

INTRODUCTION



In 2012, the Image Permanence Institute (IPI) published *IPI's Guide to Sustainable Preservation Practices for Managing Storage Environments* as part of a successful National Endowment for the Humanities (NEH) Education and Training grant to present information about defining and achieving optimal and sustainable preservation environments. This program, the first of three funded through NEH, enabled IPI to reach hundreds of institutions around the United States and the world via a series of workshops and webinars, exposing collections professionals and allied colleagues to research and strategies that could allow for the achievement of the preservation mission while also participating in institutional sustainability efforts. However, conversations and field experience soon revealed that the *Guide to Sustainable Preservation Practices* was only one of the necessary resources – while it addressed the “what you need to know” and “what you need to do” aspects of sustainable preservation, the critical aspect of “this is how you do it” was still missing.

During the same time period, IPI was conducting research into scheduled, risk-managed shutdowns of mechanical systems that served collections environments as part of an Institute of Museum and Library Services (IMLS) National Leadership Grants for Libraries project entitled “Research on Energy-Saving Opportunities in Libraries.” The premise was to show whether scheduled shutdowns – which had been used for years as a common energy-reduction strategy in commercial buildings – could be safely used in a collections preservation environment. Research showed that most buildings and environments could withstand carefully managed shutdown periods ranging from a few hours to eight hours per night, but equally as important, the research gave IPI and our partners an opportunity to think about the criteria and process involved in determining whether an environment may be a good candidate for a shutdown before testing even began. These ideas were further solidified through the experience gained in our environmental consulting practice.

In 2013, IPI applied to IMLS with a proposal to create a second, companion resource to the 2012 guide that would walk libraries, archives, museums, and other cultural organizations through the risk-laden process of exploring energy-savings work in collections-holding facilities. The proposal was successful, and IMLS provided funding for a demonstration project entitled “Demonstrating a Sustainable Energy-Saving Methodology for Library Environments” through the National Leadership Grants for Libraries program. The premise was simple – to take the successful consulting and field work practices developed at IPI with our partners and formulate them into a written methodology, the “how to do it,” based on experience.

The implementation of sustainable preservation programs in cultural institutions has often required the involvement of outside consultants throughout the process – from documentation and data-gathering through testing, implementation, and maintenance. Institutions, while interested, have been limited by the availability of

This resource is designed as a companion volume to IPI's Guide to Sustainable Preservation Practices for Managing Storage Environments.

This publication will take you from the “what you need to know” and “what you need to do” focus of the original Preservation Practices Guide to a more specific “this is how you do it” approach.

The methods that we have developed, through years of research and consulting at IPI, and decades of experience working on energy-saving practices with Peter Herzog of Herzog/ Wheeler & Associates in St. Paul, MN, are presented in this Guide.

Our hope is that the methodology and resources provided here will allow institutions to implement sustainable practices and achieve optimal preservation environments on their own.

grant funding or their own capacity to afford external assistance. By providing a clearly written methodology, with step-by-step processes, tips, resources, and tools, the hope is that institutions will be empowered to take greater ownership of implementing sustainable preservation practices.

The project itself was designed with two key activities – the writing of *IPI's Methodology for Implementing Sustainable Energy-Saving Strategies in Collections Environments*, and the field-testing and demonstration of its viability to end-users. After an application process, three partner institutions were selected for the field test. The goal was to find partners from a variety of climate, building, mechanical, and institutional types who had already been gathering data about their preservation environments and were prepared to take the next steps.

All three institutions utilized the energy-saving strategies differently, and had quite distinctive experiences over several years of implementation. One partner came into the process with a strong sustainability track record elsewhere in their institution – they needed a process that would allow them to perform energy work in their collections environment. In the end, they were able to use the process to implement night-time mechanical shutdowns in a library collections space.

Another partner was a museum library that was testing two storage areas of different eras/construction, and each with a different mechanical system design. In one building, they were able to implement seasonal shutdowns, discover unnecessary winter dehumidification operation, and document mechanical issues that they had been trying to explain for several years. In the second building, they implemented new seasonal set points and a year-round night-time shutdown, resulting in both energy-savings and improved seasonal preservation quality.

The third partner faced their own challenges: a nearly century-old academic library building located in the American deep south, their Preservation Librarian accepting a new position with another organization in the midst of the process, and the other two team members – one each from library administration and campus facilities – tasked with significant normal responsibilities. In the end, though initial testing showed the potential for several strategies to be implemented, facilities staff downsizing and controls issues halted the mechanical testing and the institution chose instead to focus on improving lighting operation and efficiency.

The partners' experiences varied greatly, yet illustrated precisely the purpose behind creating this guide – to provide institutions with a procedure to guide them through the discovery of opportunities, help them avoid risk to collections, and adopt optimal practices that are appropriate to their own situation, capacity, and needs. Some organizations with the appropriate infrastructure, energy, and mandate will be able to use this guide to implement three, four, or maybe more strategies that fit their situation and goals; others may implement one. Still others may not make any operational changes, and will use the methodology outlined here to document preservation conditions or operation in order to plan for future projects, or to confirm that the current operation is the best they can manage without external help. All of these scenarios are successes – when looking at sustainable preservation, success is any progress toward your goal, even if it is simply learning what will not work, or cannot currently be done.

THE GOAL:

An “optimal preservation environment” – an environment that provides the best possible preservation of collections at the least possible consumption of energy and is sustainable over time.

The question is how to go about safely achieving the seemingly disparate objectives of maintaining or improving the preservation quality of collection environments while reducing the energy used to create the environment.

Preservation professionals have long understood, and research has shown, that temperature and relative humidity (RH) are significant factors that impact the lifespan of collections materials held by cultural institutions. However, the mechanical systems that have been designed and installed to create and control appropriate preservation environments often represent a significant portion of the energy used by, and the total budget of, cultural institutions. With limited resources and an awareness of the environmental and energy costs of operation, cultural institutions must now continue to provide quality preservation environments but do so in a sustainable manner.

IPI's general approach to providing an optimal preservation environment focuses on three core principles:

1. Preservation of collections requires specific conditions, but that these conditions can, and often should, vary, particularly seasonally. The previously accepted standard (an unwavering 70°F/50%RH) for collections storage environments is not ideal, and a holistic and flexible approach to environmental management is more successful.
2. Most mechanical systems operate sub-optimally and this type of operation is not self-announcing. Institutions operate on a fine line when it comes to resources and time allocation – attention is given first to those things that are known to be broken. A system that is achieving its environmental goal, even through sub-optimal operation, is rarely diagnosed as broken, and it takes proactive inspection to discover the inefficiency.
3. The simultaneous achievement of both the best preservation and optimal system operation is a process that requires a series of carefully defined, risk-managed steps that serve to test individual strategies in order to come to a final strategic approach for a unique collection, space, and mechanical system.

Our experience and practice have shown us that, while there is no single solution that will work for every institution, there are a series of practical energy-saving strategies that, with testing and assessment, will work in some combination for nearly any institution that holds library or cultural materials without endangering those materials.

This guide is designed to help institutions discover the best intersection between collection preservation and energy-savings for themselves, accounting for the unique factors at every institution.

These factors include the:

- Geographic and climate region the institution is located in;
- building construction and envelope;
- specific preservation needs and characteristics of the collections stored in various locations within the building;
- design capabilities of the mechanical systems in place; and
- the skills and abilities of institutional collection care and facility management staff.

The Process of Optimization

A good optimization process is highlighted by two key underlying factors:

- Dedication to an analytical approach that is based on risk analysis and mitigation; and
- an understanding that the process of optimization requires experimentation and analysis – not simply making changes.

IPI's Guide to Sustainable Preservation Practices for Managing Storage Environments described the optimization activities of the environmental management team in six steps:

1. Document the capabilities and performance of your HVAC system
2. Define the environment that is best for collections
3. Determine the environment acceptable to occupants
4. Negotiate the optimal environment for each storage area based on the information gathered during steps 1 through 3
5. Express the optimal environment in measurable metrics
6. Regularly measure the “actual” environment, compare those results to the “optimal” environment you have defined, and promptly correct any malfunctions

Early steps in this process inform the later experiments and strategies and serve as a long-term resource for the institution as a whole. It is important to remember that the results of experimentation are only applicable given the current system and building characteristics. Major renovations, system updates, or re-purposing of space may render previous experimentation inaccurate.

This guide breaks down each of these steps a little further and lays out specific procedures for the team to follow during five primary activities:

1. Documentation
2. Gathering Environmental Data
3. Data Analysis
4. Experimentation and Implementation
5. Assessment and Maintenance

Optimization is an interactive process - the team may work through the five activities for one strategy, and then go back and repeat steps four and five to test a new strategy, or a new or upgraded piece of equipment may require revisiting steps three, four, and five to see whether its optimal operation is similar to the previous setting. If an optimization study was conducted five years ago, it is a good idea to revisit steps two and three to discover whether the system and space are still functioning as the team intended since an event (controls upgrade, major power outage, or an undocumented change) could have altered the mechanical operation without changing the space condition.

Developing the Environmental Management Team

Teamwork is an essential part of sustainable environmental management. Balancing the preservation quality of the storage environment with responsible building management and lower energy costs requires shared effort, knowledge and expertise, as well as regular communication among colleagues. It is a process, not a project, requiring a sincere long-term commitment from a team of stakeholders.

In most cases the people who affect the climate in collecting institutions are numerous and not usually connected by an organizational structure. These individuals may include:

- People who provide/create the environment
- People who are responsible for preservation of collections
- People who work in and around collections
- People who are responsible for administration and finances
- People who direct the sustainability mission and goals

Working together, representatives of these groups can provide a holistic understanding of what the collections need, what the HVAC systems are capable of, the comfort requirements of occupants, what the institution can afford, and what its sustainability mandates and policies may be.

Team Roles and Responsibilities

Collections staff are responsible for the care and management of collections, loans, and associated documentation. Management of the environment for long-term preservation of collections is an important aspect of collection stewardship.

The collection representatives need to know:

- What collections and material types the institution holds;
- what the most pressing deterioration risks are;
- which collections are vulnerable to environmentally-induced damage;
- what the environmental conditions are and what they should be; and
- how these conditions affect collections.

Facilities staff are responsible for all aspects of building management, and can include architects, engineers, controls designers, facility managers, building operators, and maintenance staff. The facilities representative(s) should:

- Understand the mechanical system functions and capabilities;
- provide mechanical system documentation and history;
- have knowledge of or access to building envelope information and construction details; and
- have the authority to carry out team decisions.

Administration is responsible for the overall management of staff needs, collection stewardship, institutional priorities and budgets. Although not necessarily active in all team meetings and activities, the administrative representative should:

- Encourage and support team goals and activities;
- place team activities within the larger institutional context as they pertain to budgets and operation; and
- provide necessary resources.

Sustainability officers are becoming more common in institutional administration and are typically responsible for broad sustainability and energy goals. A sustainability representative should:

- Know the current sustainability initiatives within the institution;
- share any existing mandates for energy or carbon-footprint reduction;
- provide examples of any similar efforts they are aware of; and
- communicate the efforts of the environmental management team to other groups, including the process, successes, and lessons learned.

Team members will be expected to:

- Collect and review environmental data from collection and exhibition spaces;
- document the capabilities and performance of the HVAC systems that serve these spaces;
- define the optimal environment—one that is best for collections, acceptable to occupants, achievable with current equipment, and energy-efficient;
- meet regularly to review and analyze data, and compare the actual environment to the optimal as defined; and
- identify and test options for improvement.

Creating Buy-In

Everyone is busy and people rarely get excited about more meetings and new responsibilities. However, our experience has shown that, with patience and commitment to the process, team management of the environment will result in more efficient use of staff time, improvements in system operation, better preservation quality, and very often considerable energy saving. Benefits can go beyond the specific task of sustainable preservation – by bringing together colleagues who may not regularly interact, professional relationships are strengthened and communication across the organization is improved, often providing gains in team members’ day-to-day responsibilities.

WITH EFFECTIVE TEAM MANAGEMENT AND REALISTIC T & RH PARAMETERS YOU CAN:
Define sustainable preservation and operational goals together
Reduce operational inefficiencies
Develop a clear path to problem resolution
Identify energy-saving opportunities and meet sustainability goals
Reduce the cost of providing heat, ventilation, cooling, and lighting
Reduce the time spent responding to short-term fluctuations in T and RH
Reduce the number of human comfort calls
Improve communication and understanding between collection and facility staff

Kick-Off Meeting

Effective team management requires a team leader, someone to champion the cause, convene meetings, and encourage participation. With administrative support, team leaders should call potential representatives together to gauge interest and recruit active participants. The roles, responsibilities, activities, and time commitments can be outlined in a kick-off meeting. Once an environmental management team is established, the five steps detailed in the methodology can begin.

While sustainable preservation is often brought to attention by staff responsible for collections preservation, the team leader can come from any place within the organization – collections professionals, facilities staff, and administrators have all successfully shepherded these efforts. The key is recognizing that each potential team member is coming to the group with their own job responsibilities and priorities that they have to accomplish. A successful kick-off meeting will place sustainable preservation in the context that is critical for each potential participant. Examples of this may include:

- Collections professionals may achieve better preservation conditions if opportunities for altered set point control are discovered.
- Facilities staff have the opportunity to fine-tune control of the system, identify components that may not be operating properly or may need to be replaced, or generally educate the team about the building operation.
- Administrative and sustainability staff may value the opportunity to include the collections areas in the institutional sustainability mission or in energy-reduction efforts, or may value the educational or public relations opportunities that go along with new initiatives.

Though sustainable preservation may be enough incentive on its own to bring a potential team together, the kick-off meeting should include an introduction to the idea of sustainable preservation and an optimal preservation environment, and will often include a discussion of the factor or factors that make the process appealing. Budgetary concerns, damaging environmental conditions, pressure to participate in energy-reduction efforts, or simple administrative mandates are all examples of potential driving forces behind sustainable preservation efforts.

Much like an integrated design process in building construction and design, the environmental management team relies on having the right voices at the table from the very outset of the process – all perspectives are considered, and the optimal preservation environment will often be a negotiation and compromise among the members of the group.

Moving the Process Forward

Once the environmental management team has been established, the next step is moving into the methodology process. You may choose to begin going through the documentation phase as part of the kick-off meeting, or to reconvene the group again after everyone has had a chance to look through the process.

Our experience has found that teams work best when they meet an average of once a month – with busy schedules and short-staffing common, a month is often a reasonable time frame. Teams will often choose to meet more frequently at the outset of the process, or during periods of experimentation and testing.

When staff changes occur, it is the responsibility of the team to recruit and bring a new member up-to-date on the current activities. This becomes easier the longer the team has been established, and is one of the underlying goals of the process – to make the environmental management team a part of the regular institutional work flow.