Greening the Library:
Collection Development Decisions

Virginia Connell
Library Instruction Librarian
Carl B. Ylvisaker Library
Concordia College

Abstract

Many writers in the library literature have addressed sustainability of the collection with regard to increased prices, user need, and format stability. To this list of concerns librarians should add the environmental impact of the different resources libraries choose. This article considers three facets of collection development: selection of materials whose content informs and assesses green practices; de-selection processes that emphasize reusing and recycling materials; and selection of a material format, specifically print or electronic, that honors the green dictum to reduce the carbon footprint an institution makes. The problem of reducing a library's carbon footprint is perhaps the most complex and most contentious when it comes to the format of the collection. It is on the issue of print versus electronic resources that the present discussion of environmental sustainability will devote most of its focus.

Introduction

Libraries have long been icons of sustainability. Vested with the duty of maintaining knowledge and information from one generation to the next, libraries have sought to support the rich variety of human experience and understanding as part of their mission. Given their substantial history as institutions, libraries have also come to embrace library economy as a necessary tenet of operation. These traditions within the library make it ideally suited to embrace a newer, increasingly urgent call for sustainability: environmentally "green" collections. Both people and the environment benefit when "a book that is loaned ten times cuts not only cost but paper use per reader by a factor of ten" (Meadows, 2009). The library's practice of loaning out a single item multiple times makes it an institution that "reuses" materials extensively, but what of the other two foundational practices of the Green Movement? How effectively do libraries recycle and reduce? Three facets of collection development are considered here: selection of materials whose content informs and assesses green practices; de-selection processes that make the most of the green mandate to reuse and recycle materials; and selection of a material format, specifically print or electronic, that honors the green dictum to reduce the carbon footprint an institution makes. The problem of reducing a library's carbon footprint is perhaps the most complex and most contentious when it comes to the format of the collection. In evaluating the environmental impacts of monographs and of electronic resources, it becomes clear that books are ultimately more earth friendly. [1]

Background

In her article "The Green Library Movement: An Overview and Beyond," Monika Antonelli (2008) provides a detailed look at the library's formal involvement in green activities. The movement began in the early 1990s, with libraries showing substantial involvement around 2003. The journal in which Antonelli's article appears is the *Electronic Green Journal*, which was preceded by *The Green Library Journal: Environmental Topics* in 1992. Around the same time, the American Library Association formed its Task Force on the Environment (TFOE), which still actively addresses issues of greening the library (p. 1-2; Stoss, 2009). Many within the library profession have become vocal advocates of reusing books, recycling paper (Jankowska, 2008), investing in green library architecture (Kuzyk, 2008), and providing green programming (Kuzyk, 2008; Colston, 2009; Urbanska, 2009, p. 54). In addition to the large-scale efforts to create sustainable libraries, individual librarians have creatively adapted local practices to produce greener results. Two libraries within a few miles of each other in Ames, Iowa, have set up a bike system for all of their interlibrary loan exchanges (Oder, 2008). Some librarians in Oregon have encouraged all staff to bike to work (Wann, 2007), and librarians in Noe Valley, San

[1] This paper was originally written under the direction of Dr. Jeff Weddle, University of Alabama SLIS program, for a Collection Development course in spring of 2009. My appreciation goes to him and to the members of my cohort for guidance and support throughout the program.

Francisco, public library have converted on-site green space into a community garden, tended by patrons and staff (Miller 2008). At the Clark County public library in Kentucky, the director, a gardener, has been saving heirloom seeds for her library (Antonelli, 2008, p.7), and to facilitate gardening and other do-it-yourself projects, the Berkeley Public Library has maintained a tool-lending library since 1979 (Antonelli, 2008, p.7-8).

Given all of these creative greening efforts, it is only natural to take a closer look at collection development practices that are influenced by or can be more closely adapted to green practice.

Green Collection Development

Green Selection

A look at the library literature suggests that there are several levels at which selection of green collection materials takes place. The first is when librarians educate themselves about green practices, green collection resources, and green programming materials. In New York, the Metropolitan New York Library Council created a Green Librarianship Special Interest Group (SIG), to further these educational goals (Antonelli, 2008, p. 5). In 2007, the University of Wisconsin-Madison graduate program in library science offered "Eco-Librarians: Changing Our Communities One Step at a Time," and in December 2008, the Southeastern Library Network (SOLINET) was slated to offer "The Greener Library" as an online class (Antonelli, 2008, p. 5).

A second level of collection building occurs when librarians gather green information for their patrons. Crucial to the campus effort is building a green emphasis across the curriculum. Sometimes there is overt web presence concerning green issues and resources (Briscoe, 1994), and often, there are specific instructions for incorporating green topics, activities, and materials into syllabi (Brase et al., 2009; Link, 2000). The ALA (2009) also suggests ways to support community needs for green information. They urge libraries to build up their green collections in several ways:

- Provide open forums for green book clubs and facilities for environmental video viewings or lecture presentations
- Create opportunities for children to get excited about ecology, such as poster competitions or poetry sound-offs
- Select collection materials on organic gardening and composting or green computing and energy conservation
- Set library computer links and bookmarks to environmental issues sites
- Forge outreach relationships with local groups interested in environmental concerns and inquire about their information needs
- Work with local schools to support green curriculum and projects, such as murals or models of eco-systems

Link (2000) offers basic suggestions for campus librarians to use green resources in several of their roles on campus. The advice includes using green topics and resources as the basis for information literacy instruction sessions and publishing reviews of new green resources in the

campus newsletter or newspaper. Crumpton (2009) echoes these suggestions, noting librarians' role in disseminating green information (p.36).

Finally, there are a number of review articles focusing on green resources to add to the library's collection. For example, Eagan (2008) offers a "starter set" of titles for a sustainability collection (p. 40-43), as do Sotak and Zeidman-Karpinski (2007) in "Green Reading: Resources for the Sustainability-Minded." Applin (2009) has created a substantial bibliography for academic libraries wishing to build their green resources, including reference works, serials, books, DVDs, and websites.

Weeding the Garden

Traditionally, de-selection in libraries has involved removing outdated or worn monographs and, on occasion, serials from the collection. Often, these were thrown away; however, as the emphasis on recycling strengthened, several more options appeared. Book sales and giveaways became standard, serving as supplemental income for the library or as a source of good will in the library's relationship with the community (Penniman and McColl, 2008). The advent of the Internet, however, has increased recycling and reusing weeded materials. Penniman and McColl (2008) provide no fewer than sixteen online options for earning extra money for the library, for trading books with other interested parties, and for getting older books to readers who would otherwise go without. Multimedia communication and digitization have made for richer collections, but they have also contributed to the production of many hard-to-dispose-of items, like CDs, DVDs, cassettes, audiobooks, and VHS tapes, all with plastic cases. Some librarians are able to find reliable services like NextStep recycling, which takes many formats to recycle (Cole, 2007). Unfortunately, it is more difficult to recycle these sorts of multi-media waste products than it is to recycle or reuse monographs. Information about e-recycling is more disheartening; reputable recyclers who take items connected with electronics are hard to find (Elgin and Grow, 2008).

Green Collection Format: Print and Electronic

Rather than assessing the collection, the great majority of green library articles focus on the actual building that houses the library, with quite a number of articles on Leadership in Energy and Environmental Design (LEED) certification (the de facto U.S. standard for green construction). As early as 2003, Brown describes examples in "The New Green Standard," a paper followed by a flurry of articles covering green construction and retrofitting (Mikkelson 2007; Fox 2007; Kuzyk 2008; Miller 2008; Miller and Fialkoff 2008; Gisolfi, 2009; Bushnell, 2009; Urbanska, 2009). No one should underestimate the value of building such libraries and of publicizing the green efforts of the library. These structures can serve as welcoming community assets as well as brick-and-mortar models of how green principles can be made concrete.

Within these green buildings, however, decisions about resource format need to be made. Finding information in the library literature that conducts a head-to-head comparison of the environmental impact of print versus electronic resources is difficult. Numerous studies have

been published which contrast the two formats listing the benefits each type brings with the cost. Connaway and Lawrence (2003), McElfresh (2006), Zhang and Haslam (2005), and Borrelli, Galbraith, and Brady (2009) all attempt to clarify the issues of pricing, rights, accessibility, archiving, and processing of each type. One of the most comprehensive and useful analyses of the cost-benefit ratio of print versus electronic resources focuses on Drexel University's conversion from primarily print resources to an almost entirely electronic collection (King, Boyce, Montgomery, and Tenopir, 2003). Comparing the two format types is complex, with evaluations of "service input and output, performance, usage, effectiveness, outcomes, impact, and cost and benefit comparisons" (King, Boyce, Montgomery, and Tenopir, 2003, p. 376).

These studies balance almost all of the regular concerns of collection development. Given the precedent in libraries, however, of considering the environmental impacts of collection information content, of de-selection, and of the library buildings themselves, it is appropriate to add to any cost-benefit analysis a consideration of the carbon footprint and the toxin footprint of resource formats.

Though the author could find no quantitative studies in the library literature comparing the environmental impacts of each of these resource formats head-to-head, librarians have not failed to worry about the issue. Becken (2009) is concerned about increasing dependence on fossil fuels in libraries, as growing digital collections require more use of electronics yearly (p. 55). Jankowska (2008) argues that:

> Today the tradition of sustainability has been overshadowed as digitization, collection development, and providing adequate technologies have become core library missions. Academic libraries must keep up with user demands and needs, but that does not mean that we should turn our backs on the very concepts that libraries were founded on. This is not even a matter of maintaining the past; it is an issue of developing and planning for a future that is realistic, achievable, and most importantly—sustainable.

She finds fault with ACRL's "Environmental Scan 2007" for not directly addressing issues of sustainability with regard to resource type. She voices concern that not enough is being done to recycle weeded materials:

> [F]urthermore, each library throws away or rarely recycles weeded and unneeded printed books, government documents, magazines, newspapers, bound periodicals, junk mail, office computer paper, and general waste. As the number of digital projects and functions escalate, libraries are faced with increasing energy costs, as well as need to recycle unwanted equipment, outdated computers, CDs, computer discs, and used computer paper. (Jankowska, 2008)[2]

She is also concerned about patrons' expectations of an ever-increasing collection and the environmental and budgetary impact of these larger collections (Jankowska, 2008). She ends with a series of questions specifically about library collections' environmental impact

[2] Jankowska and Marcum have since extended this analysis in "Sustainability Challenge for Academic Libraries," a pre-print that appeared in *ACRL Insider* in summer, 2009. The pre-print addresses many of the issues I discuss in this paper, though my emphasis is on all types of libraries and I seek to quantify the CO2 impact of formats in the collection.

specifically, contending that unless these needs are addressed in library planning and operation, libraries will eventually only be able to provide "limited access to information to a limited number of people" (Jankowska, 2008).

Print Resources: Environmental Impacts

The environmental impact of the publishing industry in the United States is substantial: "[T]he manufacture of paper consumes over 15 percent of all the energy used by all types of manufacturing activity in the U.S." (Peters, 2009, p. 3). As with any complex manufactured product, the impact is multifaceted. Trees are cut and processed, paper production involves several steps, and then books are created, marketed, and shipped. All of these steps require energy consumption. The largest portion of the publishing industry's carbon footprint, however, is in the cutting down of trees which would otherwise serve as CO2 storage, at 62.7% for "forest and forest harvest" (see Table 1) (Milliot, 2008). Each monograph is calculated to create 8.85 lbs. of CO2 equivalent in emissions over the course of its production (see Table 2) (Milliot, 2008). The carbon footprint and carbon emissions of the publishing industry break down as follows:

Table 1: Source of Carbon Emissions in the U.S. Book Industry

Segments of the Industry	Share of Carbon Emissions
Forest and Forest Harvest	62.7%
Paper Production, Printing	26.6%
Landfill Releases (methane)	8.2%
Distribution and Retail	12.7%
Publishers	6.6%
Carbon Storage in Books and Energy Recovery	-16.8%

Source: Environmental Trends and Climate Impacts: Findings from the U.S. Book Industry (qtd. in Milliot, 2008)

Table 2: The U.S. Publishing Industry's Carbon Footprint

3.086 billion:	Number of books sold, 2006
4.15 billion:	Number of books produced, 2006
1.6 million metric tons:	Amount of paper consumed for books
25%:	Average book return rate
5%:	Amount of recycled paper in books
8.85 lbs. CO2 equivalent:	Carbon footprint per book
12.4 million metric tons:	Total carbon footprint of book publishing

Source: Environmental Trends and Climate Impacts: Findings from the U.S. Book Industry (qtd. in Milliot, 2008)

In detailed discussions of the current status of forests and planted acreage in North America, Ynostroza (2008) and Miller (2009) acknowledge the difficulty of calculating the CO2 footprint of the paper industry, but they each point to continuing innovations for reducing that footprint. Upton (2008), president of Malloy, Inc., a printing company, defends print publishing, noting forests harvested for printing in the U.S. and Canada (the two largest publishers of

monographs) are being replanted at more than a replacement rate (p.3). He also points out that printed material is more easily recycled than other resources (p. 5-6).

A consideration of the environmental impact of print is important because most libraries still contain a significant number of monographs; however, the trend is toward using e-resources in serials rather than print (Franklin, 2004).

Electronic Resources: Environmental Impacts

The carbon footprint of e-resources as determined by their electricity use is substantial and growing. Current news reports have focused on the amount of energy consumed in Internet searches; one estimate "puts the CO2 emissions of a Google search at between 1 [gram] and 10g, depending on whether you have to start your PC or not. Simply running a PC generates between 40g and 80g per hour" (Leake and Woods, 2009). Our increasing dependence on computers comes at a cost: "EPA estimates that the nation's servers and data centers consumed about 61 billion kilowatt-hours of electricity in 2006 for a total electricity cost of about $4.5 billion" (Marsan, 2007, p. 26). A typical computer running the entire length of an 8-hour business day creates 618 pounds of CO2 every year while in use. Laptops are better, creating 77 pounds of CO2 every year at the same usage levels (*Lexington Global Warming Action Coalition Carbon Footprint Calculator,* 2007). When the EPA compared usage rates over the years, it found that the energy consumed by servers and data centers doubled over five years' time, and it projected that these large jumps in usage would continue, unless active measures were taken to reduce consumption (*Green Information Technology (IT) Strategic Plan,* 2009). Within the business sector, some estimates are that "server computer performance has been increasing by a factor of three every two years, but energy efficiency is only doubling in the same period" (Herring, 2009, p. 33).

While libraries obviously do not accommodate the massive amount of search traffic that Google and other commercial search engines get, and therefore have much smaller footprints, Alpi (2000) noted that 100% of libraries surveyed offer electronic journals, and Miller and Fialkoff (2008) estimate that "about one-third of energy use in libraries is in 'plug load' from computers and other tools" (p. 14). As context, Marsan (2007) notes that the amount of electricity consumed by servers and data centers each year is "more than the electricity consumed by all the nation's color televisions and similar to the amount of electricity consumed by 5.8 million U.S. households" (p. 26). An example that is a bit closer to home for librarians is Nicholas Carr's estimation that "maintaining a character (known as an avatar) in the Second Life virtual reality game requires 1,752 kilowatt hours of electricity per year. That is almost as much [as is] used by the average Brazilian" (Leake and Woods, 2009).

The environmental impact of e-resources does not stop with electricity use, however. E-resources are associated with increased paper use, as library patrons and staff print out articles for in-house use or as a result of electronic reserves: One survey on library e-resource behaviors found 69% of respondents reported increased printing (Alpi, 2000). Nardozza and Stern (2006) observe: "Ironically, the most promising paperless educational tools, including courseware and

the internet, have triggered a dramatic increase in hard-copy output" (p.2). Increased printing is a trend across campus (Brase et al. 2009, p. 11; Li and Lee, 2009, p.1) and librarians have witnessed it as well (Springman 2008; Luther Campus, 2010).

Other facets of computer use and disposal are also important in determining environmental impacts of e-resources. Recycling and reusing computer cartridges, such as those for toner, currently saves "38,000 tons of plastic and metal" from ending up in landfills (Alpi, 2000), but much of this waste is not recycled in libraries. An EPA study done in 2005 estimated that only about 15 to 20% of about two million tons of discarded electronics actually gets recycled (CoSN.org, 2009). By 2008, that e-waste estimate had increased to 3 million tons in the United States (Canada produced about 140,000 tons) (Delaney, 2008). While e-waste includes cell phones and other electronics, a substantial proportion of each pound of waste is made up of computer components. In addition to plastic, e-waste contains lead, mercury, and cadmium, all toxic and all capable of leaking into the soil and water supply (CoSN.org, 2009). *Consumer Reports* notes that the typical CRT computer contains four to eight pounds of lead ("Electronics Reuse and Recycling Center," 2008).

These sorts of statistics may seem hopelessly huge, but industry has begun to respond to customer demands for greener practices.

A Greener Agenda: Industry Efforts

Several major publishing institutions have set goals to harvest fewer trees. Random House was one of the earliest to set a goal of using 30% recycled paper as part of its publishing; it hopes to accomplish this by 2010, cutting 500,000 fewer trees annually (Deahl, 2006). Simon and Schuster aims for 25% recycled paper use by 2012 and has instituted an in-house policy of distributing e-copies of galleys instead of paper copies (Deahl, 2007). Scholastic Books has also targeted the goal of using 30% recycled paper, which has been Forest Stewardship Council-certified, by 2012. By the time the company reaches its goal, it calculates that it will reduce its greenhouse gas emissions by 24 million pounds (Milliot, 2008).

On the electronic front, some progress is being made as well. Google has developed a gadget for Google Desktop that instructs a computer to adjust Windows users' power settings to the U.S. Environmental Protection Agency's recommendations, in addition to allowing users to track how much energy they are using (Greenwood, 2008, p. 52). Verdiem Corporation has come out with a similar product called SURVEYOR, which cuts energy consumption by 30%. Of special note for librarians, Wiley-Blackwell is working to become carbon neutral by investing in projects around the world that work on reforestation and on using methane from landfills to make electricity. EBSCO Industries hopes to be energy efficient in its mill building by using solar panels, and it is also investing in global reforestation projects (Greenwood, 2008). While these companies are not the only ones who need to be concerned about their environmental footprints, perhaps these key players will contribute to peer-pressure for greener practice.

Greener Collection Development

Creative librarians can have an enormous influence on how patrons see their information-gathering. Librarians can bring their love of detail, their dedication to library economy, and their knowledge of global issues to bear on their consideration of the environmental impacts of the resource types they choose for their collections.

For those librarians who feel that their patrons will not tolerate any diminution of electronic resources, there are a number of practical ideas that will dramatically decrease energy usage by computers in the library. Among them are:

- Choosing only Energy Star compliant computer components (Neale, 2008)
- Consolidating servers in large institutions
- Using virtualization so that multiple patrons can share a single machine's computing power
- Managing equipment replacement cycles mindfully and having older computers repaired (Brase et al., 2009)
- Finding reputable recyclers of e-waste (despite a ban on trading hazardous waste, Elgin and Grow (2008) found at least 43 companies who were purported to be recycling but who were in fact shipping toxic e-waste to Asia)
- Recycling toner cartridges and choosing "green" inks
- Reducing overall paper use and, when paper is necessary, using recycled, chlorine-free, FSC certified paper (Milliot, 2008)

Another collection development decision that may seem counter-intuitive is to return to more use of monographs in the collection as a whole. Several studies have noted that for particular types of research needs, many people prefer print to electronic resources (Siebenberg, Galbraith, & Brady, 2004; Gregory, 2006, p. 268; Walters, 2008, p. 579; Borrelli, Galbraith, & Brady, 2009; Snyder, 2010). A number of authors in the library literature work on the assumption that delivering information digitally is necessarily greener than using monographs in the collection (Crumpton, 2009, p. 36; Urbanska, 2009 p. 54; Herring, 2009, p. 32), and calculations to create a head-to-head comparison of the two types of resources are quite complex (Miller, 2009, p. 33). However, a book creating 8.85 pounds of CO2 equivalent impact versus a computer used over the course of a week to search and find the equivalent amount of information for 11.88 pounds of CO2 would indicate that the book has a smaller impact environmentally (calculations of CO2 equivalent are based on amounts used by each type of resource, detailed above). This estimate does not include the environmental impact of the computer's ultimate disposal as e-waste. This comparison also does not begin to calculate the CO2 savings that result when the same book is used multiple times to access the information. The e-resource would use additional energy and would compel more printouts each time separate users wanted the same information.

Rebsamen (2008) adds further evidence that books are more environmentally sound by pointing out that publishers are heeding consumer demands for greener practices. Book waste, he contends, is "very close to 100 percent" recyclable (p. 8). In a detailed treatment of book

binding's environmental impact, he argues that "covering materials and adhesives are, in most cases, and as stated in regards to the environment, a very friendly product" (p. 8). Librarians can use these additional pieces of information to make the best decisions for their patrons.

Conclusion

The library's position as an environmentally sound institution preceded the current green movement. Its emphasis on multiple users of single items and its wish to preserve items over time both make for sound sustainability practices. These traditions are fundamentally connected to the "reuse" and "recycle" components of the green movement. The library has also been adept at being flexible with regard to library functions and patrons' needs as new technologies have come to the fore. It is with this flexibility that librarians will adapt to changes in environmental concerns moving into the twenty-first century. Of continued necessity will be comprehensive understanding of community information needs, continued critical evaluation of emerging technologies, and continued creativity. If Jankowska (2008) is correct that "the tradition of sustainability has been overshadowed" and that librarians will face "increasing energy costs, as well as [the] need to recycle unwanted equipment," then having a higher ratio of print to electronic resources in the collection would be more environmentally sound. It is likely, however, that e-resources will remain a significant portion of most libraries' collections. Reclaiming the tradition of sustainability will thus involve mindfully and consistently adopting energy-saving and resource-recycling policies and behaviors. Librarians already have the skills and talents to create a balance between conflicting needs and, as they clarify this collection development process for their library users, in formal information literacy classes as well as at the reference and circulation desks, communities and campuses will recognize that being information-literate will also involve being environmentally-literate.

References

Association of College & Research Libraries. (2008). ACRL Environmental scan 2007. ACRL Research Committee. ALA. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/Environmental_Scan_2007 FINAL.pdf

American Library Association. (2009). Three dynamics of sustainable communities: Economy, ecology, and equity. *Libraries Build Sustainable Communities*. Retrieved from http://www.ala.org/ala/mgrps/rts/srrt/tfoe/lbsc/librariesbuildsustainablecommunitiesthree.cfm

Alpi, K. M. (2000). It's not easy being green: A survey of staff experiences with environmental issues in Sci-Tech and other libraries. *Issues in Science & Technology Librarianship*. Retrieved from http://www.library.ucsb.edu/istl/00-spring/article1.html

Antonelli, M. (2008). The green library movement: An overview and beyond. *Electronic Green Journal*, 1(27) Retrieved from http://repositories.cdlib.org/uclalib/egj/vol1/iss27/art1

Applin, M.B. (2009). Building a sustainability collection: A selected bibliography. *Reference Services Review*, 37 (3), 313-325. Retrieved from Library, Information Science and Technology Abstracts database.

Becken, B. (2009). Librarians go green in an era of tight energy. *Searcher*, 17 (9), 16-19; 55. Retrieved from Library Literature & Information Full Text database.

Borelli, S., Galbraith, B. & Brady, E.E. (2009). The impact of electronic journals on use of print in Geology. *College & Research Libraries*, 70(1), 26-33. Retrieved from Library Literature & Information Full Text database.

Brase, W.C., Golden, C., Holland, N., Morooney, K., Orr, P., Spicer, D., et al. (2009). The role of IT in campus sustainability efforts: An EDUCAUSE white paper. EDUCAUSE, 1-19. Retrieved from http://creativecommons.org/licenses/by-nc-nd/3.0/

Briscoe, G. (1994). Green screens: Local recycling information online. *eScholarship Repository*, 1(1). Retrieved from http://repositories.cdlib.org/uclalib/egj/vol1/iss27/art1

Brown, B. (2003). The new green standard: with the LEED rating system in place it is easier to make sure your new library saves money as it treads lightly on natural resources. *Library Journal*, 128(20), 61-65. Retrieved from Academic OneFile database.

Bushnell, S. (2009). Library's green annex brings acclaim, growth. *Library Journal: Library by Design*, 32. Retrieved from Library Literature & Information Full Text database.

Cole, M. (2007). From worthless to worthy: Turning media trash into recycling treasure. *OLA Quarterly,* 13(4), 25-28. Retrieved from Library Literature & Information Full Text database.

Colston, V. (2009). It's so easy going green! *Voice Youth Advocates*, 32 (4), 290-292. Retrieved from Library Literature & Information Full Text database.

Connoway, L.S. & Lawrence, S. R. (2003). Comparing library resource allocations for the paper and digital library. *D-Lib Magazine*, 9(12). Retrieved from http://www.dlib.org

Consortium for School Networking. (2009). Computer Purchasing and Disposal. CoSN.org. Retrieved from http://www.cosn.org

Crumpton, M. (2009). Going green in the library: It's not just for contractors. *Against the Grain,* 21 (4), 34-38. Retrieved from Library Literature & Information Full Text database.

Deahl, R. (2006). Random goes green. *Publishers Weekly*. Retrieved from http://www.publishersweekly.com

Deahl, R. (2007). S&S rolls out green-er paper policy. *Publishers Weekly*. (7 Nov. 2007). Retrieved from http://www.publishersweekly.com

Delaney, J. (2008). 'Recyclers' illegally exporting electronic waste. *EpochTimes.* Retrieved from http://www.theepochtimes.com/

Eagan, R. (2008). Sense & sustainability. *Library Journal (1976),* 133(2), 40-43. Retrieved from Library Literature & Information Full Text database.

Electronics reuse and recycling center. (2008). *Consumer Reports*. Retrieved from http://www.greenerchoices.org/electronicsrecycling/el_home.cfm

Elgin, B. & Grow, B. (2008). E-Waste: The dirty secret of recycling electronics. *Business Week*. Retrieved from http://www.businessweek.com/magazine/content/08_43/b4105000160974.htm

Fox, B. L. (2007). Going, going, green: LJ's annual wrap-up features 168 public library projects and 21 academic buildings. *Library Journal* , 132(20), 44(15). Retrieved from Academic OneFile database.

Franklin, B. (2004). Managing the electronic collection with cost per use data. *World Library and Information Congress: 70th IFLA General Conference and Council: 22-27 August 2004, Buenos Aires, Argentina.* doi: 10:1177/0340035205058809

U.S. Department of Agriculture. (2009). *The green information technology (IT) strategic plan. EDUCAUSE CONNECT*. Retrieved from http://creativecommons.org/licenses/by-nc-nd/3.0/

Gisolfi, P. (2009). A sustainable library, inside and out. *Library Journal: Library by Design*, 8. Retrieved from Library Literature & Information Full Text database.

Greenwood, B. (2008). Technology turns a brighter shade of green. *Information Today*, 25(6), 52. Retrieved from Library Literature & Information Full Text database.

Gregory, C. L. (2006). But I want a real book: An investigation of undergraduates' usage and attitudes toward electronic books. *Reference & User Services Quarterly* , 47(3), 266-73. Retrieved from Library Literature & Information Full Text database.

Herring, B. L. (2009). Green ECM: The real deal. *Infonomics,* 23 (3), 30-34. Retrieved from Library Literature & Information Full Text database.

Jankowska, M. A. (2008). The way I see it: A call for sustainable library operations and services: A response to ACRL's 2007 environmental scan. C*&RL News*, 69(6) ALA. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/publications/crlnews.

Jankowska, M.A. & Marcum, J.W. (pre-print 2009). Sustainability challenge for academic libraries: Planning for the future college and research libraries. *ACRL Insider*. Retrieved from http://www.acrl.ala.org/acrlinsider/2009/.

King, D. W., Boyce, P.B., Montgomery, C.H. & Tenopir,C . (2003). Library economic metrics: Examples of the comparison of electronic and print journal collections and collection services. *Library Trends*, 51(3), 376-400. Retrieved from Academic OneFile database.

Kuzyk, R. (2008). Going green: LJ's second design institute tackles the ins and outs of sustainable buildings. *Library Journal* , 133(9), S1 (4). Retrieved from Academic One File database.

Leake, J. & Woods, R. (2009). Revealed: the environmental impact of Google searches. *The Sunday Times* (British edition). Retrieved from http://technology.timesonline.co.uk

Lexington Global Warming Action Coalition Carbon Footprint Calculator. (2007). Retrieved from http://www.lexgwac.org/Calculator2.html.

Li, S. & Lee, H. (2009). USG, OIT propose printing quota. *The Daily Princetonian*. Retrieved from http://www.dailyprincetonian.com/2009/03/31/23208/print/

Link, T. (2000). Transforming higher education through sustainability and environmental education. *Issues in Science & Technology Librarianship*. Retrieved from http://www.library.ucsb.edu/istl/00-spring/article4.html

Luther College. (2010). Luther campus printing significantly reduced using GoPrint. *Headlines*. Retrieved from http://www.luther.edu/headlines/?story_id=264104

Marsan, C. D. (2007). Greenest data centers: What works. *Network World*. From GreenFile database.

McElfresh, L. K. (2006). Print vs. online: The serials crunch. *Scientific Notations*, 2(2), 1-3. Retrieved from http://chemistry.library.emory.edu/scientificnotations.htm

Mikkelson, J. (2007). Going for the gold: Building a sustainable LEED library. *OLA Quarterly,* 13(4),25-28. From Library Literature & Information Full Text database.

Miller, R. (2008). San Francisco's green branches. *Library Journal,* 133(15), S18. Retrieved from Academic OneFile database.

Miller, R. (2009). The green pages: publishers strive to reduce their environmental impact. *EContent*, 32 (1), 30-33. Retrieved from Library Literature & Information Full Text database.

Miller, R. & Fialkoff, F. (2008). Part of the solution. *Library Journal (1976),* 14-17. Retrieved from Library Literature & Information Full Text database.

Milliot, J. (2008). Toward a greener future. *Publishers Weekly*. Retrieved from http://www.publishersweekly.com

Munro, K. (2009). Going green. *C&RL News*, 70 (6), 331. Retrieved from Library Literature & Information Full Text database.

Nardozza, F. & Stern, N. (2006). PrintSense: Making sense of print management. *EDUCAUSE*, 2006 (6). 1-11. Retrieved from Library Literature & Information Science Full Text database.

Neale, J. C. (2008). Go green! (BACKTALK). *Library Journal* , 133(2), 46 (1). Retrieved from Academic OneFile database.

Oder, N. (2008). Ill goes green in Ames, IA. *Library Journal* , 133(11), 20. Retrieved from Academic OneFile database.

Penniman, S. & McColl, L. (2008). Green weeding: Promoting ecofriendly options for library cards. *Library Journal* , 133(15), 32(2). Retrieved from Academic OneFile database.

Peters, T. (2009). How green is my library? *Smart Libraries Newsletter*. ALA TechSource. XXIX(2), 1-3. Retrieved from www.techsource.ala.org

Rebsamen, W. (2008). How "green" are books and bindings? *ShelfLife*, 3(4), 4-8, Retrieved from Library Literature & Information Full Text database.

Scholastic Sets New Paper-Use Goals. (2008). *Publishers Weekly*. Retrieved from http://www.publishersweekly.com

Sathe, N. A., Grady, J.L. & Guise, N.B. (2002). Print versus electronic journals: A preliminary investigation into the effect of journal format on research processes. *Journal of Medical Libraries Association,* 90(2), 235-43. Retrieved from ScienceDirect database.

Siebenberg, T. R., Galbraith, B. & Brady, E.E. (2004). Print versus electronic journal use in three Sci/Tech disciplines: What's going on here? *College & Research Libraries*, 65(5), 427-38. Retrieved from Library Literature & Information Full Text database.

Snyder, S. (2010). Web not yet the answer to college-texts costs. *Inquirer*. Retrieved from http://www.phylly.com/inquirer/education/20100208_Web_not_yet_the_answer_to_college-text_costs.html?viewAll=y&c=y

Sotak, D. & Zeidman-Karpinski, A. (2007). Green reading: Resources for the sustainability-minded. *OLA Quarterly,* 13(4), 25-28. Retrieved from Library Literature & Information Full Text database.

Springman, J. (2008). Spending green: How law libraries can save energy and money with cow-belch consciousness. *AALL Spectrum*, 13 (3), 18-21. Retrieved from LISTA database.

Stoss, P. (2009). GreeNotes: Reports from the Task Force on the Environment. *SRRT Newsletter*, 168. Retrieved from Library Literature & Information Full Text database.

Truitt, M. (2009). ALA and our carbon footprint. *Information Technology and Libraries*, 28 (2), 51-52. Retrieved from Library Literature & Information Full Text database.

Upton, B. (2008). The printed book—The "live forest version." *ShelfLife*, 3(3), 1-6. Retrieved from Library Literature & Information Full Text database.

Urbanska, W. (2009). A greener library, a greener you. *American Libraries*, 40 (4), 52-55. Retrieved from Library Literature & Information Full Text database.

Walters, W. H. (2008). Journal prices, book acquisitions, and sustainable library collections. *College & Research Libraries,* 69(6), 576-86. Retrieved from Education Full Text database.

Wann, J. (2007). Getting there is half the fun: Alternative transportation and Oregon library employees. *OLA Quarterly* , 13(4), 18-21. Retrieved from Library Lit. & Information Full Text database.

Ynostroza, R. (2008). Manufacturers working to meet demand for green alternatives. *Publishers Weekly*, 255 (10), 34-40. Retrieved from Library Literature & Information Full Text database.

Zhang, X. & Haslam, M. (2005). Movement toward a predominantly electronic journal collection. *Library Hi Tech*, 23(1), 82-98. Retrieved from ProQuest. ABI/INFORM Global database.