants always or sometimes recycle their CDs and jewel cases. However10% said they would if they knew how – suggesting that a simple piece of awareness raising about recycling service providers could be beneficial. Julie's Bicycle maintains a list of relevant recycling companies.

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Glossary

Carbon Dioxide (CO_2). A naturally occurring gas, and a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes.

Carbon Dioxide Equivalent (CO_2e). The universal unit of measurement used to indicate the global warming potential (GWP) of each of the six Kyoto greenhouse gases. It is used to quantify the relative impacts of different greenhouse gases.

Emissions. The release of a substance (usually a gas when referring to climate change) into the atmosphere.

Greenhouse gases (GHG). Greenhouse gasses in the atmosphere affect the earth's climatic balance. The six major greenhouse gases are Carbon dioxide (CO_2), Methane (CH4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF_6).

Technical appendix

Record label statistics

The number of releases and size of promotional release for each of the 53 survey respondents were checked by AIM and BPI to ensure the data covered the current range of independent label activity. The total number of independent record labels was based upon AIM and BPI's independent label membership, assuming a 2% overlap, resulting in 865 labels. The average number of releases and total number of deliveries is summarised in the **Table 1** below:

Table 1*: average number of releases and total number of deliveries in 2009 per label*

Average per label, 2009	Physical promo delivery (50 label responses)	Digital promo delivery (40 label responses)
Number of releases	29	10
Number of annual deliveries	3006	1463

Packaging type and CD materials and manufacturing

Labels were asked about their packaging choice for promos. Packaging proportions for each type were multiplied by the relevant packaging type emissions (from 'Impacts and Opportunities') to result in the emissions from the average packaging type used for promos in 2009 – 413g of CO_2e. This includes the life cycle analysis emissions of the materials used in the package and the manufacturing energy of the package. CD material life cycle emissions and manufacturing energy emissions from 'First Step' were added – 200g of CO_2e.

CD transport

Labels were asked where their packaging was manufactured and collated. Results were that 76% of jewel cases, 70% of card wallets and 98% of plastic wallets were manufactured in the UK, with the remaining proportion manufactured elsewhere in Europe. For collation, 81% of jewel cases, 70% of card wallets and 79% of plastic wallets were collated in the UK, again with the remaining proportion collated elsewhere in Europe. Therefore the assumption was made that on average, packages travelled 50km from manufacturing to collation, to take account of the high proportion of packages being dealt with on the same site, and ~10% of packages travelling ~500km.

It was then assumed that deliveries were made direct to pluggers. This is a simplification, as some will be delivered to label offices. However in an effort to protect label anonymity and simplify the survey, pluggers were assumed to be the most common delivery point, as well as a proxy for the label office location. Labels were asked what proportion of their pluggers were national (based in London) or regional (based outside London). The average result was that 80% of pluggers are based in London. Therefore it was assumed there was an average journey of 50km from collation to plugger, to take account of most collation occuring in the UK as above.

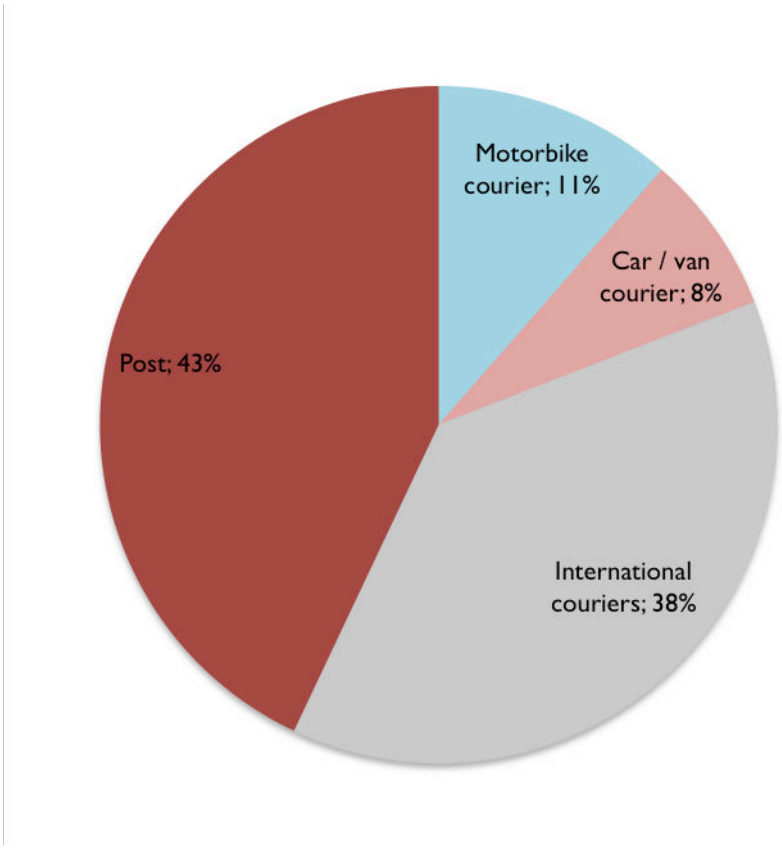
The next assumption was that pluggers deliver all the CDs to the final recipients. Labels were asked about location of final recipients. **Table 2** below shows the results and the assumed delivery distance from plugger to final recipient for each location. These distances take into account the predominance of national pluggers. These figures were multiplied to result in the average distance travelled by a package from plugger to final recipient.

***Table 2**: final recipient location and assumed distance from plugger to recipient*

	London	South East	South West & Wales	Midlands	North England	Scotland	Rest of Europe	Rest of world
Final recipient location %	38	5	5	5	4	3	19	21
Distance plugger to recipient km	10	50	100	100	200	300	1000	5000

Labels were asked how CDs were delivered. **Figure 1** below illustrates the results. As the majority are delivered using post and international couriers, all the distance travelled was assumed to be by HGV road freight, apart from travel to the rest of the world, which was assumed to be by long-haul air freight. The following Defra/DECC 2010 conversion factors were applied: 0.12631 kgCO2e/tonne.km for average HGV, 0.61931 kgCO2e/tonne.km for long-haul airfreight plus the uplift factor of 9% to allow for indirect flights and circling.

***Figure 1**: mode of delivery*



The tonnage freighted was calculated using the mass of packaging (from Impacts and Opportunities) and CDs (from First Step) as shown in **Table 3** below. Leaflets, inserts and shrinkwrap were discounted from the analysis, as they are generally light and are commonly not used for promos. The total tonnage was calculated using the proportion of that packaging type used plus the weight of the CD to result in the weight of an average package. The tonne.km were multiplied by the conversion factors resulting in 36g of CO_2e per average CD delivered.

***Table 3**: mass of CD packaging and a CD (g)*

Packaging type	Jewel case	Digipack	Card wallet	Softpack	Plastic wallet	CD
Mass in g	82	47	10	48	5	15

Digital delivery emissions

Data from the digital service providers ranged from 0.001146 – 0.114 kWh per delivery, which included the energy used in servers, routers and firewalls during transfer of the delivery. The highest estimate was used to take a conservative approach to the reductions possible. The Defra/DECC 2010 conversion factor for grid electricity consumed was applied: 0.54522 kg CO_2e /kWh (2008). 0.114kWh results in 62g of CO_2e per digital dlivery.

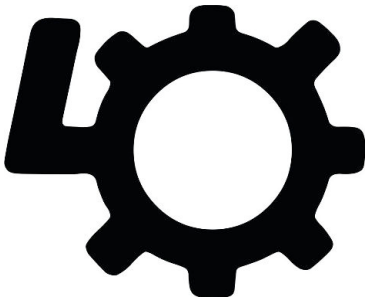
Total emissions and reduction potential

The total emissions for an average CD delivered in 2009 was estimated to be 649g of CO_2e. This was multiplied by the average of 3006 CDs per label and multiplied by 865 labels to results in 1686 tonnes of CO_2e for every independent record label in the UK in 2009. The same process was undertaken for digital dlivery: 62g of CO_2e was multiplied by the average 1463 digital deliveries per label and multiplied by the 865 labels, to result in 79 tonnes of CO_2e.

The music industry context to the total emissions was provided using data from an anonymous arena. This arena had annual emissions of 554 tonnes of CO_2e from energy, water and waste in 2008. Three times this annual emission is 1662 tonnes – similar to the emissions calculated for all independent promo releases.

Assuming that in the switch from CD to digital, the same number of deliveries would be made, the 62g of CO_2e was multiplied by 4469 (1463 + 3006) and multiplied by 865, resulting in 240 tonnes of CO_2e. This is a reduction of 86% from 1765 tonnes (79 + 1686).

THANKS TO ALL THOSE WHO CONTRIBUTED TO THE RESEARCH



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