



**Green and Growing: The Impact of a LEED Library on an Organization's Sustainable Practices**

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Salt Lake City, UT, USA

**Meeting:**

**109 — Sustainable innovation and green information for all — Environmental Sustainability and Libraries Special Interest Group**

**Abstract:**

*In 2009, the Church of Jesus Christ of Latter-day Saints opened a new library designed to meet the rigorous standards set by the U.S. Green Building Council for newly constructed facilities. The success of the project was officially recognized in 2009 when the Church History Library received its Leadership in Energy and Environmental Design (LEED) certification. This paper will trace how building plans originally focused on preserving archival materials were expanded to address larger environmental concerns. Also explored will be the impact a single green facility can have on the sustainable practices of entire organization. Topics covered will include:*

- *The Church History Library, its mission and collections*
- *The Leadership in Energy and Environmental Design program*
- *Special environmental design characteristics of the Church History Library building*
- *Data on recycling efforts in the Library and its parent organization*
- *Organizational impact of constructing a LEED certified facility*

## **Introduction**

Is there anything as contagious as the common cold? In my opinion, the answer is yes. Good ideas are just as contagious. At least that has been my experience working in research libraries over the past 39 years. Recently, I observed again how good ideas could spread through an organization when I became Director of the Church History Library in Salt Lake City.

At the time I joined its staff, the Library had only recently moved into a new 230,000 sq. ft. facility with environmentally controlled storage vaults and spacious, well-equipped reading rooms. Conspicuous throughout the library were recycling containers for different types of waste. Over time, I became more and more impressed with how much effort had gone into creating a facility that was good for books, good for people, and good for the environment.

As I listened to colleagues describe the planning of the Library, I was struck by the organic nature of the process. It seemed that good ideas for preserving documents had led to consequential decisions on environmental controls, which fostered an organizational commitment to rigorous international construction standards for green buildings. As a library administrator, I felt that this story was worth sharing in the professional literature as one way of encouraging planners to listen to and promote good ideas on sustainable practices.

## **Background: The Church History Library**

The Church History Library serves as the corporate library for the Church of Jesus Christ of Latter-day Saints (LDS Church), but it also has a broad mandate to collect, preserve, and share a record of the LDS, sometimes called Mormon, people. This mandate stretches back to the founding of the Church on April 1, 1830 when one of the first six members, Oliver Cowdrey, began keeping records of Church meetings and activities. From that date until now, the history of the Church has been meticulously kept in everything from handwritten pioneer journals to video recordings of semi-annual Church conferences.

Today, the Library holds a book collection of just under 300,000 volumes. While not impressive in terms of size compared to other research institutions, it is remarkably comprehensive in its coverage of everything having to do with the LDS Church. The majority of the Library's holdings are in manuscript form with over 150,000 collections of journals, diaries, and papers. This remarkable archive is continually expanding as Church members donate records of their ancestors or their own personal papers. In addition, the Library collects oral histories of prominent individuals with over 5,000 in its holdings today.

As the corporate library for the Church of Jesus Christ of Latter-day Saints, the library also collects histories of local ecclesiastical units all over the world and operates a records management program for the Church Headquarters in Salt Lake City. Corporate records include audio and video recordings of Church conferences and other events with over 23,000 preserved recordings. The Library's photograph collection numbers more than 2.5 million images including the entire archive of the Deseret News, a local Salt Lake City newspaper

than began publication in 1850. Lastly, the Library holds over 20,000 rolls of microfilm stored in vaults as preservation masters of important documents.

In 1856, the Library, housed in the LDS Church Historian’s Office in Salt Lake City, was just a small collection of books and manuscripts. By 1917 the collection had grown to the point that it had to be relocated to an administration building and from there it was moved in 1972 to occupy an entire wing of a newly constructed Church Office Building. While that facility provided adequate space for the Library’s collections, the environment it provided was that of an office building not an archive. With no specialized temperature or humidity controls, an inadequate fire suppression system, seismic concerns and floors loaded to or beyond capacity, it was only a matter of time before a new library would have to be constructed. By 2003, LDS Church administrators authorized planning a new facility.

### **The Building Plan**

In 2004, Omni-Group, Inc. was engaged to assist with planning a new Church History Library facility and given a charge to “define [library] space and facility requirements which will support anticipated collection, service, and operational needs over the upcoming three decades.”<sup>1</sup> The impressive plan drafted by Omni-Group detailed the usual library design features and code requirements but also explored the possibility of creating optimum environmental storage conditions for different document formats.

For example, the plan noted that the rate of deterioration for paper-based materials could be cut in half for every 18-degree reduction in temperature. The plan also pointed out that controlling humidity was even more important than managing temperature and offered recommendations for temperature and humidity control in different document types and different areas of the building. The recommendations, as summarized in an appendix to the plan, were as shown below.

**Table 1**  
**Recommendations on Temperature and Humidity Control**

<b>Format Type/Storage Location</b>	<b>Recommendation</b>
Paper based/open stacks	72° F ± 4° and 30% ± 5% RH
Paper based/closed stacks	60° F ± 4° and 40% ± 5% RH
Paper based, rare/closed stacks	35° F ± 2° and 40% ± 3% RH
Photographs and film (black and white)/closed stacks	35° F ± 2° and 30% ± 3% RH
Photographs and film (color), nitrate, acetate film/closed stacks	25° F ± 2° and 30% ± 3% RH
Sound and video recordings (magnetic)/closed stacks	55° F ± 4° and 35% ± 5% RH

With respect to minimizing deterioration from exposure to light, the plan recommended illuminating closed stack areas at only 10-30 ft. candles and keeping the areas in the dark as much as possible. Consideration should even be given, according to the plan, to illuminating these areas with high pressure sodium/high density discharge fixtures configured to provide indirect lighting. The plan suggested that office and public areas be

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<sup>1</sup> Omni-Group Inc. *Building Program Update for the Family and Church History Department of the Church of Jesus Christ of Latter-day Saints. Draft, March 25, 2004.* (California, 2004), 1.1

illuminated to 60-75 ft. candles but low-UV fluorescent tubes with screening sleeves should be installed.

A separate appendix to the plan was devoted to recommendations for protecting materials against air borne pollutants. Drawing on data from the 2003 ASHRAE Applications Handbook, the plan specifically recommended filtering out six pollutants that may cause irreversible chemical damage to materials. The pollutants to be eliminated were acetic acid, hydrogen sulfide, nitrogen dioxide, ozone, sulfur dioxide, and PM2.5 fine particles. The goal set was to filter the pollutants such that the maximum average concentration of these damaging chemicals would not be realized for at least 100 years.

In considering filtration possibilities it was noted that the Enersave Program of the Purafil system, which allows recirculation of indoor air, could reduce overall building operation costs. Saving energy costs and minimizing other future operational expenses had been raised elsewhere in the plan as well. For example, the section on planning and design guidelines included the following stipulation.

“The new facility ... should be designed and engineered with the goal of minimizing the total consumption of all forms of energy. As a means of achieving energy conservation objectives, architectural analyses should be conducted with regard to passive conservation methods (i.e. exterior wall and roof systems, glazing and weatherproofing, etc.); as well as direct methods related to lighting and power consumption and efficiencies of the HVAC systems of the facility.

Later, as the plan considered interior furnishing, it argued for selecting materials that are non-toxic and require minimal maintenance. The plan stated.

The determination of the interior décor of the new facility during the detailed building design process will be a matter of aesthetics, function and cost. Another factor which should be given equal attention is the durability and resistance to wear of the specified interior materials and finishes. Products should be selected with the need for minimal maintenance as a high concern. Maintenance is an expensive and continuing budgetary item in any building, and therefore all reasonable means of reducing long-term maintenance costs should be pursued.

A further concern in the selection of interior finishes and materials bears upon the avoidance of toxic products detrimental to the occupants of the facility, as well as to the preservation of the holdings stored within. Careful research must be undertaken during the detailed building design process to assure a healthy environment for people and materials.”<sup>2</sup>

Assuring a healthy environment for people and materials became a larger and larger part of facility planning as the project progressed. Linking environmental concerns to cost avoidance made the argument even more compelling. The search was on for building design

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<sup>2</sup> Omni-Group Inc. *Building Program Update*, 7.6-7.7

solutions that were good for books, good for the environment, and good in terms of long-term cost savings for the organization.

## **LEED Certification**

Ground breaking for the new Church History Library was held in October 2005 but planning for the facility didn't stop with the turn of ceremonial shovels. The project was pursued as a design/build effort meaning that innumerable design decisions were being made even as the facility was under construction. Two of the decisions reached had a major impact on environmental features of the building and its future operations. The first of these, made mid-way through construction, was to seek LEED certification for the new Library making it the first building constructed by the LDS Church to be officially recognized as "green."

LEED is an acronym for Leadership in Energy and Environmental Design. Launched in 1998 by the U.S Green Building Council (USGBC), the LEED certification program has become an internationally accepted method for verifying that buildings are planned and operated according to rigorous environmental standards. The stated goal of the LEED program according to the USGBC website is to encourage "global adoption of sustainable green building and development practices through a suite of rating systems that recognize projects that implement strategies for better environmental and health performance."

At the time the Church History Library decided to seek LEED certification there were 69 points possible in the rating system.<sup>3</sup> Points were awarded in six categories including; (1) sustainable sites, (2) water efficiency, (3) energy and atmosphere, (4) materials and resources, (5) indoor environmental quality, and (6) innovation and design processes. To be LEED certified, a building project had to earn a minimum of 26 points. Facilities that were awarded 33-39 points were recognized as Silver buildings, with those scoring 39-51 ranked as Gold, and those over 52 as Platinum.

The choice to seek LEED certification influenced many design decisions made from that point forward. While it would be impossible to identify all of the decisions made with LEED certification in mind, Jonathan Dazley, an MHTN architect on the Project, remembers efforts to ensure that the building's envelope would be as tight as possible, that the HVAC system would include heat recovery, and that all mechanical systems would operate as efficiently as practical. These design features would eventually earn the Church History Library LEED points in the "energy and atmosphere" category and in addition, save the LDS Church money.

How much money would be saved was estimated by Enermodal Engineering Inc. an independent firm hired by the LDS Church to perform a LEED energy analysis of the revised Library plan. Enermodal concluded that changes made to the original building plan would

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<sup>3</sup> Today there are 100 points possible in the rating system but the points are spread over the same categories.

save over \$60,000 annually or approximately 33% in energy costs.<sup>4</sup> The energy analysis developed by Enermodal was then submitted to LEED.

When the LEED evaluation of the Church History Library was performed in 2009 the building scored 36 points, enough to merit recognition as a Silver facility (see Table 2).<sup>5</sup> The highest number of points awarded was in the “Indoor Environmental Quality” category, reflecting the Library’s sophisticated systems for controlling temperature and airborne pollutants. These systems had primarily been designed to protect library materials but what is good for books can also be good for people and good for the environment, as the LEED scoring proved.

**Table 2**  
**LEED Scoring of LDS Church History Library**

<b>LEED Category</b>	<b>Possible Points</b>	<b>Library Score</b>
Sustainable Site	14	7
Water Efficiency	5	2
Energy & Atmosphere	17	6
Materials & Resources	13	6
Indoor Environmental Quality	15	10
Innovation and Design Process	5	5
<b>Total</b>	<b>69</b>	<b>36</b>

### **LEED and Recycling**

A second decision influenced by LEED certification had to do with recycling. Well towards the end of the design/build process, a high volume paper shredder from Ameri-Shred Inc. and a horizontal compactor from MaxPak were added to the facility. This equipment had the capacity to manage all of the Library’s waste paper plus all of that generated in over 50 other buildings located at LDS Church headquarters. In addition, the new shredding equipment could process document types that had previously been reduced to a wet pulp and hauled to the landfill. Where the LDS Church had once paid landfill fees, it would now derive a modest income stream from recycling. LEED awarded the Library two points in the Materials and Resources category for its recycling program.

Recent figures on waste paper processing in the Church History Library show just how successful the paper recycling program has become. On average, the Library processes five 800 pound bales of shredded paper every week. Reports from Rocky Mountain Recycling, the firm that purchases shredded paper from the LDS Church, suggest that the new program is many times more effective than past operations. Between 2007 and 2009, the LDS Church shipped an average of 33.3 tons of shredded paper to Rocky Mountain Recycling annually. During just the first three months of 2011, Rocky Mountain Recycling received 40.41 tons of compacted paper from the Church or more than it had received previously in an entire year. If that rate continues, then the LDS Church will ship over 160

<sup>4</sup> Enermodal Engineering, Inc. *Final LEED Energy Analysis, Church History Library, Salt Lake City Utah, 26 March 2007*, 3.

<sup>5</sup> U.S. Green Building Council. *LEED™ Scorecard, LDS Church History Library*. May 2009.

tons of compacted paper to Rocky Mountain during 2011 or nearly 500% more than it recycled annually in the past.

**Rocky Mountain Recycling Data<sup>6,7</sup>**  
**Tons of Material Received from the LDS Church**

<b>Category</b>	<b>2007- 2009</b>	<b>2007-2009 Average/Year</b>	<b>Jan. 2011- April 2011</b>	<b>2011 Projected</b>
Aluminum	.56	.19	.18	.72
Cardboard	260.27	86.76	44.59	178.36
Office paper	99.97	33.32	40.41	161.64
<b>Total</b>	<b>360.80</b>	<b>120.27</b>	<b>85.18</b>	<b>340.72</b>

In fairness, it should be noted that the 2011 increase in recycling can't be attributed solely to the Church History Library's shredding/compacting equipment. Other factors, such as the number of workers employed by the Church and sustainable practices at a Church printing facility, also contribute to today's more robust recycling program. These other factors, however, suggest a growing commitment on the part of the LDS Church and its employees to recycling, as evidenced by increased shipments of aluminum and cardboard to Rocky Mountain Recycling during 2011. Growth in recycling of these products was due to additional shredding and compacting equipment purchased after the Church History Library was completed. The success of the Library's recycling program undoubtedly encouraged further investment in sustainable practices by the LDS Church.

## **Conclusion**

The completed Church History Library is a remarkable facility. Preservation conditions in its storage vaults actually exceed those recommended by the building plan. Ten vaults are maintained at 55° F and 35% humidity with two other vaults kept at -4° F. The building's filtration system meets the requirements specified in the building plan, ensuring a healthy environment for books, employees, and library patrons. Lighting in office areas and storage rooms throughout the building are motion activated and window shades are computer controlled to manage heat gain and minimize UV damage. Landscaping around the facility utilizes xeriscaping to conserve water in Utah's desert climate. The new Library merits its LEED certification and deserves recognition as a superbly designed facility for long-term preservation of archival materials.

The success of the project can be partially attributed, I believe, to the phenomenon I noted at the outset of this paper. Good ideas spread as fast as the common cold. The first good idea that influenced the project was a fundamental commitment to conservation of resources. In the LDS Church, this commitment stretches back to its 19th century founder,

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<sup>6</sup> Rocky Mountain Recycling. *Shipping Statement for Corp. of the Presiding Bishop, 01/01/2007 to 12/31/2009.*

<sup>7</sup> Rocky Mountain Recycling. *Shipping Statement for Corp. of the Presiding Bishop, 01/01/2011 to 04/30/2011.*

Joseph Smith, who reportedly instructed members, "... not to kill a serpent, a bird, or an animal of any kind ... unless it became necessary to preserve ourselves from hunger."<sup>8</sup>

Ongoing commitment to environmentally responsible practices has been evident in LDS buildings for years. Jared Doxey; Director of Architecture, Engineering, and Construction for the LDS Church, estimates that Church buildings constructed prior to LEED probably still met 80% of the requirements for certification. Given this prior institutional commitment, it is easy to understand how good ideas for preserving documents sparked ambitious plans to meet LEED certification standards. The decision to pursue LEED certification was probably also influenced by local civic leaders.

In 2005, Salt Lake City mayor Rocky Anderson issued an executive order directing that all new or significantly remodeled municipal buildings meet LEED silver certification standards.<sup>9</sup> Later that year, he challenged LDS Church leaders to adopt LEED standards for Church construction projects.<sup>10</sup> Then in November 2006, the Salt Lake City Council passed an ordinance requiring that city-funded construction merit a "certified" or "silver" LEED designation.<sup>11</sup>

The Salt Lake City ordinance and statements by the Mayor came just as construction on the Church History Library was getting underway. Since Library building plans already called for strict environmental controls and operational efficiencies, embracing LEED was the next logical step for building planners and it was consistent with the LDS Church's commitment to being a responsible member of the local community.

Where will the good ideas lead next? The Church History Library is aggressively pursuing a digital preservation system to ensure the long-term survival of born digital documents as well as digitized versions of rare, fragile and high-use materials. This effort may extend the life of the existing building by reducing the demand for additional storage space. In terms of LEED, the LDS Church is prototyping five new chapel designs that will likely be certified, with three of the designs being solar powered. The Church History Library may have been the first "green" building constructed by the LDS Church but many more will likely now follow. The take away from this story for librarians and building planners should be, never underestimate how far a good idea can take you, particularly when it comes to sustainable practices.

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<sup>8</sup> Roberts, B.H. ed. *History of the Church of Jesus Christ of Latter-day Saints*. (Salt Lake City, Deseret News, 1902-1932), vol. 2, 72.

<sup>9</sup> Brady Snyder, "City Buildings Must be 'Green', Rocky Orders," *Deseret Morning News*, July 9, 2005.

<sup>10</sup> Brady Snyder, "Salt Lake Mall Project May go 'Green': Church Considering Environmentally Friendly Standards," *Deseret Morning News*, July 24, 2005.

<sup>11</sup> Salt Lake City Ordinance No. 78 of 2006. An Ordinance Enacting Title 18, Chapter 25, Salt Lake City Code, Requiring LEED Certification for Certain City-Funded Construction. Passed by the City Council of Salt Lake City, Utah, November 7, 2006.