Charles Sturt University

Greening Libraries Report

Jane Garner, Kasey Garrison, Sabine Wardle, Karen Bell & Sarah Redshaw
Charles Sturt University

GREENING LIBRARIES

Australian Library and Information Association

CAUL
COUNCIL OF AUSTRALIAN UNIVERSITY LIBRARIANS

This report is the second output from the Greening Libraries research project, and was commissioned by the Australian Library and Information Association (ALIA) with the support of the Council of Australian University Librarians (CAUL)

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Contact: enquiries and feedback are welcomed and can be directed to: educatio@alia.org.au or jgarner@csu.edu.au

Contents

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Aim

The overarching aim of the Greening Libraries research project is to underpin the Australian Library and Information Association's focus on sustainability, in line with its commitment to the United Nations Sustainable Development Goals. The report aims to highlight examples of best practice and inform the creation of a toolkit for libraries to help them support environmental action, further the greening libraries movement as well as exemplify sustainability practices that are consistent with United Nations Sustainable Development Goals.

Introduction

> *Founded on the principle of reuse, libraries have a long tradition of being environmentally friendly* (Griebel, 2012, p. 113)

Sustainability is relevant to libraries on many levels. As users of energy and resources, and in providing places for community resources to be accessed and displayed, libraries need to consider sustainability in each of their operations and service provisions. A 'green library' refers to 'any library that promotes sustainability through education, operations, and outreach' (Aulisio, 2013, p. 1). Similarly, Ephraim states that 'green library theory calls for a conscious awareness of the environment and devising strategies [for] administering library resources and services with environmental considerations at the forefront' (2003, p. 161). Libraries provide important opportunities for community engagement on many levels. They are also in a position to provide leadership and guidance on important social issues. Sustainability is an area where libraries can both be an active example and provide resources for the community.

The United Nations Sustainable Development Goals (SDGs) (2015) give a framework recognised by ALIA for sustainability. All seventeen SDGs can be supported by libraries through the sharing of resources and in bringing parties together to share and build knowledge. In particular, the authors believe the following goals are highly relevant to libraries:

Libraries support good health and wellbeing by building collections and resources that help people access health and wellness information

Libraries support quality education by providing formal and informal learning opportunities, programs, and resources for all age groups

Libraries support sustainable cities and communities by collecting and preserving Australia's cultural heritage now and into the future

Libraries support climate action by adopting sustainable processes and collecting resources that document climate change and climate action

Libraries support peace, justice and strong institutions through the provision of public access to information via their collections, resources, internet connections and IT resources

Libraries support partnerships by working with libraries across the world, with International Federation of Library Associations and Institutions (IFLA) and supporting partnerships with government, non-government, and community organisations to further and support goals

Taking these goals into account, sustainability relates not only to resources but also to community well-being and acknowledgement of cultural heritage and diversity, including Indigenous knowledges. Libraries can offer services and resources to different sectors of the community including Culturally and Linguistically Diverse (CALD) groups, and address access and storage issues for non-dominant forms of expression and community engagement. Although the focus of this report is environmental sustainability these areas are also relevant to the sustainability of libraries.

Addressing environmental sustainability has moved beyond the 'reduce, re-use, and recycle' principle to include disaster management and recovery, digital greening, research and education, and collaboration with land and water management authorities contributing to capacity building at regional, state and even national levels. Libraries can reach out to their governing organisations and broader communities to raise awareness of sustainability issues and practices. They can work independently to improve their own sustainable practices within their organisation, or they can form partnerships with communities and parent bodies to raise awareness of sustainable practices.

This report provides a literature review of scholarly and professional literature relating to sustainability and libraries. The review of the literature is followed by six case studies that each explore sustainability programs, activities and events undertaken by libraries. Public, academic, and national libraries from urban and regional locations are included in the case studies. There are five Australian case studies and one international public library case study. The studies describe sustainability-related initiatives that can serve as inspirational exemplars to other institutions in the library and information services sector. The report concludes with a series of recommendations that can be taken by all varieties of libraries to support their own sustainability practices.

It should be noted that in compliance with university standards of ethical research practice, the authors of this report were restricted to the use of publicly available documents. This restriction limited the capacity to include many examples of best practice that are occurring internally within libraries but are not reported publicly. Due to COVID-related closures of libraries during the time of writing, the authors were unable to visit any libraries to observe sustainability initiatives. The authors were also unable to find public reporting from remote libraries of their sustainable programs, activities or events being undertaken. However, it is likely that these practices are occurring without being publicly reported.

The library and information science literature relating to sustainability practices is dominated by the greening libraries movement in the United States, which began in the 1990s. Sustainability can therefore be considered a relatively new area of focus in the field of librarianship, and one where the literature calls for sustainable development policies to be specifically designed for library and information organisations (Khalid et al., 2021, p. 8). In much of the available literature that

examines the greening libraries movement, sustainable development is based on the definition of sustainability provided by the United Nations:

> *Sustainable development is development that meets the needs of present generations without compromising the ability of future generations to meet their own needs*
> (United Nations, 1987, para. 1)

The International Federation of Library Associations and Institutions (IFLA) produced a *Statement on Libraries and Sustainable Development* in 2002. The statement echoes the language of the United Nations statement (1987) and acknowledges a commitment to sustainable development which addresses the needs of the present and future. This understanding is extended to recognise that library and information services promote sustainable development by ensuring freedom of access to information. In 2010, the American Library Association recognised sustainable development as a 'core value of librarianship'. Libraries' role and potential in sustainable development is affirmed in other publications such as Prasanth and Vasudevan (2019), among others, who note the sharing and reusing of resources by the broader community contribute to the inherently 'green' nature of libraries. Recognising the role of library collections in sustainability practices of communities, ALIA supports the SDGs as a participant in IFLA's International Advocacy Programme built around the United Nations' *2030 Agenda for Sustainable Development* (2015).

The United Nations (2015) extends this view of sustainability to include creating sustainable cities through the provision of safe and affordable housing, investment in public transport, creating green public spaces, and improving urban planning and management in participatory and inclusive ways. In addition to strengthening efforts to protect and safeguard the world's cultural and natural heritage, targets involve environmental concerns such as air quality and waste. Libraries have a significant role in preserving cultural heritage and making it accessible. They need to strive to do this in ways that have a low impact on the environment. Reducing the impact on the environment has become increasingly important to how libraries function and in their role as educators.

A Review of the Literature

This literature review explores resources published since the year 2000 that relate to sustainable practices of libraries. These resources have been clustered into five groups: exploring the definitions of 'greening' in libraries, the importance of libraries committing to sustainability as one of their core values and reflecting these values in their policies and activities, the role of libraries in educating communities about sustainability, the activities and initiatives in place within libraries and information organisations themselves and finally, the opportunities for libraries to measure their sustainability practices.

A literature search was conducted using the Library, Information Science & Technology Abstracts database (LISTA). Using the search term 'green libraries' to search within the abstract-only field returned 787 results. It was apparent that the term 'green' was also used to identify research relating to open access. The addition of the terms 'sustainable/sustainability/eco-friendly' returned 104 results. The title of each returned reference was examined for relevance and suitability. All resources considered suitable for inclusion were downloaded to an Endnote library. Additional references were found through analysis of the reference lists in the papers identified as relevant to the study. The search strategy is shown visually in a PRISMA diagram in Figure 1 (adapted from Moher et al., 2009).

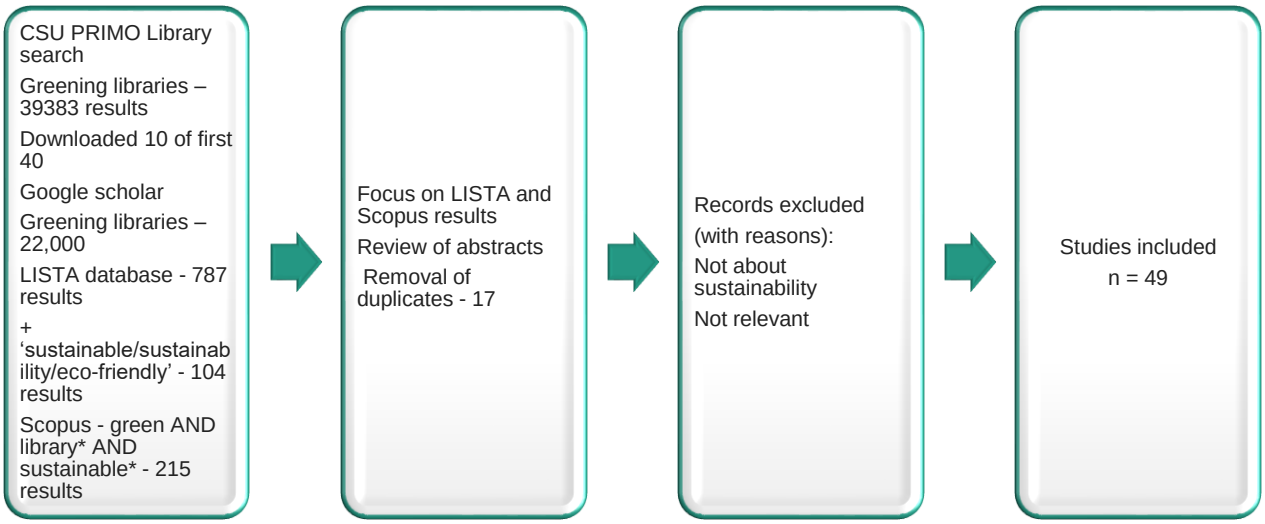

Figure 1. PRISMA of search strategy

Additional searches were undertaken within the Charles Sturt University Library Primo catalogue, Google Scholar and Scopus for 'Greening Libraries' and/or librar* AND sustain*. All relevant resources published from 2000 to the present were downloaded and added to the Endnote library. The final Endnote library contains a total of 49 resources published between 2000-2021 and includes books, journal and magazine articles. This is on par with a previous bibliometric study and literature review conducted by Meschede and Henkel (2019) that found 68 Library and Information Sciences (LIS) publications published from 1990-2017 related specifically to environmental sustainability. Some reports that appeared in searches were also included such as those from the Sustainable Libraries Initiative in the United States and ALIA's report *Australian Libraries Support the Sustainable Development Goals* (2018).

Eight resources were published in 2014, making this the most prolific year, followed by 2020 with six, and 2010 with five publications. Only five resources were published in the decade 2000-2010, indicating an increasing interest in sustainability issues over the most recent ten years (see Figure 2).

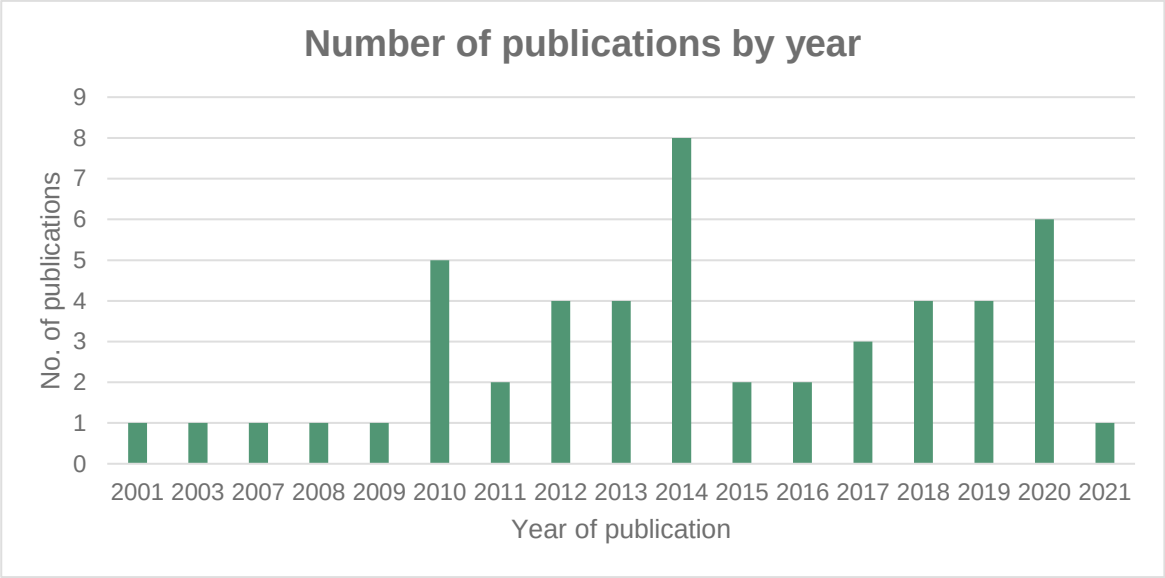

Figure 2. Number of publications by year

Besides the considerable body of literature from the United States, publications appeared in searches related to greening libraries in Aruba (Alders, 2018), China (Kang, 2020), Croatia (Dragaš,2017; Dragaš & Ercegovac, 2019; Vrana & Zečević, 2020), Hungary (Dubniczky, 2018), India (Suresh Kumar & Sofiya, 2019), Iran (Ghorbani, Babalhavaeji, & Nooshinfard, 2016), Nigeria (Oyelude & Alabi, 2013), Slovenia (Kebe & Podjavoršek, 2019), Turkey (Akbulut et al., 2018), and the United Kingdom (Matthews, 2013).

A range of literature was gathered with the majority being journal articles from library journals such as *Libri: International Journal of Libraries & Information Services, Journal of Library Administration, Library Journal*, *Progressive Librarian* and *Electronic Green Journal* with national library journals and specialist journals such as *Public Library Quarterly, College & Research Libraries,* and *Journal of Hospital Librarianship* also represented. A limitation of this search strategy was the inability to explore literature outside of articles published in English, so it is inevitable that other useful resources have not been included.

The meaning of 'greening'

Definitions and understandings of the notion of 'greening' are multiple and varied. The significant role of libraries as resource consumers and their efforts to reduce energy use and consumption are outlined in a number of publications. A review by Jankowska and Marcum (2010) states that 'greening' is a process and a state of mind (p. 162). They identify four major categories where sustainability focus is required:

1. Sustainability of scholarship and collections;
2. Green library operations and practices;
3. Green library buildings; and
4. Measuring and improving sustainability. (p. 161)

Writing about academic libraries, Jankowska and Marcum (2010) recognise the continued growth of library collections as a threat to their sustainability. They identify academic libraries as significant consumers of paper, water, electricity and ink, and argue that unless libraries address their environmental impact, their role in providing access to holdings could be compromised (p. 165). While now dated and demands on ink and printing having decreased in more recent years, the point that libraries are significant consumers of resources remains valid.

Noting a fundamental contradiction within the framework of economy, ecology, and equity, they argue that a balance is needed between 'the attributes of core sustainability in today's digital environment with the tradition of continued growth and the substantial environmental consumptions that growth requires' (Jankowska & Marcum, 2010, p. 165). Integration of sustainable strategies relating to library collections, buildings, resource digitisation and preservation, and use of finite resources is needed. Sustainability should be prominent in the work and thinking of library management, including a clear vision for improving library performance (Aldrich, 2019). The Online Dictionary for Library and Information Science (ODLIS) identifies that a sustainable library is one that is:

> designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.) (ODLIS, 2020)

These different facets of sustainability practices and concepts are explored further in the following sections.

Organisational commitment, values, and policies

The literature suggests that institutional commitment is essential to advancing sustainability (Aulisio, 2013; Davis, 2014). Organisations such as universities, businesses, corporations, local councils and city councils need to have sustainability policies to enable libraries to work with and be supported by the assistance of their broader context. For example, in the United States, Hendrick Hudson Free Library worked to put itself at the forefront of the sustainability movement with a series of green initiatives; Davis (2014, pp. 24-28) describes the role of Hendrick Hudson Free Library in helping its community to implement various changes that can impact the environment. The library established a general environmental policy and added sustainability

practices to job descriptions and employee reviews to initiate such changes. The library's mission and policies were supported by a Green Team, which included board members and volunteers who identified and promoted sustainable practices through example and education.

McBane Mulford and Himmel (2010) note that the first step to greening a library is to review its organisational values. Core values should align with becoming greener, including a statement of values generated through strategic dialogue and a facilitated sustained discussion among staff and clients (pp. 83-84). The next step is to set goals and objectives encompassing research and data gathering, development of opportunities, constraints and resources, followed by further research and analysis (p. 85). McBane Mulford and Himmel (2010) provide a Preliminary Green Assessment Checklist (pp. 57-58), a comprehensive guide on reducing and recycling solid waste, energy conservation, and water conservation (pp. 63-68).

To evaluate the steps that a library or any organisation might take, Norton (2007) suggests that libraries conduct an environmental audit. Audits could include the annual usage of water and electricity, the annual amount of hazardous and solid waste, and the quantity of paper used per employee. Similarly, Salonga-Silverio (2011, p. 82) suggests measuring the environmental performance of libraries in an Environmental Performance Evaluation (EPE). The EPE can include variables such as the perceptions of librarians and LIS professionals, types of waste produced, presence or absence of environmental management policies, presence or absence of sustainable practices, and barriers to implementing sustainable practices.

A role in education

Several studies describe the ways that libraries perform roles that extend their impact and influence outside their physical buildings buildings in creating environmentally literate communities (Aulisio, 2013; Binks et al., 2014; Jankowska et al., 2014; Miller, 2010). Ephraim (2003) argues that university libraries can encourage green habits amongst users by teaching students how to respect and care for books and other resources (p. 162). Though many university library purchases are now electronic resources there are still large numbers of shelves containing books and other physical items in most libraries. Similarly, Miller (2010) notes that public libraries can develop environmental literacy in their local communities through programs and events (p. 13), to which we can add the emergence of outdoor green or garden spaces within the library complex or managed by the library. In the same vein, Jankowska and Marcum (2010, p. 166) highlight the role of libraries in supporting global sustainability by promoting and disseminating literature on this topic and providing environmental information literacy.

Over the past decade, research on environmental sustainability in libraries notes that ecological education is seen as an important task for various types of libraries (Binks et al., 2014, p. 302; Ghorbani et al., 2015, p. 215; Miller, 2010, p. 63–75). Libraries have become ‘green educators’ or

'green teachers' with the goal of environmental education to 'raise ecological awareness, disseminate knowledge about the natural environment, develop sensitivity and promote pro-environmental attitudes and behaviours' (Fedorowicz-Kruszewska, 2020, p. 280). Kurbanoglu and Boustany, (2014, pp. 54–55) discuss that green information literacy and the greening of information literacy form an important component of the Green Library Movement and can contribute in different ways to the creation of a greener community. This view is supported by Fedorowicz-Kruszewska (2020), who labels environmental literacy as 'green information literacy', leading to 'sustainable thinking that considers how our information behaviours, including searching, using and transmitting information, affect the environment' (pp. 282-283).

Sustainability activities in libraries

Internationally, there are numerous examples of libraries and their parent bodies making considerable efforts to reduce their waste and energy use and still provide comfortable and accessible environments. Research on academic libraries in Australia and New Zealand suggests the increase in e-books and decrease in print books is reducing greenhouse gas emissions and the university's carbon footprint (Chowdhury, 2012a). However, paper use continues to be an issue. For example, Yale University provides a guide on using paper wisely for their students and staff. They identify that although their copy paper purchasing has reduced by almost half, they were still purchasing over 1,000,000 reams of paper each year (Yale University, 2021).

The book *Greening Libraries* (Antonelli & McCullough, 2012) offers exemplars and models of practice in North America that libraries can use to build their own sustainability plans and activities. One chapter describes the greening efforts at the West Vancouver Memorial Library (WVML) housed in a 1950s building that has had various additions made over the last 50 years (Backer, 2012). A Green Team of WVML volunteers was formed in 2007 inspired by a new building manager with ideas about how this older building could increase its energy efficiency. The Calgary Public Library's Eco-Action Plan resulted from the formation of a team, driven by the CEO, to develop an environmental action plan focused on eco education and using an 'environmental lens' to examine all areas of the library system (Griebel, 2012, p. 114). Likewise, the Denver Public Library has a strong interest in educating the public about sustainable living through outreach education and partnerships with other groups in Denver dedicated to sustainability (Lawrence, 2012, p. 119). Another chapter of *Greening Libraries* highlights the academic library at Concordia University in Portland, Oregon, as a community learning space (Reynolds, 2012). With much student activity moving online, the library was constructed as a gathering place supporting social interaction and intellectual exploration (p. 18).

Mentioned above, the Hendrick Hudson Free Library's efforts to push itself to the forefront of the sustainability movement through a series of green initiatives is reported in Davis (2014). The

process involved organisational commitment from the library's governing body, establishing a general environmental policy and making sustainability practices central to employees' work (p. 25). A Green Team conducted energy and waste audits and proposed solutions to reduce energy use including simpler ways to shut down computers at the end of the day and ways to reduce paper use. A commitment was made to buy products with at least 30% post-consumer recycled materials and the library stopped using chlorine-based cleaners or aerosol cans (Davis, 2014, p. 26).

Despite various practical examples in the professional literature, there is only a small body of empirical research studies relating to sustainable and environmental performances of libraries. In one study by Jankowska et al. (2014), a survey of 149 North American libraries explored engagement in sustainability-related activities and initiatives. The study found that 26% of libraries were minimally engaged, 49% were somewhat engaged, 22% were moderately engaged, and only 3% were highly engaged. Some of them reported sustainability-related activities and initiatives, which included:

- Information literacy classes incorporating topics related to open access, use of institutional repositories, the environment, retaining author rights, social equity, and community engagement (71%)
- Collaborating on sustainability-related activities with other units on campus (62%)
- Creation of subject guides related to sustainability (46%)
- Efforts to build collections devoted to sustainability-related topics (40%)
- Involvement in sustainability research (23%) (Jankowska et al., 2014, p. 53)

Still, in the United States, the Duke University Medical Center Library created and implemented a sustainability plan as a way of contributing to the University's institutional goal of becoming carbon neutral by 2024. The library created workshops titled 'Leading for Sustainability' in which sustainability staff explained the process for obtaining Duke Green Workplace Certification which requires completion of 40 out of a possible 58 action items on a checklist (Peterson et al., 2014). Examples from the checklist include:

- Eliminate unnecessary electronic equipment (e.g., desktop printers)
- Purchase recycled paper and office supplies
- Use of videoconferencing/conference calls instead of travel
- Recycle all paper, plastics, metals, glass, and cardboard
- Donate used supplies to the Duke Free Store
- Provide reusable dishware and cutlery in the staff lounge (p. 15)

Another example of supporting sustainable practices in academic libraries comes from organisations like the Australasian Campuses Towards Sustainability (ACTS) and the Environmental Association for Universities and Colleges (EAUC) in the United Kingdom. These associations are responsible for supporting educational institutions, including their libraries, with sustainability

initiatives and education. ACTS offers a variety of resources for universities wanting to evaluate current practices, including the LiFE Index discussed in the Charles Sturt University case study later in this report. Matthews (2013) reports on a range of sustainability initiatives in British academic libraries with a strong focus on green building design and architecture. Matthews extends his focus to Australia and includes the University of Tasmania as an example of an organisation with advanced sustainability practices within its daily services and operations. The University focuses on foundational initiatives like using Energy Star Ratings as selection criteria for the purchase of technology; using recycled paper for printers and copiers; offering facilities and pickup for the recycling of toner cartridges, batteries and mobile phones as well as waste recycle bins for glass and metal (Matthews, 2013, p. 195).

Measuring performance

A systematic review by Khalid et al. (2021) identified major obstacles in sustainability development processes in libraries. These obstacles included a lack of guidelines to reduce printing waste management (Dempsey & Palilonis, 2012), a lack of institutional support for creating sustainability policies for library collections (Brodie, 2012; Marcum, 2009), and an absence of frameworks for estimating or reducing greenhouse gas emissions resulting from the use and disposal of IT infrastructure required to operate information retrieval systems (Chowdhury, 2012b).

With an escalation in the number of digital projects and networking functions, libraries face increasing energy costs and increased demands for recycling unwanted equipment like obsolete computers, CDs, disk drives, and used computer paper. There is a need to develop or adopt indicators related to these areas (Jankowska & Marcum, 2010, p. 165). Chowdhury (2013) developed the model of sustainability of digital information systems and services which is useful to consider in this context. The model highlights the interconnection of economic, social and environmental sustainability and considers how these can be measured. Cloud computing for example, needs to take into account user behaviour and digital literacy, accessibility and social networking and the social informatics models (p. 616-617).

Karioja (2013) created an evaluation model of sustainable development in libraries shown in Figure 3. This model focuses on eight areas for libraries to evaluate and measure performance. By focusing on libraries ‘in action’ and not those being built with green architecture in mind, this model can be used by libraries to consider how their policies and practices support or hinder sustainability.

Figure 3. Evaluation Areas for a Sustainable library (Karioja, 2013, p. 5)

Energy and waste audits are recommended as one way to embark on library greening (Davis, 2014; Hauser, 2014). Energy audits involve recording kilowatt-hours used and the cost per kilowatt-hour. For recording levels of waste created by libraries, measuring rubbish/refuse, paper and recyclables as well as the cost of disposal over a period of time can be established. These audits can form baselines of energy use and waste production and subsequently ways to decrease these amounts can be sought, and reductions calculated. Audits can also include examination of the building envelope and systems for lighting, space heating and cooling, and water heating, including an inventory of equipment (Hauser, 2014, p. 9).

Hauser (2014) notes sustainability certification can be pursued through frameworks and tools like the Sustainability Tracking, Assessment & Rating System (STARS). STARS is a global sustainability standard created by and for the higher education sector, including academic libraries. It is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. In Australia, there is the National Australian Built Environment Rating System (NABERS) which rates buildings from 0 to 6 stars, with 6 stars representing exceptional greenhouse performance and resource efficiency. NABERS is run by the NSW Government on behalf of the Australian Government and state and territory governments.

The Sustainable Libraries Certification Program in the United States also offers a plan to support academic, public, and school libraries in developing their 'commitment to environmental stewardship, economic feasibility, and social equity' (Sustainable Libraries Initiative, n.d.b, para 1.) In the United Kingdom, the People and Planet's University League includes a biennial ranking of universities according to areas like their environmental policies, carbon management, sustainable

food, education, and waste and recycling. While this ranking is focused on the whole university, there is potential for libraries to be sustainability leaders within their educational institutions.

Conclusion

A study of published literature regarding sustainability and 'greening' practices in libraries shows us that there is an increasing interest and growth of knowledge in these ideas. While dominated by resources from the United States, the more recent literature includes contributions from across the world. Common to the resources that make up this body of work is the idea that sustainable practices in any organisation must be mindful of both the needs of the present generation, and those of the generations to follow. The literature shows various strategies that libraries around the world are using to support environmental initiatives and make sustainability a priority. From developing eco-friendly policies to playing an educative role by offering environmental literacy classes, the greening of libraries takes place in different ways depending on the community and type of library. The case studies that follow look in more detail at some library exemplars to create flexible and practical frameworks for other libraries to go green.

Case Studies

The following six case studies each provide details of a range of programs, initiatives and infrastructure projects that exemplify sustainable practices in libraries. The case studies include libraries from urban and regional areas of Australia, and in one from New York, USA. A mix of library sectors including public, academic and state libraries included to illustrate sustainable practices in multiple library contexts.

Each case study includes an image of the library, an overview of the library itself, links to online resources relating to the case study, and a description of the specific program, initiative, or infrastructure project.

The following case studies are discussed:

1. Woollahra Libraries, NSW (Urban public)
2. Noosa Library Services, QLD (Regional public)
3. National Library of Australia, ACT (National)
4. Charles Sturt University Library, NSW (Regional academic)
5. The Grove Library, WA (Urban public)
6. Longwood Public Library, New York (International public)

Case Study One - Woollahra Libraries, NSW

Figure 4. Vertical garden returns wall at Woollahra Library at Double Bay. Image credit: Woollahra Libraries

Library Service Overview

Woollahra Libraries is part of the Woollahra Municipal Council in the eastern suburbs of Sydney on the land of the Gadigal and Birrabirragal people. Three branches make up the library services including Woollahra Library at Double Bay, Paddington Library, and Watsons Bay Library.

Policy on Environment and Sustainability

- Woollahra Council's Environment page
- Woollahra Municipal Council's Environmental Sustainability Action Plan 2013-2025 (2013)
- Environmental Targets and Reports for Assessing Progress (2018)
- Ecological Sustainability Task Force

Program/initiative/infrastructure Summary

The original location for the Woollahra Library was at the beautiful Blackburn Gardens in Double Bay right on the harbour. When the library moved to a new building in 2016, the green focus remained with plants lining shelves and the beautiful vertical garden returns wall shown in Figure

3 and featured in an online issue of *Sanctuary: Modern Green Homes Magazine* (Yule, 2020). The library promotes greening of the community in other ways. For example, to support the Council's Garden Awards in October, they created themed e-Reading Lists including an Overdrive specific list. They also involved younger patrons with online school holiday activities related to gardens and plants, like 'Growing Food from Scraps', 'Make your Own Bird Bath', and 'Garden Story Time.' The recordings for these events are free to view on the library website.

Seniors in the community are also encouraged to participate in green programs like the Green Spark event organised by the Council's Environment and Sustainability Team which included 130 participants (Woollahra Libraries, 2020, p. 16). This event focused on gardens with a tour of the Cooper Park Community Garden and a special talk from a garden designer and horticulturist. The library used this event as an outreach opportunity by having their Library Spark van present with a collection of relevant books, reading lists, digital apps, and the mobile 3D printer. This focus on gardens and greening is very much a partnership across different groups in the council. It is publicised through Woollahra's Our Environment Newsletter including links to the themed e-Reading List in the library and on Overdrive for the Garden Awards. The awards themselves are also promoted with signage throughout the community and through the council website with references to the reading lists and programs on the website as well.

Case Study Two - Noosa Library Services, QLD

Figure 5. Cooroy Library grassy rooftop. Image credit: Phil Jackson courtesy of Noosa Library Services

Library Service Overview

Noosa Library Services is a part of the Noosa Council, a local government area about 130 kilometres north of Brisbane, QLD. It is on the land of the Kabi Kabi / Gubbi Gubbi people. There are three branches in the library service including Cooroy Library & Digital Hub, the Noosaville Library, and their Mobile Library.

Policy on Environment and Sustainability

- Noosa Shire Council's new Emission Reduction Policy (2016). This policy paves the way for a zero-emissions target.
- Noosa Shire Council's Environment and sustainable living policy (2019)
- Noosa Shire Council's Environment Levy Policy (2020)
- Noosa Shire Council's Zero Emissions Noosa strategy (incorporated in 2017)

Program/initiative/infrastructure Summary

On 19 November 2015, Noosa Council adopted a set of Sustainability Principles to provide a common basis for increasing sustainability in Noosa. The principles have been identified to guide the development of the Noosa Council's strategy documents and prompt consideration of sustainability across all areas of Council business so that the environmental, economic and social elements of sustainability are considered interdependently. Noosa's Six Sustainability Principles are:

1. Resources are sustainably managed so that the lifestyle of the community is preserved without compromising the ability of future generations to meet their own needs (consistent with the United Nations 1987 report definition of sustainability).
2. Noosa's economy is prosperous, diverse and protective of its unique environment.
3. Noosa residents belong to a community that values its diversity, accessibility and affordability.
4. Noosa's community is inclusive, connected and resilient and encourages participation and information sharing.
5. Noosa's community benefits from quality places and programs that enhance wellbeing and support creative, active and healthy lifestyles.
6. Good governance is achieved through effective and efficient decision making, made in the interests of the community.

The Noosa Council is currently developing a set of sustainability indicators to regularly measure and report on the Council's and the community's progress towards sustainable best practice and to identify priority issues where attention is next needed. In addition to the two static library branches and mobile library, Noosa Library Service has developed a partnership with the Queensland Government and the State Library of Queensland for the Noosa Seed Library.

The program initiatives were publicised in the community through expos such as the Living Smart Solutions Expo which is an exposition for builders, renovators, businesses and households looking for sustainable products and services available locally. In addition, the library advertised its activities during the 'Celebration of the World Environment Day' and the 'Living Smart Glossies Awards' evening where local residents and businesses are recognised for their sustainability. The council's sustainability achievements include building design and land use, creating edible landscapes, transport initiatives, environment friendly business practices, resource management, the new category 'Greening the Arts' and a newly introduced Hall of Fame Award.

Further, the Cooroy library branch hosts an impressive array of green building features. Voted as one of the six coolest libraries globally, the building is packed with cutting-edge technology and environmentally sustainable features, including a grass-covered earth roof that stabilises temperatures and reduces cooling and heating requirements. Climate control and internal comfort have been developed with a mixed-mode ventilation system. The library can operate as a naturally ventilated space, with operable louvers for cross ventilation, assisted by thermal mass of the below-ground walls and grassed roof. It can also operate with below floor displacement ventilation, which is assisted by pre-cooling of the external air through two large underground labyrinth concrete pipes. The environmentally sustainable design features a low-energy shell and a natural-light-filled interior featuring digital training and community rooms, a lounge, reading areas and a cafe that opens onto a large, covered verandah. An array of solar panels has been designed for the building to provide site-generated power to reduce power consumption and carbon

footprint. Solar chimneys have also been integrated within the roof structure. Solar heating of hot water occurs using roof-mounted solar collector heat exchangers. High levels of diffused natural lighting have been provided to the building through glass walls and high windows. A 20,000 litre (5283 gallons) below ground rainwater harvesting tank is used to irrigate the landscape and toilet and urinal flushing within the library.

Seed Library

Noosa Seed Library is a joint initiative with Permaculture Noosa and the Cooroy Community Permaculture Garden with funding from the Queensland Government and the State Library of Queensland. Starting 'from the ground up' the Noosa Seed Library provides seeds to library members to borrow, plant, grow, harvest and return. While enjoying produce from the plants, members are also encouraged to complete the cycle by harvesting seeds from their plants to return to the library for others to borrow. Seeds are accessible at all library branches.

Educational Workshops

Noosa Library Service hosts a series of educational workshops (for both adults and children) and instructional videos for the community to provide both inspiration and education and facilitate deeper social connections among community members interested in gardening, food, and sustainability issues. These events provide the secondary benefit of establishing cross-visibility and awareness among various local groups that share comparable interests but that might not have been previously familiar with one another. The library has also hosted a series of Compost and Worm Farm Workshops, and an 'Ecoflicks Film Festival'.

Recycling Books

Giving used books a new lease of life, the Library is a place community members can take a book, leave a book and share a book through the recycling books program.

Case Study Three - National Library of Australia, ACT

Figure 6. The National Library of Australia exterior. Image credit: National Library of Australia

Library Service Overview

The National Library of Australia (NLA) http://www.nla.gov.au is situated on First Nations land of the Ngunnawal and Ngambri people in Parkes Place, Canberra, Australian Capital Territory.

Policy on Environment and Sustainability

- NLA Environmental Policy (2014)

Program/initiative/infrastructure summary

As the National Library of Australia, the focus of the case study is on the Library's Environmental Policy. The Environmental Policy gives effect to government policy requirements for all agencies of the Australian Government to operate in environmentally sustainable ways through the development, implementation, and maintenance of a formal Environmental Management System (EMS) for all operations.

The NLA states its commitment to improving environmental sustainability across all operations and embeds sustainable development principles into its major projects (NLA, 2015), for example:

- Sustainable procurement and construction practices in the newly constructed Special Collections Reading Room such as the use of energy efficient and LED lighting, sustainable building materials (e.g. recycled insulation, sustainable floor covering products, re-use of heritage furniture). The Head Contractor also reports to the NLA on volumes of waste recycled, energy use, and water consumption on-site.

- The Environmental Management System is implemented by an EMS Coordinator who is responsible for the development of Environmental Action Plans, monitoring and reporting on the Library's environmental performance, and periodic reviews. The EMS Coordinator is also responsible for ensuring all staff, contractors, consultants, volunteers, Library users and the public are aware of the Environmental Policy and the EMS.

- The Library has a comprehensive recycling system and in 2014-15, it achieved re-accreditation with the ACTSmart Office Recycling Program and won a business sustainability award for being the 'Biggest Recycler' (i.e., diverting most waste from landfill to recycling; NLA, 2015).

In addition to infrastructure initiatives, in its most recent *Annual Report*, 'sustainability' is mentioned at least ten times throughout, including the core values statement (NLA, 2020, p.5). The report also links sustainability principles to its organisational capability, its financial sustainability, environmental protection, environmentally sustainable storage facilities (NLA, 2020, pp. 39-57). The NLA *Annual Report* (2020) explicitly refers to the UN SDGs albeit in limited detail (NLA, 2020, pp. 39, 57, 149). There is an implied reference to SDG 17 (Partnerships for the Goals; UN, 2015) regarding the Library's partnerships in the Pacific region 'to improve knowledge of and access to Pacific cultural heritage resources' (NLA, 2020, p. 36).

Given the spirit and intent of the NLA Environmental Policy, a partnership approach is critical to the implementation of the policy. For example, the EMS Coordinator works with a range of internal and external partners to develop and deliver environmental initiatives across all operations. Partners' awareness of the NLA's commitment to sustainability and framing all operations with reference to the Environmental Policy is fundamental to achieving its stated aims. In each NLA Annual Report since 2011, there is a section on Environmental Management. Monitoring of EMS is embedded in all operations and periodic reviews are undertaken (NLA, 2015).

Case Study Four - Charles Sturt University Library, NSW

Figure 7. Charles Sturt University Library. Image credit: Charles Sturt University

Library Service Overview

The Charles Sturt University (CSU) includes six libraries across the various campuses on lands belonging to the Wiradjuri, Ngunnawal, Gundungarra and Biripai peoples of Australia in regional New South Wales (Albury-Wodonga, Bathurst, Dubbo, Orange, Port Macquarie and Wagga Wagga.) The libraries are part of the University and operate within the auspices of the University including the sustainability initiative 'CSU Green'.

Policy on Environment and Sustainability

The sustainability practices of the CSU Library are guided by the University policies and statements:

- Charles Sturt University's Sustainability Home page
- Charles Sturt University Sustainability Statement (2019)

Program/initiative/infrastructure Summary

In 2013, the university adopted the Learning in Future Environments (LiFE) index as the framework for benchmarking, evaluating and identifying areas for improvement to shape Charles Sturt's sustainability action plan. Supported by Australian Campuses Towards Sustainability (ACTS), this initiative is implemented across all areas of the university, managed by a central department called CSU Green and led through the university by 160 trained LiFE champions. As shown in Figure 7, LiFE includes four priority areas with 16 frameworks within those areas and various

activities identified across the areas which could support the university's Sustainability Statement released in 2019.

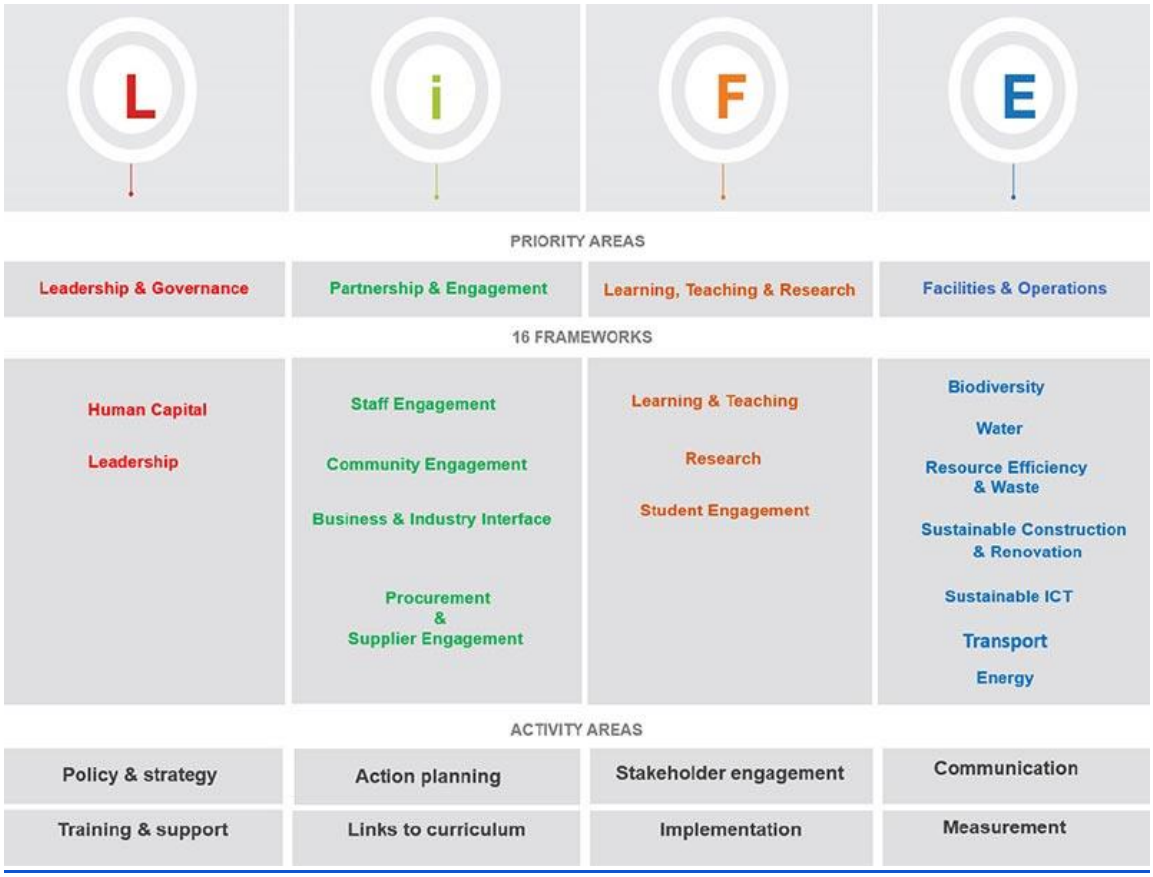

Figure 8. LiFE Index

The goal of the LiFE Framework is to embed sustainability practices in all facets of university life, identifying practices that support or impede these practices and making changes as needed to reach targets and benchmarks as shown in the graph below. As shown in Figure 8, the university has reached baseline rankings for all areas with the goal of a 5% increase per year as they progress towards best practices.

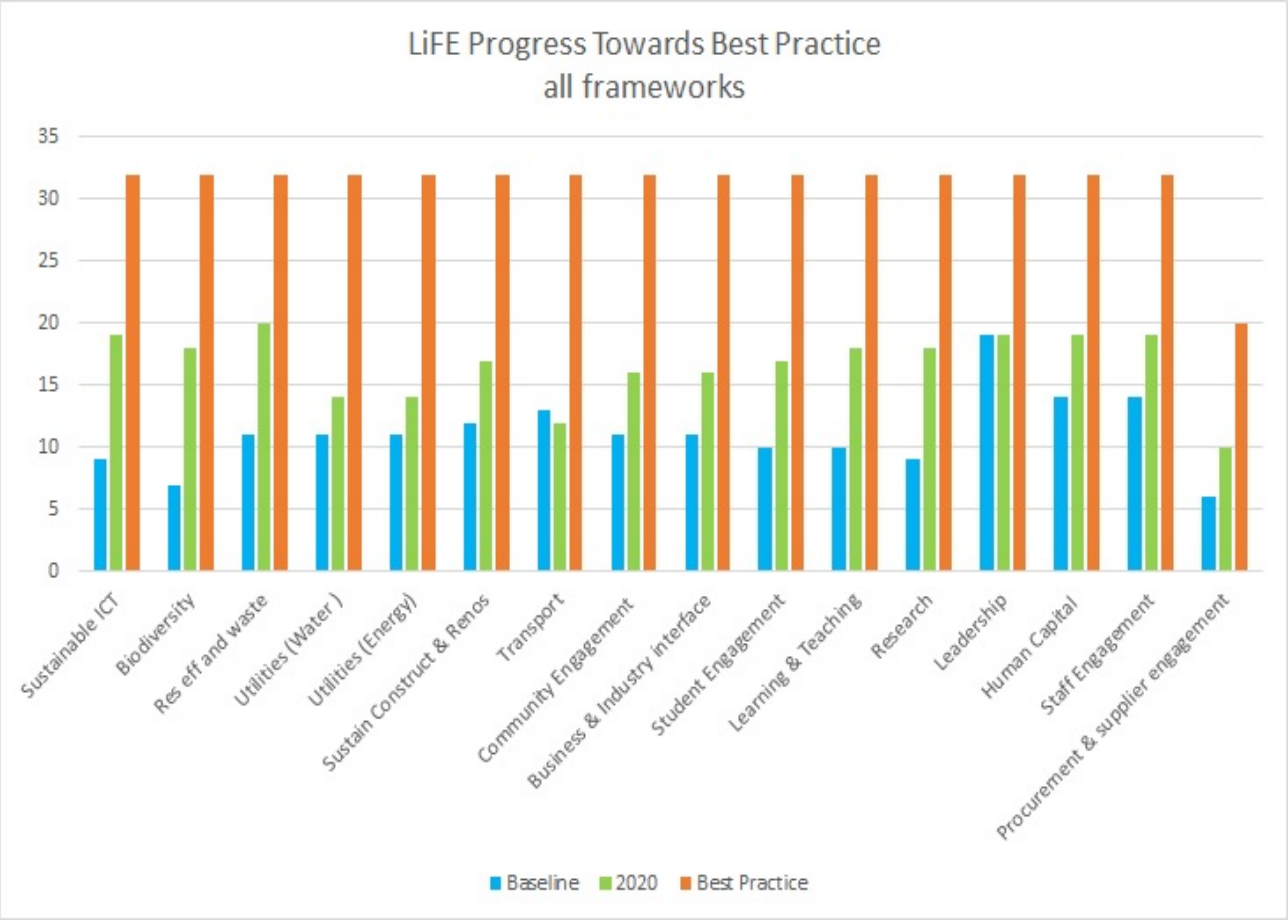

Figure 9. LiFE Progress Towards Best Practice

While this is a university-wide initiative not just in the library, it underlines processes and procedures throughout the library and presents a useful framework for other libraries to consider their sustainability practices. All students and staff at the university have the opportunity complete online training modules on sustainability practices.

Charles Sturt is a signatory to the University Commitment to the Sustainable Development Goals. Further, the SDGs are embedded within the Framework and linked to areas within improvement action plans which detail best practices criteria and the university's progress towards that.

The LiFE Index is used throughout the entire university and by 70 other institutions worldwide. The University is an active member of ACTS and ACTS Member Institutions can use LiFE for free as the organisation administers the index. Other costs are dependent on the size of the institution.

The program is assessed in various ways including annual evaluation of the framework to measure progress through improvement action plans designed to support staff in making the necessary changes. Further, senior staff have LiFE framework goals within their annual performance plan. This also puts sustainability at the forefront as a discussion point within division planning cycles.

An example outcome from the inclusion of sustainability as a discussion point within division planning cycles is the reduction in processes requiring printing.

CSU has received numerous accolades for greening activities, including recognition as Australia's first certified carbon neutral university (2016); Green Globe Awards (2016) for Regional Sustainability and Climate Change Leadership; Green Globe Australasia Award (2016) Carbon Reduction, Green Globe Award (NSW) 2018 Ed Maher (Sustainability at CSU Manager); Green Gown Awards Australasia (2019) Continuous Improvement Winner; and Green Gown Finalist International (2020) *Highly Commended* status for Sustainability Institution of the Year. Also, in 2020 Charles Sturt achieved a global rank of 61st (out of 766 universities) overall in *Times Higher Education* Impact Rankings related to the SDGs, specifically achieving outstanding individual results in categories such as: reduced inequalities, gender equality, clean water and sanitation, life on the land, quality education, and climate action.

The library supports sustainability in other ways including:

- The collection development policy is to collect e-resources whenever possible unless print is specifically needed.
- The roofs of the Learning Commons buildings host significant solar arrays.
- The Learning Commons is a recycling hub for the university, hosting printer ink, oral hygiene and battery recycling stations for the Division of Facilities Management, as well as the usual waste separation and recycling bins.
- The library displays recycling and other sustainability messages on digital screens throughout the Learning Commons spaces.
- Library managers participate in biodiversity events on various campuses and promote these to staff.

Case Study Five - The Grove Library, WA

Figure 10. The Grove Library Exterior. Image credit: The Grove Library

Library Service Overview

The Grove Library is jointly managed by the towns of Mosman Park and Cottesloe, and the Shire of Peppermint Grove in Western Australia. It is located on the First Nations land of the Whadjuk Nyoongar people.

Policy on Environment and Sustainability

The sustainability practices of the library are guided by their owning council. The following resources detail the initiatives of the council, including the library.

- Sustainability efforts by the Shire of Peppermint Grove
- Environment & Sustainability initiatives by the Town of Cottesloe
- Sustainability efforts by the Town of Mosman Park

Program/initiative/infrastructure Summary

The Grove Library notes its commitment to sustainability in its Vision Statement: 'Confident, connected communities leading the way in learning and sustainable living'. The Grove considers itself to have a special mission to educate the broader community about sustainability. In the library's events calendar, they have a category of events labelled 'Environmental Sustainability and 2021 events across the year'. These have included: 'Make New and Mend Saturdays', a crafting

group reusing items and sponsored by Earth Carer Volunteers, ‘Ace your Bulk Shopping’ a Waste Watchers Workshop, ‘WESROC: Native Verge Conversion Workshop’, a community education event about converting verges into native gardens.

The Grove acquires and maintains a showcase collection of books and magazines on environmental issues and sustainable living, and these are identified with a green ‘spot’ on the spine. These resources are frequently highlighted when the Grove hosts green-themed activities and events. The Grove also regularly incorporates green themes in children’s programming like a Halloween event themed as ‘Hallowgreen’.

The Grove Library was one of the first public buildings in Australia to incorporate a wide range of environmentally sustainable initiatives such as the responsible demolition of existing buildings that allowed 80% of demolition materials to be salvaged. The design team had initially designed a ‘basic’ green building, but as the design developed through phases of consultation with stakeholders and user groups, the decision was taken to include as many green initiatives as possible.

The library building includes a climate sensitive design, with renewable energy generation and energy and water efficiency measures. The library includes environmentally friendly furnishings and fittings made from materials with low volatile organic compound emissions and purchased from suppliers with strong green credentials. To avoid the use of plastic at library events, plates, cups, glasses, knives, and forks are kept in commercial quantities. The gardens surrounding the building include a storm water treatment system including rain gardens, sensory gardens, and shade gardens. Some food plants are included in the plantings, and a green wall garden is included as a demonstration of a vertical landscape.

Case Study Six - Longwood Public Library, Middle Island, New York, USA

Figure 11: Longwood Public Library Interior. Image credit: Longwood Public Library

Library Service Overview

The Longwood Public Library services the Middle Island area of New York, USA. It is a single branch library that was certified as a 'Sustainable Library' in August 2021 through the 'Sustainable Libraries Initiative.' Prior to achieving this certification, the library achieved a Green Business Partnership in April 2021. The library includes a dedicated teen area, a children's room, story room, community room and also hosts a local history room. In addition, it provides services to teachers and home-schooling families and job seekers.

Policy on Environment and Sustainability

The Longwood Public Library gained its Sustainable Library Certification in August 2021 through the Sustainable Library Certification program recognised by IFLA. The Library's press release regarding this award describes the accreditation process and priorities, while their public statement on sustainability explains some of the processes associated with their sustainability work.

Program/initiative/infrastructure Summary

Gaining certification as a Sustainable Library required Longwood to comply with a 'Triple Bottom Line' definition of sustainability where they had to demonstrate their programs and services were 'environmentally sound', 'economically feasible', and 'socially equitable'. In doing so, they were praised for their building design along with their consideration of their communities' needs when designing sustainable services and programs.

Longwood has written an Environmental Policy that states the library will observe all relevant environmental regulations, prevent pollution, train staff to understand sustainability issues and practices, and communicate their sustainability practices to patrons. In addition, they have committed to a process of continuous improvement that will be demonstrated by measuring the library's environmental impacts. To enable the measurement of the library's environmental impact, Longwood regularly measures their Greenhouse Gas emissions by metric tons of CO_2e (carbon dioxide equivalents – Ecometrica provides a good explanation of this measure and why it is an important indicator of sustainable practices. Longwood was able to measure emissions from their use of natural gas, and their use of air conditioning and refrigeration. They were able to reduce these emissions through better maintenance of air conditioning machinery. Longwood encourages staff to reduce their use of electricity when they can, and requests that staff work virtually from home when possible to reduce commuting-related emissions. Staff working on site found ways to reuse and recycle items as an alternative to disposal. Unavoidable emissions were offset by the creation of renewable energy via solar roof panels. Staff are also encouraged to take part in wellness activities and support this through forming a Safety & Wellness Committee.

Some simple methods of 'green cleaning' were introduced by the maintenance staff including the use of reusable cloth towels as an alternative to disposable wipes. These clothes are washed and air-dried each day. Environment-friendly cleaning fluids are used throughout the building and all maintenance staff have received training in environmentally sustainable practices.

Recycling bins for paper, plastics and cans are available throughout the building for the use of staff and visitors. No weeded collection items or obsolete equipment are discarded, but are instead sold on, donated, or if in poor condition, recycled. Outside the library building, bike racks and reserved parking places for hybrid and low-emission cars are located at the front entrance to encourage the use of these vehicles. Also outside the library, lawns have been replaced by native trees to attract local species of animals and insects. An additional benefit of planting native trees is that they have reduced need for additional water, fertilizers or pesticides compared with introduced species.

Library users can participate in community programs designed by the library on topics such as recycling, climate change, native plants, sustainable gardening and seed diversity. Earth Day is celebrated each year with library patrons. Community partnerships have been developed between the library and external government departments, for-profit and not-for-profit organisations to deliver projects such as 'Little Free Libraries' in local parks, and a free food pantry outside the library building, stocked by community donations.

Longwood's commitment to sustainability is supported by their 'Future Sustainability Goals' that include continuing to monitor emissions and operating their building as sustainably as possible.

They will continue to train staff and patrons in sustainable practices, reduce waste, decrease business travel, increase ‘green purchasing’ and seek out new community partnerships.

Recommendations

The information collected for this report provides a broad overview of the current efforts of six Australian and international libraries towards 'greening' their buildings, services, programs and policies and towards supporting sustainability across the board. This section takes lessons learned from these case studies and our broader reading to identify recommendations that can be implemented by other libraries. The recommendations are divided into three categories: library management, community engagement and partnerships.

Library Management

Perhaps of most importance, it is recommended that libraries develop official policies regarding the promotion of sustainability in everyday library practice. At an organisational level, it is recommended that:

- Libraries tap into the environmental and sustainability plans of their parent or governing organisations or that they create their own plans.
- While advocacy is often a challenging issue for libraries, they can actively advocate by initiating and collaborating in greening activities and share their efforts more widely through online platforms, such as their websites and social media.
- 'Green' themes are embedded into every aspect of libraries' business, including branding, programming, events, vision, and mission statements.
- Libraries have internal plans to raise awareness of the staff's impact of their activities at work and implement any actions arising from these plans.
- Risk assessments including environmental impact and energy consumption of technologies that have not been tried on a large scale in public buildings are carried out before libraries commit to their use.
- Library management is ready to commit to managing the changes and challenges of operating a green or more sustainable building.
- Practical guidelines are embedded within the library's policies across various operational areas to create an organisational mindset of sustainability.
- Key Performance Indicators (KPIs) for the library and its staff need to include sustainable practices and measures across the organisation as standard. These KPIs should be evaluated at each round of performance reviews.

Community Engagement

Based on data generated from our research and given the limited resources of most libraries and councils, libraries are best placed to focus their resources on community engagement activities. This helps ensure that the community is involved and informed about policies and efforts towards greening the libraries and will allow libraries to lead by example. Community engagement raises

awareness, understanding and support and can include promotional activities and campaigns using the internet, online information and resources, educational tools and community events to deliver sustainability related engagement strategies that have local reach and can connect to and support national and global sustainability initiatives such as the UN SDGs.

To this end, some key recommendations for the libraries are to:

- Create a community consultation and communication plan.
- Proactively engage with the community through continuous consultation.
- Create and implement an ongoing community education strategy relating to the benefits and practical actions that the community can take to secure a sustainable future.
- Collate and disseminate credible, easy to understand information sheets and press releases.
- Lead by example so that it is easy to demonstrate how community members could apply similar green steps in domestic contexts.

Partnerships

The findings of the research suggest ongoing partnerships and collaborative initiatives between libraries and other stakeholders, such as:

- Partnering with local green groups, and giving them space for their workshops and programs and joining connected school, university or business sustainability initiatives.
- Joining groups like the IFLA Environment, Sustainability and Libraries Section's (ENSULIB) to stay up to date on global sustainability initiatives in libraries
- Joining the special interest group elist, ALIA Green, to receive and share news of sustainability in Australian libraries.
- Collaborating with neighbouring councils for public library activities and planning.

Overall, it is recommended that libraries analyse and accept any shortcomings in project planning and implementation. Libraries need to consider their efforts as valid learnings rather than allowing shortcomings to overshadow the overall successes.

Conclusion

To conclude, libraries in Australia and many other parts of the world are, to differing extents, embracing a diverse range of greening efforts and engaging in and seeking out increasingly sustainable practices, programs, services and workflows. Collectively, these efforts will help ensure the environmental integrity of library buildings and practices, and work to support the work across the world that is going into reaching the UN SDGs. The information available in this

report has highlighted the rich range of initiatives taken by the six libraries discussed, each case study demonstrating how greening initiatives are adapted to local contexts, communities and collections and the particular opportunities and challenges they raise.

Further approaches would benefit from innovation and progress at the policy level, community engagement and working in partnerships with local, national, and international groups. What is clear is that libraries in all sectors can play a crucial role through education, awareness raising, and behaviour modelling as well as providing opportunities for communities to get involved in practical sustainability efforts.

We hope that the recommendations above will assist in guiding and inspiring libraries toward embracing new approaches, reaping beneficial outcomes in greening libraries and furthering and supporting the United Nations Sustainable Development Goals.

Limitations

The overarching aim of the study was to highlight best practice and to inform libraries in an attempt to support their environmental action through their library spaces and activities. While the research team reviewed published literature on the topic and examined several national and international libraries' websites to develop a literature review and case studies, identifying challenges and highlighting exemplary practices in public, national, and academic libraries, there were certain limitations while exploring the aim of the study. It is expected that these points will help future researchers avoid facing the same shortcomings.

- A reliance on information available on public websites for case studies has limited the identification of data to publicly available data only.
- The overlap of the organisational policies with the libraries' policies presented a challenge in separating the practices followed by the library versus the organisation.
- Due to government Public Health Orders related to COVID-19, the research team was unable to visit the libraries for primary data collection. Greater access to primary data would have enabled a more thorough analysis.

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