FOOT/PRINT

REDUCING THE CARBON FOOTPRINT OF THE CANADIAN MAGAZINE INDUSTRY

by

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ABSTRACT

Individuals and business people around the world are looking for ways to reduce their impact on the environment, and Canadian magazine publishers are no exception. In order to help publishers "green" their businesses, Magazines Canada collaborated in 2008 with the environmental organization Markets Initiative (now Canopy) to produce the *Magazine Ecokit.* This document highlighted a number of ways magazine publishers could reduce their harmful impacts on the environment.

Recognizing climate change as the most pressing environmental issue facing humanity, Magazines Canada and Canopy collaborated again in 2011 to create a guide specifically focused on how Canadian magazine publishers can reduce their greenhouse gas emissions: *The Carbon Footprint Compendium*.

During an internship with Magazines Canada, I was responsible for assembling the *Compendium* into a single straightforward and practical document. The process revealed the complexity and controversies surrounding carbon reduction in the magazine industry, as well as the lack of information available on Canadian publishers' environmental activities. In-depth examinations of either of those topics would not have been appropriate within the context of the Compendium, but both are certainly worthy of study and discussion.

By tackling both subjects together, this report provides a detailed picture of the state of Canadian magazines' response to climate change, beginning with an analysis of existing studies of magazines' climate impacts and the strategies they suggest, continuing with case studies of Canadian publishers' environmental practices, and concluding with an examination of the challenges and possibilities of the future, including possible directions for scientific research and collective action within the publishing industry. Issues examined include the challenges of creating high-quality paper from recycled fibre, paper mills' claims of carbon neutrality, and whether digital publishing provides environmental benefits.

DEDICATION

I dedicate this report to the memory of my grandfather, Derek Lukin Johnston, who loved nothing more than the printed word, and of his father, Rufus, from whom many members of my family inherited the publishing bug.

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United Nations Secretary General Ban Ki-Moon has described climate change as "the single most important challenge which we are facing these days."[1] Over the last two and a half decades, this issue has achieved prominence thanks to events like the widely publicized (if not always successful) climate change conferences in Kyoto, Copenhagen and Durban; former U.S. Vice President Al Gore's Nobel Peace Prize for his environmental activism and Academy Award-winning documentary; and dramatic natural disasters including Hurricane Katrina, the 2010 flooding in Pakistan, and the East African drought and famine of 2011.

As a result of public concern about climate change—according to polls conducted by Environics, Canadians rated it the most important environmental issue facing the country for all but six months between 2007 and 2011[2]—industries of all kinds have taken steps to improve their environmental reputations. It is currently possible to buy putatively eco-friendly wine, running shoes, bed sheets, cell phones and laundry detergent, to name just a few "green" products. Members of the publishing industry have also joined the movement toward environmental responsibility, perhaps most notably when Canada's Raincoast Books chose to publish the Harry Potter series on Ancient Forest Friendly branded paper.[3]

Magazines have also joined the shift toward greener practices, primarily in the United States, where prominent publications—including *National Geographic*, *Time*, *InStyle*, and *Backpacker*—have commissioned studies assessing the environmental impacts of their operations, and shared the results with the public. In Canada, a partnership between the Canadian Magazine Publishers Association (now Magazines Canada), the British Columbia Association of Magazine Publishers (now the Magazine Association of B.C. or MABC) and the environmental advocacy organization Markets Initiative led to the creation of *The Coated Paper Eco Kit* in 2004, which outlined ways publishers could reduce their environmental impact through improved paper choices.[4] In 2008, Magazines Canada and Markets Initiative collaborated on an updated *Magazine Eco Kit*, which examined the same issues in greater detail and was printed on the Wheat Sheet, a newly developed coated paper incorporating agricultural waste into its fibre mix.[5]

Magazines Canada and Markets Initiative (now known as Canopy) collaborated again in the summer of 2011, producing a follow-up to the eco kits called *The Carbon Footprint Compendium*. This straightforward and practical guide for publishers explaining why they should be concerned about their greenhouse gas emissions, what the major sources of that "carbon footprint" are in magazine

1 *Ki-Moon, "Innaugural Speech," 2011.*
2 *Environics,* Canadian Public Opinion*, 2011, 17.*
3 *Long,* Marketing a Message, *2003.*
4 *Canadian Magazine Publishers Association and British Columbia Association of Magazine Publishers,* Coated Paper Eco Kit, *2004.*
5 *Magazines Canada,* Magazine Eco Kit, *2008.*

publishing, and how they could go about reducing their operations' contribution to climate change is now available for download from the Magazines Canada website.[6]

I assembled the *Compendium* as part of an internship with Magazines Canada. The process made me aware of the complexity and controversies surrounding carbon reduction in the magazine industry, as well as the lack of information available on Canadian publishers' environmental activities. In-depth examinations of either of those topics would not have been appropriate within the context of the *Compendium*, but both are certainly worthy of study and discussion. By tackling both subjects together, this report will provide a detailed picture of the state of Canadian magazines' response to climate change, beginning with an analysis of existing studies of magazines' climate impacts and the strategies they suggest, continuing with case studies of Canadian publishers' environmental practices, and concluding with an examination of the challenges and possibilities of the future.

6 *At http://www.magazinescanada.ca/uploads/File/AdServices/CarbonFootprint2012/CarbonFootprintEN.pdf*

2. CARBON FOOTPRINTS: WHAT THEY ARE AND HOW THEY'RE MEASURED

Climate change is a complex process, involving the interaction of both naturally occurring and human-generated factors. The primary human contribution to the current changes in our climate is the release of "greenhouse gases" into the atmosphere. Greenhouse gases are so called because they trap heat in the Earth's atmosphere, contributing to global temperature increases the same way a greenhouse's walls trap heat to warm the plants within. The most common greenhouse gases are water vapour, carbon dioxide, methane, nitrous oxide, and human-manufactured aerosol gases like CFCs. By far the most prevalent of all greenhouse gases—both naturally and produced by human sources—is carbon dioxide.[7] As a result, many of the terms used to describe greenhouse gas measurement and reduction refer to "carbon" as a stand-in for greenhouse gases as a group.

A carbon footprint "measures the total greenhouse gas emissions caused directly and indirectly by a person, organization, event or product."[8] Carbon footprint measurement grew out of the existing practice of conducting a Life Cycle Assessment (LCA), in which the entire environmental impact of a product, process or service is measured, from raw materials extraction and production, through distribution, consumption, and disposal. The central idea of the LCA has been focused specifically on greenhouse gas emissions in what we now call carbon footprint measurement, and the technique has also been extended to allow entire organizations' footprints to be measured. As such, it can be applied to the operations of magazine publishers.

Unlike the products, processes and services measured by an LCA, organizations do not have clearly defined beginning and end points. In order to analyze an organization's carbon footprint, then, emissions must be measured over a specific period of time. As a general rule, organizations measure their carbon footprints in terms of the quantity of greenhouse gases released during a single year.

One of the reasons this process is called "carbon footprint" measurement rather than "greenhouse gas footprint" measurement is the way the results are presented. Each greenhouse gas traps heat within the earth's atmosphere at its own rate, called the gas' "global warming potential" by environmental scientists. Methane, for instance, has a global warming potential of more than 20 times that of carbon dioxide.[9] In other words, releasing a tonne of methane into the atmosphere has the warming effect of releasing more than 20 tonnes of carbon dioxide.

Because organizations release a combination of greenhouse gases, and because these kinds of analyses are most useful when they can be compared both to similar organizations and within the same organization over time, it was important to develop a standard that would allow these cumulative emissions to be compared.

7 *U.S. Environmental Protection Agency, "Global Greenhouse Gas Data," 2011.*
8 *Carbon Trust, "Carbon Footprinting," accessed 2011.*
9 *U.S. Environmental Protection Agency, "Glossary of Climate Change Terms," 2011.*

Because carbon dioxide is both the most common greenhouse gas and has the lowest heat trapping capacity, the accepted standard is to convert all measured emissions into the quantity of carbon dioxide required to generate the same global warming potential. Thus, carbon footprint measurements are expressed in terms of quantities of carbon dioxide, even though the emissions being analyzed are in all likelihood of a variety of greenhouse gases.

Carbon footprint measurement is an extremely complex and expensive undertaking. It requires not only a detailed listing of all the various activities an organization undertakes that cause greenhouse gas emissions, but a calculation of the frequency and duration of those activities throughout the year, plus a measurement or calculation of the quantities of gases each activity releases. Even the first part of the process, identifying relevant carbon emitting activities, is more challenging than it might seem. For example, if a company's employees drive themselves to work in cars, should their commutes be factored into the company's carbon footprint? If a publisher's customers send their reading material to the landfill instead of the recycling plant when they finish with it, should the resulting methane emissions be considered part of the publisher's total footprint?

To help organizations answer these questions, the World Resources Institute and the World Business Council for Sustainable Development developed the Greenhouse Gas Protocol (GHGP) corporate standard in 2001. Subsequently, the International Organization for Standardization (ISO) used the protocol as the basis for its own internationally recognized standard, the *Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals* (ISO 14064), published in 2006.[10] Carbon footprint measurements that are based on the same standard can easily be compared, either between organizations or within a single establishment over time.

The implementation of such standards is voluntary, however, and some companies choose to set their own boundaries for carbon studies, making the results challenging —if not impossible—to compare. This is the case with most of the publishing-related carbon footprint analyses conducted to date. One reason publishing companies may choose not to follow the GHGP and ISO protocols is that, as generic organizational standards, they don't take into account the specific issues that arise in particular industries. A print-industry-specific standard for carbon footprint measurement is under development at the ISO (*ISO 16759—Quantification and communication for calculating the carbon footprint of print media products*) and its publication is expected sometime in 2012.[11] The existence of print-specific measurement guidelines may encourage more publishers to conduct carbon footprint analyses that adhere to established standards.

Because of the complexity and expense of carbon footprint measurement—given the specialized knowledge required, carbon footprints are usually measured by

10 *Greenhouse Gas Protocol, "About the* GHG *Protocol," accessed 2012.*
11 *Verdigris,* Sustainable Standard, *2011, 1.*

outside consultants—it is not a process many companies can afford. As a result, no Canadian magazine publisher has undertaken a complete carbon footprint analysis of its operations to date, despite the fact that many publishers are concerned with and have taken action to reduce their environmental impacts. In the U.S., however, a handful of publishing organizations have had both the desire and the means to measure their greenhouse gas emissions during the last decade, and analyzed together these studies can provide a picture of the typical sources of emissions in magazine publishers' carbon footprints.

3. MAGAZINE LIFE CYCLE ASSESSMENTS

Between 2006 and 2009, a number of American magazine publishers and a pair of publishing organizations decided to invest in the process of carbon footprint analysis to determine the environmental impacts of the publishing process. Most defined the scope and boundaries of their own study independently, so comparing their results isn't straightforward. However, there are trends among the studies that make it possible to draw general conclusions about the carbon emissions generated by magazine publishing.

3.1 *Time* and *InStyle*

The first study examined two Time Inc. titles: *Time* and *InStyle* magazines. The H. John Heinz III Center for Science, Economics and the Environment analyzed them as part of a larger study titled *Following the Paper Trail—The Impact of Magazine and Dimensional Lumber Production on Greenhouse Gas Emissions: A Case Study*. The study was conducted in 2006, and measured the greenhouse gas emissions resulting from the production of both magazines and "dimensional lumber" (lumber cut to standardized dimensions, for instance a 2x4) for sale at Home Depot stores. These products were studied in tandem because wood wastes from the saw mill supplying the Home Depot lumber are used in the pulp that goes into the papers used by *Time* and *InStyle*.

The study began its measurement for all three products, with logging operations. The measurement at this first stage was limited to the greenhouse gas emissions produced by the machinery and tools used for logging. Like most publishing studies, no account was made of the lost carbon sequestration capacity of the trees that were cut down. This is an important omission, which will be discussed later in this section.

Following the logging of the timber, a number of areas were identified as causing greenhouse gas emissions in the life cycles of both *Time* and *InStyle*. Those sources of emissions were: transportation of wood fibre to pulp and paper mills, transportation of clay (used in coated paper) to the paper mill, production of pulp, production of paper, transportation of paper to printers, printing, distribution of printed magazines, and what the study called the "final fate" of the magazines (whether recycling, landfill or incineration).

For the majority of these sources, the cause of greenhouse gas emissions is easy to grasp—the equipment involved (saws, trucks, printing presses) is either powered directly by fossil fuels (oil, coal, natural gas), or with electricity generated by burning fossil fuels. "Final fate" emissions are more complicated. Some emissions from the final life cycle stage are typical—the trucks used to transport the magazines to the recycling plant, and the plant itself, use energy resulting from fossil fuel combustion. For incinerated magazines, there is an additional release of carbon dioxide

that occurs when paper is burned. The greatest source of emissions, though, is the paper that winds up in the landfill. When paper and wood products decompose in an anaerobic environment (which is typical in a landfill, since waste is quickly covered with other waste, cutting it off from oxygen), it produces methane gas. Since methane has a global warming potential of more than 20 times carbon dioxide's, the disposal of magazines in the landfill is a significant source of emissions in a publication's life cycle.

The final results showed the following breakdown of emissions sources for the two magazines: Production at the pulp and paper mills was the most significant, generating 61% of *Time*'s emissions and 77% of *InStyle*'s. Next came "final fate," which generated 16% and 10% of emissions respectively. This was followed by the distribution of the printed magazines to customers, at 9% and 5%, then transportation of raw materials to the pulp and paper mills, at 8% and 3%. The transport of paper to the printer and printing itself constituted a mere 4% and 2% for each magazine. And last of all, the process of harvesting the wood itself contributed 2% of the emissions for each magazine.[12]

3.2 The Green Press Initiative

The next publishing life cycle study did not focus on the magazine industry. However, it is important to consider because it included measurements left out of all the magazine studies. The study in question, *Findings from the U.S. Book Industry: Environmental Trends and Climate Impacts* was initiated by the Green Press Initiative (GPI) in collaboration with the Book Industry Study Group. The GPI study's findings are the result of a survey sent in 2007 to 1,000 book industry stakeholders, including publishers, printers, paper manufacturers, retailers and distributors.[13] The study then applied a set of standardized calculations to the data in the survey responses (which were sent back by 13 printers, six paper mills, 76 publishers, eight distributors and three retailers) to come up with the breakdown of carbon emissions within the industry as a whole.

The most significant aspect of the GPI study is that it identifies forest biomass loss as the largest contributor, by far, to the book industry's carbon footprint. The term "biomass" refers to biological material contained in living, or previously living organisms, such as trees used in paper production. Trees are the most important of the planet's photosynthesizing allies, with forests responsible for absorbing 67% of the carbon dioxide removed from the atmosphere by living organisms.[14]

When trees are cut down, not only is much of the carbon stored in them released into the atmosphere when processing by-products are used for fuel (this form of energy is known as biomass energy, and will come up for discussion later in this report), but the trees' capacity to absorb further carbon dioxide is eliminated. Even

12 *Gower et al.,* Following the Paper Trail*, 2006, 44-48.*

13 *Book Industry Study Group and Green Press Initiative,* Environmental Trends*, 2008, 1.*

14 *Landsberg and Gower,* Applications of Physiological Ecology*, 1997, quoted in Gower et al., 2.*

if new trees are planted immediately in logged areas, the carbon storage capacity of those areas is significantly depleted, because new trees absorb far less carbon than old and middle growth stands. In fact, for their first decades, replanted forests emit more carbon than they absorb, according to the Environmental Paper Network.[15] Old growth forests' carbon storage capacity continues to increase over time, so even once a replanted forest has begun to absorb carbon, the new forest will never reach the absorption levels the existing forest would have attained by the same date.[16]

The GPI's inclusion of the carbon impacts of biomass removal sets this study apart from the other print industry carbon footprint analyses conducted to date. With biomass loss included in the calculations, the breakdown of emissions sources changes dramatically. From greatest to least, the emissions sources identified in the GPI study were: biomass removal, 44.4% (resulting from the calculation that 61.2% of the carbon impacts came from biomass removal, but 16.8% of those emissions were recovered in the form of carbon stored in books and biomass used for energy production); paper production, 22.4%; distribution of printed books, 12.7%; methane releases from landfilled books, 8.2%; publishers' emissions (office energy and paper use, business travel, etc.), 6.6%; printing and binding, 4.2%; harvest and transport of fibre to the mill, 1.5%.[17]

Leaving out the biomass removal and other areas not measured in both studies, the findings in the Time Inc. and GPI studies are not drastically different. (The Time Inc. study focused exclusively on production and transportation of physical magazines, so didn't measure publisher or retailer emissions.) Paper production is the greatest source of emissions, printing, transport and harvest are the three smallest sources, and distribution and "final fate" fall in between, though these two are reversed between the two studies—perhaps unsurprisingly, as magazines do intuitively seem more likely to wind up in the landfill than books.

The importance of the GPI study, though, lies precisely in the 44% of emissions resulting from biomass removal. Given the rest of the study's consistency with the findings of the Time Inc. analyses, it is reasonable to extrapolate that were biomass removal considered in the magazine studies (from Time Inc. and those to follow), it would amount to an equally significant portion of the emissions generated.

3.3 *Backpacker*

The next carbon footprint study was probably the most exemplary of the magazine studies (though it too neglected to factor in biomass removal). In 2008, *Backpacker* magazine engaged energy auditor Cooler to conduct a carbon footprint analysis of their entire operation the previous year, including publisher-related emissions like staff commutes and contributor travel.[18] Because no such study had been conducted

15 *Environmental Paper Network, "Paper Myths.," accessed 2012.*
16 *Book Industry Study Group and Green Press Initiative,* Environmental Trends*, 2008, 36.*
17 *Ibid., 2.*
18 *The* Backpacker *Editors,* "Backpacker's *Carbon Neutral Project," 2008, 1.*

by a magazine before, *Backpacker* and Cooler developed their own parameters, making this study challenging to compare with previous and future analyses.

Backpacker's research uncovered the following breakdown of emissions sources: paper production, 48%; magazine distribution, 26%; staff and writer travel, 9%; printing and production, 8%; ink, 5%; office, 4%.[19] The results, though not exactly comparable, again fall in line with the two previous studies: paper production is the greatest source of emissions, followed by distribution, with printing and publisher emissions near the bottom. This study doesn't include any measurements of "final fate" emissions, so those can't be compared. And the inclusion of staff and writer travel at this adventure-focused publication is a divergence from the previous studies.

3.4 *Discover*

The first magazine to take guidance from the Greenhouse Gas Protocol for its carbon footprint measurement was *Discover*, also in 2008.[20] However, their adoption of the GHGP doesn't make the results any easier to compare with previous studies, as *Discover* was the first publication to use the standard. Once again, a different list of emission sources was included in the analysis: biomass removal was omitted; disposal, staff transport, ink, and subscription insert cards were included.

The three most important emissions sources were paper manufacturing (63.8%), "afterlife" (what Time Inc. called "final fate"—18.3%) and printing (5.4%). Distribution was divided into transport to subscribers (3.3%) and newsstand distribution (.8%) but taken together as they are in the other studies, they make up the fourth most important source at 4.1%. Logging and lumber transport, as well as the manufacture and transport of the inserts each contributed about 2%. Transport of paper to printer was 1.4%, and ink, office energy use, and staff transport all factored in at 1% or less. The picture, though once again missing some previously measured sources and including others previously neglected, is familiar: paper is the greatest source of emissions, magazines in landfills cause significant carbon impacts, printing and distribution play a role worth measuring, and all other factors have a minor effect.

3.5 *National Geographic*

The final, and most problematic, magazine carbon footprint analysis was conducted at *National Geographic Magazine* (*NGM*), and was published in 2009.[21] Once again, the parameters for the study were established by the magazine and its measurement partner, Harmony Environmental, this time taking guidance from the ISO's standards for life cycle assessment, as well as the GHGP's corporate standard.[22] Like the other magazine studies, *NGM*'s did not include biomass removal. Also like the other studies, paper production was the greatest contributor to *NGM*'s carbon footprint (at 70%).[23]

19 *Ibid., 2.*
20 *Barone, "How Big is* Discover*'s Carbon Footprint?" 2008.*
21 *National Geographic Society,* "National Geographic Magazine *Life Cycle Assessment," accessed 2012.*
22 *Boguski, "Life Cycle Carbon Footprint," 2010, 635.*
23 *Ibid., 639.*

But that is where the similarities end. Unlike any of the other print industry studies cited, *NGM* found that printing contributed significant greenhouse gas emissions: 26%. The study notes the discrepancy, and suggests that the reason for the divergence is that a greater number of factors were included in the "printing" figure: "The printing step includes cradle-to-gate GHG emissions for the manufacture of solvents for inks, gravure printing of the magazine pages allocated on the basis of the number of pages printed, and transportation by the printer to magazine drop off sites."[24] Ink solvent manufacture is not mentioned in any of the other studies, so that may provide a partial explanation for the discrepancy.

Another theory offered by the study's authors is that the relative percentages of emissions between paper manufacturing and printing are unusual because the energy source for their paper manufacturing is Canadian hydro-electricity, while the printer is powered through an electric grid dependent in large part on fossil fuel combustion.[25] While plausible, this argument loses credence when considering the fact that paper manufacturing's percentage of emissions is not notably low in the *NGM* study. At 70%, it's actually higher than the percentages measured by *Discover* (63.8%), *Time* (61%) and *Backpacker* (48%) and not much lower than *InStyle*'s 77%. If the printing emissions were disproportionately high because of the difference in energy sources, it is surprising that paper emissions were not disproportionately low for the same reason.

Another anomaly in the *NGM* study is its treatment of what it calls "end of life management" (equivalent to the "final fate" and "afterlife" emissions in other studies). Whereas the studies that examined their "afterlife" (*Backpacker* didn't) found a significant contribution to their footprints from the methane released by decomposing paper, *NGM* claims a greenhouse gas "credit" for the "afterlife" of its magazines. It should be noted that *NGM* differs significantly from other magazines in that its subscribers are widely known to archive their issues rather than disposing of them. Surveys conducted by the National Geographic Society show that approximately 60% of copies are archived by consumers.[26] Nonetheless, the study assumes that all copies not archived end up in landfills, so it stands to reason that methane emissions would be attributed to those copies as in the other studies.

Instead, *NGM* makes the following claim:

> Coated magazine paper in landfills sequesters more carbon, measured as carbon dioxide equivalents, than is released by the degradation of the magazine paper (Barlaz et al. 1997). This is because the magazine paper contains a significant portion of groundwood pulp. Groundwood contains lignin, which prevents degradation of the wood pulp in landfills.[27]

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24 *Ibid., 642.*
25 *Ibid.*
26 *Ibid., 637.*
27 *Ibid., 641.*

This claim contradicts the science supporting all the other carbon footprint studies. Hoping to clarify how this statement could be scientifically supported, I consulted the Barlaz article cited in the quotation above: "Biodegradability of Municipal Solid Waste Components in Laboratory-Scale Landfills" by Morton A. Barlaz et al., published in the journal *Environmental Science and Technology*.

However, the Barlaz article makes no reference to coated magazine paper sequestering carbon or to the lignin in coated paper preventing it from decomposing. In fact, Barlaz's study measures the quantity of methane emitted by coated paper as it decomposes within a simulated landfill environment.[28] Even if it is possible that un-degraded coated paper in landfills sequesters more carbon than its decomposing portions release methane (and no scientific studies were found to confirm this claim), that carbon would continue to be sequestered (without methane being released), if the magazines were recycled instead of landfilled. As such, it is disingenuous to attribute a carbon credit to landfilling when it produces more emissions than other methods of magazine disposal, even if all other claims about landfilled coated paper in the *NGM* study were true.

With paper manufacture and printing taking up a total of 96% of emissions measured, the remaining sources (distribution, pallets and packaging, publisher operations and travel, and "end of life") were all found to have contributed between -1.7% (the credit for "end of life" management) and 2.5% of the magazine's carbon footprint.

The final unusual aspect of *NGM*'s study is that it investigated whether the inclusion of "recycled content" (the study doesn't specify whether said content would be post- or pre-consumer waste) would have an effect on the magazine's carbon footprint. Calculations simulated the inclusion of 5% and 10% recycled fibre in the magazine's paper. According to the study, such changes in the magazine's fibre makeup would have an "insignificant" effect on the total carbon footprint.[29]

There is, however, a significant problem with this assertion. Like the other magazine studies, *NGM*'s does not attribute any carbon impacts to the removal of biomass when virgin fibre is sourced from the forest. As such, the reduction in emissions that would be achieved by leaving those trees standing is left out of these calculations. If the carbon impacts of logging had been included in the analysis, the study would undoubtedly have shown reductions in emissions as recycled fibre increased, since the carbon impacts from biomass removal would have decreased. If that reduction remained at an "insignificant" level, it might be appropriate to attribute its insignificance to the fact that the study only measured the change when 5% and 10% of the fibre was switched from virgin to recycled sources. If greater percentages of recycled fibre were considered, the resulting improvements would surely be more evident.

Interestingly, while no such statement is made in the *International Journal of Life Cycle Assessment* article describing the *NGM* study, the webpage where the

28 *Barlaz et al., "Biodegradability of Municipal Solid Waste," 1997, 912.*
29 *Boguski, "Life Cycle Carbon Footprint," 2010, 643.*

magazine describes its results claims that using recycled fibre in magazine paper "would do more harm than good."[30] This claim is then justified as follows: "before they can be used to make high-quality paper of the type we put in our books and magazines, [recycled] fibers must be cleaned and re-bleached—an expensive process that requires the use of toxic substances that may be both non-biodegradable and extremely harmful to the environment." The validity of this and other claims about the viability of using recycled paper in magazine production will be assessed in the following section of this paper: Strategies, Challenges, and Controversies.

3.6 Findings for the Magazine Industry

As we have seen, the publishing industry carbon footprint studies conducted to date are difficult to compare, as publishers defined the scope and boundaries of their own studies independently. However, even with these differences, trends do emerge, though an effort must be made to ensure that the measurements being compared are as equivalent as possible. Table 1 (on p. 14) is an attempt both to compare the studies, and draw some conclusions about the sources of carbon emissions within the magazine industry.

Since no two studies measured exactly the same emissions sources, the table lists all the categories of emissions studied, and notes are included to explain if and how emissions have been accounted for if a study didn't provide a specific measurement for that particular source (e.g. some quantified ink-related emissions on their own, others included them in printing emissions). Because the studies have been presented to the public in different forms (the *NGM* study was published in a scientific journal, the *Backpacker* and *Discover* studies were published only as articles directed toward their readers, etc.) it is not always clear whether a particular source of emissions was not measured at all, or simply wasn't mentioned in a document created for public consumption. The table indicates "not measured" for those sources that clearly were not studied, but "not mentioned" for sources that seem likely to have been measured given the study's methodology, but for which a specific number was not provided (for instance if a percentage was provided for transport of fibre to the mill, but not transport of paper to the printer). In the instances when a study measured a source that was not mentioned by any of the other studies, that measurement was folded into the source other studies would most likely have included it under. This too is noted in the table (for instance *Discover*'s measurement of emissions connected to their insert cards).

The table also includes a column for average values. However, given the many differences among the studies, it was not possible simply to calculate the mean percentage from each row. The first step to enabling a comparison between all the studies was to recalculate the results of the GPI study as if biomass removal had not been a factor. While the reality of carbon measurement suggests that the opposite approach is more accurate (i.e. biomass removal should be factored into the other studies, rather than factored out of the GPI study), the fact that only one study has

30 *National Geographic Society, "Recycled Paper," accessed 2012.*

measured the carbon impacts of logging means it is not yet possible to estimate what a realistic percentage of carbon emissions from biomass removal would be. It is the percentages from this recalculated column (not the original numbers from the study—indicated with the light grey background) that were used in calculating the average percentages in the table.

The next step was to ensure that numbers being averaged were as equivalent as possible. Since percentages bundled together in any one study (say ink and printing emissions) can't be separated out, the averages had to combine those emissions sources across all studies. As a result, Transport to Mill emissions have been included in Harvest emissions, Staff Travel was included in Publisher emissions, and Ink and Transport to Printer were both included in Printing emissions.

The final step to coming up with comparable emissions numbers turned out to be excluding the *NGM* study. The study used such different methodology from the others—as evidenced by the end of life credit assigned to landfilled magazines and the disproportionately high percentage of emissions attributed to printing—that including it in the calculations would likely obscure any trends that could be detected among the other studies. Additionally, *NGM*'s decision to combine sources of emissions in a quite different manner from the other studies (Transport to Mill and Transport to Printer are both included in Paper Milling emissions, when other studies either separate them out or include them with Harvest and Printing emissions, respectively) would make the numbers impossible to compare even if the methodologies behind them were similar. To draw any conclusions at all about the data, it was necessary to leave *NGM* out of the average calculations. Those results are therefore also displayed with a light grey background.

Two additional mathematical steps were taken to reach final average numbers. If a study simply didn't measure or mention a particular emissions source, it was left out of the average calculation. For instance, the percentage derived from logging was calculated only with figures from *Time*, *InStyle*, GPI and *Discover*, since the *Backpacker* study did not include it. As a result of each average being based on different combinations of magazines, the average percentages as first calculated added up to 107.7%, instead of 100%. They were thus adjusted so that the total of all the averages would equal 100%.

Table 1

Summary of Print Industry Carbon Footprint Study Findings, with Averages

(Columns with light grey backgrounds were not included in calculating averages.)

	Time	*InStyle*	GPI	GPI (without biomass)	*Backpacker*	*Discover*	*NGM*	Adjusted Averages
Biomass Removal	not measured	not measured	44.4%	excluded for comparison	not measured	not measured	not measured	only measured in one study
Harvest	2%	2%	1.5%	2.7%	not measured	2.3%	included in Paper Milling emissions	5.1% (includes Transport to Mill)
Transport to Mill	8%	3%	included in Harvest emissions	included in Harvest emissions	not mentioned	2%	included in Paper Milling emissions	included in Harvest emissions
Pulp/Paper Milling	61%	77%	22.4%	40.3%	48%	65.9% (includes insert cards)	70%	54.2%
Publisher Emissions	not measured	not measured	6.6%	11.9%	4%	.9%	1.5%	8.2% (includes Staff Travel)
Staff Travel	not measured	not measured	included in Publisher emissions	included in Publisher emissions	9%	.6%	included in Publisher emissions	included in Publisher emissions
Transport to Printer	included in Printing emissions	included in Printing emissions	not mentioned	not mentioned	not mentioned	1.4%	included in Publisher emissions	included in Printing emissions
Printing	4%	2%	4.2%	7.6%	8%	5.4%	28.2% (includes pallets/ packaging)	6.3% (includes Transport to Printer and Ink)
Ink	included in Printing emissions	included in Printing emissions	included in Printing emissions	included in Printing emissions	5%	1%	included in Printing emissions	included in Printing emissions
Distribution	9%	5%	12.7%	22.8%	26%	4.1%	2.5%	12.4%
Disposal	16%	10%	8.2%	14.8%	not measured	18.3%	-1.7%	13.7%

It would be unreasonable to adopt these averages as any kind of definitive description of the sources of carbon emissions in the magazine industry, but the trends are certainly instructive. As seen throughout the studies, paper production is the greatest source of emissions (when biomass removal is discounted, as in Table 1), at 54.2%. Next is disposal (called variously "final fate", "end of life" and "afterlife" in

the studies) at 13.7%, followed closely behind by distribution, at 12.4%. Printing, publisher emissions and harvest all come in below 10%.

Since it would be a more accurate reflection of real-world emissions to include biomass removal when calculating the averages, Table 2 presents an example of what the industry-wide averages might be, were biomass removal included. As only the GPI study has measured this emission source so far, it is impossible to know for certain how it might play out in the magazine industry. For the purpose of comparison, I have assigned a figure of 40% (slightly more conservative than the GPI's 44.4%) for the carbon impacts of biomass removal. The resulting hypothetical percentages are included in Table 2.

Table 2

Hypothetical Magazine Industry Carbon Emissions Percentages with Biomass Removal Included

(The adjusted averages excluding biomass and GPI study results from Table 1 are included for comparison)

	Percentage	GPI	Averages from Table 1
Biomass Removal	40%	44.4%	N/A
Pulp/Paper Milling	33%	22.4%	54.2%
Disposal	8%	14.8%	13.7%
Distribution	7%	22.8%	12.4%
Publisher Emissions	5%	6.6%	8.2%
Printing	4%	7.6%	6.3%
Harvest	3%	1.5%	5.1%

It is clear from the results displayed in both tables that the majority of carbon emissions in the production and disposal of magazines result from paper manufacturing, whether or not biomass removal is considered. However, since some of the other emissions sources may be easier to address, they are worth including in any plan to reduce a magazine's carbon footprint.

As a result of their carbon footprint measurement activities, many of the magazines discussed above undertook various actions to reduce their carbon footprints. The next section of this report will examine the strategies employed by these magazines, as well as other potentially helpful ways to approach carbon reduction, the challenges presented by some of these strategies, and the controversies surrounding others.

4.1 Certified Paper

In its *2009-2010 Sustainability Report*, Time Inc. identified purchasing paper from certified sources as one of the pillars of the company's sustainability strategy.[31] Forestry certification schemes arose in the 1990s as a tool that would enable consumers (whether corporate or individual) to better understand where their wood products came from. The first forest certification scheme was the Forest Stewardship Council (FSC), founded in Toronto in 1993.[32] In the following years, a number of other certification systems with comparable objectives have arisen: the Sustainable Forestry Initiative (SFI) in 1994,[33] the Canadian Standards Association (CSA) Sustainable Forest Management System in 1996,[34] and the Programme for the Endorsement of Forest Certification (PEFC) in 1999.[35]

Since FSC certification is the system with the most support from environmental organizations,[36] it will serve as the example for explaining how forestry certification works. The FSC creates forest management standards for forestry activities around the world according to a single set of guiding principles, which includes: compliance with local laws, clearly defined land tenure and land use rights, respect for indigenous peoples' and workers' rights, positive community relations, biological diversity, protection of endangered species and high conservation value forests, maintenance of ecosystems, the creation of management plans, and proper plantation management.[37] For example, there are currently three accredited FSC management standards in Canada: the National Boreal Standard, the B.C. Standard, and the Maritimes Standard.[38] Once a management standard has been accredited, forestry practitioners can apply for a particular forest in which they operate to be certified by a designated third-party FSC certifier.

In order to guarantee that forestry products originating from a certified forest are not contaminated with non-certified wood once the trees have been cut down, the FSC has also implemented a program of Chain of Custody (CoC) certification. For

31 *Rowzie,* Time Inc. 2009-2010 Sustainability Report*, 2010, 11.*
32 *Forest Stewardship Council Canada, "History," accessed 2012.*
33 *Sustainable Forestry Initiative, "Basics of SFI," accessed 2012.*
34 *Canadian Standards Association, "CSA SFM," accessed 2012.*
35 *PEFC, "History," accessed 2012.*
36 *Sprang and Meyer-Ohlendorf,* Public Procurement and Forest Certification*, 2006, 13.*
37 *Forest Stewardship Council Canada,* FSC Principles and Criteria*, 2004, 1-7.*
38 *Forest Stewardship Council Canada, "Forest Management Systems," accessed 2012.*

a product (whether paper or lumber) to bear the FSC logo, the FSC-certified fibre from which it was manufactured must at all times remain in the possession of companies that have received FSC's CoC certification. The logo can be applied to products manufactured from wood harvested in FSC-certified tenures as well as those manufactured from recycled post-consumer-waste (PCW) paper fibre that has remained in the possession of a certified Chain of Custody (and thus is verifiably recycled).

Not only does the CoC certification reassure customers that products bearing the FSC label truly are manufactured from certified forestry (or recycling) activities, but the record of a forestry product's journey that is created through CoC certification makes it possible for paper purchasers to reliably track the fibre in their paper back to its source. For instance, a publisher could measure the distance their paper has been transported throughout its life or assess whether the forest it came from had a high carbon storage capacity.

Clearly the work of the FSC is a positive addition to the forestry landscape, and Time Inc.'s stated goal of having 80% of its paper come from certified sources is a laudable one.[39] The fact that CoC certification makes it significantly easier for paper purchasers to determine the distances timber, pulp, and paper travel before they reach the printer certainly makes certification a boon for publishers looking to reduce their carbon footprint.

That said, there is a limit to certification schemes' ability to help reduce carbon footprints. Not all forests sequester carbon at the same rate. Intact old growth forests store carbon at a far higher rate than young, middle growth or plantation forests. In particular, the Boreal forest in both Canada and Russia, temperate rainforests in British Columbia, Alaska, and Chile, and intact tropical rainforests in Indonesia and the Amazon have a significant carbon storage capacity that simply cannot be replaced if they are logged.[40] While certification schemes like FSC may refuse to certify the logging of some parts of those forests if it would violate any of the principles of the relevant forest management standard, any logging operations that met all the criteria within these regions could be certified, despite the more significant climate impacts of logging these forests. For instance, significant areas of British Columbia temperate rainforest, and Boreal forest[41] in Alberta, Ontario, and Quebec are currently FSC-certified.[42] It is clear that while FSC certification is a positive step toward environmental and human rights protections in the forestry industry, it is not the end of the story when it comes to carbon footprint reduction.

Although not strictly a certification scheme, another program for identifying environmentally preferable paper is worth including in this discussion. The Ancient Forest Friendly (AFF) designation is assigned by Canopy (the environmental advocacy organization formerly known as Markets Initiative) to papers that are chlorine-free

39 *Rowzie,* Time Inc. 2009-2010 Sustainability Report*, 2010, 11.*
40 *Markets Initiative,* Resource Guide 2008*, 2008, 16.*
41 *Canadian Boreal Forest Agreement,* Map*, accessed 2012.*
42 *Forest Stewardship Council Canada, "Certified Forests in Canada," accessed 2012.*

and contain a minimum of 50% PCW fibre, and whose other fibres are either pre-consumer recycled, agricultural residue, or virgin fibre from sources that fall outside the criteria for three different definitions of "ancient" forests: high conservation value forests, endangered forests and large intact forest landscapes.[43]

To date, no papers containing virgin fibre meet all the AFF standards, so for now, all AFF papers contain only recycled or agricultural residue fibre. As such, the AFF designated papers currently on the market are some of the lowest-carbon options available. While its standards are certainly more rigorous than any certification scheme's, and the focus on preserving "ancient" forests ought to exclude many high carbon value forests, none of the AFF guidelines explicitly protect them either. There is thus still no designation on the market that specifically excludes fibre extracted from the forests that store the most carbon per square kilometre.

4.2 Low-Carbon Paper Production

Another strategy highlighted by Time Inc. in its *2009-2010 Sustainability Report* is the adoption of renewable energy sources in the paper manufacturing process. Given that paper manufacturing is the greatest source of emissions identified in all the magazine studies (and comes second only to biomass removal in the GPI study), this is an excellent strategy for reducing magazines' carbon footprints. Because of its enormous purchasing power (Time Inc. buys paper from four major suppliers to print its 21 magazine titles), the company is in a position to influence its suppliers to reduce their emissions. After conducting the life cycle assessments for *Time* and *InStyle*, Time Inc. gave its paper suppliers a choice of three different carbon reduction targets, one of which they had to meet by 2012.[44] While this may not be possible for publishers on a smaller scale, they can at least seek out paper manufacturers that make use of low-carbon energy sources to power their mills.

Forms of low-carbon energy that can help paper manufacturers lower their emissions include: hydro-electricity, solar power, wind power, geothermal energy, wave or tidal energy, combined heat and power (CHP—also known as cogeneration—which is heat energy generated by power stations), and biogas (gas generated by waste decomposing in landfills). An example of a mill powered by renewable energy is Cascades' Rolland Mill in Quebec. Not only does Cascades produce papers that all contain at least 50% PCW recycled fibre (with six of their nine product lines featuring 100% post-consumer fibre), but it uses hydroelectricity combined with biogas piped in from a landfill 13 kilometres away to manufacture all of its papers.[45] Another paper manufacturer that makes use of renewable energy is New Leaf Paper, which purchases renewable energy credits that inject electricity from wind power and other sources into the electrical grid to make up for non-renewable sources used in its mills.[46]

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43 *Markets Initiative,* Your Guide to the Ancient Forest Friendly Brand*, 2007, 4.*

44 *Rowzie,* Time Inc. 2009-2010 Sustainability Report*, 2010, 7.*

45 *Ford,* 100% Recycled Papers*, 2008, 5.*

46 *New Leaf Paper, "Climate Change," accessed 2012.*

One challenge facing publishers seeking low-carbon fuels is the paper industry's use of inappropriate terms to describe biomass energy. Biomass energy is derived from burning wood and wood by-products—including bark, wood chips, and "black liquor" (a combustible by-product of the "kraft" method of manufacturing wood pulp, which uses chemicals instead of a mechanical process). It is common for paper manufacturers and other users of biomass energy to refer to it as "renewable" and "carbon neutral." Both of these claims, however, are misleading.

According to National Resources Canada (NRCan), renewable energy "is energy obtained from natural resources that can be naturally replenished or renewed within a human lifespan, that is, the resource is a sustainable source of energy."[47] While it is of course true that logged trees can be replaced with new plantations, the same quantity of fibre will not grow back within a human lifespan if the forest was itself more than a human lifespan old. As the NRCan website states, biomass "is a renewable resource only if its rate of consumption does not exceed its rate of regeneration."[48] Given these two facts, it can safely be stated that not all biomass energy would qualify as renewable in a meaningful sense. This is important because paper mills will often describe their energy source only as "renewable" up front, and require further investigation on the part of customers to determine what the nature of that "renewable" energy is.

The term "carbon neutral" generally refers to the idea that the greenhouse gas emissions of a process, organization, or individual can be "neutralized," usually through a combination of emissions reductions and carbon offset purchases. When used in reference to energy, it is intended to indicate that no greenhouse gases are emitted by the energy source. Examples of carbon neutral energy sources (which, incidentally, are also renewable according to the NRCan definition) are: wind power, solar power, geothermal energy, and wave energy.

The problem with claiming that biomass energy is "carbon neutral" is, simply, that it's not. Burning wood and wood by-products does release carbon dioxide into the atmosphere.[49] It seems biomass energy users have decided that energy derived from trees is "carbon neutral" because it replaces the burning of fossil fuels. While avoiding fossil fuels is always a step in the right direction, that step does not in and of itself guarantee "carbon neutrality."

This is not to say that paper mills ought not to make use of any biomass as an energy source. "Reuse" is the second of the environmentalist's "three Rs," and the transformation of pulping wastes and by-products into energy is certainly preferable to dumping those wastes somewhere where they would either decompose and release methane (in the case of wood chips) or pollute water courses (in the case of black liquor).

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47 *Natural Resources Canada, "About Renewable Energy," 2009.*

48 *Ibid.*

49 *Mainville,* Fuelling a BioMess*, 2011, 16.*

All of that said, the first of the "three Rs" is "Reduce", and while making energy from mill by-products makes some environmental sense, the industry's long-term goal should be to minimize the creation of those by-products so that an increasing amount of energy can be obtained instead from non-greenhouse-gas-emitting sources. And certainly, purchasing additional biomass that isn't a mill by-product in order to burn it for fuel—something mills must certainly feel justified in doing having termed biomass energy "carbon neutral"—is very much a step away from emissions reduction.

Given the carbon impacts of biomass energy and the tendency to gloss over them within the paper industry, magazine publishers concerned about their carbon footprint should be wary of any claims of "carbon neutral" or unspecified "renewable" energy used in paper manufacturing, and if possible favour papers known to be manufactured with truly renewable power sources like biogas and wind energy.

4.3 Recycled Paper

Since the Green Press Initiative study found that publishing's greatest carbon impact is caused by the removal of biomass through logging, it follows that the best way to mitigate the environmental impact of magazines would be to print on paper made from 100% recycled post-consumer-waste fibre. Unfortunately, it is a solution much easier to propose than to enact.

Paper manufacturers have been recyclers for years, long before it was something that concerned the general public. Initially, they were not recycling paper that had been used and thrown away. Like biomass energy, recycling was a way of keeping mill by-products out of the landfill: offcuts and any other paper waste from the milling process would be re-pulped and made into new paper. When paper is specified as made from recycled—but not PCW—fibre, the source of that fibre is the same paper mill waste that has always been re-pulped. The importance of post-consumer-waste fibre is that it keeps used paper out of the landfill, and prevents more trees from being cut down.

While it is easy to say that magazines should switch to 100% PCW fibre papers, it isn't actually easy for them to do. It's true that there has been a massive increase in the quality, availability and affordability of 100% PCW uncoated fine papers in the last decade. "The paper quality of uncoated papers in 100% post-consumer recycled is great," Eric Kouwenhoven, an account manager with Vancouver's Hemlock printers said in an interview. "I would use the 100% 'post' over virgin any day. There's no limitation in terms of quality there anymore."[50]

However, the vast majority of magazines are printed on coated paper. A survey of a portion of the magazine rack at Vancouver's Chapters store at Granville and Broadway revealed the extent of the preference for coated stock. On February 28,

50 *Eric Kouwenhoven (account manager, Hemlock), in discussion with the author, February 20, 2012, in Burnaby, British Columbia.*

2012, a total of 336 magazines were examined (out of approximately 1500 different titles on display). Of those 336—which covered a wide range of subjects: celebrity, current affairs, travel, film, fashion, wristwatch design, and women's, men's, and gay lifestyle—only 16 (or less than 5%) were found to use some uncoated paper in their production. Only nine used uncoated paper throughout, and four of those were printed on newsprint, not fine paper. Of the 16 using some uncoated stock, the only widely recognized consumer magazine was *Spin*, which used uncoated paper for its cover and some back-of-book signatures, but incorporated glossy coated stock for the valuable ad inventory in the front of the book.

Coated paper made from 100% PCW fibre is almost unheard of in North America. The closest readily available option is the 100% PCW Rolland Enviro100 Satin sheet produced by Cascades, which their website describes as a "hybrid between coated and uncoated paper."[51] New Leaf Paper out of San Francisco sells two 100% PCW coated stocks, Revival Bright and Cyclus Print, but they are only available on a made-to-order basis, and must be ordered by the full truckload. And that is the complete list of 100% PCW coated fine papers made in North America.

There are a number of explanations for this scarcity. The first is connected to fibre supply: not all papers can be recycled after use (think household products like paper towel), and not all paper that can be recycled is. According to the Environmental Paper Network's 2011 *State of the Paper Industry* report, paper is only recovered for recycling at a rate of around 65% in North America (63% in the U.S., 66% in Canada).[52] Unless North American paper consumption were to decrease by about 40% per year (the current rate of paper use reduction is about 8%),[53] it would be impossible to produce all papers from 100% PCW fibre—some paper would still need to contain virgin fibre. (Additionally, when rates of paper recovery do increase, it can have an adverse effect on the quality of PCW fibre available for paper manufacturing. Brian Kozlowski, director of sustainable development at North America's largest coated paper manufacturer, NewPage, pointed out in a telephone interview: "When you improve your recovery rate, you are collecting lower quality papers that are more contaminated [for instance with oil or food]. Paper is more contaminated than it's ever been.")[54]

Second, fibres lose strength each time they are re-used,[55] another reason why virgin fibre will probably always be incorporated into the paper manufacturing process to some degree. There are paper manufacturers who argue that as a result of this reduction in strength, it is impractical to manufacture coated paper (which typically contains 20-40% clay and 60-80% fibre) with recycled fibre, as it would no longer be strong enough to run on offset presses.[56] NewPage's Kozlowski believes there are

51 *Cascades Fine Papers, "Rolland Enviro100 Satin," accessed 2012.*
52 *Environmental Paper Network,* State of the Paper Industry 2011*, 2011, 4.*
53 *Ibid.*
54 *Brian Kozlowski (director of sustainable development, NewPage Corporation), in discussion with the author, May 8, 2012.*
55 *MacGuire, "Paper Recycling: Exposing the Myths," 2011.*
56 *Sappi Fine Paper, "Recycled Fiber and Recycling," accessed 2012.*

risks to producing paper with more than 30% PCW fibre (the highest percentage of PCW fibre in any NewPage product). "Customers would have to sacrifice quality and compromise functionality, the look, and the feel," he said. "You're going to lose brightness, you're going to lose strength. There would be a quality loss."

Michelle Thornton of New Leaf Paper—the makers of the only two 100% PCW coated papers manufactured in North America—says those "taboos" about recycled fibre simply aren't true: "We've found that we can make a sheet that's just as bright as its virgin fibre counterparts, that runs just as well, that prints just as well, and that can stay true to being green and helping the environment."[57] From New Leaf's perspective, all of the explanations for why more fine papers don't have higher PCW content are just excuses.

Both the lack of sufficient fibre and reduction in strength with recycling are well documented and agreed upon by paper industry stakeholders (though, as we have seen, there are still disagreements about the ramifications of these facts). There are, however, other explanations for the lack of quality coated papers made from PCW fibre that are more controversial. Time Inc.'s *2009-2010 Sustainability Report*, contains the following statement:

> Recovered paper used in products like corrugated boxes, brown paper grocery bags and newsprint requires much less re-processing than recovered content needed for whiter, higher-quality magazine papers. Less processing means less fossil-fuel energy consumption, less solid waste generation and lower production costs. Using recovered content in magazine paper would divert a valuable resource from other uses that are better for the environment and better for the bottom line.[58]

These and similar statements (like the *NGM* assertion that recycled paper "does more harm than good") have provoked the ire of environmental paper manufacturers like New Leaf. In a blog post subtitled "Virgin Paper Manufacturers Confuse Paper Buyers with Misleading Comparisons of the Environmental Impacts of Virgin Paper vs. Recycled Paper," New Leaf president Jeff Mendelsohn writes:

> To be clear—making fine paper from waste paper is a more efficient process than making paper from trees, using less energy, less water, creating less effluent, and generating fewer greenhouse gas emissions. These facts are supported by the most comprehensive, independent, scientific lifecycle analysis of the impacts of paper manufacturing, the paper task force final report.[59]

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57 *Michelle Thornton (team leader, New Leaf Paper), in discussion with the author, April 5, 2012.*

58 *Rowzie,* Time Inc. 2009-2010 Sustainability Report*, 2010, 7.*

59 *Mendelsohn, "Mirror, Mirror on the Wall," 2011.*

At first this quote might seem the obvious response of a business owner whose livelihood depends on recycled paper, but it is actually borne out by research. The Paper Task Force was a collaboration between the Environmental Defense Fund, Time Inc., Prudential Insurance, Duke University, McDonald's, and Johnson & Johnson, which convened in the early '90s and published its findings after two years worth of research in 1995.[60] The Task Force studied the entire life cycles—from fibre procurement to disposal—of a number of kinds of paper, including office paper (which uses high-quality, bright white fibre equivalent to publishing paper's). Environmental impacts examined included energy use and sources, water usage, polluting effluents and solid waste production.

The Task Force's final report is 248 pages long, not counting the 16 detailed technical white papers that accompany it, but the most important two sentences relating to fine paper production are these (emphasis from the original):

> The lifecycle comparison of virgin and recycled office paper systems developed by the Task Force examined a total of 16 parameters, including total and purchased energy, eight categories of pollutant releases to air and four to water, and quantities of effluent and solid waste. *Ton-for-ton, 100% recycled paper made from deinked used office paper is preferable (for most parameters) or comparable (for three parameters) to 100% virgin paper.*[61]

The only parameters where recycled paper's impacts exceeded virgin paper's were purchased energy and fossil fuel energy, both of which were used in greater amounts in recycling processes because of the lack of self-generated biomass energy used in virgin pulp and paper plants. Total energy used by virgin processes, however, was almost twice the total energy required by recycled paper processes.[62]

While many paper manufacturers and purchasers have made claims about the negative environmental impacts of recycled paper, none have yet produced research that actually refutes the findings of the Paper Task Force. Still, the relative lack of availability of 100% PCW coated papers does mean magazines are hard-pressed to print on them. The options for now include switching to an uncoated or hybrid stock, using an available coated paper with the highest possible PCW content (New Leaf has 60% PCW magazine papers that don't require a custom order), special ordering large quantities of a made-to-order stock, or looking overseas for paper (which could introduce massive transport-related emissions to a publisher's carbon footprint, depending on the means of transport and distance traveled). For the long term, the best hope for high PCW-content coated papers is for major paper purchasers to put pressure on their suppliers to up the recycled fibre content of their products.

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60 *Paper Task Force,* Paper Task Force Recommendations, *1995.*
61 *Ibid., 89.*
62 *Ibid., 90.*

4.4 Other Paper Strategies

While increasing PCW fibre content and using certified and/or low-carbon paper are the most discussed ways to reduce the climate impacts of publishing, there are other paper-related strategies available too. *Backpacker*, for instance, reduced the basis weight of its stock (already 10% recycled), thereby lowering its annual paper use by over 150,000 pounds.[63] The magazine also moved all of its regional pages online, a strategy whose complicated impacts will be discussed below. Additional paper-reduction strategies could include optimizing a magazine's trim size to limit the amount of waste, or reducing the number of pages per issue.

Another aspect of publishing operations with major potential for paper use reduction (or modification) is direct mail marketing. According to Industry Canada, approximately 13 billion pieces of direct mail are delivered in Canada each year[64]—and a significant proportion of that that volume consists of subscriber recruitment and retention pieces sent out by magazine publishers. (In the U.S., advertising mail volumes hit 84.7 billion pieces in 2011.)[65] Direct mail wasn't specifically examined by any of the magazine publishing studies (though some may have included it in their Publisher emissions category), so it's impossible to estimate what percentage of publishers' emissions comes from direct mail.

Given the quantity of paper involved, though, and the high contribution to emissions of biomass removal and paper production, it is reasonable to assume that direct mail sent on virgin paper, if measured, would contribute significantly to publishers' carbon footprints. Given the continuing belief among marketers that direct mail is an effective[66]—in some views necessary—tool for the magazine industry, it is unlikely that publishers will dispense with it in the near future. However, efforts could certainly be made both to decrease the quantity of virgin fibre used in magazine marketing (through a com-bination of switching to recycled fibre and reducing mail volumes through more efficient campaigns) and to invest in marketing methods not dependent on paper.

4.5 Public Education

A percentage of all papers that could be recycled in North America still end up in a landfill or incinerator. Obviously, publishers are not in a position to oblige their readers to recycle magazines after reading. But, as content creators and branding professionals, they are in a position to effectively encourage eco-friendly behaviour.

Time Inc., for example, has participated in two recycling promotions: ReMIX (REcycling Magazines Is eXcellent)—a public education campaign conducted in New York and four other American cities—and Please Recycle This Magazine, a campaign that includes recycling messages in magazines themselves.[67] Similarly,

63 *The* Backpacker *Editors,* "Backpacker*'s Carbon Neutral Project," 2008, 3.*
64 *Office of Consumer Affairs, "Consumer Trends Report," 2011.*
65 *United States Postal Service, "Postal Facts," 2012.*
66 *McGee, Thorin, "Media Usage Forecast 2012," 2012, Chart 5.*
67 *Rowzie,* Time Inc. 2009-2010 Sustainability Report*, 2010, 8-9.*

both *Backpacker* and *Discover* published the results of their carbon footprint analyses in their magazines to help readers understand the sources of the magazine's emissions, and encourage them to reduce the part of the footprint they have control over. Like their American counterparts, Canadian magazines have the opportunity to promote recycling to their readers. One way is to participate in Magazines Canada's "Read. Share. Recycle" program, which provides member magazines with logos and full-page ads encouraging recycling.[68]

4.6 Reducing Print Runs

Reducing print runs is a strategy that is rarely discussed by magazines looking to reduce their environmental impact, but which could quickly bring about a massive improvement. In 2011, the typical North American magazine averaged a newsstand sell-through rate of 33%.[69] While there are arguments to be made that a sell-through rate approaching 100% would not only be impossible, but also undesirable (it would mean somewhere copies were unavailable where they could have been sold), there is surely a middle ground between 33% and 100% that could maximize newsstand exposure while minimizing the waste inherent in a system in which all unsold magazines are sent straight to the recycling depot. There is a significant opportunity for greater efficiency to be introduced into the magazine supply chain to reduce the quantity of paper waste (and related carbon impacts) it creates.

4.7 Low-Carbon Printing

Just as the carbon impacts of paper manufacturing can be reduced by employing renewable, non-carbon emitting energy sources at pulp and paper mills, the emissions from printing can be reduced with the help of sustainable energy and efficiency measures. Hemlock, for example, has worked with the company Offsetters to document their sources of emissions, reduce them as much as possible, and then purchase offsets to make up for those that can't be eliminated.[70] In addition, they offer clients the opportunity to offset the emissions caused by their own print jobs.[71] And, as a result of being powered through British Columbia's electrical grid, their electricity comes primarily from non-emitting hydro power.

4.8 Sustainable Transportation Methods

The transportation of raw materials, paper, and printed magazines are all significant contributors to magazines' carbon footprints, so switching to lower emitting forms of transportation could significantly reduce publishing carbon footprints. Shipping has been estimated to produce only 5-10% of the emissions of trucking freight the equivalent distance, and rail produces about 15% of road transport's emissions.[72] Obviously neither of these means of transportation is available for all the transport

68 *Magazines Canada, "Join the 'Read. Share. Recycle.' Campaign," accessed 2012.*
69 *MagNet, "First Half 2011 Sales," accessed 2012.*
70 *Hemlock, "Walking the Talk," accessed 2012.*
71 *Hemlock, "How Zero Works," accessed 2012.*
72 *CN, "Greenhouse Gas Calculator Emission Factors," accessed 2012.*

required for the production and distribution of printed magazines, but it would certainly behoove publishers to inquire about the means of transport used at each stage, give preference to paper manufacturers and printers that make use of transport by ship and rail, and pressure their suppliers to make use of the lower-emitting forms of transport whenever possible.

If it's not possible for a publisher to influence the way a magazine and its paper travels those larger distances, there are still things that can be done about shorter distances. Hemlock, for instance, started making smaller deliveries within Vancouver by hybrid vehicle shortly before Kouwenhoven was interviewed for this report. Smaller magazines with primarily local distribution could easily encourage their printer to adopt a similar strategy, or even employ a cycle-based delivery system like Vancouver's Shift Urban Cargo.[73]

4.9 Office and Travel Strategies

Both *Backpacker* and *National Geographic* have identified a litany of ways to reduce carbon emissions within their offices and among their staff. After its footprint measurement exercise, *Backpacker* set a goal of converting its headquarters to a "zero-waste facility," in which all office waste would be either recycled or composted.[74] Since contributor travel was considered a necessary evil of their subject matter, office staff committed to collectively walk, bike or take transit 25,000 miles over the course of 2008. Other changes included adopting energy efficient bulbs, adjusting thermostat settings, switching to 100% recycled office paper and developing a workflow that minimizes paper use. To date, no subsequent updates have been published to indicate whether their zero-waste or commuting goals have been reached.

The National Geographic Society as a whole has adopted a number of environmental initiatives at their headquarters in Washington, D.C. Energy savings were found by eliminating unnecessary lighting, installing energy efficient bulbs, putting lights on motion sensor switches, setting thermostats lower in winter and higher in summer, closing the office for ten Fridays every year and shutting down boilers during off hours.[75] Headquarters keeps 60% of its waste out of landfills with extensive composting and recycling programs, and the organization promotes carpools, tele-commuting and public transit commuting among employees. Society staff are encouraged to keep printing to a minimum, and to print on 30% PCW paper if necessary.[76]

Even though office and contributor emissions are typically one of the smaller sources of a magazine carbon footprint, reducing them is often the low-hanging fruit of emissions reduction. There are many small steps that can be taken around an office to reduce its greenhouse gas output. Additionally, if an office is located in an area whose electrical grid doesn't source power from non-emitting sources, one of the best

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73 *Shift Urban Cargo Delivery, "Hello and Welcome," accessed 2012.*

74 *The* Backpacker *Editors,* "Backpacker*'s Carbon Neutral Project," 2008, 3.*

75 *National Geographic Society, "Our Carbon Footprint," accessed 2012.*

76 *National Geographic Society, "Green Workplace," accessed 2012.*

options is to invest in renewable energy through a program like that offered by Bullfrog Power. This Canadian company produces energy from renewable sources, and customers pay a premium to have the quantity of energy they purchase monthly from their local utility injected into the grid from Bullfrog Power's generators.[77]

4.10 Offsets

The last major strategy that publishers can consider adopting is purchasing carbon offsets. The reason this strategy should come last is that it is preferable to reduce greenhouse gas emissions as much as possible before attempting to compensate for what remains. "Reduce" is, after all, the first of the environmentalist's "three Rs."

The David Suzuki Foundation defines carbon offsets as "credit for greenhouse gas reductions achieved by one party that can be purchased and used to compensate (offset) the emissions of another party."[78] Examples include investing in non-emitting energy sources, energy efficiency improvements, and carbon sequestration projects. *Backpacker* and the National Geographic Society both included ongoing offset purchases among their carbon footprint reduction efforts.

Like *Backpacker*, *Discover* claimed to undertake their carbon footprint measurement process as a first step toward making their operations more environmentally friendly. After the study, *Discover* purchased $4,796 worth of carbon offsets from the organization Carbonfund.org, enough to compensate for the emissions produced by the issue in which the carbon measurement information was published.[79] It is not clear, however, whether *Discover* has gone on to purchase any additional offsets, or undertake further carbon reduction activities, as they have never published an update to their original report.

One additional factor is worth mentioning regarding *Discover*'s offset purchase, which funded both renewable energy projects and tree planting. While tree planting in and of itself is valuable, and can certainly contribute to reducing the greenhouse effect, it is problematic as a form of carbon offset.[80] Among the reasons the David Suzuki Foundation does not recommend tree planting as an offset is the fact that tree plantations are not permanent, and their potential to succumb to disease or fire (or logging) means that all the carbon they sequester initially could be emitted into the atmosphere in future. Another is a lack of land—there isn't enough space for the number of trees needed to compensate for the quantity of greenhouse gases humans will emit in coming years. Most importantly, tree planting does not contribute to reducing humans' dependence on fossil fuels. By putting offset dollars into projects geared towards reducing fossil fuel use (like all Gold Standard certified offsets),[81] companies can contribute to long-term solutions to the climate change crisis, instead of short-term "band-aid" fixes.

77 *Bullfrog Power, "Green Electricity," accessed 2012.*
78 *David Suzuki Foundation, "Problems with Carbon Offsets," accessed 2012.*
79 *Barone, "How Big is* Discover*'s Carbon Footprint?" 2008.*
80 *David Suzuki Foundation, "Problems with Carbon Offsets," accessed 2012.*
81 *Gold Standard Foundation, "Who We Are," accessed 2012.*

5. CANADIAN CASE STUDIES

Having summarized the research undertaken and carbon reduction strategies adopted by a number of American magazines, this report will now focus on actions being taken by Canadian publications. No Canadian publisher to date has invested in a carbon footprint measurement project of its own, but that hasn't stopped publishers north of the border from taking steps to reduce their contributions to climate change. The following case studies were compiled from a combination of publicly available documents and interviews conducted expressly for this report, and cover carbon footprint reduction strategies adopted by Canadian publishers large and small.

5.1 *Alternatives Journal*

Canada's oldest environmentalist magazine, *Alternatives Journal* was founded in 1971.[82] The publication is a hybrid consumer magazine and scholarly journal published bi-monthly by the University of Waterloo's Faculty of the Environment. Given its subject matter, environmental practices have always been central to the magazine's operations. Marcia Ruby, *Alternatives*' production co-ordinator, described those practices in a telephone interview.

The magazine has been printed on paper containing recycled content for two decades. Initially, *Alternatives* applied for and received a grant of $20,000 to help pay for the then-expensive paper. After that first grant, their paper has always contained some recycled content. Since mid-2011, the magazine's interior has been printed on Cascades' 100% PCW Rolland Enviro100 Satin sheet, the hybrid paper previously discussed (p.15). The cover is currently printed on an FSC-certified, 30% PCW glossy coated stock. Ruby says she has experimented with cover stock with more recycled content, but has yet to find one that prints images in a way that they still "jump out on the newsstand."[83]

One of the considerations Ruby says *Alternatives* has always weighed in its paper choices is where the paper comes from.

> There started to be 100% recycled paper available at a price point that we probably could have gone for, but it wasn't domestic. So then you have to weigh 'whether 'tis nobler' to buy 100% recycled from across the sea, or to buy domestic paper. North America would be the second choice, and the first choice was Canadian... It became really important to me to keep our dollar in Canada.

Another area where *Alternatives* has tried to make improvements is newsstand waste. In the past the magazine tried to have retailers and distributors send unsold

82 Alternatives, *"The* Alternatives *Story," accessed 2012.*

83 *Marcia Ruby (production co-ordinator,* Alternatives Journal*), in discussion with the author, November 2, 2011.*

copies to *Alternatives*' office rather than recycle them, but Ruby says she hasn't been able to arrange those kinds of returns since a small American distributor she worked with went out of business. Still, the magazine has been reducing draws where appropriate so that not too many copies are sent straight to recycling. *Alternatives* has also attempted to limit paper waste by eliminating direct mail campaigns from its promotional activities, but to date has found it impossible to do so without losing subscribers. "Direct mail is still the necessary evil," says Ruby.

Within the office itself, emissions are reduced through telecommuting (the editor is only present physically two days a week), printing double-sided, walking and biking to work, and purchasing Bullfrog Power. *Alternatives* also benefits from being part of the Faculty of the Environment, where eco-friendly practices are an institutional priority, taking some of the burden off the magazine staff's shoulders. "Our office is in a place where it's somebody else's business to be handling that," says Ruby. "We're in a nice little island."

Last but not least, the magazine is in the business of teaching people about making their own lives greener. Says Ruby: "I think the very act of us informing people should count for something."

5.2 *The Ark*

The Nature Conservancy of Canada (NCC) publishes three issues of *The Ark* each year. The magazine serves as the organization's newsletter for members, and features lush wildlife photography alongside updates on the NCC's work. In a telephone interview, editor Christine Beevis shared some of the eco-friendly practices at this conservation-minded publication.

Like *Alternatives*, *The Ark* is printed on Cascades' Rolland Enviro100 Satin, and has been since 2006. The magazine is printed by Warren's Waterless Printing, which, in addition to its unique waterless technology, uses Bullfrog Power to run its operations, reducing carbon emissions from the printing process.[84] The NCC's main Ontario office is also Bullfrog powered, as is Beevis' home, from which she telecommutes some days every week. (Beevis is based in the Nova Scotia office, a donated space, so Bullfrog energy isn't purchased there.) To reduce the impact of working so far from the NCC's national headquarters, Beevis has as many meetings as possible through online conference calls, and proofs are sent back and forth as PDFs, rather than printed and couriered. Other simple office practices include double-sided printing, printing on scrap paper, and an active recycling program.

In future, *The Ark* is considering moving in a more digital direction as a carbon reduction strategy. The NCC's annual report is already exclusively online. Says Beevis, "The move to digital is really something we're investigating quite strongly."[85]

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84 *Warren's Waterless Printing, "Genuine Environmental Printing," accessed 2012.*

85 *Christine Beevis (editor,* The Ark*), in discussion with the author, October 26, 2011.*

5.3 Corporate Knights

Tagged "the magazine for clean capitalism," *Corporate Knights* was founded in 2002, and is distributed quarterly along with copies of *The Globe and Mail* in Canada, and the *Washington Post* in the U.S.[86] It is also sold on the newsstand, but single copy sales form only a tiny percentage of the magazine's circulation. Co-founder, publisher and CEO Toby Heaps discussed the company's carbon reduction efforts in a telephone interview.

Five years ago, Heaps says *Corporate Knights* made the decision to "reflect our mission in our medium"[87] by printing on eco-friendly paper. Its cover stock is now one of the ubiquitous-seeming Rolland Enviro100 sheets, and inside pages are printed on an FSC-certified stock manufactured by Catalyst, which claims its manufacturing practices are "carbon neutral" in part thanks investing in reforestation carbon offset programs.[88]

Beyond paper and printing, the magazine also ships its printed copies by train when timing allows (tight timelines occasionally get in the way). Around the office, they've reduced heating and cooling energy use (employees wear sweaters in the winter) and installed a bike rack for cyclists (none of the 15 or so staffers drive to work). *Corporate Knights* also obtains carbon offsets and Bullfrog Power for all events they run. Next up on their eco-checklist: convincing the magazine's landlord to install solar panels on the roof of their office building, and investing more in digital offerings.

5.4 Cottage Life

Cottage Life has been recognized numerous times for its eco-friendly printing practices, including a pair of Aveda Environmental Printing Awards in 2007 and 2009.[89] The magazine is printed on FSC-certified Ancient Forest Friendly paper produced by Leipa in Germany,[90] which contains between 85% and 100% PCW fibre for inside pages, and 30% PCW fibre for the cover.

Beyond making low-carbon paper choices, the magazine has lowered office and staff emissions through a number of emission-reduction practices, including: programmable thermostats; secure bike lock-up and showers for cyclists; compact fluorescent lightbulbs; double-sided printing; and replacing paper filing with digital filing. The magazine also promotes its (and others') environmental endeavours by giving out an annual Environment Grant and spreading the word on a web page called "*Cottage Life* Helps Out."

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86 Corporate Knights, *"About Us," accessed 2012.*

87 *Toby Heaps (publisher and CEO,* Corporate Knights*), in discussion with the author, October 24, 2011.*

88 *Catalyst Paper,* Manufactured Carbon-Neutral Paper, *2011, 2.*

89 *Cottage Life Media,* "Cottage Life Helps *Out," accessed 2012.*

90 *Maria Musikka (acting production manager,* Cottage Life*), e-mail message to author, March 20, 2012.*

5.5 Rogers Publishing

In 2007, Canada's largest magazine publisher, Rogers Publishing, created a Magazine Paper Procurement Policy, which can be viewed on the company's website.[91] The publisher behind *Maclean's*, *Chatelaine*, *Today's Parent*, and *MoneySense* (among many others) committed to purchasing all its paper from suppliers with chain-of-custody certification from CSA, SFI or FSC—with preference for FSC-certified papers if possible. Rogers also claimed it would "strive" to increase the average PCW content of its magazine papers from 10% to 15% by 2009. In addition, the company said it would "aim to reduce paper waste, promote paper recycling, promote manufacturing advances in fibre efficiency, and where possible, use lighter weight paper." Despite a stated goal of annually reviewing the policy and providing updates, none have been published since the policy was posted online in 2007, so it is unclear how successful Rogers has been in its carbon reduction efforts.

5.6 St. Joseph Communications

St. Joseph is both a publisher of magazines in its own right—including *Toronto Life*, *Quill & Quire*, and *Fashion*—and operates printing facilities where other magazines are printed. St. Joseph Print's facilities are all CoC certified by FSC, PEFC and SFI.[92] In 2005, the company switched to printing *Quill & Quire* on an Ancient Forest Friendly stock, and the company's website mentions an "Ancient Forest Friendly Stewardship Policy" adopted in 2006, though the text of the policy does not appear to be posted online. St. Joseph is also heavily involved in tree-planting, having collaborated since 1990 with Scouts Canada on the Partners in Growth reforestation project, and encouraging staff to get in on the action with designated volunteering days.

5.7 Teacher

The B.C. Teacher's Federation (BCTF) publishes a member "newsmagazine" seven times a year called *Teacher*. Along with fellow case study subjects *Corporate Knights* and *The Ark*, the BCTF is a member of Green America's Better Paper Project, which encourages magazines to print on environmentally friendly papers by promoting them to consumers as environmental leaders.[93] In a telephone interview, Donna Coulombe, who works in the BCTF's executive office, provided information about the carbon cutting efforts involved in publishing *Teacher*.

The magazine has been printed on BPM's 100% PCW uncoated Envirographic 100 paper since 2009. In recent years, they have also reduced their run from 442,000 copies to 402,000 copies per issue, a significant reduction in both paper use and printer emissions. The magazine is printed by Mitchell Press, which outlines a number of carbon reduction measures on its website, including: using warmth generated by industrial processes to heat the plant, high efficiency lighting on motion sensors, cooling presses with water cooled by ambient air temperature in

91 *Rogers Publishing, "Magazine Paper Procurement Policy," 2007.*
92 *St. Joseph Communications, "Reducing our Footprint," accessed 2012.*
93 *Better Paper Project, "Green Magazine Promotions," accessed 2012.*

rooftop units, and a significant recycling program.[94] Coulombe says the organization is considering encouraging more teachers to access the magazine digitally (it's posted online in PDF and HTML formats) in the future.

Like *Alternatives*, *Teacher* benefits from being published by a larger organization with strong environmental initiatives. The BCTF has an internal Green Work Group that examines practices throughout the union's headquarters. Major initiatives include office composting and recycling endeavours that reduced landfill waste generated by employees by 67% between 2008 and 2009. Staff are encouraged to recycle and compost by having only very small trash bins by their desks that they are required to empty themselves. Staff receive subsidized transit passes, and carpoolers have designated stalls in the otherwise limited parking garage. Efficient light bulbs have been installed, and office lights shut down at 6 p.m. In addition to its own internal strategies, the BCTF makes significant contributions to the environmental charity Evergreen, whose school-ground greening projects—though not technically a carbon offset—contribute to environmental education for children. The donation, says Coulombe, is "in keeping more with the BCTF's objectives" than a typical carbon offset.[95]

5.8 Transcontinental

Like St. Joseph Communications, Transcontinental is an integrated printing and publishing operation, putting out its own magazines—including *Canadian Living*, *Elle Canada*, and *The Hockey News*—and providing printing services to other publishers, including Rogers. In 2009, Transcontinental published a white paper titled *Reducing the Carbon Footprint of Magazines*, which summarized some existing research and provided guidance for publishers, as well as touting some of the company's own carbon reduction practices. Those measures included: FSC, SFI and PEFC certification of their printing facilities, digital workflows to eliminate paper waste from the proofing process and "paper purchasing policies that promote the use of environmentally preferable papers."[96]

Additionally, the company has an environmental policy that it proudly points out was developed as early as 1993, and overall makes public significantly more information about its environmental policies and practices than other major publishers. The environmental policy, paper purchasing policy (introduced in 2007), internally developed classification of environmental papers and sustainability reports for the years 2009 through 2011 are all available for download on the company's site. The Environmental Policy itself is vague, identifying intentions rather than clearly defined and measurable goals. The items in the policy that would contribute to carbon reduction are: cooperating with other organizations to increase recovery and recycling of Transcontinental's products, using energy and resources more

94 *Mitchell Press, "Environmentally Responsible," accessed 2012.*

95 *Donna Coulombe (executive assistant to the executive director, British Columbia Teachers' Federation), in discussion with the author, November 2, 2011.*

96 *Transcontinental Printing,* Reducing the Carbon Footprint of Magazines*, 2009, 17.*

efficiently, encouraging "the use of papers with maximized post consumer and deinked recycled fibre and maximized agricultural residue fibre," giving preference to certified sources when virgin fibre is purchased, and seeking to transition to low carbon and renewable energy sources.[97]

The company's paper purchasing policy echoes the statement quoted above, and adds the intention to avoid paper from "high conservation value" forests, and provides a definition of the qualities that identify those forests.[98] Like the environmental policy, the paper purchasing policy avoids quantitative goals or measurable targets. Transcontinental's internally developed environmental paper classification system does, however, include specific percentages for things like the quantity of PCW or certified virgin fibre required for each of the five classes of environmental paper defined within it.[99]

It is in Transcontinental's annual sustainability reports (first published in 2009) that quantitative goals set by the company are identified, and progress measured. For instance, in 2011 Transcontinental met the goals it had set for 2012, to increase the use of paper it defines as Gold Plus and Gold (containing high percentages of PCW, recycled, certified and agricultural waste fibres) to 55%, and reduce the quantity of Bronze papers to 10%.[100] (This latter goal was actually surpassed; Bronze purchases were reduced to 6%.) Other goals include reducing greenhouse gas emissions and energy consumption at printing and office facilities. In order to reduce energy use, Transcontinental has created a fund dedicated to energy efficiency pro-jects that its various business units can apply to.[101] The report highlights a handful of projects that contributed to the company's overall 20% reduction in energy consumption since 2008.[102]

Other actions identified in the sustainability report include supporting the Canadian Boreal Forest Agreement and the Great Bear Rainforest Agreements, establishing a Sustainable Development Steering Committee involving representatives from all sectors of the company, and introducing an energy policy (which, unlike their other sustainability documents, is not available online).

5.9 The Watershed Sentinel

Founded in 1980, *The Watershed Sentinel* is an environmentally minded magazine published six times a year out of Comox, B.C. At the time that editor and publisher Delores Broten was interviewed for this report, the magazine was trying to cope with the recent closure of their paper supplier, Grays Harbor, and searching for a

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97 *Transcontinental,* Transcontinental Environmental Policy, *accessed 2012.*
98 *Transcontinental,* Transcontinental Paper Purchasing Policy, *accessed 2012.*
99 *Transcontinental,* Classification of Environmental Papers, *accessed 2012.*
100 *Transcontinental,* Sustainability Report 2011, *2011, 30.*
101 *Ibid., 39.*
102 *Ibid., 10.*

new stock to replace the chlorine-free 100% PCW paper they had been printing on for many years.[103]

Because *The Watershed Sentinel* is a very small operation, its non-paper and printing emissions are negligible. The magazine is published out of a home office, so Broten has no commute, and all office appliances are plugged into power bars, so it's easy to avoid unnecessary energy usage. The magazine has tried to move as much as possible of its interaction with subscribers online, and now only sends renewal notices by mail if subscribers request it specifically. Broten also expressed an interest in moving more content online as a way of reducing paper use. And last, but not least, *The Watershed Sentinel*, like the other environmental publications profiled, uses its platform to educate consumers about their own environmental impacts.

103 *Delores Broten (editor and publisher,* The Watershed Sentinel*), in discussion with the author, November 2, 2011.*

Magazine publishers already have options available to them if they are interested in reducing their carbon footprints, as evidenced by the many strategies employed by the publishers profiled above. Not all of these options—printing on 100% PCW coated paper, for instance—are as readily available as they ought to be, however. And other solutions, like moving content from print to digital formats, are more complex than they may first appear. There is definitely room for improvement in the future, both in terms of the availability of environmentally friendly papers suitable for magazine printing, and our understanding of the environmental impacts of digital publishing.

6.1 Availability of Eco-Paper

While the case studies show the multitude of small ways magazine publishers can reduce their carbon footprints, the only way to make a major dent in the industry's greenhouse gas emissions is to significantly increase the percentage of PCW fibre in the paper magazines are printed on, and to purchase those papers from mills using non-emitting sources of energy in their manufacturing processes—i.e. energy from hydro power, biogas, wind, solar and geothermal energy. Unfortunately, the availability of these kinds of papers is not something magazine publishers—particularly small ones—have any control over.

It is true that a number of smaller magazines (including some profiled in this report) have switched to papers with high percentages of PCW content, so it is not impossible to do in the current market. However, most of those magazines are printing on either uncoated or "hybrid" stock like Cascades' Enviro100, an option most publishers will probably not be willing to consider (evidenced by the overwhelming percentage of magazines printed on coated paper). It is also easier for smaller magazines to switch to papers that are available in limited quantities (like New Leaf's made-to-order coated stocks), because they require much smaller quantities of paper than large, multi-title publishers. Major players in the magazine industry need to know that a given paper is available in large volumes whenever they choose to print before they will consider adopting it. For that same reason, it is unreasonable to expect most companies to follow in *Cottage Life*'s footsteps and order their paper from overseas. The odds of the paper being at sea when it needs to be on press are just too high. For a significant number of Candian magazines to switch to paper with a significant proportion of PCW fibre, it will need to be manufactured in large quantities, and on North American soil.

Individual publishers might not be able to influence the multi-billion-dollar paper industry to make such a change, but there is the possibility that large-scale cooperation between publishers could prove fruitful. If magazine publishers—potentially organized by an industry group like Magazines Canada—pledged to seek out papers with higher PCW content immediately, rather than waiting to see what the paper

industry chose to provide, they might inspire manufacturers to develop higher PCW-content magazine papers sooner rather than later.

Equally, magazine publishers could potentially band together with other major paper purchasers (book and newspaper publishers, printers, office supply companies) to apply pressure to mills to seek out non-emitting sources of energy. Coast Paper specification representative Brenda Cofield pointed out in an interview that the vast majority of paper mills in North America are over a century old: "Paper mills are really, really old. They're not something that just pops up and you have them the length of a cell phone," says Cofield. "The majority of all paper mills that we represent would be well over 100 years old. Many of them would be going back to about the 1880s-1890s."[104] As long as the industry can get away with using century-old technology without losing business, there is no incentive to upgrade to energy efficient equipment optimized for PCW fibre and run using non-emitting energy. The technology already exists, and if major paper purchasers demand it, suppliers will find it difficult not to update their operations.

6.2 The Digital Question

A number of the publications discussed in this report, from *Backpacker* and *Corporate Knights* to *The Ark* and *Watershed Sentinel*, identified offering magazine content digitally (whether online, on mobile devices, or both) as a way of lessening their environmental impact. In a very simple way, it is true that if a publisher replaces a paper copy of a magazine with a digital equivalent, the publisher eliminates the emissions that would have been generated by creating that paper copy. But, for digital publishing to be a truly environmental choice, it would also have to be true that the emissions released by producing, distributing, and reading the magazine digitally were less than what would be emitted to produce, distribute, and read the paper copy. Otherwise, switching from print to digital is simply off-loading part of the magazine's emissions from the publisher to the reader.

Over the last 11 years, a handful of studies have compared the environmental effects of digital and print reading. While the overall trend identified among the studies is that digital reading is less harmful to the environment than reading from paper, there are some significant caveats to those findings. An additional caveat is that none of these studies focused specifically on magazines. Newspapers, books, telephone directories and scholarly journals have all been examined, but each presents a slightly different reading scenario from a magazine, and the differences tend to be in the areas that matter most when it comes to emissions. A third caveat is that it is not clear from any of these studies whether biomass removal was factored into the measurement of the emissions resulting from reading on paper. If it was omitted (which seems likely given how frequently that has happened in other publishing studies), then the carbon impacts of reading from paper would have been significantly underestimated in all of these studies.

104 *Brenda Cofield (specification representative, Coast Paper), in discussion with the author, February 21, 2012, in Vancouver, British Columbia.*

The first such study was conducted by Hischier and Reichart in 2001. They examined a number of "digital vs. print" scenarios, including the aforementioned telephone directory. The part of their study most relevant to this report examined newspaper reading. They compared both the environmental impact of reading a single article, and of the larger activity of getting the daily news from a physical newspaper, television, or an online newspaper. The study found that reading online caused fewer greenhouse gas emissions than reading printed material if it was "not very time-consuming."[105]

Once reading online reached a duration of 20 minutes, it produced the same quantity of emissions as reading from paper. Any additional reading beyond the 20-minute mark would have increased the emissions above those generated by print. It should also be noted that these findings were based on the power mix in Switzerland's electrical grid, which is primarily hydro (like Canada's). If the study had been conducted in the U.S.—where almost 70% of electricity is generated by burning fossil fuels[106]—the results would have favoured paper even earlier. Given that magazine readers average 42 minutes with each issue, a similar study looking at magazine reading might have come down in favour of print.[107]

A study by Gard and Keolian in 2003 looking at academic journals reached a conclusion complementary to Hischier and Reichart's. Journals are different from consumer magazines in that their subscribers tend to be institutions rather than individuals, and they are generally accessed by multiple members of those institutions. That said, the overall finding was that the traditional paper format was more environmentally costly for "low-traffic" journals, while sticking to print resulted in environmental benefits for popular journals.[108] Again, if a work was read at length (or by a high number of readers), it was more environmentally sound for it to remain in print than switch to digital. It follows that publishing in print form is probably a benefit for magazines with high numbers of readers per copy.

The next two studies both came down unequivocally on the side of digital reading, however. Kozak compared a 40-volume academic library to its digital equivalent.[109] This scenario is so different in both size and usage from a magazine or even an entire subscription, however, that it seems unwise to extend those findings to the magazine industry. And Toffel and Horvath's comparison of receiving daily copies of the *New York Times* for a year with reading *New York Times* articles on a personal digital assistant (PDA) for an hour every day is again comparing a quantity of paper so much more vast than would ever be generated by a magazine subscription that extrapolating from it to magazine reading would be difficult to justify.[110]

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105 *Hischier and Reichart, "Multifunctional Electronic Media," 2003, 397.*
106 *U.S. Energy Information Administration, "Net Generation by Energy Source," 2012.*
107 *Magazines Canada,* Put Magazines to Work for You 2011*, 2011, 10.*
108 *Gard and Keoleian, "Digital versus Print," 2003, 129.*
109 *Kozak,* Printed Scholarly Books and E-book Reading Devices*, 2003, ii.*
110 *Toffel and Horvath, "Environmental Implications of Wireless Technologies," 2004.*

The most recent examinations of this issue have all been led by Åsa Moberg, who has compared print reading and e-reading in a number of studies. Her 2007 paper identified the major sources of emissions for three kinds of newspaper reading: print, online and on a dedicated e-reader.[111] For print, as we have already seen, the major source is paper. Online reading generates the bulk of its emissions through the power used by the computer. Once again, when online reading reached a duration of 30 minutes or longer, it generated impacts in the same range as the printed newspaper.

Using a dedicated e-reader—with its significant reduction in power usage relative to a computer—generated most of its emissions from the production of the device itself. Despite e-readers' lower energy requirements, their use for magazine reading does not guarantee a lower environmental impact than paper. Because the major source of emissions resulting from e-readers is their manufacturing, moving a magazine from print to a version optimized for an e-reader is only an environmental advantage if the reader is getting the most from their device—i.e. they are using it for purposes beyond magazine reading, and keeping the device for a number of years before replacing it.

In her 2011 study comparing paper and e-books, Moberg writes that in order for it to be an environmentally preferable choice,

> an e-book reader should be used frequently, the lifetime of the device should be prolonged, as far as possible, and when not in use anymore, the device should be disposed of in a proper way, making material recycling possible. In addition, the production of the e-reader should be energy efficient and striving towards minimization of toxic and rare substances.[112]

The question of toxic and rare substances in e-readers, while not directly related to carbon emissions, is certainly an important one to consider. Rare metals used in electronic devices are often sourced from—and the source of conflict in—war-ravaged areas like the Democratic Republic of the Congo. One other key issue Moberg highlights is that, because e-reader devices are made in China, their manufacture is generally powered by coal—which contributes 72% of the Chinese power grid.[113] So if publishers make a point of seeking out paper manufactured with non-emitting renewable energy, they could significantly reduce the relative emissions of print compared to e-reading.

Given the possibility that biomass removal was omitted from some or all of these studies, their findings must be taken with at least a grain of salt. That said, they are also the only research currently published on the subject, and there are certainly lessons that can be learned from them. To begin with, the relative emissions of

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111 *Moberg et al.,* Screening Environmental Life Cycle Assessment*, 2007, 6.*
112 *Moberg et al., "Books from an environmental perspective," 2011, 238.*
113 *Moberg et al.,* Screening Environmental Life Cycle Assessment, *2007, 93.*

paper and digital reading depend on a number of factors. The first is the source of the energy used to power any digital device. Readers in areas powered by fossil fuels may be better off reading from paper (as long as it wasn't also manufactured using fossil fuels). The second is duration of reading. The longer spent reading a particular publication, the fewer relative emissions caused by the print version. The third is sharing—a magazine that is often passed hand-to-hand may be preferable in print form, environmentally speaking. And the fourth is appropriate use and disposal of e-reading devices. Used properly, these devices can certainly reduce the carbon footprint of magazine reading, but if their owners get caught up in the cycle of planned obsolescence and replace their device whenever a new one comes on the market, they could instead cause significant greenhouse gas emissions. "Digital comes with a price too," says *Alternatives*' Ruby.

What should magazine publishers do, then, in response to the existing research? First they should inform themselves and understand the studies that have been done, rather than assume that "digital equals green." Next, they should strive to inform their audience. Instead of simply making both print and digital versions available to subscribers, they could educate readers that casual digital reading is preferable to casual print reading, but for reading a magazine cover to cover and passing it between many readers, print may be preferable. Furthermore, in the same way they encourage print readers to recycle their magazines, publishers should encourage digital readers to use and dispose of their devices appropriately in order to minimize their environmental impact.

Another useful step would be for a group of publishers—again perhaps through an organization like Magazines Canada—to commission a study explicitly comparing the life cycle of a printed magazine to its digital equivalent, rather than being forced to draw on research conducted on newspapers, books and scholarly journals. Such a study ought, of course, to include the removal of biomass in any calculations relating to print-related emissions in order to ensure that all significant sources are accounted for. Last, publishers should—as this entire paper has argued—seek out the lowest emitting papers available, so that the discrepancy between print and e-reading is further reduced.

6.3 Cradle to Cradle Certification

One other approach to sustainable development is worth briefly mentioning as a potential future help to publishers wishing to reduce their carbon footprints. The Cradle to Cradle (C2C) framework has been developed over the last two decades by architect William McDonough and chemist Dr. Michael Braungart and their consulting firm MBDC. Intended to recognize manufacturers for "using safe materials that can be disassembled and recycled as technical nutrients or composted and absorbed as biological nutrients,"[114] C2C certification is now conducted by the Cradle to Cradle Products Innovation Institute, and assesses five criteria: material health, material reutilization, energy, water, and social responsibility. The

114 Cradle to Cradle Products Innovation Institute, "Program Details," 2012.

parameters for assessing each of these criteria are compatible with other established standards, including the Greenhouse Gas Protocol and FSC guidelines.

To date, only one paper product has been C2C certified, a 100% recycled office paper whose Dutch manufacturer provides it to the same companies whose waste paper was used to make it. Clearly, there is enormous potential for paper manufacturers to pursue this holistic level of sustainability. Another publishing-related realm that would benefit greatly from C2C principles is the manufacturing of electronics, notably those used for reading. The environmental implications of the paper vs. digital discussion would be significantly altered if any e-reader manufacturer pursued Cradle to Cradle design. As it stands, no electronic device has achieved C2C certification yet.

7. CONCLUSIONS

Thanks to the studies conducted by American publishers and publishing organizations, Canadian magazines are in a good position to understand the nature of their carbon footprints and take actions to reduce them. Unfortunately, the largest area for improvement lies in the hands of another industry entirely: the paper industry. Individual publishers may not be able to pressure their paper manufacturers to adopt lower-carbon fibre and energy sources, but by banding together (and possibly joining forces with other major paper buyers), they certainly have the potential to influence their suppliers. In addition, because of their role as trusted purveyors of information to the public, Canadian magazine publishers have a platform from which they can educate consumers about these issues and engage them in a campaign for lower carbon papers.

As can be seen from the case studies, there are many ways that publishers large and small can immediately reduce in their carbon footprints, even if they can't afford to measure those reductions. It is important, however, that industry players make a point of understanding the science of magazine carbon footprints clearly, or working with those who do, so that apparent solutions—like going digital, investing heavily in tree planting, and purchasing paper manufactured with biomass energy—aren't adopted without a complete grasp of the ways in which they do, and don't, contribute to a reduction in greenhouse emissions.

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