

## **GREENING ILL PRACTICES**

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### **ABSTRACT**

In September 2009, OCLC Research in San Mateo, California, USA, commissioned environmental impact consultants from California Environmental Associates to conduct a three-month study of current interlibrary lending practices. Their assignment was to determine the greenhouse gas emissions associated with specific ILL practices and recommend affordable improvements that will lessen the system-wide impact of resource sharing activities on the environment. The consultants visited two academic libraries to observe interlibrary lending operations first-hand and interviewed ILL staff from a dozen other US libraries. They also interviewed experts on ILL automation, packaging, and shipping. OCLC provided data on the number of returnable items loaned by each participating library, and the destination to which each package travelled. The consultants were able to determine the level of greenhouse gas emissions per book per mile for four of the participating libraries. Combining this information with a careful analysis of the interlibrary lending practices of each library, the consultants were able to correlate specific practices with negative and positive impacts on emissions totals. The result is a set of recommended "green" interlibrary lending practices that are not only common-sensical but also supported by scientific analysis.

## **1. A GREEN TWIST TO AN "ANCIENT" ART**

### **1.1. General remarks**

In a world rapidly going digital, practitioners of the "ancient" art of interlibrary loan find themselves working in a growth industry. Business is booming. Advances in discovery technology, combined with shrinking library materials budgets, have sent the number of borrowing requests shooting through the Learning Commons roof. Within the global OCLC resource sharing network, representing only a fraction of worldwide interlending activity, 10,179 libraries in 46 countries fulfilled 10.3 million ILL transactions from July 2008 through June 2009, up 300,000 from the previous year [1]. Two out of every three of those requests was for a book that had to be packaged and shipped to the borrowing library, then repackaged and reshipped to the lending library.

One can almost picture Mother Nature shopping online for a gas mask, or perhaps for a hermetically sealed bio-dome in which to take up permanent residence.

## **1.2 Assignment: Green**

In September 2009, OCLC Research in San Mateo, California, USA, commissioned environmental impact consultants from California Environmental Associates to conduct a three-month study of current interlibrary lending practices. Previous CEA projects include working with San Francisco Bay Area concert promoter Live Nation to reduce the environmental impact of entertainment venues. Their assignment for OCLC was to determine the greenhouse gas emissions associated with specific ILL practices and recommend affordable improvements that will lessen the system-wide impact of resource sharing activities on the environment. The consultants visited two academic libraries to observe interlibrary lending operations first-hand and interviewed ILL staff from a dozen other US libraries. They also interviewed experts on ILL automation, packaging, and shipping. OCLC provided data on the number of returnable items loaned by each participating library, and the destination to which each package travelled. The consultants were able to determine the level of greenhouse gas emissions per book per mile for four of the participating libraries.

Combining this information with a careful analysis of the interlibrary lending practices of each library, the consultants were able to correlate specific practices with negative and positive impacts on emissions totals. Most of the ILL practices with a low impact on the environment are common-sense practices that staff at many libraries have already implemented.

## **2. OF CARBON FOOTPRINTS AND GREENHOUSE GAS EQUIVALENTS**

### **2.1. General remarks**

These days one hears the words “carbon footprint” thrown around quite a bit. Most people probably have a sense that this describes the environmental impact our activities have on Mother Nature. One also hears a lot of talk about greenhouse gas emissions. There are five major greenhouse gases besides carbon: methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. There is a formula for finding the carbon equivalent for each of those gases, so, for the sake of comparing apples to apples, one can always talk about the emissions numbers in one unit of measure.

### **2.2. Total environmental impact**

There is also more to the story of our impact on the environment than just our carbon footprint. Some organizations are going so far as to capture their entire environmental footprint by including every impact their existence causes, from the production of the energy they consume to the fuel burned by their workers during their daily commutes. This idea comes into play a bit later when we compare the manufacturing processes behind some of the packaging materials we use in ILL shipping.

All of the technical detail, as well as a comprehensive description of methodology and assumptions behind the calculations, are included in the final report available on the OCLC Research Web site [2].

## **3. ILL ENVIRONMENTAL IMPACTS: CONTRIBUTING FACTORS**

### **3.1. General remarks**

Before conducting any interviews or gathering any data, the consultants had a clear idea of which aspects of the interlibrary loan life cycle would lend themselves to investigation and improvement. Packaging, shipping, paper use, and waste disposal were the big four.

Setting aside paper use for the moment, packaging materials account for 51% of greenhouse gas emission from sending a returnable item via ILL, shipping accounts for 48%, and waste disposal accounts for a negligible 1% [3].

### **3.2. Packaging materials have the most impact**

The 51% of greenhouse emissions referenced above assumes that new packaging is being used. An obvious and significant implication of this is that an interlibrary lending operation can potentially cut its greenhouse gas emission in half simply by re-using packaging for returnable items as often as possible.

The consultants also reported that any sort of mailer is more friendly to the environment than any sort of corrugated cardboard box. When the manufacturing processes of each type of packaging are taken into account, mailers generate between 2,000 and 10,000 pounds of CO<sub>2</sub> equivalent per 10,000 packages, while cardboard boxes generate between 35,000 and 45,000 pounds of CO<sub>2</sub> equivalent per 10,000 packages [4].

Using mailers over boxes whenever possible can lessen an ILL unit's impact on the environment exponentially. Does that mean using a box is a bad thing? No, of course not. Sometimes the nature of the material being shipped makes a cardboard box the only responsible choice for packaging. The idea is to utilize greener alternatives whenever possible, and for library staff to rely upon their professional judgment to know when other considerations make being green a lesser priority.

### **3.3. Paper use**

The consultants learned some best practices from the study participants that reduce the use of paper within ILL processes down to the bare minimum. ILL management systems like ILLiad and WCRS, and document transmission systems such as Odyssey and Ariel have been reducing the amount of paper used within ILL for years. ILL operations are already pretty tree-friendly. Some of the best practices noted by the consultants can reduce it even more – down to zero sheets for a typical copy request, and to 1.16 sheets for a typical lending request. Small improvements added up over thousands of iterations amount to a substantial benefit.

Putting the numbers into terms more easily understood, by reducing loan paperwork from 3.5 to 1.16 pieces of paper, a mid-size library with a volume of 10,000 loans per year would reduce paper use by 234 pounds per year, and save three million BTU's of energy, stop 688 pounds of CO<sub>2</sub> from being emitted, reduce 2,600 gallons of waste water, and prevent the creation of 223 pounds of solid waste.

By reducing article loan paper use from 11 (or more) to 0 pieces of paper, a mid-size library with a volume of 5,000 requests would reduce paper use by 550 pounds per year, and eliminate about one ton of wood use or seven trees, save eight million BTU's of energy, stop 1,618 pounds of CO<sub>2</sub> from

being emitted, reduce 6,110 gallons of waste water, and prevent the creation of 525 pounds of solid waste [5].

Extrapolate these numbers over the globe, where tens of thousands of libraries process hundreds of millions of ILL requests every year.

## 4. COMPARISON OF FOUR TARGET INSTITUTIONS

### 4.1. General remarks

Utilizing statistical data provided by OCLC, the consultants were able to analyze the loans of returnables for four of the libraries in the study – Clark Art Institute, Stanford University, University of Chicago, and University of Miami – and come up with greenhouse gas emissions numbers per book per mile for each of the four. Then, by analyzing the interlending practices of the four institutions, the consultants were able to determine the positive or negative impact on greenhouse gas emissions of specific policies and procedures

Appearing in Figure 1 is a comparison across the four libraries of the overall environmental impact of their ILL lending activities. The four are interesting examples because of their geographic location – Stanford on the west coast of the United States, Chicago in the center of the continent, Clark Art Institute on the east coast of the United States, and Miami in the extreme southeast, far close to Cuba's Havana than to any major American city – and for the variety in the volume of interlibrary lending transactions involving returnable items – Clark Art institution with extremely low volume, Stanford and Miami with medium volume, and Chicago heavy lenders. Our target libraries are also interesting for the various consortial arrangements of which they are part, which often influences their packaging and shipping decisions.

It is interesting to note that the University of Chicago staff, with 35,000 loans of returnables per annum, see greenhouse gas emissions from their lending operations each year that are about one and a half times what a single family home would produce. Clark, Art Institute puts out about twice as much carbon emissions in a year as a single ten gallon tank of gasoline [6].

### 4.2. Observations on Packaging

Figure 2 compares the numbers for packaging across the four institutions. Reusing packaging is the key to lowering emissions. Stanford and the University of Chicago have the highest per-book emissions because they reuse minimal amounts of packaging material compared to Clark and Miami. (When the consultants conducted the study, Stanford routinely used all new boxes but are heavily reusing boxes now.) The bins and nylon bags that come from using local couriers has a favourable

Institution	University of Miami	Clark Art Institute	Stanford University (Green Library)	University of Chicago
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Loan volume (returnables)	10,143	471	6,445	34,559
Book Miles Traveled (000s)	13,849	767	11,756	38,702
Total Emissions (lb CO <sub>2</sub> e)	6,297	439	10,009	37,931
Shipping Emissions (lb CO <sub>2</sub> )	6,095	383	6,735	20,851
Packaging Emissions (lb CO <sub>2</sub> e*)	203	56	3,274	17,080

Figure 1: Overview comparison

Institution	University of Miami	Clark Art Institute	Stanford University (Green Library)	University of Chicago
Packaging Emissions (lbs CO <sub>2</sub> e)	203	56	3,274	17,080
Packaging Emissions (lbs CO <sub>2</sub> e per 100 books)	2	12	51	49
Packaging % of total emissions	3%	13%	33%	45%

Figure 2: Packaging comparison

impact on emissions numbers. Clark's per book mile emissions from packaging are higher than Miami's because Clark is not a member of a resource-sharing consortium, while Miami's courier provides reusable packaging. For new materials, choose less energy intensive products. Miami, which has the lowest per book mile emissions, reuses a large quantity of packaging materials, especially boxes. For new materials, Miami purchases jiffy mailers which require less energy to

produce than boxes. Recycled content boxes reduce resource use. Chicago earns high marks for using the 90% recycled content boxes, saving eighty trees per year.

### 4.3. Observations on shipping

Aggregate shipments to minimize materials. Clark and Chicago primarily use boxes to ship loans; however, Clark’s per book-mile emissions for ground shipments are higher because it aggregates shipments less frequently than Chicago (due to Clark’s smaller volume of loans). Minimize package size. University of Miami has the lowest ground shipping emissions per book-mile. Miami uses 60% bags to ship materials, compared to other schools that use primarily boxes. Bags take up less space on the truck and can therefore help reduce carbon emissions and shipping costs. Packaging size matters for courier shipments. Totes occupy approximately 4.5 times as much space as nylon bags. For example, Miami’s courier uses nylon bags while Chicago’s uses totes. Ground transportation produces fewer emissions than air. While shipments travelling by air make up less than 10% of Miami’s total book-miles, they account for 35% of its emissions. Source materials locally if possible. While Stanford and Chicago use similar shipment methods, the average Stanford loan travels ~700 miles further – in part because of the school’s geographic location. By comparison, the average loan within Stanford’s local consortium travels just one third the distance of its Chicago counterpart.

Institution	University of Miami	Clark Art Institute	Stanford University (Green Library)	University of Chicago
Shipping Emissions (lbs CO <sub>2</sub> )	6,095	383	6,735	20,851
Shipping Emissions (lbs CO <sub>2</sub> per 100 Book-Miles*)	0.044	0.050	0.057	0.054
Shipping % of total emissions	97%	87%	67%	55%

Figure 3: Shipping comparison

## 5. GREENING LIBRARY TOOLKIT

### 5.1. General remarks

One of the least surprising outcomes of the study is that ILL practitioners are already doing plenty to be green. Interlibrary lending staff have been streamlining processes and cutting waste to the bone

for a decades. The consultants spent a fair amount of time documenting the best practices they saw at Stanford and heard about in the interviews with the dozen other U.S. libraries. Those best practices are now part of a Library Greening Toolkit that appears as a separate section in the final report *Greening Interlibrary Loan Practices* available on the OCLC Research Web site [7].

Aside from tips and suggestions for greening ILL practices, the toolkit also contains checklists of ideas for greening any office environment and links to resources about carbon footprints and greenhouse gas emissions, including some tools that the consultants used in order to make their calculations.

## **5.2. Many ILL units have already gone green**

ILL staff are already widely going paperless, bundling shipments, sourcing materials from close by, and reusing packaging materials. They collect boxes from other departments, shred worn-out packaging material to use for padding, and do not staple mailers so that they can be reused. They use paper with 30% recycled content, which in most areas costs the same as virgin areas and performs just as well in copiers and fax machines.

## **6. BARRIERS TO GREENING**

Library staff attempting to green their operations will encounter a number of significant barriers. Sometimes green practices cost more and are difficult to justify during tough economic times. Sometimes operational needs for speed or for ensuring the safety and integrity of valuable or fragile materials can outweigh the urge to be environmentally responsible. Logistical details can make green practices more difficult to implement, such as poor communication between ILL staff and mail room staff, lack of storage space for reused packaging materials, and time spent saving and sorting packaging materials for reuse costing more than using new materials. However, benefit accrues only if many units across the interlending system use green practices routinely whenever possible.

## **7. SUMMARY OF FINDINGS**

With the possible exception of the relative impacts on the environment of the manufacture of mailers as opposed to corrugated cardboard boxes, none of the findings of the "greening interlibrary loan" study are surprising. The common-sense practices already in place in many interlibrary loan units are the correct ones which will help minimize the impact of ILL on the environment.

When it comes to interlibrary lending, near is better than far. Ground shipping is better than air. Re-used is better than new packaging materials. Mailers are better than boxes, with reusable nylon bags and plastic bins the greenest of all. Aggregate shipments whenever possible for materials going to the same destination. Use recycled paper if the cost in your region is not prohibitive.

ILL practitioners already know which practices are best for the environment and have implemented them widely, using green techniques as often as possible. Thanks to the study by the consultants from California Environmental Associates, we now have scientific numbers to back up our common sense green practices.

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