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ARTICLE

Tomorrow’s green public library1,2

Lisa Binks⁸, Emily Braithwaite⁷, Lisa Hogarth⁹*, Andrew Logan⁴ and Stephanie Wilson⁵

⁸Monash Public Library Service, Mount Waverly, Victoria, Australia; ⁷Wyndham City Libraries, Werribee, Victoria, Australia; ⁹Maribyrnong Library Service, Footscray, Victoria, Australia; ⁴Brimbank City Council, Sunshine, Victoria, Australia; ⁵Mornington Peninsula Library Service, Rosebud, Victoria, Australia

This article provides recommendations that can be used by public library services and associated organisations when considering building or refurbishing library buildings. Recommendations range from simple and easy-to-implement practices and procedures, to large-scale building development. It also provides a framework for libraries to follow when designing a new building, refurbishing existing buildings and raising community awareness of the benefits of designing and running sustainable libraries. The article looks at sustainability and its importance within a library, refurbishment of library buildings, greener work practices and public education initiatives. Three key areas of sustainability are highlighted: building/refurbishing, sustainable practices and education. The recommendations and concepts noted in the article are demonstrated through a case study of the Melton Library and Learning Hub in Victoria. In the relative absence of relevant Victorian publications, Tomorrow’s Green Public Library also serves as a resource guide to direct public libraries to further information and publications available.

Keywords: environmentally sustainable design; public libraries; green buildings; sustainability; Green Star Rating; library design

Implications for best practice

- Public library services that are planning to build new or refurbish existing library buildings should use sustainable practices and principles.
- A framework provides a practical starting point for library staff when planning sustainable library design and initiatives.
- Sustainability is an important initiative for public libraries.
- Community awareness of the benefits of designing and running sustainable libraries, and how these can be further implemented in the home environment, can be raised through implementing sustainable practices and principles.

A sustainable library

Sustainability has many meanings, including preserving natural resources for the future, living in a carbon-neutral way, and meeting the needs of the community now whilst ensuring that the needs of future generations are also met. In this article, sustainability is defined as living and working in a practical and environmentally responsible manner, to ensure the protection of the world’s resources for future generations. The term ‘sustainability’ is often used interchangeably with the word ‘green’.

In most cases, sustainable buildings cost less to operate and maintain than non-sustainable buildings. They create less strain on natural resources and are more attractive.
and comfortable than older buildings. Although the initial financial outlay for the building or redevelopment of a green library is more expensive than a traditional build, the decreased running costs and added benefits to the community and environment make the overall investment a more cost-effective long-term proposal.

A sustainable library encompasses not only design and refurbishment of library buildings, but also improved day-to-day operations and procedures of the library. It also contributes to educating the community about responsible environmental practices. Libraries are in a unique high-profile position that enables them to be community role models by implementing sustainable strategies. Public libraries have the opportunity to become environmental leaders in our communities as they are committed to the community and to the future by creating welcoming and long-lasting buildings. When creating green buildings, libraries make good use of public funding and lead the way in the community by implementing sustainable design and operations.

Designing for and measuring sustainability

According to the Green Building Council of Australia, the building sector contributes 23% of all greenhouse gas emissions in Australia each year (Green Building Council of Australia 2009). The building sector therefore has the potential to make a huge impact on lowering greenhouse gas and energy emissions.

There are many tools for measuring and assessing the sustainability of buildings in Victoria, such as Green Star (Green Building Council Australia), STEPS (Sustainable Tools for Environmental Performance Strategy) and SDS (Sustainable Design Scorecard) (Municipal Association of Victoria 2011). The average Green Star certified building uses around 66% less energy, 51% less water and emits 62% less greenhouse gases than traditional buildings (Green Building Council of Australia 2009). Currently, the Green Star system is the most commonly used certification system in Australia, administered by the Green Building Council of Australia. This system is holistic, national and voluntary. It rates buildings on nine factors:

1. Management (of the design and construction)
2. Indoor environmental quality
3. Energy
4. Transport
5. Water
6. Materials
7. Land use and ecology
8. Emissions

Buildings can achieve a maximum of 6 stars. The star system indicates either 4 Star (Best practice in environmentally sustainable design (ESD) and/or construction), 5 Star (Australian excellence in ESD) and/or construction or 6 Star (World leadership in ESD and/or construction).

The Local Government Planning for Sustainable Building Guide (Municipal Association of Victoria 2011) provides information for local councils to improve sustainability of buildings built in their municipalities. This guide also states that the ultimate environmental design aim for the built environment should be to create buildings and neighbourhoods that benefit the community, use no energy, no water, produce no waste in operation or construction, and are made of materials that are derived from sustainable sources.
Whilst this may be difficult to achieve in practice, this aim should be the theoretical goal for sustainability opportunities that are considered in any project (Municipal Association of Victoria 2011, 3).

Buildings should include aspects of ESD principles. Environmentally sustainable, or ‘green’, design aims to reduce the environmental impact of the construction and operation of buildings. Key ESD principles include reducing energy consumption and cost; providing a natural environment for people; passive and active ventilation, heating and cooling; natural lighting; reducing heat in summer and reduction in water usage.

Reducing energy consumption
Buildings can achieve a reduction in energy consumption and costs by implementing a number of different strategies, ranging from renewable energy sources to energy-efficient lighting and climate control systems.

Renewable energy
Renewable energy provides smarter and cleaner ways of meeting the energy needs of a building, as opposed to using non-renewable resources such as coal and gas. Power is generated by sources such as solar, wind and hydro (water). Renewable energy systems reduce greenhouse emissions, decrease demand on conventional energy resources and are becoming more cost effective in the long term. The most common renewable energy systems used in Australia are solar power systems and wind turbines.

Solar power generates power by converting sunlight into electricity. Energy produced can power fixtures and appliances in a building. Solar panels require a significant upfront cost, but once installed they need little maintenance and can last for up to 20 years. Excess energy can be fed into the main electricity grid or into a storage system. Wind turbines or generators use the wind to turn a propeller which drives a generator and produces electricity to power a building onsite. Wind turbines are usually installed on a tower and are better suited to rural or non-urban areas.

Building orientation and mass
Reductions in building energy use through lighting systems and climate control systems can be gained through strategic building orientation and massing. Building massing, which is the overall size and shape of a building, can reduce reliance on artificial lighting by making the most of natural lighting. Buildings can be oriented in a way that utilises the sun’s path at the building site. Building massing can also be used to influence elements such as rainwater harvesting and acoustics.

Indoor environment quality
Following ESD principles and careful building design, library buildings can achieve efficient and sustainable indoor air, thermal and lighting qualities. This will provide cost benefits to the organisation in the ongoing running costs of the building, and also allow libraries to provide spaces to their members that are both visually inviting and comfortable for spending extended periods of time in (see Table 1).
Materials

The materials used in the construction of a building can improve the sustainability of the library by reducing the need for mechanical systems to improve the indoor environment quality. The use of materials from sustainable sources also helps reduce the impact of the building’s construction on the environment. Ideally, materials used in a building should also create minimal waste at the end of the building’s life, preferably being easily re-used in other natural or industrial processes. Some points that should be considered when designing a sustainable library are outlined next.

Carpet tiles and sustainable carpets

Carpet tiles, which can be produced from recycled materials, help to reduce waste caused by replacing large areas of carpet within a building. When high traffic paths are worn or small areas damaged, carpet tiles in the affected areas can be easily replaced.

Low embodied energy materials

‘Embodied energy’ refers to the energy used during building construction. This includes the energy to obtain raw materials, energy needed to turn the raw materials into building products (for example concrete, transporting the materials) and the energy used to power

<table>
<thead>
<tr>
<th>Design element or action</th>
<th>Beneficial effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properly designed ventilation systems (passive and mechanically powered)</td>
<td>Provides a thermal comfort for the building occupants, and well as keeping internal air fresh</td>
</tr>
<tr>
<td>Climate-controlled systems to monitor temperature, humidity and air circulation</td>
<td>Reduces energy consumption by activating ventilation systems only when necessary, whilst maintaining both thermal comfort and air quality</td>
</tr>
<tr>
<td>Integration of daylight and energy efficient light fittings</td>
<td>Reduces energy consumption of the building based on naturally available light at that particular time of day, and provides cost benefits with reduced electrical consumption</td>
</tr>
<tr>
<td>Windows and shades</td>
<td>Reduces heat gain: unprotected glass is the greatest source of heat gain</td>
</tr>
<tr>
<td>Passive solar heating</td>
<td>Maximises the effectiveness of the heating and cooling system by keeping summer sun out and letting winter sun in</td>
</tr>
<tr>
<td>Passive cooling</td>
<td>Achieves natural cooling during summer and minimises energy use for cooling</td>
</tr>
<tr>
<td>High quality insulation throughout the building</td>
<td>Minimises heat loss and heat gain through walls, roofs and floors</td>
</tr>
<tr>
<td>Airtight enveloped building design</td>
<td>Reduces heat and cooling loss through drafts, reducing the need for active heating and cooling systems</td>
</tr>
<tr>
<td>Energy efficient cooling and heating systems such as in-floor systems</td>
<td>Does not require air to be cooled as much and therefore reduces energy consumption</td>
</tr>
<tr>
<td>Night purge systems</td>
<td>Effectively cools buildings overnight during the warmer months to reduce the reliance on air-conditioning systems</td>
</tr>
<tr>
<td>Rooftop gardens</td>
<td>Absorbs heat from direct sunlight on the roof, and reduces reliance on mechanical air conditioning, whilst also removing CO₂ from the air</td>
</tr>
</tbody>
</table>
tools and machinery for construction. Low embodied energy building materials are those that use less energy and resources to make, transport and build. These materials will help minimise the impact the building has on the environment from the start, reducing CO₂ and waste emissions from the manufacturing of the building materials. Embodied energy can also be interpreted to include the energy used to transport the material and construction workers to the site (Gibson 2011).

**E-Crete**

E-Crete is a geopolymer concrete. Geopolymers are a type of inorganic polymer that can be formed at room temperature by using industrial waste or by-products such as fly ash and slag – both by-products of other manufacturing. The use of E-Crete reduces the embodied CO₂ of traditional concrete by at least 60% and reduces the impact on the environment from quarrying for the products (http://www.zeobond.com/products-e-crete.html).

**Solar hot water systems**

There are two types of heaters: active systems, which use an electric pump to circulate the fluid, and passive systems, which have no pump. Heat pump or solar water systems are beneficial to the environment and will reduce energy cost, over the years paying for themselves.

**Water**

Water shortages have been common in Australia for many years, resulting in the need to enforce water restrictions that vary in stages across the country. Due to the rising cost of infrastructure and the shortage of water in many Australian states and territories, costs have risen dramatically, reinforcing the need to think sustainably about water usage.

The following actions can be implemented to reduce water consumption:

- Harvest rainwater: aim to harvest enough to meet 100% of the building’s water demand.
- Store run-off in water tanks: once a building has been constructed on a site, water run-off increases. Use run-off for landscaping or toilets.
- Treat and reuse water: waste water or storm water can be treated and re-used for irrigation purposes.
- Treat black water (from kitchen and toilets): needs to be treated either biologically or mechanically before it can be reused.
- Store water in underground or in-ground tanks.
- Use drought-resistant plants and indigenous shrubs or trees and grasses: this reduces the need for watering as these varieties tend to require less water.
- Use mulch on garden beds: this keeps the soil moist and minimises water loss from the soil and reduces the need for watering.
- Use electronic watering systems at night: this decreases water evaporation. Drip watering systems are preferred over sprinkler systems that can waste large amounts of water.
- Carefully landscape surrounding grounds: this can assist in thermal control; additionally, the plants will absorb carbon dioxide from the atmosphere.
- Where possible, minimise lawn areas or consider using indigenous grasses or materials such as synthetics, crushed rock or gravel in order to decrease the amount of water needed to maintain outdoor areas.
- Use automatic or sensor taps and dual flush toilets. Install waterless urinals: this can dramatically decrease water usage in bathrooms.
- Install efficient fixtures and fittings such as flow regulators or aerators on taps: this reduces water use.
- Avoid leaks wherever possible and aim to have them fixed as soon as they are noticed to reduce water use.

Sustainable practices
Reduce, re-use and recycle – these are fundamental aspects of sustainable living and, from an operational point of view, all very valid ideas when it comes to reducing impact on the environment. But there is far more to sustainable practices than just these three concepts. It is important for libraries to start thinking outside the box in terms of truly sustainable practices. Ensuring that initiatives are embraced and changing the mindset of customers and staff are essential steps in the process of moving to a sustainable industry. Table 2 provides a list of initiatives that libraries can incorporate to ensure they operate more sustainably. Some libraries will be able to adopt all, or most, of these ideas; however, some will be able to adopt only a limited number of them, dependent upon budgetary constraints. It is important to recognise that some of these initiatives will, in fact, reduce a library’s operating costs, such as a reduction in the use of energy and water.

Many operational procedures and practices are entrenched in the library industry. It is imperative that library management ensures that all staff members are included in the planning, implementation and management of the new policies. This will ensure that staff feel they are included and have some ownership of the changes involved in moving towards a more sustainable way of operating.

Education
Aside from being intrinsically valuable, green public building projects can be excellent vehicles for initiating broader community conversations about sustainability. Libraries are traditionally places associated with learning and discovery, so it is fitting that ‘green’ libraries use their buildings to demonstrate green technologies and practices. Libraries can show their patrons how these practices can be applied at home, work and in the community.

Public libraries are well positioned in their communities to deliver education programmes about environmental sustainability. In this paper, the Melton Library project is described (see Appendix A). One of Melton Library’s key targets is to educate people and lead by example. They understand the importance of ‘walking the talk’ – not just designing and building a sustainable library, but living it and sharing it with the community.

Libraries can use a variety of methods to educate the community about responsible environmental practices. Some of these methods include library programming, providing resources, in-library displays and energy dashboards.

Library programming
In order to help educate the community about sustainability, libraries can plan and execute programmes featuring guest speakers on topics such as water-wise gardening practices, composting and worm farming, recycling in the home, energy efficiency and ‘green cleaning’ (using non-toxic, non-hazardous chemicals). Other events could include film
nights, fruit and vegetable cooperatives and author talks. Immediately following the
opening of a new ‘green library’, it would be beneficial to invite the architect and builders
to present the key ESD features to the community.

**Resources**

Libraries can provide access to a range of resources including books, magazines, DVDs
and energy kits.

**In-library displays**

A library that has successfully implemented green practices and/or sustainable building
design can create displays within the library that help to educate the public about the

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**Table 2. Sustainability initiatives.**

<table>
<thead>
<tr>
<th><strong>Energy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Signage in staffing areas (for example ‘Please turn off when leaving room’)</td>
</tr>
<tr>
<td>• Maximum use of natural lighting</td>
</tr>
<tr>
<td>• Light-sensitive lighting</td>
</tr>
<tr>
<td>• Movement-sensitive lighting</td>
</tr>
<tr>
<td>• Energy-efficient lighting</td>
</tr>
<tr>
<td>• Heating/cooling to be run only on extreme temperature days</td>
</tr>
<tr>
<td>• Re-use of warm air produced from computer/server rooms into areas in need of heat</td>
</tr>
<tr>
<td>• Green IT solutions, for example energy efficient servers, printers, photocopiers, computers, screens and programs</td>
</tr>
<tr>
<td>• Installation of thermal solar energy panels</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Waste</strong></th>
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</thead>
<tbody>
<tr>
<td>• Recycle e-waste: can it be used by someone else or does it need to be recycled efficiently?</td>
</tr>
<tr>
<td>• Recycle everything! Toners, paper, cardboard, flyers, books, CD/DVD cases, etc.</td>
</tr>
<tr>
<td>• Waste bins in every area of the library for rubbish, paper products, recyclables (different colour for different functions): this will require cleaners to be ‘on board’ with the library’s needs</td>
</tr>
<tr>
<td>• Implement a waste audit that can be used as a starting point for measuring the library’s waste and any possible reductions – an organisation such as Green Makeover (<a href="http://www.greenmakeover.com.au">www.greenmakeover.com.au</a>) can deliver this</td>
</tr>
<tr>
<td>• Greater reliance on eResources to reduce paper production and waste in monograph production</td>
</tr>
<tr>
<td>• Resource sharing to reduce the number of items required</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Transport</strong></th>
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<tbody>
<tr>
<td>• Hybrid or electric van for courier use on branch run</td>
</tr>
<tr>
<td>• Hybrid or electric car for staff use</td>
</tr>
<tr>
<td>• Electric vehicle charging stations</td>
</tr>
<tr>
<td>• Multi-purpose external visits</td>
</tr>
<tr>
<td>• Set up and maintain a staff car-pooling roster</td>
</tr>
<tr>
<td>• Incentives for public transport users, cyclists and walkers such as bike shelters, bike racks and close proximity to public transport</td>
</tr>
<tr>
<td>• Staff to work at the branch closest to home</td>
</tr>
<tr>
<td>• Flexible working hours to avoid road congestion</td>
</tr>
<tr>
<td>• Video meetings and teleconferencing</td>
</tr>
<tr>
<td>• Allow remote access to system for staff to work from home</td>
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<thead>
<tr>
<th><strong>Green Team</strong></th>
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<tbody>
<tr>
<td>• Create a ‘green team’ to investigate, implement and monitor sustainability measures</td>
</tr>
<tr>
<td>• Create incentives for staff – for example, the monthly ‘green’ staff member wins a ‘green’ prize</td>
</tr>
<tr>
<td>• Review suppliers and ensure they practice sustainable practices (use a company such as Ecobuy (<a href="http://www.ecobuy.com.au">www.ecobuy.com.au</a>) to create sustainable procurement procedures) and give sustainable practices a higher rating when comparing quotes</td>
</tr>
<tr>
<td>• Set up and maintain a car-pooling roster</td>
</tr>
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</table>
sustainable strategies employed and their positive impact on the environment. For example, Melton Library (see Appendix A) has plans to include green trails which involve a process of self-discovery where patrons follow a trail through the library, stopping at points along the way which highlight the key ESD features via signage. Other initiatives include web-based interactive programmes accessible both remotely and from within the library. The use of monitors to display slideshows featuring the building project from start to finish, including commentary on ESD features, can help to create interest and give a good background on the project and its key goals and objectives. Communication and transparency are essential elements of community education.

By highlighting the key ESD features of the building, including recycling and re-use of materials from a demolished site, libraries can demonstrate sound sustainability practices and encourage the community to think about ways that they can do the same. It also fosters a sense of community satisfaction: patrons like to know that their rates are being put to good use. In their YouTube video, which was posted after the new building opened, Melton Library aims to educate the community about the ESD features of the new building (https://www.youtube.com/watch?v=UKxze2R1mv4).

Book displays are also an excellent way of educating the community on sustainability. Creative, attractive displays featuring items from the collection such as building green homes, water and energy saving, and recycling create interest and awareness about environmental issues.

**Energy dashboards**

Other education initiatives include monitors within the building displaying the performance of the building using software such as eGauge MySmartCTI (www.egauge.net). This technology can be used within the library and on the library’s website to help inform and educate the community. This software is a visual, practical way of educating the community on energy efficiency, and demonstrates the effects that the ESD features are having on the actual energy consumption of the building. It has the capacity to include sustainability tips as well as detailed information about the library’s green features.

**Conclusion**

This article offers a framework and point of reference that provides a valuable information guide, and can be used as a practical starting point for library services planning to build new libraries or refurbish existing library buildings. Three key areas of focus are highlighted: building/refurbishing, sustainable practices and education. Sustainability encompasses a wide range of principles and practices and involves making environmentally friendly design and construction decisions, implementing greener work practices and educating communities in the value of living sustainably. The article can be used in conjunction with the *People Places* guide (State Library of New South Wales 2012). It is hoped that future plans to build new libraries and re-fit existing buildings will include consideration and adoption of the ESD features and recommendations for sustainable practices outlined in this framework.

**Acknowledgement**

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Notes


2. This article has been double-blind peer reviewed to meet the Department of Education’s Higher Education Research Data Collection requirements.

References


Notes on contributors

Lisa Binks moved to the information sector from the business world. She works as a Youth Services Librarian at Monash Public Library Service, providing programmes and services for children and teenagers.

Emily Braithwaite is the Collections and Information Services Coordinator at Wyndham City Libraries, where she is responsible for the adult collections at four library branches. She has worked in both academic and public libraries since 2007 in a number of different roles.

Lisa Hogarth is currently completing a Master of Information Management degree. She works as Yarraville Branch Librarian for the Maribyrnong Library Service, where she enjoys overseeing branch operations and providing a range of valuable information services and programmes for the community.

Andrew Logan is a Senior Library IT Services and Programs Officer at Brimbank City Council. Andrew has worked in a variety of roles at public libraries since 2001. Andrew has concentrated his work in the past 10 years around technology-based roles that allow him to deliver programmes and services that aim to increase digital literacy in his community.

Stephanie Wilson is the Library Services and Programs Coordinator at the Mornington Peninsula Library Service. She has worked in customer service roles in Victorian public libraries since 1983. Since commencing with the Mornington Peninsula Shire in 1999, Stephanie has worked in numerous positions and is currently in a library management role overseeing the operations of the library service.

Appendix A. Case study – Melton Library and Learning Hub

Melton Library and Learning Hub, 31 McKenzie Street, Melton, Victoria

Municipality: City of Melton

Project cost: $21 Million

Completed June 2013

Site Area: 3500 m²

Architect: FJMT

Builder: ADCO Constructions

The Melton Library and Learning Hub was built at the site of the old Melton Library. The building consists of 3500 m² over two levels and is four times larger than the previous 30-year-old building.
It services a population of approximately 50,000 people and contains around 70,000 items. In demolishing the old building, the City of Melton ensured that they were as sustainable as possible, recycling 92% of the old building materials.

This innovative building has a strong focus on sustainability and has a proposed 5 Star Green Star rating from the Green Building Council of Australia, and will be the first public building in the Western Metropolitan area that achieves this rating. As part of this building project, Melton City aimed to set a benchmark for sustainable buildings and show leadership in the area of green and sustainable buildings. It is hoped that this will inspire builders to achieve new levels of environmental sustainability within the City Council.

Aiming to achieve a 5 Star Green Star rating can increase the costs of building by 5%. These costs can be slowly recouped over the years in costs saved on amenities usage.

The Melton Library features the following green and sustainable design features:

**Building and materials**
- Efficient design to minimise heating, cooling and lighting costs.
- Real-time display of building energy usage.
- First structural use in Australia of E-Crete panels (made with no Portland cement resulting in a 900 kg reduction in CO₂ emissions per tonne compared with traditional concrete).
- Sustainably sourced timber – 95% forest certified.
- Use of steel from Accredited Responsible Steel manufacturers.
- Environmentally certified materials in all facets of the construction and fit out.
- New materials used have a high recycled content.
- As often as possible, building components were designed to be disassembled, moved and reused.
- Durable and maintainable material was selected and used to minimise the need to replace or redo sections of the building in the near future.

**Energy**
- Underfloor air distribution system.
- Mixed mode ventilation (mechanical and natural).
- Night purging of hot air.
- Highly efficient air systems – 50% of heating will come from solar thermal collectors.
- Carbon dioxide sensors to monitor acceptable levels and increase airflow as appropriate.
- Solar thermal collectors.
- Finally, 50 m² of solar electricity generating Photovoltaic panels.

**Light**
- Digital controlled automatic lighting.
- Daylight optimisation and daylight glare control.

**Water**
- Water tanks in the size of 2600 m³ (capacity 48,000 l) dedicated to rainwater collection.
- Rainwater harvesting and re-use in irrigation and toilet flushing.
- Solar hot water.
- Indigenous drought-tolerant plant species used in landscaping.

**Waste**
- Operational waste management plan.

**Transport**
- Transport management, including onsite car and bicycle parking and close proximity to bus stop.
Not only has the sustainable design of the Melton Library resulted in a decreased environmental impact and set a benchmark for sustainable public libraries, it will also save the municipality a significant amount of money in its day-to-day running, compared with a standard building. It is estimated that the annual utility cost savings will average $30,000 a year. Melton Library and Learning Hub will have a 52% decrease when compared to standard total energy use, with a 60% reduction in gas usage. Thermal collector heaters will save $23,000 a year in gas costs, with electricity savings of $6000 annually. The building will have a decreased water consumption of 82% resulting in $5000 savings on water per year.

Appendix B. Recommended resource list

Websites

Green Building Council Australia. The Green Building Council Australia promotes the development of a sustainable property industry in Australia. Its website provides information on sustainability by promoting green building programmes, technologies, design practices, operations and the integration of green building initiatives in designing and construction of buildings. Also included is the Green Star – Public Building rating tool for independent assessment of environmental attributes of new and refurbished public buildings (including libraries) and their fit-outs.

- www.gbca.org.au

Information on living sustainably. The Australian Government’s Department of Industry provides information about energy savings.


Key ESD features. The Grove Precinct website give further information and examples of ESD in libraries, including diagrams and fact sheets.

- thegroveprecinct.com/the-building/

Purchasing green products. This website provides advice on purchasing green products.

- www.ecobuy.org.au

Sustainable building design. This website offers online resources and tutorials about sustainable building design.


Sustainable practices. Sustainability Victoria has identified specific tools to help organisations and government to assess and incorporate sustainable practices.


Water saving in the workplace. These websites contain information on saving water in the workplace, including tools to help non-residential water customers to assess their water usages and find ways to save and conserve water.

- www.savewater.com.au
Water sensitive urban design. This website provides information on water management in urban development and design to work towards creating a sustainable city. It covers water cycle management, including drinking water, storm water, water recycling and sewage treatment.

- wsud.melbournewater.com.au/

Waste audits. Find out what is in your waste.

- www.greenmakeover.com.au

Publications