



Understanding Carbon Footprints in the UK Consumer Magazine Media and Business Information Sectors

A whitepaper prepared for the 2013 PPA Environment Forum

November 2013

This paper has been prepared by Innventia Edge working on behalf of the PPA



Background

The PPA and its members take their environmental responsibilities seriously and over the past ten years have engaged in a series of industry-wide initiatives to understand, minimise and manage the impacts of magazine publishing in the UK. A key element of this work has included the carbon footprinting initiative, which has culminated in the development of a carbon calculator allowing publishers to estimate the anticipated carbon footprint of four key elements of their business:

- The carbon impacts arising from office buildings
- The carbon impacts associated with travel (e.g. business travel or journalistic fieldwork)
- The carbon impact of printed titles
- The carbon impact of digital products

From the outset, the PPA has sought to push boundaries by tracking and applying the very latest thinking and the best available data and methodologies. As a result, the carbon footprinting initiative has been widely acclaimed and is regularly held up as an example of best industry practice. Subsequently, the development and application of the carbon footprinting initiative is a key element of the PPA's voluntary environmental agreement with Defra, which provides a structure for the industry to continue to achieve challenging environmental targets on a voluntary basis without the need for government regulation.

As part of the agreement with government, PPA will work with its membership to produce a series of case studies each year to demonstrate the application of the carbon calculator.

This white paper utilises the findings of some of these case studies to highlight the likely carbon issues for different publishing scenarios and to show case trends and developments in the sector.

The case studies and this subsequent white paper have been prepared by PPA with support from our carbon footprinting partner Innventia Edge. Innventia Edge has also been responsible for all aspects of the development of the PPA carbon calculator.



The Digital Challenge

Recent years have seen a rapid growth in the importance of digital products in the portfolios of PPA members. The PPA's own research shows that this trend will continue into the future, with digital representing an increasing share of total company revenues.

Own <u>Print</u> Brands' Share of Total Company Revenues			Own <u>Digital</u> Brands' Share of Total Company Revenues		
	Consumer	B2B		Consumer	B2B
Current	78%	40%	Current	8%	22%
Two Years Out	71%	32%	Two Years Out	15%	29%
Change	-7	-8	Change	+7	+7

Source: *Publishing Futures: PPA 2013*

Whilst the carbon footprint implications of printed magazines have been scrutinised in detail in the preceding work by PPA, the implications of digital products are less well researched. Extending the footprint calculations to include digital products presents a number of significant challenges. In particular, there is no recognised methodology or data for estimating the footprint of digital goods and services.

In line with the carbon initiative's underlying principle of pushing boundaries and providing industry leadership, PPA and their carbon footprinting partner Innventia Edge have sought to draw together the latest thinking and best available data to provide some first insights into the carbon impacts of digital products. To complement the calculations for printed magazines, the method applied for digital products takes a whole life cycle approach, i.e. incorporating data storage, distribution, and consumption of the product by the end-user.

To achieve this, much work on the development of the methodology and underlying data has been required. However, there are still knowledge and data gaps to be filled. The PPA's work on the carbon impact of digital products is ground-breaking and will undoubtedly be improved as these knowledge and data gaps are further

debated, improved and filled. In the meantime, the calculations provide:

- Our best estimate yet of the magnitude of the carbon impacts of digital products
- Insights into the drivers that influence the carbon impact of digital products and therefore some early indications of how the digital footprint can be managed.

Case Studies

The results presented in this section do not represent the results of any specific individual publisher, brand or title. Instead, the results presented for each scenario described are a composite of a number of case studies undertaken with PPA members to investigate the carbon implications of certain situations. In each case, the scenario investigated is described and the key takeaways are highlighted.

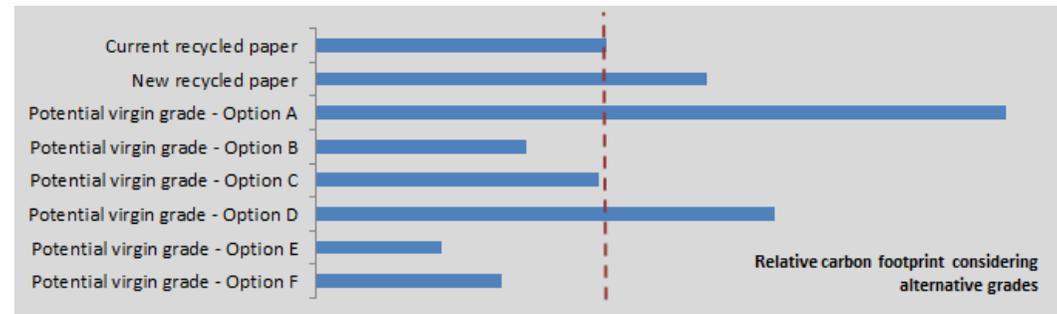
Scenario 1: Switching between recycled and virgin papers

A B2B publisher has been using a recycled content paper. However, the mill currently supplying the paper will close and production will move to another site leading to increased paper and delivery costs for the publisher. In response, the publisher must consider other papers but this will require a change from recycled content to virgin paper. The PPA carbon calculator was therefore used to estimate the carbon impact considering the current recycled paper and alternative recycled paper and a number of potential virgin options.

The results showed that:

- Migrating to the new recycled paper would increase the carbon impact of the publication. Digging deeper into the analysis showed that this was due to the fact that this mill has a greater impact per unit of paper produced compared to the mill currently supplying the paper.
- A number of alternative virgin papers were considered, all from certified sources. Some of these would result in a reduced carbon impact whilst others would result in an increased carbon impact.

In performance terms, the preferred virgin paper would be Option A, but this would significantly increase the carbon footprint as the mill is reliant on grid electricity with a high carbon impact. The publisher is therefore working with their printer to determine the best compromise between performance, cost and carbon impact.



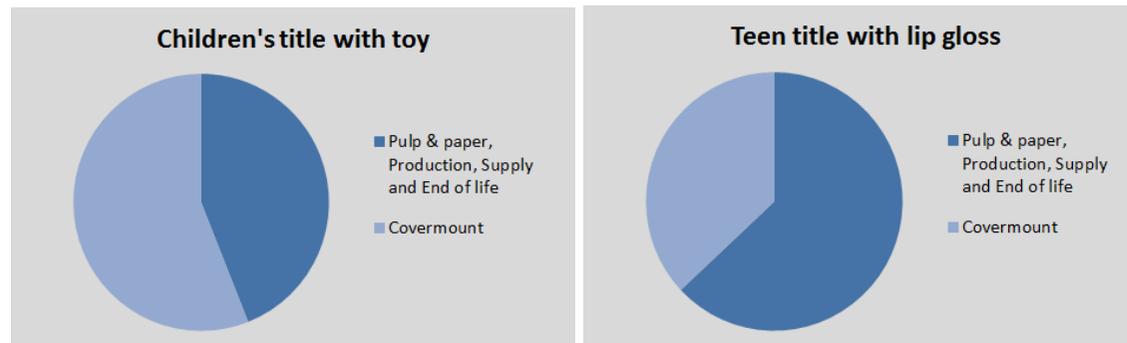
Key takeaways from the scenario are:

- When choosing between papers, recycled content is not necessarily always better than virgin fibre. Key factors influencing the carbon impacts of different papers include:
 - How efficient is the mill producing the paper?
 - How much of its own energy does it produce and what fuels are used?
 - How reliant is the mill on grid electricity, and what is the national grid electricity mix?
- It is therefore not possible to make a generalised statement that recycled is better than virgin or vice versa. Each situation should be considered on its own merits.

Scenario 2: Consumer titles with covermounts

A large number of printed consumer titles carry covermount gifts as an integral part of the product offering. The boundaries of the carbon calculator have been extended to allow the carbon impact of covermounts to be estimated. In this scenario, two types of publications with typical covermounts were investigated to determine how significant the covermounts may be in terms of their carbon impacts:

- A children's title with a plastic toy weighing approximately 45g contained in a plastic film pack
- A teen's title with a lip gloss set consisting of four lip glosses in a combination of rigid and flexible plastic packaging contained in a plastic film pack with a card backing



The results showed that covermounts can account for a significant proportion of the overall footprint of a printed magazine title:

- For the children's title, the covermount accounts for more than 50% of the overall carbon impact
- For the teen title, the covermount accounts for around a third of the overall carbon impact.

Key takeaways from the scenario are:

- Covermounts can account for a significant proportion of the overall footprint of a printed magazine
- The exact footprint of a particular covermount will vary case by case, depending on the amount and type of materials they are constructed from
- Generic data for the carbon impact of different materials was used in these case studies. There is therefore some uncertainty in the estimates, but the results do at least give an indication of the potential magnitude of the carbon impact of the covermounts investigated and indicate that this is a significant part of the footprint warranting further investigation.

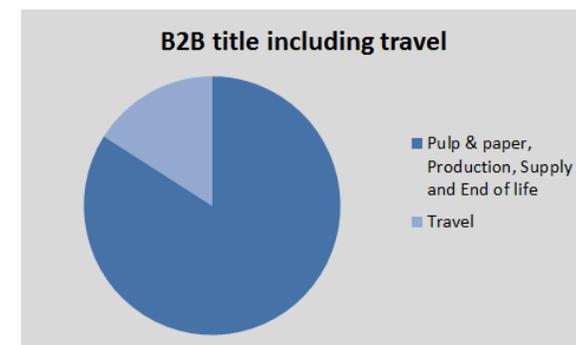
Scenario 3: Extending the boundaries to include travel

Like all businesses, publishing usually involves travel of some kind. This may be travel for fieldwork (e.g. journalism or photo shoots) or business travel (e.g. for sales meetings, press passing, etc). The PPA's early work on carbon footprinting focussed on the physical magazine product, but the boundaries of the calculator have now been extended so that the impact of fieldwork and business travel can also be considered.

In this scenario, the potential additional impact of fieldwork and business travel is estimated for a B2B publication. The group of titles that were used to construct this particular scenario had the following characteristics:

- Quarterly titles with relatively low circulation (print runs in the range of 7,000-10,000)
- Production of each title requires a mix of UK train trips (on average 4 per annum), European flights (1-3 per annum) and long-distance flights (1-3 per annum).

Travel for business and fieldwork accounted on average for 16% of the overall footprint of the title, but this varied widely by title from as low as just 1% to as high as 24%. The sample size considered was small, covering just five titles, but these initial results suggest that travel could be a significant part of the overall footprint of a title. It would be useful to be able to extend the sample size and to make a similar analysis of the travel associated with some consumer titles where fieldwork (journalism and photo shoots) may require considerably more travel per annum, although this may then be shared across a much greater number of copies due to the higher print runs.



Work is on-going on case studies with a number of PPA members to estimate the travel related impacts of specific titles.

Key takeaways from the scenario are:

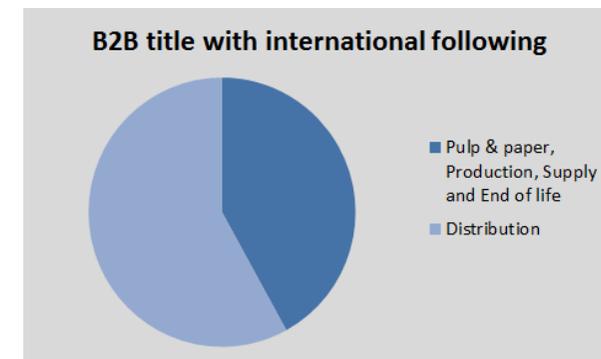
- Although only a small sample size could be considered, the results suggest that travel for business meetings and fieldwork may represent a significant share of the overall footprint of a printed title
- Unfortunately some publishers find it difficult to collate the data necessary for this analysis. However, the results suggest that the additional effort required may be worthwhile as travel emissions are potentially a significant share of the overall footprint
- Video conferencing and other tools may be a useful way of reducing the carbon footprint of business meetings. This has been demonstrated by academic research which has shown that mediated meetings using personal computers can reduce GHG emissions per meeting for media businesses¹. However, these are unlikely to be a viable substitute for journalism fieldwork.

Scenario 4: International distribution

Many publications, particularly B2B titles, have an international readership. To reflect this, the capabilities of the PPA carbon calculator have been extended to allow publishers to model specific distribution scenarios in greater detail. In this scenario, the implications of high levels of international distribution were considered for a series of business titles.

The group of titles that were used to construct this particular scenario had the following characteristics:

- More than 50% of copies were exported (ranging between 55% and 90%)
- Export was split roughly 50:50 between Europe and Rest of the World, with product distributed by a mix of short-haul and long-haul air freight.



¹ Business meetings at a distance – decreasing greenhouse gas emissions and cumulative energy demand?, Clara Borggren, Asa Moberg, Minna Rasanen and Goran Finneveden, Journal of Cleaner Production 41 (2013) 126-139

The results show that international distribution significantly increases the carbon impact of printed magazines. Across the six titles investigated, distribution accounted for more than half of the total carbon impact of the title. In these examples, the share of the footprint due to distribution ranged between 52% and 63% of the overall footprint, depending on the proportion of product exported and on the geographical distribution of the readership. In each case, the footprint per copy consumed by overseas readers was more than double the footprint per copy consumed by UK readers.

Key takeaways from the scenario are:

- International distribution of product can significantly increase the carbon impact of a title. Although many publishers do not currently have access to data on how the export share of their product is distributed, gathering this data would provide a significantly improved estimate of the carbon impacts of magazine publishing
- The scale of the impact will depend on the proportion of product sent abroad and on the geographical distribution of the international readership
- From a carbon perspective, investigating the possibilities for printing product locally or regionally to reduce distribution distances may be interesting. This may not currently be an option for titles with smaller print runs where the economics would prove unfavourable, but the increasing emergence of digital print may make this a viable option in the future.

Scenario 5: Total footprint across a publisher's titles

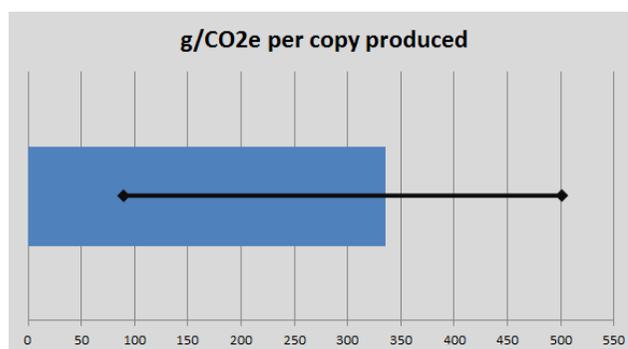
In this case study, a B2B publisher was interested in obtaining a better understanding of the footprint across their entire range of titles. Two key questions for the publisher were:

- What is our Scope 3 carbon impact for these titles²?

² Greenhouse gas emissions are categorised into three groups (scopes). Scope 1 and 2 cover direct emissions sources (e.g., fuel used in company vehicles and purchased electricity). Scope 3 emissions cover all indirect emissions from the supply chains supporting the activities of an organization.

- How does the footprint per copy vary between titles and what influences this?

Their range included over 30 titles, encompassing fortnightly, monthly, quarterly and biannual publications. Circulations for the titles varied from a few hundred to 16,000.



The results showed that the average footprint per copy produced was 336gCO₂e. However, the range was very wide, from as low as 93gCO₂e per copy to as high as 503gCO₂e per copy. Two factors were found to have the most significant influence on the result – the pagination of the title and the choice of paper.

Adding the totals together for all publications gives an estimate of the Scope 3 GHG emissions. This was found to be in the region of 355tonnesCO₂e for all titles across the whole year. To place this into context, this is around the same as the total emissions from an eleven and a quarter hour flight in a 747³.

So, for the same carbon emissions as a one-way transatlantic flight for five hundred people, this publisher manages to provide valuable content to over 150,000 readers for a whole year.

³ <http://www.yousustain.com/footprint/howmuchco2?co2=355.7+tons>

Key takeaways from the scenario are:

- the total scope 3 carbon impact of publishing printed magazines can be significant. However, when placed into context and compared to the carbon impact of other activities, magazine publishing remains an efficient medium for providing valuable content.

Scenario 6: Combined printed and digital footprint

Digital products are an integral part of the publisher's product portfolio. If the full carbon impact of a particular brand is to be understood, then it is important that this element is evaluated and combined with the carbon footprint of printed titles. In this scenario, a number of individual sub-scenarios are investigated to reflect the different degrees to which publishers are utilising digital media within their product mix.

The PPA carbon calculator has been expanded to facilitate the evaluation of digital content. However, there are still knowledge and data gaps to be filled. The methodology applied is the best available at this time, but it is anticipated that new methods and data will emerge as further research into digital carbon footprints progresses.

For this reason, the results presented for these digital case studies should be considered as indicative only. They illustrate the likely magnitude of the footprint of digital publishing and provide insights into the drivers behind the footprint, but the values presented represent the "anticipated greenhouse gas emissions"⁴ rather than a firm carbon footprint value.

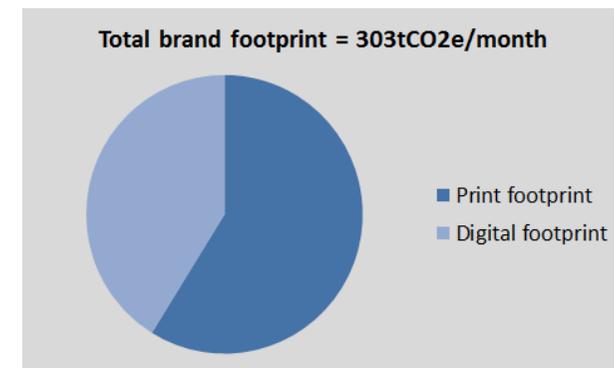
Scenario 6a: UK consumer brand

The scenario considered in this case study was a UK consumer brand with a monthly printed magazine, also available as a pager-turner and app edition for both iPad and iPhone. The printed magazine has a print run of around 320,000, with a roughly 50:50 share between newsstand and subscription. Unsolds in the newsstand

⁴ Defined in PAS2050 as an "initial estimate of greenhouse gas emissions for a product that is calculated using secondary data or a combination of primary activity data and secondary data, for all processes used in the life cycle of the product"

supply chain are typical for the sector. The page turner edition has monthly sales in excess of 1,000 and the monthly app downloads are in excess of 10,000

The website supporting the brand is rich in content featuring nearly 4,000 pages and containing some video. Visitor numbers are high with over 13.5million unique visits to the site during the month of this analysis (September 2013). Website traffic is predominantly UK. The nature of the web content means that there is a much greater likelihood that users will print out content at home, and therefore it has been assumed that there may be one print out per visit.



The results show that the magnitudes of the printed and digital footprints are similar. However, the digital content is reaching a considerably larger audience.

Together, the total footprint for this brand for the one month period considered in the analysis is approximately 302.7tCO₂e. Assuming that September was a typical month, then the total annual footprint for publishing this brand would be in the region of 3,600tCO₂e per annum.

Not surprisingly, considering the high visit numbers, the digital content is dominated by the impacts from the website. 55% of the web footprint is associated with the assumed home printouts, so anything that can be done to discourage unnecessary printing of content would help reduce the life cycle GHG emissions. The vast majority of the rest of the web footprint is associated with the production and powering of the consumer's reading device.

Scenario 6b: International B2B publisher

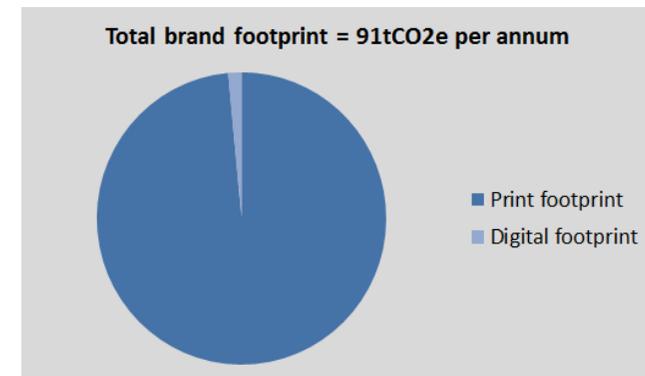
The scenario considered in this case study was a UK-based B2B publisher with an international readership. Four separate quarterly printed titles are drawn together under the banner of one composite website.



The printed titles have a combined circulation in excess of 23,000, with readership distributed globally. There is also a page turner edition which has downloads of over 1,200 per month and an app version, although this currently only has very limited uptake. The website is rich in content featuring over 10,000 pages and containing some video. Visitor numbers stand at around 8,000-9,000 unique visits per month. Web traffic is again global in nature, although together US and UK visitors account for 79% of traffic, with India accounting for a further 12%. A long tail of other countries account for the remaining visitors.

The high level of international readership for these titles means that the footprint of the printed magazines is relatively high, accounting for over 98% of the total footprint of the brand. Of course, the printed titles currently reach more readers than the digital content, but the magnitude of the disparity between the print and digital footprints is more a factor of the improved efficiency of content delivery that digital offers for internationally consumed titles when compared to shipping hard copy.

As this publisher's digital programme matures and more readers migrate to digital content the overall brand footprint will be reduced. Currently, the consumption of web content accounts for around 36% of the digital footprint and consumption of page turners accounts for around 40%. The business also has a strong social media outreach programme, especially using email newsletters. This aspect accounts for a further 19% of the digital footprint. Currently, with only limited uptake, the impact from consumption of app editions is insignificant, but this may change in the future as apps become a more established format.



Scenario 6c: International consumer brand

The scenario considered in this case study was an international weekly printed magazine with regional editions printed at seven sites globally. Global sales are in excess of 1.5million copies per issue. A high proportion of the product is sold via subscriptions, although exact proportions vary by region. Even with the distributed production model to deliver regional editions there is still a requirement for considerable transport of product to different markets within each region.

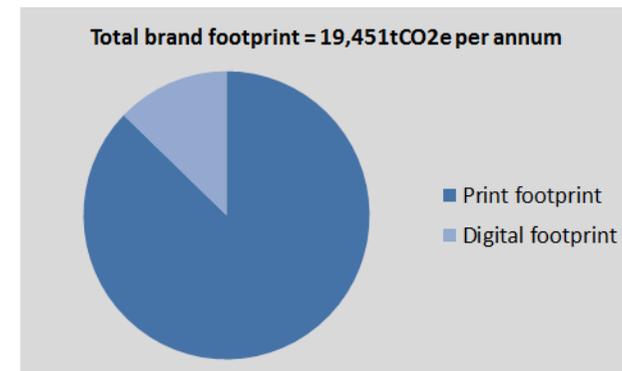


Page-turner editions and tablet/smartphone editions are in place. Compared to print and web, penetration of these products to date is relatively small but growing. Data indicates that subscribers spend over 1 hour and 45 minutes accessing content per week.

The brand is supported by a very rich website with in excess of 10,000 pages and a high level of audio and video content. The publisher makes extensive use of social media to connect with its readership, particularly email newsletters and twitter.

The results show that the print footprint is considerably larger than the digital footprint, despite the fact that the digital content reaches a considerably larger audience. A major contributor to the print footprint is distribution – even with regional production centres, distribution of product to various countries within each region can account for 30-40% of the total print footprint.

The high level of web traffic for this publication means that accessing web content accounts for around 60% of the digital footprint. This publisher's high usage of social media, particularly email newsletters, accounts for a further 30%, page turners and app editions responsible for the rest of the digital footprint.



Key takeaways from these scenarios are:

- Generally, the digital footprint has a smaller share of the total brand footprint when compared to print
- As penetration of page turners and apps is relatively low compared to web traffic, consumption of web content currently tends to dominate the digital footprint. This may change in the future as apps become a more established product channel
- Where web traffic is particularly high, the digital footprint can be in comparable in size to the print footprint, although it should be remembered that in this scenario digital content is reaching a far greater audience



- For products with an international readership distribution of printed product can account for a significant share of the print footprint. In these cases, encouraging consumption of digital content to avoid distribution impacts may help reduce the overall footprint of the brand
- Home printouts can add a considerable burden to the digital footprint. Publishers should do all they can to discourage consumers from printing out content unnecessarily.

Annex: Method and limitations

Best available techniques

A key principle of the PPA's carbon initiative has always been to monitor and apply best available methods and data in the carbon footprinting process. Initially there were no specific guidance documents or standards to follow, but since the work first began a series of developments have had to be taken into account. The implications of three important methodology documents in particular should be highlighted:

- PAS 2050: Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

This document was first published in 2008, shortly after the completion of the first version of the PPA carbon calculator which focused on the printed magazine supply chain. Subsequently, the underlying data sets and assumptions were independently reviewed against PAS2050 by the Edinburgh Centre for Carbon Management (ECCM). Their findings were very positive, concluding "*ECCM believes that the study...is relatively comprehensive, and provides a high level of analysis of the greenhouse gas (GHG) emissions associated with the UK magazine supply chain*".

- ISO16759: Graphic technology – Quantification and communication for calculating the carbon footprint of printed media

This International Standard was published in July 2013. The methodology behind the PPA carbon calculator is in line with many of the principles outlined in this document. However, the standard requires that "*Calculations done in accordance with this International Standard shall include all emissions of those unit processes within the defined system boundary that contribute to a total of at least 95% of the total carbon footprint...Any unit process with a contribution of more than 1% of the total carbon footprint shall be included in the calculations...*". It was never the intention that the PPA carbon calculator would provide this degree of detailed coverage and therefore it is not anticipated that a calculation completed with the calculator could achieve ISO16759 accreditation. Considerably more primary data collection would be required and it is unlikely that publishers in the UK have the resources to achieve this level of detail or have the requirement to do so. The calculator is intended to provide a sensible balance between accuracy and accessibility to carbon footprinting for the broad cross section of PPA members. Any publishers wishing to go beyond the



current calculations and aim for ISO16759 are advised to seek further advice from specialist consulting companies.

- ISO 14067: Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication

This Technical Specification was published in May 2013. It provides further recommendations on three aspects potentially relevant to the carbon footprint of printed products.

- i) Treatment of fossil and biogenic carbon – *“GHG emissions and removals arising from fossil and carbon sources and sinks shall be included in the CFP and shall be documented in the CFP study report”*
- ii) Land use change – *“When significant, the GHG emissions and removals occurring as a result of direct land use change (dLUC) shall be assessed in line with internationally recognized methods...Indirect land use change (iLUC) should be considered in CFP studies, once an internationally agreed procedure exists”*
- iii) Soil carbon change – *“If not calculated as part of LUC, the GHG emissions and removals occurring as a result of soil carbon change should be assessed and included in the CFP...”*

At this stage, sufficient methodology and data are not in place to support the inclusion of these aspects in the carbon footprint calculations, and therefore in this respect the current methodology applied in the calculator is not in line with these requirements of this technical specification. The PPA will continue to monitor developments in methodology and data, and should this become necessary the carbon footprint calculations may be amended to comply with emerging best practice in the future.

There are no methodology documents specific to digital products.

In order to develop the methodology for the digital calculations reference has been made to a wide range of academic and industry studies leading to the development of what the PPA believes is best practice for carbon footprinting of digital publishing. In developing the method, much consideration has been given to ensure that the calculator is accessible and that the data/information required is typically available to publishers.

It should be recognised that there are many knowledge and information gaps and the results generated for the digital carbon footprint should be considered as indicative only, with considerably less certainty that the results



achieved for print. The PPA will continue to monitor developments in the carbon footprinting of digital products and amendments/improvements to the calculator may be made if necessary.

Background data for the calculations

In terms of underlying data, the PPA has worked hard to generate primary data for the key stages of the life cycle of printed magazines:

- Data for the carbon impact of magazine papers has been sourced directly from papermakers. Wherever possible, carbon footprint statements made in line with the CEPI ten toes guidelines have been used. Where these are not available, the carbon impact of papers has been estimated from Paper Profile environmental declarations. This introduces some additional uncertainty, but is currently the best available data set for these purposes.
- Primary data has been gathered from magazine printing and finishing houses who are currently members of PPA. This data has been compiled to produce average datasets for the three principle printing processes (sheet fed, HSWO and gravure). Efforts to improve this data set and provide a detailed breakdown according to individual print sites are on-going.
- Primary data has been gathered with distributors and wholesalers to develop a model of the UK newsstand supply chain. This model takes into account the composite nature of UK newsstand supply (handling both newspapers and magazines in a single system and managing the return of unsolds)
- Default data based on current UK averages is provided for the unsolds rate (based on figures supplied by wholesalers) and for the post-consumer magazine recycling rate (determined by the latest PPA audit). These can be edited where publication specific data is available.

Where it has been necessary to apply secondary data, recognised data sources have been applied.

For the digital footprint, the calculations are based on a more generic framework which allows publishers to describe their digital content and the consumers of this content. Secondary data on the impacts of data storage, data distribution and data consumption are then used to estimate the carbon impact. Key data sources for the digital calculations include:



- Reworking of the data from the SYMPACT study investigating the annual carbon footprint of The Guardian Newspaper⁵
- Data on the production and use of hardware has been sourced primarily from the Ecoinvent databases⁶ for laptops and other computing hardware and from Apple's environmental declarations for various tablets and smart phones⁷.

⁵ Modeling and Assessing Variability in Use Phase Energy of Online Multimedia Services, In press (prepress version available at <http://sympact.cs.bris.ac.uk/publications/>.)

⁶ <http://www.ecoinvent.org/>

⁷ <http://www.apple.com/uk/environment/reports/>



The PPA carbon calculator is available free of charge to PPA members. To register, please visit www.ppa.co.uk/carboncalculator

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