



# Life Cycle Assessment

Understanding the CO<sub>2</sub> impact of Yellow Pages®  
and White Pages® print and online directories

## An Overview

Prepared for Sensis



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## **Another step in the journey**

Sensis commissioned an independent study to evaluate the environmental impacts of the White Pages® and Yellow Pages® print and online directories.

The Life Cycle Assessment (LCA) is part of Sensis' ongoing commitment to improving their environmental performance. The LCA identifies impact areas and recommends strategies to integrate sustainable practices into all aspects of directory production (internal and external) from the supply chain through to the finished product and customer service.

## Directories as part of our lives

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### Directories as part of our lives

An important step on Sensis' sustainability journey is to understand the environmental impacts of their White Pages® and Yellow Pages® print and online directories (directories) to enable them to:

- understand which aspects of print and online have the greatest environmental impacts;
- identify actions that will enhance environmental performance of their directories;
- inform their sustainability strategy and identify areas for further research; and
- communicate truthfully and accurately with stakeholders regarding directory impacts.

Around 10 million customers (according to 2006-07 data) access Sensis' printed and online directories each month.

In 2007-08, there were 20.8 million printed directory "packs" delivered Australia-wide to households and businesses. Over 99% of Australian households received directory packs relevant to their area.

Sensis' online directories had 176 million searches made in 2007-08. The ABS reported that in 2006-07 (latest data) only 64% of Australian households had internet access (ABS, Cat 8146.0). In addition, many professionally active Australians have access to internet at work. So whilst most Australians have a choice between internet or printed format, for some Australians (particularly regional), the printed book is their preferred option.

# What was done

**What was done**

A full Life Cycle Assessment (LCA) was undertaken by URS to provide Sensis with a comprehensive understanding of the impacts of printed and online directories.

LCA is defined as the “compilation and evaluation of the inputs and outputs and the potential environmental impacts of a product system throughout its life cycle” (ISO 14040). In applying the LCA process, a product or service is broken down into a series of consecutive, interlinked stages from raw material acquisition through to final disposal, commonly referred to as “cradle to grave”.

In the study, the LCA assessed the impacts associated with the delivery of the online and print directories. Energy consumption and key materials were included for all aspects of directory production and use.

For printed directories, the following aspects were considered across White Pages®, Yellow Pages®, In the Car and Local directories:

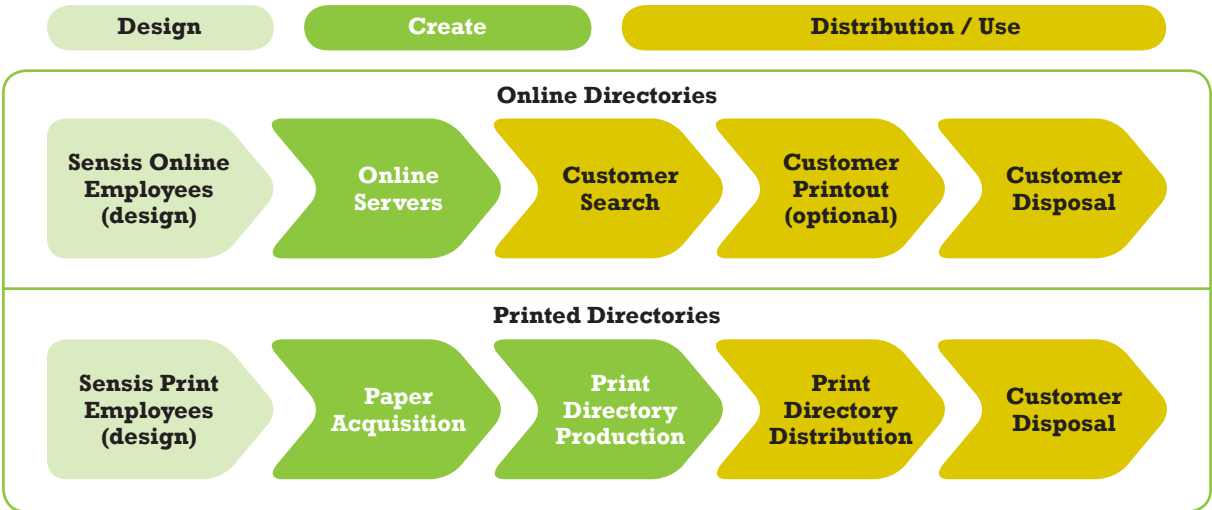
- Book design; book materials; book creation; book distribution; and book disposal.

For online directories the following components were considered across yellowpages.com.au and whitepages.com.au:

- Directory design; directory delivery (electronic); searching/viewing the directory; printing the search (sometimes); and disposing of the printout (when applicable).

Both printed and online directories go through similar production and usage stages. The LCA process has therefore been split between design, creation, and distribution/customer use product stages (**Figure 1**).

**Figure 1 Production process for printed and online directories**



## What was done continued

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The LCA included processes and materials as far as practicable, however there were some exclusions, as discussed in the 'Important Background Information' section.

Full technical details and methodology are provided in a separate, technical report that has been verified by an independent third party to conform with ISO 14040 standards.

Key assumptions made in the LCA are outlined in the 'Important Background Information' section.

The initial LCA incorporated environmental impacts covering exhaustion of non-renewable resources, pollution (greenhouse gases and human toxicity), and eco-system quality (habitat/species loss).

This LCA was then peer reviewed by the University of New South Wales. This analysis informed Sensis' decision to certify the White

Pages<sup>®</sup> and Yellow Pages<sup>®</sup> carbon neutral through the Department of Climate Change Greenhouse Friendly<sup>™</sup> program.

A revised LCA was subsequently completed focused on CO<sub>2</sub> impacts. This assessment was developed alongside an Emissions Monitoring Plan (EMP) and both were peer reviewed by Energetics as part of the Greenhouse Friendly<sup>™</sup> certification process.

# What was found

### The results

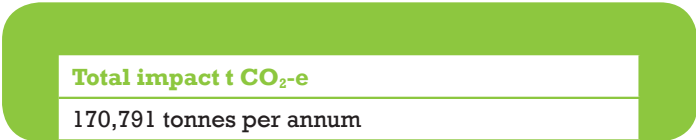
The total carbon footprint of the print and online directories is 178,632 tonnes annually; around 96% of impacts are associated with the printed directories.

The results of print and online directories are not directly comparable for a number of reasons. For example, the penetration of printed directories is close to 100%, whilst online directories is limited by the fact that not all households and businesses have access or chose to adopt internet services. A printed directory can also equate to hundreds of searches across multiple headings throughout a year.

### Print directories

For printed directories, the majority of the impacts (79%) relate to the creation of the printed directories, with 78% of those impacts relating to material and energy associated with paper and cardboard.

### Impacts of the printed directories



### Impacts of the online directories



# What was found

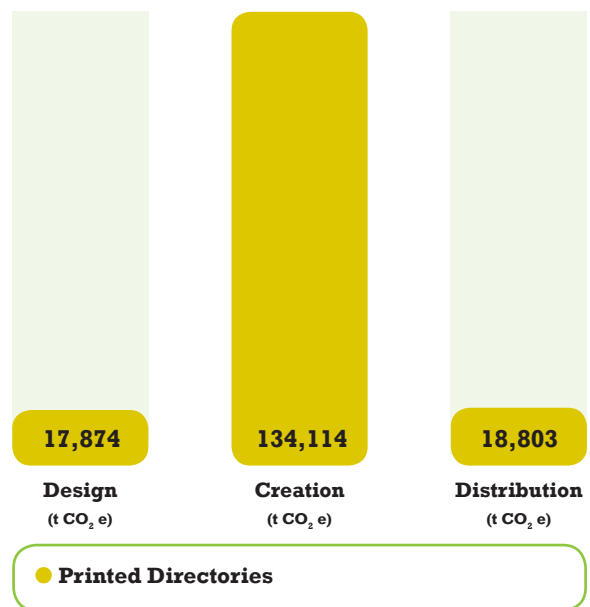
## Online directories

For online directories, the majority of impacts (50%) relate to Sensis employee impacts, with 50% of those relating to office energy use and a further 20% to air travel.

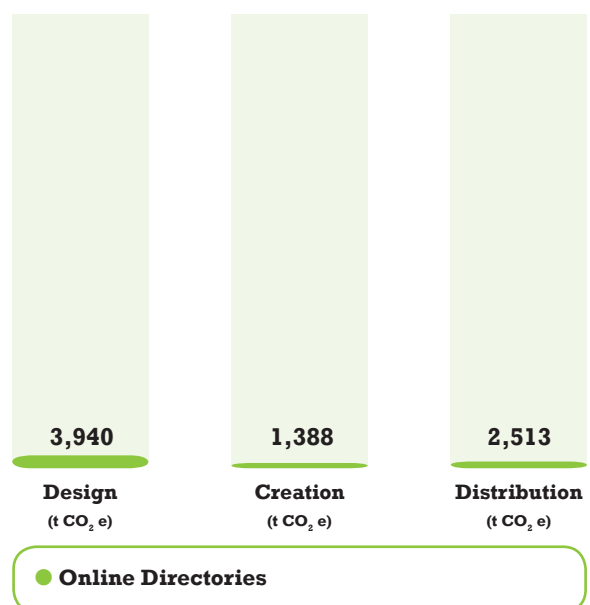
**Table 3 Average carbon footprints of single advertisements in a printed directory**

	g CO <sub>2</sub> e		
	Average impact	Average metro	Average regional
Display (full page) – Size 20	7.70	4.74	8.12
Display – Size 12	4.59	2.82	4.83
Display (half) – size 10	3.81	2.34	4.01
Display – Size 6	2.27	1.39	2.39
Display – Size 4	1.50	0.92	1.58
Display – Size 3	1.11	0.68	1.17
Display – Size 2	0.73	0.45	0.77
Display – size 1	0.35	0.22	0.37
Space Entries – Size 5	0.37	0.23	0.39
Space Entries – Size 3	0.23	0.14	0.24
Space Entries – Size 1	0.08	0.05	0.09
Line Entry Bold Name	0.05	0.03	0.06

**Figure 2 Annual impacts by process stage for printed directories (CO<sub>2</sub> eq.)**



**Figure 3 Annual impacts by process stage for online directories (CO<sub>2</sub> eq.)**



# What was found

**Table 5 Key Drivers – Print and online directories**

Impact category	Driver	
	Printed Directories	Online Directories
Pollution – greenhouse gas	Paper creation 35% Printer energy use 14% Paper transport energy use (ship) 6% Distribution and disposal 28% Sensis employee energy use 10%	Sensis employee office energy use 25% Sensis employee air travel energy use 10% Online server energy use 18% Customer energy use (home computer and printer) 23% Sensis fleet 13%

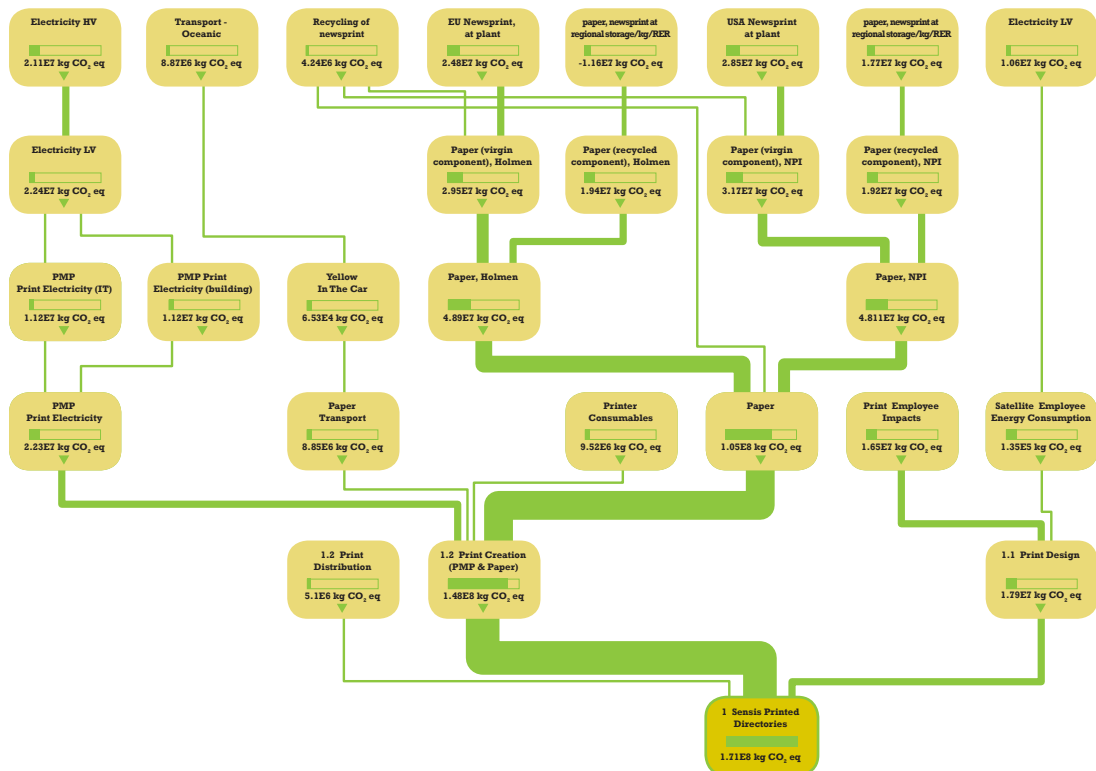
**Table 5** shows the main drivers for print and online impacts.

In terms of printed directories, energy use is the main driver for global warming impacts. The majority of energy use relates to paper production and energy consumed for the production of the directories. Transport (ship/trucks) and directory disposal are also key contributors.

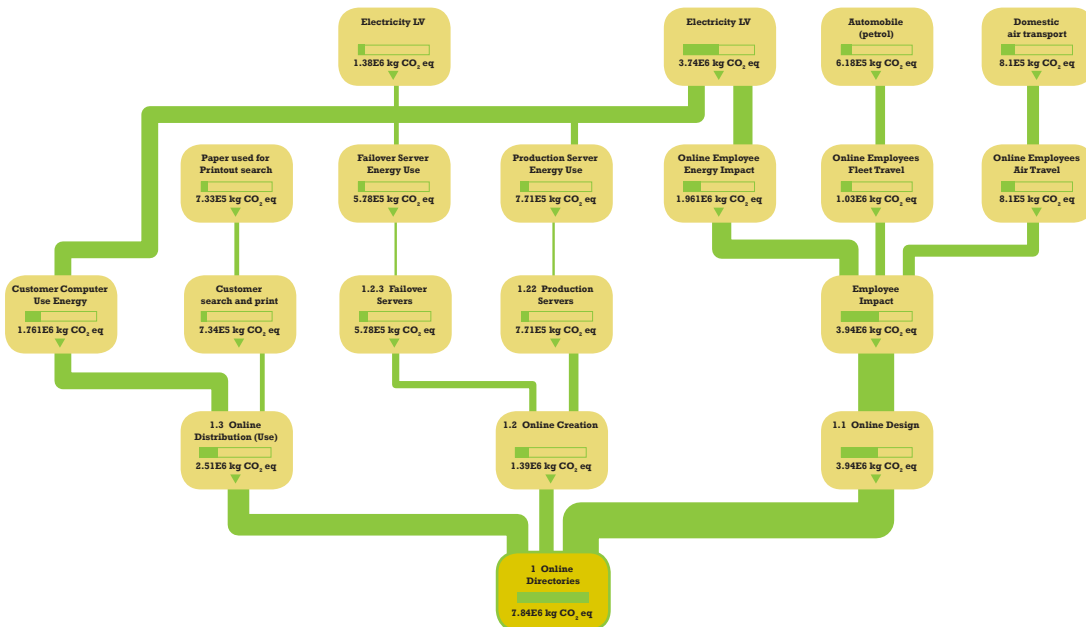
For online directories, key impacts relate to Sensis employee energy use, air travel and online server energy use. Customer search and printout habits are also significant in their contribution to online impacts. Although Sensis employee impacts also exist for the printed directories, their relative contribution to the overall print process is less than other processes, so is less significant.

**Figures 4 and 5** depict print and online processes by a series of inter-linked stages. Picture the flow chart in terms of a system of plumbing – the thicker the pipe, the greater the flow (or environmental impact). Note that the charts have been simplified to show the most significant plumbing/pathways – many more pipes are not visible (the technical report shows a more complete view).

**Figure 4 Print Directory flow-chart: Global Warming**



**Figure 5 Online Directory flow-chart: Global Warming**



# What does it mean?

## In simple terms

The key contributor of the printed directory impacts is the paper production and printing process, and particularly, the associated energy usage. The LCA has revealed that the most significant contributors for online directories relate to paper use (by Sensis employees and customers who print out), and energy use (including air travel by employees).

## What we can do about it?

URS provided a number of possible options for Sensis to explore that may help them to reduce the environmental impacts of their directories. These were:

### Engage the paper suppliers and printers

- Consider initiatives to decrease energy consumption and adopt renewable energies
- Create waste reduction opportunities
- Explore increasing the recycled content of directories

### Improve Sensis' own performance

- Consider initiatives to create energy efficiencies
- Consider green energy options
- Reduce air travel and fleet usage where feasible
- Create waste reduction opportunities
- Explore carbon offset options
- Improve search engine performance to reduce time spent on online searches
- Improve form design to minimise pages printed

### Educate and influence directory clients and customers

- Discourage customers from printing out their search
- Research impacts of send to mobile with a view to encouraging customers to send to mobile rather than print their search (if send to mobile is found to have lesser environmental impacts)
- Encourage customers to continue to recycle their directories
- Educate customers and advertisers on the impacts of books and online using results of LCA
- Encourage customers to recycle print paper and/or adopt green energy to reduce their search impacts
- Increase awareness of the "opt out" option to households and businesses for those who solely use online or mobile directories or do not wish to receive a print copy.

## Important background information

Full details regarding the LCA, including the items below can be viewed in the technical report and have been subject to peer review.

**Context:** The results of the LCA relate to print or online impacts at a specific point in time. Certain aspects of the production process were not included in the analysis, including: home computer/printer materials and embodied energy; fleet materials and embodied energy (only fuel is included). Yellow Pages® mobile, White Pages® mobile, and send to mobile were outside scope.

### Key assumptions:

- 25% of customers print their online directories search.
- Recycled content of consumer paper is 50%.
- 46% of customer paper is Australian made.
- 60% of customers recycle their paper.
- Print directory recycling rate (based upon Sensis survey results) is 91%.
- Energy, fleet, air travel and waste for Sensis directory staff are based on average per Sensis employee.
- Paper used for printed directories is based upon a standard European newsprint so does not represent the actual paper production process for NPI or Holmen paper.
- No data was available on local distribution of printed directories. The model assumes that all roads within distribution areas were travelled and that vehicles return three times for resupply.
- It is assumed that Sensis' activities do not influence the size of Linfox's or local distribution vehicle fleet or infrastructure, thus material impacts have not been modelled.
- Transmission impacts for online (from Sensis to the customer) are considered negligible and are not modelled.
- Server materials are based upon those of a desktop computer. Printing press and binder materials are based on the equivalent weight in steel.
- Household activity estimates are based upon typical household appliance wattages as published on the Energy Australia website: <http://www.energy.com.au/energy/ea.nsf/Content/Ways+Household+Appliance+Wattages>, accessed 05 December 2008.

**Sensitivity analysis:** The results of the study are considered to be robust, however there are some assumptions or factors that were explored in the sensitivity analysis that may influence the environmental impacts of directory services. These were, for printed directories: directory paper recycled content, consumer recycling rates; and local distribution. For online, these were length of stay of an online visit; online server capacity usage and visitation levels; customers who print their search; and pages printed.



**URS**