

Environmental Indicators for Graphics Services

ERS 317

Prepared by:

Paula Viola (WLU)

Karen Hermsen (20143171)

Ben Dunbar (20119913)

For: Jim Robinson

Patti Cook

April 5, 2005

Table of Contents

1.0 Introduction	3
2.0 Environmental Indicators	3
3.0 Background Information on Graphics Services	4
4.0 Methodology	5
4.1 Literature Review	6
4.2 Consultation with Waste Management Coordinator	6
4.3 Interview with Graphics Services	6
5.0 Indicators for Graphics Services	7
5.1 Paper Consumption	7
5.1.1 Recommendations for Reducing Paper Consumption	9
5.2 Reducing Amount of Solid Waste	9
5.2.1 Recommendations for Waste Reduction	10
5.3 Recycled Content of Paper	10
5.3.1 Recommendations for Recycled Content of Paper	12
6.0 Recommendations	13
7.0 Conclusions	14
8.0 References	16

1.0 Introduction

As part of the University of Waterloo's environmental initiatives in the State of the Environment Report, one of the departments that requires waste management audits is Graphics Services. Paper is one of the largest components of waste generated on campus, and since Graphics Services is the largest consumer of paper on campus there is a need to monitor and reduce waste from this department. This report focuses on three indicators that will be crucial to reducing Graphics Services impacts on the environment. These indicators are reduction in paper consumption, solid waste reduction and increasing recycled content of paper.

2.0 Environmental Indicators

The first step in this project was to ensure that there was a clear understanding of indicators. According to the Standing Committee on Evaluation and Accountability in British Columbia, indicators are:

“Critical information about selected areas of performance, usually expressed as an index or ratio, monitored at regular intervals, and compared to one or more standards. Indicators describe various aspects of the operation of a program, service, or institution. They must be relevant, reliable, accessible and clear. They are frequently tracked (SCOEA, 2001).”

Indicators can be used for many different purposes including monitoring the economy or social well-being. This project is focusing specifically on environmental indicators. Paul Martin, recognizing the benefits of environmental indicators, says:

“Environmental indicators will provide us with the hard, quantitative data to ensure a sound basis for both environmental and economic policy in the future. In effect, these indicators can serve as a continuous call to arms – an ongoing protection against environmental complacency (DFC, 2001).” A good environmental indicator should provide a direct measure of processes that have environmental impacts, and should be tracked over time in order to determine whether there is an improving or deteriorating trend (Jones, et al., 2002).

The environmental indicators used in this project are based on the Campus Sustainability Assessment Framework proposed for the University of Waterloo by Crystal Legacy (2004), and previously adopted by Concordia University (SCP, 2003). Legacy recommends that student groups working on the indicators collaborate with the relevant departments on campus as a means to develop tangible short-term and long-term benchmarks as indicators. This project focuses on the Graphics Services department at the University of Waterloo, since it has yet to develop a set of environmental indicators.

3.0 Background Information on Graphics Services

Graphics Services are helpful to students in a variety of ways. The staff combines their team with advanced technology to provide visual solutions to the students. Some services provided include custom services of Courseware, communication material of design, photo imaging, and print pieces. It is located on the east side of the University of Waterloo campus. The main focus of Graphics Services is to help both students and faculty create comprehensive learning materials for staff members.

The staff members direct their focus on the consumer's needs; they compile a series of questions to insure that the clients get exactly what they need. Some of the questions that they ask are:

- Is copyright clearance required?
- Should a departmental fee be applied?
- Is this supplementary or mandatory course material?
- Is there a need for colour paper or colour printing?
- How would you like your package bound?
- Is your document in electronic format now?
- Where would you like your book to be sold?

These questions are specific, and ensure that the client receives whatever they need out of graphic services.

Graphics Services are a competitive market which means that the students must pay fees in order to use this service on campus. To survive on campus, this service must keep on adapting and changing in order to compete with other markets. This requires the graphic services to constantly maintain and improve their technologies. It is always a challenge for a company to balance between being a main competitor, and developing an environmentally conscious business.

4.0 Methodology

There were three approaches used for the methodology for this research. These approaches included a literature review, consultation with the University of Waterloo's

Waste Management Coordinator, Patti Cook, to initiate this Environmental Indicators of Graphic Services project and then an Interview with the Graphics Services manager, Chris Read.

4.1 Literature Review

A review of all other relevant projects and indicator reports on waste management, environmental indicators and sustainability and environmental to gain a background on what had already been done and what kinds of indicators we were looking at. This information was also used in the description of what indicators are and to aid in narrowing down the three indicators used in the project.

4.2 Consultation with Waste Management Coordinator

A consultation with Patti Cook, the University of Waterloo's Waste Management Coordinator, was held to discuss taking on an Environmental Indicators project for Graphics Services. This would be the first time indicators would be assessed for this department. The meeting also helped to narrow down the three for this study. We were also put in touch with a contact person from Graphic Services. This was where the majority of brainstorming for the project, the goals and possible recommendations was initiated.

4.3 Interview with Graphics Services

A meeting was set up with Chris Read of Graphics Services, to discuss possible environmental indicators and whether Graphics Services could work toward improving on them. We were taken on a tour of the university's Graphics Services department, to

better understand how we would evaluate the operation and its facets. We were also able to discuss any current initiatives being taken and given a more thorough background of its services.

In the interview, numerous possible indicators were ruled out that had or were in the process of being implemented. These included, double sided photocopying which has already been set as a default for printing of course packs, instructor lecture notes, assignments etc. unless professors, students etc request otherwise.

We discarded the possible indicator of vehicle trips Graphics Services makes to distribute paper, supplies, maintenance of copier equipment around the university because we discovered this transportation was not under Graphics Services' control. In addition, measure had already been taken in reducing this number to two trips per week. As well, we were told that Graphics Services' ink cartridges were reused and/or recycled.

5.0 Indicators for Graphics Services

5.1 Paper Consumption

According to the Interim Director of Graphics Services, Chris Read, Graphics Services is the largest consumer of paper on campus. Between January 1st and December 31st 2004 it is estimated that 132.68 metric tonnes of paper were used in the main facility. This number excluded the amount of paper used in the copy centres, as there is currently no system in place to track paper usage at these locations.

Paper consumption was chosen as an environmental indicator because it is derived from trees, which are a valuable part of ecosystems. Trees remove pollutants and carbon dioxide from the atmosphere, provide habitat for wildlife and help maintain

soil stability. The production of paper has impacts on the environment including air and water pollution. It is estimated that every tonne of paper equals (SCP, 2003):

- 17 trees
- 4,100 kilowatts of energy (enough to power the average home for 6 months)
- 7,000 gallons of water
- 60 pounds of air pollution particulate
- 3 cubic yards of landfill space

Based on these estimates, in 2004, the Graphics Services main facility would have consumed the equivalent of 2,255 trees, 541,200 kilowatts of electricity, 924,000 gallons of water and produced 7,920 pounds of air pollution particulate.

The indicator used by Concordia University for paper consumption calculates the total piece of paper purchased by all departments in the university each year, divided by the total number of full time equivalent students, staff and faculty. Graphics services at the University of Waterloo does not have a means of tracking paper consumption in terms of pieces of paper used, therefore, the formula will be modified to calculate total weight of paper purchased, divided by full time equivalent students. Full time equivalent (FTE) students were calculated from reports generated by office of Institutional Analysis & Planning. These reports are generated based on academic years, where Graphics Services Paper consumption is calculated based on the calendar year. To calculate FTE students in 2004, an average was taken of the 2003/2004 and 2004/2005 academic years:

2003/2004 FTE Undergrads: 20011.7, Grads: 2252.1

2004/2005 FTE Undergrads: 20845.4, Grads: 2324

Average = $(2011.7 + 2252.1) + (20845.4 + 2324) / 2$

= 22,716.6 FTE students for 2004

Paper Consumption 2004/ FTE Students 2004

=132.68/ 22716.6

=0.00584 tonnes paper per FTE student 2004

5.1.1 Recommendations for Reducing Paper Consumption

The recommended short-term benchmark for this indicator is to have a reduction in paper consumption per FTE student annually. The long-term recommended benchmark is to approach zero paper consumption per FTE student.

One specific area where paper use can be reduced is in the number of course packages that are returned from the bookstore unsold. By monitoring more closely the sales trends of course packages, Graphics Services can significantly reduce the number of packages that are discarded after each term. A second area where Graphics Services can reduce paper use is by developing electronic versions of course notes. The idea of mandatory fees for every student enrolled in particular class to access electronic versions of course packages can be explored.

5.2 Reducing Amount of Solid Waste

Graphics Services, while the biggest user of paper, is also a large emitter of solid waste. When posters etc are printed, they print with a small white border around, detailing the type of printing and so forth. This small border needs to be cut off before the product can be used. This amounts to many binfuls of white and colour paper. Two bins are used for this output...one for white paper and one for colour. The white bin is twice as

large as the colour and is emptied once a week.

To determine the amount of waste generated, calculate the total weight of paper and recycled product. On average, the amount of paper product considered waste is 6220 lbs. of white paper and 3050 lbs. of colour paper. We recommend that Graphics Services should work toward continually decreasing the volume of solid waste produced every year with an emphasis on a continued drop to zero, long term.

5.2.1 Recommendations for Waste Reduction

The amount of waste could be reduced by purchasing more efficient machines that do not leave a large berth around the posters being produced or by designing posters that are a size that does not require extensive alteration (trimming excess off the edges). The packaging that the paper comes in is often thrown away because there is line of glue near the lid, which cannot be recycled. By asking the supplier of the paper (Cascade) to take back any packaging, this could encourage the supplier to find a less wasteful way of packaging paper, or look for other alternatives besides glue lined boxes. This would ensure that UW would produce less waste. If suppliers are required to take packaging back, then they think of more environmentally friendly alternatives for packaging, or at least, packaging that is not as excessive, or minus the non recyclable glue that is adhered to the cardboard.

5.3 Recycled Content of Paper

If the Graphics Services department wanted to take a more environmental approach, than using paper with more recycled content within it would help this service

get closer to this goal. Graphics Services uses more paper than any other service on Waterloo campus. Graphics Services will have a positive impact if they were to choose to only use paper with recycled content. As a result of being the largest paper consumer on campus, Graphic Services has gained influence over what kind and type of paper the University orders. Therefore if Graphic Services were to want to make a change in the paper being used, it would not be hard for them to influence the university to order environmentally friendly paper.

Currently Graphics Services does not order its own paper; it relies on the University Central Department to order the paper. As a result, it may be harder for Graphics Services to make a direct change on the paper being ordered. This is because there would be more steps involved with changing the situation with regards to paper, and even though Graphics Services may be able to influence the Universities Central Department, it may not be able to convince them totally to order the post-consumer paper.

Currently Graphics Services does use some paper with recycled content, but there is always room for improvement. The percent of paper currently used with post-consumer content is approximately 30 percent. If Graphics Services is the largest consumer of paper, than it would only make sense that the number of recycled paper being used should be higher.

There are many different kinds of paper that are currently being used. The paper that is supplied from Graphics Services that has the most variety would be Exact MP Bond Recycled. It comes in a variety of colours from blue to salmon colour. This brand of paper that is recycled. Other paper that Graphics services provide to the consumer

would be IBM MP Recycled, Fore MP Recycled, IBM Multi Purpose, Relay Multi Purpose, and Newlife Opaque Repro Recycled. The only paper listed here that does not contain recycled content would be the IBM Multi Purpose, and the Relay Multi Purpose.

5.3.1 Recommendations for Increasing Recycled Content of Paper

There are many ways in which Graphics Services can take a more environmentally friendly route when it comes to the types of paper it uses. Graphics Services can stop selling the IBM Multi Purpose and the Relay Multi Purpose paper all together and only sell the paper with recycled content in it. If the only selection of paper available to the consumer is the recycled paper, than it would be impossible for the consumer to use the non-recycled content paper.

Another way that Graphics Services can be more environmentally friendly is to only purchase paper which has 100 percent recycled content in it. Currently the recycled paper that is being used at this department is only part recycled. It may be an impossible goal to only have paper that is 100 percent recycled, but Graphics Services can at least present this paper as an option for the consumer. The reason why it may be impossible to have only 100 percent recycled paper, is because recycled paper contains an altered makeup, and therefore may not feed through copier machines as effectively as virgin paper. Therefore, an ideal goal would be to have maybe 50 percent of the paper sold containing 100 percent recycled content in it, and have the other 50 percent of paper sold to have only a portion of recycled content within it.

As an overall goal that Graphics services may take is gradually increase the paper with recycled content in it. A short term goal for Graphics Services is to have

approximately 50 percent of the paper being used having recycled content. In a few years maybe Graphics Services can insure that 100 percent of the paper being used will have recycled content in it.

There are many potential steps that Graphics Services can take to ensure a more environmentally approach in regards to recycled material in paper content. They can obliterate the paper with no recycled content, and set goals for them to eventually have paper that is 100 percent recycled. If they were to take these steps, than there service can and will be more environmentally friendly.

6.0 Recommendations

- Graphics Services can use their increasing influence regarding the type of paper being used for photocopiers, course packages, lecture notes etc. by trying to work towards increasing post consumer paper content.
- They could also keep records of waste being created either numerically or by weight for auditing efficiency. A further step could be the consistent auditing of Graphics Services to ensure they are either not exceeding the previous audit's paper consumption or to ensure that they are meeting the level of improvement and waste reduction set out in previous years' audits and performance indicators.
- An economic feasibility study could be taken up because many of the indicators under review, while beneficial to the environment and to students, would result in decreased revenue for Graphics Services. Many of these services are under the control of the University, rather than the department. Therefore, the department would not necessarily see the direct benefits. An economic feasibility study may help to determine if certain indicators are necessary, as well.

- Instead of coursepacks, course readings could be put online. There could be an online course fee included in students' tuition, instead of a coursepack. Once the student is registered in a course, they could be given a password to access it. This would eliminate the need for "rainchecks" given to students when there are not enough course packs printed off for the number of students enrolled in the class. This way, students would automatically have their required readings. This would also eliminate the need for used books in the bookstore, and the publishers would in turn, benefit by making more money.
- Final exams—digital submissions of everything
- In the future, Graphics Services could ensure that all copiers would be energy efficient. They could also try to reduce the amount of time copiers run in the day. Currently it is 24 hours, but if this was reduced by 4-6 hours a day, there may be increased energy savings. This would reduce the overall electricity consumption of the University, since it is not Graphics Services that handles the bills for energy consumption.

7.0 Conclusion

This paper has provided baseline data and recommendations for reducing Graphics Services' environmental impacts. Annual reviews of the three indicators presented should be conducted to ensure that short-term goals are being met and that they are moving towards the long-term goals. For the purposes of this paper, the economic viability of Graphics Services is seen as separate and secondary to the environmental impacts of the department.

8.0 References

DFC (Department of Finance Canada). “Development of Environmental Indicators a Priority, Says Finance Minister”. May 25, 2001. <<http://www.fin.gc.ca/news/01/01-054e.html>>

Jones, Laura, Liv Fredricksen and Tracy Wates. “Environmental Indicators (5th Edition)” Fraser Institute. April, 2002.

Legacy, Crystal. “Campus Sustainability: Sustainability Assessment Framework at the University of Waterloo” ERS 490 / 475 Final. 2003/2004.

SCOEA (Standing Committee on Evaluation and Accountability). “Glossary of Evaluation and Accountability Terms”. March, 2001. <<http://www.scoea.bc.ca/glossary2001.htm#I>>

SCP (Sustainable Concordia Project). “Concordia Campus Sustainability Assessment”. 2003. <<http://web2.concordia.ca/sustainability/assessment.html>>