

# PAPER – THE ENVIRONMENTAL CATASTROPHE

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Over 30 million acres of forest are destroyed annually, more than 40% of which is used in the paper production industry. This proportion is expected to grow by more than 50 percent in the next 50 years [1]. Worldwide, 300 million tonnes of paper are produced each year. In the UK alone, in excess of 12 tonnes of paper are consumed per year [2], much of which is imported from Scandinavia. Table 1 shows the 10 greatest producers and consumers of paper as of 2000 and the amount of paper in tonnes.

Paper production		Paper consumption	
USA	85,495	USA	92,355
Japan	31,828	China	36,277
China	30,900	Japan	31,736
Canada	20,689	Germany	19,112
Germany	18,182	UK	12,684
Finland	13,509	France	11,376
Sweden	10,786	Italy	10,942
France	9,991	Canada	7,476
Korea	9,308	Korea	7,385
Italy	9,000	Spain	6,922

Table 1. The world's largest 10 producers and consumers of paper.  
Numerical values are in tonnes.

Current practice within the paper industry is to offset the destruction of natural, primary, forests by replacing them with managed secondary forest or plantations. These plantations often use large quantities of pesticides, herbicides and fungicides and so cannot provide the same ecological function as the primary forests they replace. This in turn has the effect of reducing the natural habitat for a wide range on animal and plant life. In order to satisfy the UK's increasing demand for paper products, the majority of the natural Boreal forest in Scandinavia has been converted into intensively managed plantations, where the inhabitants of a natural and complex forest eco-system struggle to survive. Only around 5% of Scandinavian primary forests remain, and yet these are still being logged [3]. As a result, hundreds of plant and animal species are endangered. Many environmental groups are vehemently opposed to these schemes and actively encourage a drastic reduction in energy consumption and paper use.

It is not just the loss of plant and animal life that is a concern. The paper industry is the fifth largest industrial consumer of energy in the world, accounting for four

percent of the world's energy use [1]. Much of this energy need is satisfied by the burning of fossil fuels. In the production of 1 tonne of virgin copy paper, it is estimated that 38 million BTU's are expended (equivalent to 253 gallons of petrol) and over 2.6 tonnes of greenhouse gasses are released [4]. A huge amount of water is also used in paper production, between 16 and 60 cubic meters per tonne, much of which becomes contaminated with toxic chemicals, bleaches and heavy metals such as copper, chromium, lead, zinc, nickel and cadmium in the production process before being released back into the water table. The pulp and paper industry is the single largest consumer of water used in industrial activities in the 30 member countries of the Organisation for Economic Co-operation and Development (OECD) and is the third greatest industrial greenhouse gas emitter, after the chemical and steel industries [5].

The data in Table 1 shows that in most cases, countries consume significantly more paper than they themselves produce. There is therefore a huge market in the import and export of paper. The vast majority of the transportation for this trade is provided by container ships which are one of the fastest growing and least-regulated sources of air pollution and are fast becoming the biggest source of air pollution. It has been estimated that, unless more action is taken, they are set to emit more pollutants than all land sources combined by 2020 [6].

Beyond the production and transportation of paper, the environmental impact of the inks and dyes used in the printing process must also be considered. The huge environmental impact of paper production and printing is intensified by the fact that over half of all paper produced ends up being disposed of in land fill sites and incinerators within a year of its production [2]. Over one third of all landfill waste is believed to be paper. This waste paper then decomposes releasing more greenhouse gasses into the atmosphere.

Although increasing the use of recycled paper can reduce these effects, recent studies have shown that the production of recycled paper has a comparable environmental impact to that of virgin paper. The production of 1 tonne of 100% recycled paper is estimated to release 1.6 tonnes of greenhouse gasses [4]. The costs (both financial and environmental) associated with the transport of recycled paper are also believed to be comparable to or greater than those of virgin paper.

With these points in mind, it is clear that the only effective way to significantly reduce the negative environmental consequences of paper production, use and disposal is by being more economical with our use of paper products. Offices are one of the major sources of waste paper, with employees using up to 50 sheets of A4 every single day [7], with paper usage rising by around 2.8% every year [8]. It is also estimated that UK businesses throw away five million tonnes of printing and writing paper each year. Dr Martin Gibson, Envirowise Programme Director, says businesses cannot afford to ignore this problem.

*“Wasting paper is not only a drain on our environment, but a burden on most companies’ bottom line – they are wasting money with every piece of paper they use needlessly. In our experience, most businesses don’t think enough about how much they*

*are paying for items they throw away. There is tremendous scope for reducing waste in offices.*” Waste costs money. Waste paper can account for up to 4% of business turnover and by finding ways to reduce waste companies could become more profitable.

It has been estimated that up to 90% of information in businesses is retained on paper [9]. This practice is so familiar that it generally goes unquestioned, however, it often forces companies to remain dependent on a wasteful system. The costs to business associated with paper storage, lost documents, postage, document obsolescence, and labour inefficiency can be significant. Almost all paper used in business today provides copies of information that is created and/or stored electronically. A greater use of electronic means of data storage and transmission ensures that ‘hard copies’ need only be produced if and when it is absolutely necessary and so the need for paper based documents is minimal. Relying more on the existing digital copies of information has the added benefit of reduced transportation costs, both environmental and financial. The cost of sending an electronic file via email to 50 different people is negligible compared to printing and delivering 50 hard copies. It is also significantly quicker and easier. Data storage and backup is also substantially easier if an electronic document is used rather than a paper copy. To store 1 million paper documents, an organization can expect to spend between \$20,000 and \$30,000 on filing cabinets alone not even considering the cost of the floor space required to house them. Those same files could fit on a single hard disk drive. On top of the initial cost, filing and sorting through paper based documentation is time consuming and thus costly. Computational tools allow millions of files to be indexed and searched in a matter of seconds. A study performed by the Lawrence Berkeley National Laboratory, California, estimated that the cost per tonne of handling paper is 20 times the purchase cost and 200 times the disposal cost [10]. Automated processes can increase productivity by 50 percent or more [11].

Any opportunity to reduce paper based communications within business should be embraced with both hands for both financial and environmental reasons. Many multinational companies such as Dell, Lockheed Martin, Bell Atlantic, Nike and AT&T have initiated paper reduction schemes which are reported to have saved thousands to millions of dollars for these companies whilst simultaneously reducing their environmental impact.

## References

- [1] Abramovitz, “Paper Cuts”, WorldWatch Institute 1999, p. 124
- [2] Pulp and Paper International. Annual Review, July 1997.
- [3] The Paper Federation of Great Britain pers. comm.

- [4] Environmental impact estimates made using the Environmental Defence Paper Calculator. <http://www.papercalculator.org>.
- [5] OECD Environmental Outlook, p. 218
- [6] Clean Air for Europe impact assessment, p31 (2005).
- [7] National Statistics' Labour Market Statistics, December 2004
- [8] Envirowise publication – “Green Officiency: Running a cost effective, environmentally aware office.”
- [9] Fujitsu Presentation. AIIM International ECM Road Show. Sacramento, CA, September 10, 2001.
- [10] “Useful Facts for Your Paper Efficient Office,” fact sheet. Lawrence Berkeley Laboratory, Energy Analysis Program. November 16, 1994
- [11] Cardiff Presentation. AIIM International ECM Road Show. Sacramento, CA. September 10, 2001.