Toward a More Sustainable Rose Library

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Preface: Incorporating Sustainability into Decision-Making

Emory University is a national leader in sustainability, receiving a gold star rating from the Association for the Advancement of Sustainability and Higher Education and dozens of awards for our work in sustainable initiatives. More than 30 of Emory's buildings meet LEED Certification requirements, and over 54% of campus grounds have been designated as protected green space. Over half of the waste produced by Emory is recycled or composted, and over 40% of our wastewater is recycled for water use needs. These achievements reflect Emory's increasing commitment to sustainability over the last decade (see Appendix A for more information on Emory University's commitment to sustainability).

Over the last decade, Emory has implemented sustainable decision-making—from construction to daily work—at every level. At the same time, the Rose Library has not maintained that engagement in sustainability. We are not an outlier in the library profession; libraries have been largely outside of and disengaged from the world of sustainability, but we can change this to align with Emory-wide goals and position the Rose Library as a leader in sustainable and green libraries. But we must first commit the Rose Library to sustainability in planning, leadership, and operational decisions.

The Rose Library is in the process of making sustainability a central priority. Led by the Sustainability Committee, the Rose Library achieved Green Office certification in 2019 and 2020. Building on this certification, the Rose Library aims to further integrate sustainability into all aspects of our operations. This evolving document outlines recommendations to reduce the environmental impact of the Rose Library's work and increase our climate resilience. The first chapter focuses on digital collections and infrastructure. Future additions will include travel and professional development, archival and office supplies, events and programs, and facilities. Goals outlined by the Sustainability Committee will align with Emory-wide sustainability goals and be rooted in a culture of sustainability. We therefore urge Rose Library leaders and staff to integrate sustainable decision-making, for which we have outlined possible tactics below, into our routine practices.

Similar to how the Rose Library reviews budgets for spending efficiency, we should review our procedures to identify realistic options for incorporating sustainable choices and practices. Implementing the following tactics across all areas of our operations will help create a focus on sustainability as integral to our work and not as an additional constraint in our decision-making tools and processes:

- Ensure decision-makers at all levels of the Rose Library are actively engaged in changing their decision-making to consistently:
    - Analyze the procedures and associated impacts of identified goals;
    - Plan, review, and address operational actions to address those impacts;
    - Implement those recommendations; and
    - Track, report, and share the results.
- Use the sustainability decision-making structure—created through Emory Human Resources' Excellence Through Leadership program—which creates a "Triple Bottom Line" framework for creating daily decisions based on sustainability. Under the framework's system of review, decision-makers identify positive, neutral, and negative impacts in the following areas:
    - Planet (conserve energy and water, recycle)
    - People (use fair trade, ensure worker rights, support local community)
    - Price/cost, including on-going costs beyond immediate price (use preferred vendors, reduce/reuse, spend wisely)
- Revise the Rose Library's operational impact statement, potential acquisition one-pager, processing plan, digitization proposal, and similar templates and forms to include energy use and other sustainability considerations.
- Introduce the Sustainable Canvas Model to the decision-making workflow (Appendix B). This system is based on the Business Model Canvas, which describes how an organization creates, delivers, and captures value.

The Sustainable Decision-Making structure includes sustainability, but it also includes identifying cost as a component. Its recommendations are realistic approaches towards making long-term changes in decision-making. Rose Library's commitment to the above recommendations and those outlined in the subsequent chapters, as well as openness to future operational changes, will move the organization toward significant environmental sustainability in a meaningful way. First, Rose Library will demonstrate a true commitment to these issues and not just performative action. Implementation could significantly decrease our carbon use within a short amount of time and increase the resources available for priority projects.

Chapter 1: Digital Collections and Infrastructure

Digital activities in libraries have a substantial environmental footprint, from the energy used to operate digital access and preservation hardware[1] to the toxic effects of electronic waste.[2] These effects are magnified in the context of digital preservation practices that demand redundant storage, periodic refreshing of media, and frequent, computationally intensive fixity checking. Rose Library aims to align with Emory University sustainability policies and demonstrate innovation and leadership by centering environmental sustainability in our approaches to digital acquisitions, digitization, digital infrastructure, and digital preservation. The Rose Library Sustainability Committee and Digital Archives Unit recommend five actions in support of this goal.

Many of these recommendations are fundamentally about reframing our view of and procedures for non-paper-based formats. Admittedly, there are situations where format necessitates deviation from established practices, but we must avoid centering format over content when possible. These recommendations seek to do that: putting our primary focus on content, rather than medium, and bringing our handling of audiovisual (AV) and born digital content in line with the approaches we use for other materials. We request the assistance of Rose Library leaders in revising internal policies and procedures to ensure the greatest possible alignment with these recommendations; explaining to donors, researchers, and other stakeholders the rationale behind sustainability-driven changes; and advocating, as participants in Emory Libraries governance groups, for sustainable choices related to digital collections and infrastructure throughout the organization.

Recommendation 1: Digitize Deliberately

Proposed actions

- Create a rubric for digital and digitization projects requiring compelling reasons for digital projects. (Digital Strategy Committee)
- Focus on discoverability through description and metadata versus digitization. (Processing Archivist, Accessioning Archivist)
- Create nuanced digitization tiers for access- and preservation-focused digitization based on intellectual value of materials, artifactual value of carriers, and technological needs of original formats.[3] One goal of the tiers would be to uncouple the concepts of access and preservation; equating these functions has led to the long-term storage of preservation-quality surrogates for less valuable content in response to researcher interest. (Audiovisual Conservator, Digital Strategy Committee)
- Digitize subsets of the collection and mitigate the "proximity" doctrine where we digitize low-value items that are in the same container as high-priority materials solely due to their location. (Digital Strategy Committee)

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[1] Bethany Scott, "Estimating Energy Use for Digital Preservation, Part I," *BloggERS: The Blog of SAA's Electronic Records Section*, October 6, 2020, https://saaers.wordpress.com/2020/10/06/estimating-energy-use-for-digital-preservation-part-i/.

[2] Christopher Cameron, Linda Tadic, Laura Alagna, and Keith Pendergrass, "Environmentally Sustainable Preservation of Physical and Digital Materials," June 20, 2019, *RBMS Conference: Response and Responsibility: Special Collections and Climate Change*, Baltimore, Maryland.

[3] The Emory University Audiovisual Conservation department has created a guide on the technical specifications for common media types.

- Create policy to ensure that content and context direct work with collection materials over format (e.g., ensuring that we don't digitize based on format without regard to content). (Digital Strategy Committee, Audiovisual Liaison)
- Before materials are proposed for digitization, they should be reviewed using the established rubric and representative series or subseries should be identified as options to digitizing the entire collection. (Curator, Head of Digital Archives, Digital Strategy Committee)

Justification

Eira Tansey wrote that we should make "present-day archival choices that enable future archivists to carry out their jobs and ensure survival of cultural heritage."[4] The increasing overall cost and volume of digital storage will inhibit the work of future archivists if we thoughtlessly put resources toward materials with little evidentiary value, and even as storage costs decrease, the exponential increase of our audiovisual digitization statistics shows that Rose Library's financial costs will increase along with our carbon footprint, and this is a particular concern, as audiovisual files "tend to raise storage requirements to an exponential level."[5]

As far back as 2010, there was an understanding that digital preservation strategies are flexible. The Blue-Ribbon Task Force on Sustainable Digital Preservation and Access stated that a "misleading perception about digital preservation investments is that […] choices are binary: either we implement intensive preservation […] or we do nothing."[6] We should carefully curate what we digitize and store, recognizing that "'best practice' is often an unrealistic and inappropriate aim. Institutions must perform preservation actions to their specific standards and goals, within the constraints of time and resourcing and to meet particular needs."[7]

Expected outcomes

Rose Library's Digital Strategy Committee and other stakeholders will use considered approaches for digitization and digital access, including requiring robust archival description, a well-defined rubric for digitization selection, and a tiered system for digitization.[8] A rubric will guide digitization decisions, focusing on material with the most current and future research value. Intellectual content

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[4] Eira Tansey, "Archival Adaptation to Climate Change," *Sustainability: Science, Practice and Policy* 11, no. 2 (2015): 48. In addition, Samantha R. Winn echoed this comment in her article "Dying Well in the Anthropocene," *Journal of Critical Library and Information Studies* 3, no. 11 (2020).

[5] Ashley Blewer, *Pragmatic Audiovisual Preservation*, DPC Technology Watch Report (Great Britain: Digital Preservation Coalition, 2020), 15.

[6] Blue Ribbon Task Force on Sustainable Digital Preservation and Access, *Sustainable Economics for a Digital Planet: Ensuring Long-term Access to Digital Information*, 2010, 99-100.

[7] Ashley Blewer, *Pragmatic Audiovisual Preservation*, DPC Technology Watch Report (Great Britain: Digital Preservation Coalition, 2020), 2.

[8] Keith L. Pendergrass, Walker Sampson, Tim Walsh, and Laura Alagna, "Toward Environmentally Sustainable Digital Preservation," *American Archivist* 82, no. 1 (2019), 183-184. https://doi.org/10.17723/0360-9081-82.1.165. As Pendergrass et al. explain, "The growth of digital content collected by Cultural Heritage Organizations (CHO) is due not only to the proliferation of born-digital content or forensic capture methods, but also to technical advancements that allow for higher-quality content creation and digitization. This is especially true for audiovisual content. For example, digitizing a single minute of film in an uncompressed format at 2K resolution can result in a file up to 26 gigabytes in size, and at 4K resolution, the same minute of film can be more than 100 gigabytes. This trend to higher resolution, and the accompanying increase in file size, means an exponential increase in digital storage needs, the environmental costs of which can be addressed through appraisal."

and media condition will be prioritized over the digitization of items based on their proximity to valued subject matter. The Rose Digital Strategy Committee, as a central decision-making body, will guide digitization priorities and document the rationale for these projects, creating digital access to representative series that will support researcher needs but not be driven by individual researchers' requests. At the outset, robust archival description and enhanced metadata for and born-digital materials will increase discoverability without requiring digital access. These are attainable workflows that can limit our equipment, preservation, and hosting costs and the accompanying footprint.

Recommendation 2: Reappraise Collections Regularly

Proposed actions

Rose Library should set an appraisal schedule for collections, especially digital and digitized materials, to create a consistent review of materials at the following points of action:

- Acquisition (Curator, packing archivist)
  - Collecting staff must appraise born-digital and audiovisual materials based on their content before acquisition as they do with paper-based materials, and if materials are brought on-site without appraisal reports, they must be appraised by collecting staff before accessioning.
  - Appraisal reports must explain what makes the material unique and offer research as to why the materials should be collected and digitized.
  - Expectations about digitization and access should be clearly documented at this stage. In the case of audiovisual materials, this can require item-level considerations.
  - Because reformatting is essential to provide access to most born-digital and audiovisual materials, we should not acquire any such items that we do not actively plan to convert or digitize.
- Accessioning (Accessioning Archivist)
  - During accessioning and the subsequent minimal processing, digital and audiovisual media should be reviewed and identified as granularly as possible.
  - At the least, the archivist should be empowered to identify available commercial recordings and remove them from the holdings.
- Processing (Processing Archivist)
  - During granular processing, the archivist should review the materials to ensure that digital and audiovisual materials add to the documentation of the creator. If the archivist can find no reason to keep the items, they should be removed from the collection.
- Digitization (Audiovisual Liaison, Audiovisual Conservator, Digital Strategy Committee)
  - Before an audiovisual item is digitized, the audiovisual liaison and audiovisual conservator should review the materials for enduring value and commercial availability.
- Post-digitization (in cases where digitization led to identification) (Audiovisual Liaison)
  - In cases where there is no identification, and digitization or imaging is done partially for identification, there should be no obligation to keep the digital file or the original if it does not fit the assessments.
  - If processing and preservation standards change (e.g., if we no longer rely on disk images as the default preservation format for all born-digital material), we should systematically review and deaccession versions of content that are no longer needed.

At each of these points, archivists should review collection materials for enduring value, and they should set up workflows to ensure this work is done in a premeditated manner and not rely on "as it comes up" to make changes. The workflows should include a set of assessments that measure research value, use statistics, risk assessments, uniqueness, etc. While some materials will carry inherent value outside of these scopes, the concept of "inherent value" should be practically explained and there should be concrete reasons why we are keeping the materials, and we should be mindful that researcher requests do not create an obligation to keep the materials—either original items or the digital surrogate—so, there should be a path for access to materials without a preservation requirement.

Justification

Appraisal is a foundational component of the archival profession. From Sir Charles Hilary Jenkinson's view of the organic nature of archival records and impartiality of the archivist to T.R. Schellenberg's more hands-on approach to shaping collections, archivists have continually reevaluated the process of acquisition. Therefore, in addition to identifying archival value, archivists must systematically evaluate collection materials for digital access and not take a "digitize it all" approach.

As data storage becomes more cost effective, the assumption is that it is more sustainable, but if we use financial cost as an excuse to collect (and store) more content without a critical eye to appraisal, any streamlining of our processes and "greening" of our technologies will be undermined.[9] The bulk of all preserved data is consuming more electricity than necessary. Although electricity use can be mitigated, in the long run, the only solution for curbing data storage will be "to implement data and records value appraising methods and tools, and to completely and permanently delete data and records that have lost their economic, social, cultural, financial, administrative, fiscal and/or legal value."[10]

Rose Library should recommit to conducting critical appraisal, which allows us to focus our resources on high-value materials; rethink our goals around digital permanence to reduce the resource intensity of digital preservation actions; and challenge our assumptions about the availability of digital content to meet user needs in different ways.[11]

Expected outcomes

There will be a reduction (and limiting) of digital surrogates upon integration of these recommendations, which will be based on a view that digitization is done to enhance the value of our repository instead of only adding one-off surrogates to our holdings. Digital projects will include

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[9] Ben Goldman, "It's Not Easy Being Green(e): Digital Preservation in the Age of Climate Change," in *Archival Values: Essays in Honor of Mark A. Greene*, ed. Christine Weideman and Mary A. Caldera (Chicago: Society of American Archivists, 2019): 180; Mark Wolfe, "Beyond 'Green Buildings': Exploring the Effects of Jevon's Paradox on the Sustainability of Archival Practices," *Archival Science,* vol. 12, no. 1 (2012): 35. These articles point out that the financial costs (as well as the environmental costs) of physical distribution seem mitigated by using digital formats, but that new research highlights the growing impact of energy usage for digital consumption that remains reliant on dirty energy.
[10] G.J. Bussel, N. Smit, and John Pas, " Digital Archiving, Green IT and Environment. Deleting data to manage critical effects of the Data Deluge. *Electronic Journal of Information Systems Evaluation.* Vol. 18. (2015): 189. Digital Archiving, Green IT and Environment. Deleting data to manage critical effects of the Data Deluge. pp. 187-198.
[11] Ibid, 190

only relevant and research-worthy materials that promote the strength of our collections. The appraisal and reappraisal of materials will ensure that materials with strong research value are accessible and preserved and that we no longer retain digital surrogates of materials digitized for identification or items that were prioritized only due to their proximity to valuable materials. Documented collecting policies will also limit the amount of incoming audiovisual and born-digital material based on expected research value, which will enable curators build upon those policies to create strong and focused collections. Digitization projects—especially those large in scope or comprehensive of collection—will be reviewed by the Rose Library Digital Strategy Committee (DSC) before first steps are taken to pursue only the most valuable, innovative, and research-focused projects. This body should be responsible for creating a record of the decision to move forward on large-scale projects, including documentation of rationale, goals, and desired outcomes. Researcher orders and exhibit requests will not fall under this procedure, as the goal is built into the request (i.e., researcher access and exhibit content), though we should consider reasonable limits to the flow of projects through the Digitization Department. The DSC should establish a threshold for larger researcher or exhibit requests requiring its review and approval to ensure digitization capacity is deployed strategically and one-off requests combined into more efficient projects when appropriate[12]

Recommendation 3: Rethink Born-Digital Capture

Proposed actions

- Involve curators more fully in donor interviews about and preliminary evaluation of born-digital material. Conduct more extensive appraisal prior to and during capture to reduce energy expenditure on transfer and storage of content we will not ultimately keep. (Head of Digital Archives, Collection Development Team)
- Shift our default practice away from capturing forensic disk images and storing them indefinitely. Save disk images only when there is a specific use case (e.g., fragile or damaged media, emulation plans); otherwise, identify critical files earlier in the process and discard extraneous items and full disk images after final ingest of preservation copies. (Head of Digital Archives)
- Streamline workflows to require fewer working copies of files and avoid duplication of primary files in our preservation systems. Redundancy is critical for preservation, but this should be built into our preservation infrastructure and backup practices rather than accomplished by saving additional duplicates within a given space (e.g., ingesting disk images alone into the Keep then re-ingesting the same disk images packaged with extracted files). (Head of Digital Archives)

Justification

Digital content capture and analysis is computationally intensive, and processing and storing ever-larger volumes of content requires significant energy use on site and in remote data centers. With insufficient time and staffing for born-digital collection management, archivists often default to

[12] Currently, there is a limit of 25 audiovisual items per order before special review must take place. Larger orders can hinder timelines within the conservation office and should require review of some governing body to ensure there is reasonable access.

workflows that save time but incur significant storage and energy costs. When archivists choose between, on the one hand, investing time to reduce the volume and increase the usability of born-digital content and, on the other, saving time by retaining more content and postponing appraisal and processing actions, they may also consider the energy use and environmental impact of each option.[13]

As the fields of digital archives and digital preservation mature, along with the technologies on which they depend and the theoretical and practical frameworks that guide decision-making, archivists increasingly recommend nuanced approaches to capture, analysis, and retention, in part to extend existing archival best practices into a digital context and promote sustainability.[14] For example, creating disk images in all cases may represent a privileging of preservation for preservation's sake over donor privacy considerations, archivists' professional judgment, and environmental considerations. A more flexible approach, as advocated by DANNNG (the Digital Archival Transfer, Ingest, and Packaging Group),[15] allows for selective imaging when technically necessary but demonstrates 1) trust in archivists' ability to make responsible appraisal and selection decisions for digital just as for analog materials and 2) acceptance that some loss is inevitable.

Expected outcomes

These recommendations, which focus on capturing and saving born-digital content more selectively, support sustainability goals by slowing increases in energy use and storage hardware and align with Rose-wide efforts to manage collection volume and ensure we invest resources only in materials with significant research value. Providing records creators, donors, and curators with expanded resources and training should also raise awareness of the resources necessary to curate and preserve digital items and ensure decisions about born-digital acquisitions are deliberate rather than reactive. Closer collaboration between the Collection Development, Collection Processing, and Digital Archives teams will ensure we capture and keep only born-digital content that fits the agreed-upon scope of a collection and supports its future use and increase efficiency and consistency across functional areas.

Recommendation 4: Reduce Storage Impact

Proposed actions

- Select (or encourage LTDS to select) storage vendors and/or data centers based on their use of renewable energy sources and energy-efficient practices. To the extent possible, energy source and geographical location should be among the criteria considered when assessing or implementing new storage options. Our regions and availability zones should be reviewed regularly with environmental impact in mind, prioritizing locations with higher availability of

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[13] Bethany Scott, "Estimating Energy Use for Digital Preservation, Part I," *BloggERS! The Blog of SAA's Electronic Records Section*, October 6, 2020, https://saaers.wordpress.com/2020/10/06/estimating-energy-use-for-digital-preservation-part-i/.

[14] Keith L. Pendergrass, Walker Sampson, Tim Walsh, and Laura Alagna, "Toward Environmentally Sustainable Digital Preservation," *American Archivist* 82, no. 1 (2019): 176-177. https://doi.org/10.17723/0360-9081-82.1.165

[15] "Disk Imaging Decision Factors," DANNNG!, accessed October 25, 2021, https://dannng.github.io/disk-imaging-decision-factors.html.

renewable energy sources and with colder climates. (Head of Digital Archives, Leadership Team, LTDS partners)

- Implement a tiered storage model in which the highest-risk and/or highest-value content resides in a larger number of independent locations and receives elevated fixity checks, while lower-risk and lower-value content can be responsibly managed with less redundancy and less energy-intensive monitoring. (Head of Digital Archives, LTDS partners)
- Utilize nearline (powered down when not actively in use) or offline storage technology where appropriate. For content that need not be immediately available at all times or for use cases that allow some lead time for retrieval, nearline storage could reduce environmental costs for electricity and cooling compared to energy requirements for always-on hardware. (Head of Digital Archives, LTDS partners)

Justification

Data centers consume a growing share of global energy, required both to power servers and to cool equipment and facilities. Increases in demand may outpace gains in energy efficiency in the coming decade.[16] The Rose Library's ongoing acquisition and digitization of collections means perpetual growth in data volume and storage needs (by a factor of 2–7x the size of the data acquired or created), which we address by increasing our reliance on remote data centers and upgrading local servers. Our contributions to the constant construction and expansion of data centers hosting our collections, as well as to the expansion of on-premises infrastructure to store and monitor portions of our holdings, thus augmenting a wide range of environmental impacts such as carbon emissions, wasted energy, and material resource depletion.[17] Our current storage infrastructure relies heavily on Amazon Web Services (AWS), which, despite its commitments to renewable energy projects and its goal of powering its operations with 100% renewable energy by 2025,[18] has also demonstrated a lack of transparency about environmental impacts and expanded rapidly in markets that are primarily coal-powered.[19] Furthermore, increasing renewable energy use and decreasing emissions do nothing to reduce the effects of mineral extraction and electronic waste, also major issues for data centers.[20]

Expected outcomes

Thoughtfully managing our storage volume will help us contribute less to the energy-related and other environmental impacts of data storage. A tiered approach to storage (and the preservation actions taken while data is at rest) may also have benefits beyond managing our environmental impact: increasing efficiency in processing, clarifying appraisal decisions and stewardship priorities, and saving money. Incorporating environmental factors into decisions about storage vendors,

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[16] Eric Masanet and Nuoa Lei, "How Much Energy Do Data Centers Really Use?," Energy Innovation Policy and Technology LLC, accessed October 25, 2021, https://energyinnovation.org/2020/03/17/how-much-energy-do-data-centers-really-use/.

[17] Hashem Izadi Moud, Jeanette Hariharan, Hamid Hakim, Charles Kibert, and Ian Flood, "Sustainability Assessment of Data Centers Beyond LEED," in *2020 IEEE Green Technologies Conference (GreenTech)* (IEEE, 2020): 62–64, https://10.1109/GreenTech46478.2020.9289793.

[18] "Sustainability in the Cloud," Amazon, accessed October 25, 2021, https://sustainability.aboutamazon.com/environment/the-cloud.

[19] Gary Cook, *Clicking Clean: Who Is Winning the Race to Build a Green Internet?* (Washington, DC: Greenpeace, 2017), https://www.greenpeace.org/static/planet4-international-stateless/2017/01/35f0ac1a-clickclean2016-hires.pdf.

[20] Klaus Fichter and Ralph Hintemann, "Beyond Energy," *Journal of Industrial Ecology* 18, no. 6 (2014): 846–858. http://dx.doi.org/10.1111/jiec.12155.

locations, and equipment can reduce the energy use and emissions associated with the storage of any given item, raise awareness within the Rose and Emory Libraries of environmental concerns related to IT infrastructure, and pressure vendors to provide more sustainable options.

Recommendation 5: Use Electronic Equipment Longer

Proposed actions

- For all computers and peripherals managed by Rose Library staff rather than LTDS (e.g., digital archives lab, reading room laptops and iPads), purchase replacements only when necessary, rather than on a regular cycle or when warranties expire. (Associate Director, Operations Manager, unit heads)
- Upgrade machines with new or added components before replacing them entirely. (Head of Digital Archives, Operations Manager)
- Before purchasing new equipment or parts, try first to locate acceptable equipment within the library or from Emory surplus. (Head of Digital Archives, Operations Manager)
- Ensure all equipment that is no longer used is sent to surplus, donated for reuse, or disposed of in an environmentally responsible way. (Head of Digital Archives, Operations Manager)

Justification

To see the full environmental impact of information and computing technology, we must look beyond electricity usage. The physical components that make up our local and global technology infrastructure have significant environmental and human impacts throughout their lifecycles. In 2020, the total volume of electronic waste (e-waste) generated around the world surpassed 50 million metric tons.[21] This number will continue to increase as the global economy depends more on information technology and people and organizations purchase more electronic equipment. The majority of e-waste is disposed of in undocumented or unsafe ways, contributing to toxic conditions that harm workers at e-waste sites, damage ecosystems, and pollute water and air, particularly in lower-income areas and the Global South, contributing to environmental racism. Furthermore, the production of new computers and other electronic equipment involves a significant amount of energy, the extraction and refining of rare-earth metals, and emissions caused by manufacturing and shipping processes. Organizations like Harvard Business School's library are reducing their contributions to these effects by delaying acquisition of new electronic equipment and ensuring safe disposal.[22]

Expected outcomes

Extending the useful life of our electronic equipment will not only reduce our contributions to e-waste pollution and mineral extraction but also save money. While this approach might require some additional labor to implement, this added effort could be offset by time savings on researching,

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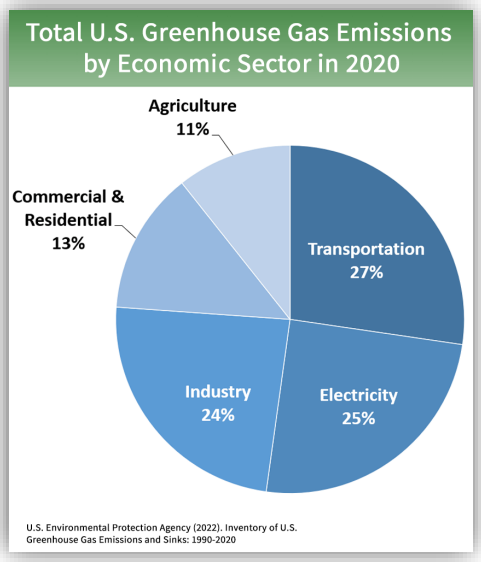
[21] Vanessa Forti, Cornelis Peter Baldé, Ruediger Kuehr, and Garam Bel, *The Global E-waste Monitor 2020: Quantities, Flows, and the Circular Economy Potential* (Bonn/Geneva/Rotterdam: United Nations University, 2020). https://collections.unu.edu/view/UNU:7737.

[22] Keith Pendergrass, "Integrating Environmental Sustainability into Policies and Workflows," *BloggERS! The Blog of SAA's Electronic Records Section*, July 28, 2020, https://saaers.wordpress.com/2020/07/28/integrating-environmental-sustainability-into-policies-and-workflows/.

ordering, and configuring new equipment. Some changes might require consultation with and support from the Staff Technology Training and Support team in LTDS, but successful implementation could lay the foundation for adoption in other Emory Libraries divisions. University-wide programs, such as recycling and surplus, largely align with these sustainability practices already; we can take advantage of these options in support of our actions around electronic equipment and advocate for the continuation and expansion of such programs.

Chapter 2: Travel

The U.S. Environmental Protection Agency (EPA) identifies transportation as the industry with the highest output of greenhouse gases, responsible for 27% of total U.S. emissions in 2020.[23] Further, U.S. business and commercial aviation produces about 10% of the total transportation-related emissions domestically, and aviation in general produces 2–3% of total carbon dioxide emissions globally.[24] This makes transportation, particularly air travel, a leading cause of human-induced climate change.



In a global society, however, travel is difficult to avoid. Operational travel is essential for Rose Library collection development and stewardship as well as donor relations. In addition, Rose Library benefits from having professionally involved staff and must continue to support learning opportunities.

While travel is an important part of Rose Library operations and staff development, leading climate change scientists have advised rethinking the frequency and manner of travel to significantly lower greenhouse emissions.[25] To align with broader Emory University sustainability policies, Rose Library should center environmental sustainability in our approaches to travel through a two-pronged approach: our general recommendations are to 1) reduce travel when possible and 2) mitigate the impact as much as possible when travel is required.

In creating these recommendations, we understand that reducing travel has no simple solution. Our suggestions about how to manage processes remotely or mitigate the impact of essential travel will require work to develop the necessary relationships and strategies and may require staff to consider innovative tools and partnerships rather than relying on familiar methods. We request the assistance of Rose Library leaders in revising internal policies and procedures to ensure the greatest possible alignment with these recommendations; explaining to donors, researchers, staff, and other stakeholders the rationale behind sustainability-driven changes; and advocating, as participants in Emory Libraries governance groups, for sustainable choices related to travel throughout the organization.

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[23] EPA, Sources of Green House Emissions, May 20, 2022. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[24] Environmental and Energy Study Institute, Issue Brief: The Growth in Greenhouse Gas Emissions from Commercial Aviation, June 9, 2022. https://www.eesi.org/papers/view/fact-sheet-the-growth-in-greenhouse-gas-emissions-from-commercial-aviation.

[25] In her 2021 *The Oxford Scientist* article, Nia Evans explained that in April 2020 there was a reduction of 60% of air travel due to the travel ban related to the pandemic. New York emissions decreased by up to 10%, and China saw a reduction of 25% before the lockdown measures eased. https://oxsci.org/the-lasting-benefits-of-the-travel-ban/

Recommendation 1: Reduce Frequency of Operations-Related Travel

Proposed actions

- Continue to support flexible work options per the Emory Sustainability Vision and Strategic Plan.[26]
- When possible, meet with donors virtually using Zoom or other communication systems, use donor-provided images to understand the sizes and contents of collections, and guide donors to complete their own packing.
- Use remote support for trips:
    - Identify and employ local vendors.
    - Collaborate with and delegate some negotiations to Emory staff who may already be traveling (e.g. Advancement and Alumni Engagement).
    - Build reciprocal partnerships with other special collections in the target area who could work on our behalf (and we on theirs in Georgia).
- Schedule fewer, longer trips featuring multiple legs instead of individual roundtrips.
- Send only essential staff on trips to conduct Rose business (i.e. limit operational travel to those who have the most knowledge and skill in appraisal and packing to reduce the number of staff who need to travel).

Justification

In recent years, the COVID-19 pandemic and budget constraints have reduced the frequency of operational travel, forcing us to develop virtual alternatives and more efficient approaches. It has become clear that while not always a viable replacement, remote technology can significantly reduce the frequency of long-distance travel without sacrificing operational effectiveness. We should build on this momentum with an explicit goal of reducing emissions and achieving a more environmentally sustainable approach to travel for collection building, donor relations, development, and outreach travel.

Expected outcomes

The recommendations above are practical solutions for reducing Rose Library's carbon emissions. Fewer trips and fewer people taking them necessarily means lower emissions generated in the course of our work. Efficient travel strategies like multiple-leg itineraries can significantly reduce greenhouse gases expended on single-destination trips by removing the return flights for each leg.

In addition to direct reductions in emissions, Rose Library would benefit from secondary outcomes related to other types of operational sustainability. Explaining to donors that our dedication to the stewardship of their materials extends to environmental concerns can demonstrate a deep, multifaceted commitment to long-term stewardship. Collaboration with other departments or even external organizations builds strong relationships with future benefits. Reducing the amount of time staff are removed from on-site duties increases our capacity to support core services and operations.

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[26] The 2020 Annual Energy and Usage Report highlighted a full 11% reduction in energy usage in the spring and summer months due to limited occupancy.

Recommendation 2: Adjust Policies and Practices to Mitigate Impact of All Travel (Operations and Professional Development)

Proposed actions

- Create a dedicated budget line for carbon offsets—a "green pool" or "sustainability incentive fund"—to support travel with lower carbon emissions without reducing funding availability for professional development.
- Develop a decision matrix or promote use of a simple trip footprint calculator to help Rose staff compare the environmental impact of different modes (especially car, bus, train, and plane) at different distances.
- Encourage alternative, slower forms of travel (foot over public transport over car over plane)[27] when feasible and explicitly allow staff more paid travel time to use them. If these options cost more than airfare, cover the difference out of the "green pool."
- Require staff to consult carbon emissions data in Google Flights and select flight routes with lower emissions (especially direct flights), with any cost difference coming out of the "green pool."
- Use Electric Vehicle Fleet options from the Emory fleet for business travel, including donor meetings, collection pickups, and conference travel within driving distance.
- Promote carpooling when multiple staff members are attending the same events or meetings within driving distance.
- Use sustainable accommodations when available. Create guidelines to help staff identify sustainable accommodation options, such as hotels in LEED-certified buildings and brands that advance sustainability goals.[28]
- Prioritize personal impact of individual staff when traveling (i.e., encourage staff to limit their own carbon footprints during travel through use of reusable mugs, avoidance of single-use plastic, and increased foot travel when possible).
- Set up a task force to research university policy related to the proposed actions above and advocate for changes to policies that currently disincentivize more sustainable options (such as transportation modes or routes with a higher dollar cost but lower emissions).

Justification

Professional organizations and academic institutions are increasingly attentive to the environmental impacts of travel and are modifying their policies and practices accordingly. Universities such as Yale University, Oregon State University, the University of Washington, and Colorado State University have developed carbon offset funds or procedures, and associations such as the American Library Association and American Association of Law Librarians encourage offsets and greener travel choices for conference attendees.

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[27] According to their 2019–2020 annual report and accounts, the National Archives in the United Kingdom lowered their carbon footprint due to travel by 33% by promoting this method.

[28] Some organizations, like Marriott, are including information about their sustainability measures in annual reports. We recommend a review of the information to ensure that the reports show the company's investment in ongoing efforts towards sustainability and the documents are not an effort to greenwash unsustainable practices.

Emory University's own Office of Sustainability Initiatives plans to eventually create a carbon offset program for university travel, so the goal of reducing the impact of our travel is in line with university priorities. Adjusting our practices internally while we wait for the OSI program to be developed will prepare the Rose Library to support and participate in the broader program once it becomes available.

Expected outcomes

The recommended actions, which represent a multi-faceted approach to reducing the environmental costs of travel, will not only reduce Rose Library's contributions to pollution and warming but will also forward sustainability in travel-related decision making. Carbon offsets should not be used to rationalize unsustainable choices or increase the frequency of travel.[29] When travel is necessary, though, offsets are one tool we can use to both manage and quantify our impact. In addition, incorporating environmental considerations into our travel planning in other ways—such as by choosing alternative transport methods or limiting waste from single-use products—can help us directly reduce our footprint without depending on the quality or effectiveness of offset programs.

Many organizational peers are considering these positions, and, through minor changes, Rose Library can show itself to be a leader in this area. By establishing precedents for alternative travel methods and new offset strategies, we can create a culture of prioritizing sustainability alongside other travel considerations such as cost, time, programmatic goals, and professional development needs.

[29] For a discussion of some drawbacks and limitations, see https://www.nytimes.com/2022/05/18/climate/offset-carbon-footprint-air-travel.htm.

Appendix A: Emory University Sustainability Targets

Emory University Sustainability Vision and Strategic Plan includes metrics including:

- Reduce Emory's total greenhouse gas emissions by 45% by 2030 and achieve net zero emissions by 2050, using 2010 levels as baseline.
- Reduce university campus energy use per square foot by 50% and total energy use by 25% by 2025 using 2015 as a baseline.
- Reduce Emory water use by 50% by 2025 using 2015 as a baseline.
- Support culture change towards "reduce, repair, restore, and reuse" mentality and "cradle to cradle" purchasing.
- Ensure that all university events will be zero municipal landfill waste by 2025
- Ensure that all university functions will be plastic bottle free.
- Support flexible workdays to reduce commute time, improve recruitment and retention, and support work/life balance; work with InfoTech, Human Resources, and other appropriate groups to ensure that all non-essential personnel are expected to telecommute at least one day per week by 2025 unless justified by supervisor.

Appendix B: Sustainability Canvas Worksheet

By Sarah Klimek, Terence O'Neill, Stephanie Perentesis and Eric Tans

Sustainability Proposal: What is the project/goal you want to undertake		
Key Partners Who will help you implement this program or service?	Target Participants What groups or individuals would most directly interact with your proposal?	Metrics of Success How will you measure whether your solution was successful?

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