Environmentally Sustainable Design

Sport and Recreation Victoria | Community Infrastructure Programs

## The construction and operation of infrastructure can have a significant direct and indirect impact on the environment. Including Environmentally Sustainable Design (ESD) principles and initiatives in the design and development of infrastructure can reduce operation costs and environmental impacts while increasing building resilience. This information sheet includes links to further information on a range of ESD initiatives that you may wish to consider in the design and development of your project.

[Victoria’s Social Procurement Framework](https://www.buyingfor.vic.gov.au/social-procurement-document-library) promotes sustainable practices that go beyond compliance requirements to both minimise adverse environmental impact and deliver positive environmental outcomes. The Victorian Government is committed to achieving positive environmental outcomes through sustainable procurement practices, which achieves value for money while minimising impact to the environment. Sustainable procurement practices may include:

• maximising recyclable/recovered content

• minimising waste and greenhouse gas emissions

• conserving energy and water

• minimising habitat destruction and environmental degradation

• providing non-toxic solutions

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| **TIP 1: Consult Future Proofing Community Sport & Recreation Facilities: A Roadmap for Climate Change Management for the Sport and Recreation Facilities Sector.**  The roadmap was developed in partnership between the Sports Environment Alliance and Victorian State Government. It supports the sector to be nimble and resilient to climate change through commitment, mitigation and adaption to ever changing environmental conditions. Consult this resource for seven steps for positive action. [Future Proofing Community Sport and Recreation Facilities](https://static1.squarespace.com/static/5fff7feae90dd00ceac27df1/t/601fb250c6429e2b6fbc9883/1612690082418/Guide+to+future+proof+sport+%26+recreation.pdf) |

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| **TIP 2: Include ESD features in grant application submissions.**  **NOTE:** Some programs have a compulsory ESD component. Applications under the Indoor Stadiums/Aquatic Facilities Stream of the Local Sports Infrastructure Fund program require a minimum of 25 per cent of the requested grant amount to be allocated to components that will improve environmental sustainability such as energy (note: LED lighting is mandatory) and/or water efficiency to be eligible. This must be demonstrated with a specific ESD budget in the application. |

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| **TIP 3: Quantify the outcomes of ESD features.**  Applicants are encouraged to quantify the outcomes their ESD features are expected to achieve. These could include the initial capital costs, running cost savings, energy savings, emission reductions or water savings. |

The main objectives of sustainable design are to reduce, or completely avoid, depletion of critical resources like energy, water, land, and raw materials; prevent environmental degradation caused by facilities and infrastructure throughout their life cycle; and create built environments that are liveable, comfortable, safe, and productive.

Six fundamental ESD principles:

1. Optimise site potential

2. Enhance indoor environmental quality

3. Optimise energy use | [wbdg.org/design-objectives/sustainable](https://www.wbdg.org/design-objectives/sustainable)

4. Protect and conserve water

5. Optimise building space and material use

6. Optimise operational and maintenance practices.

## Building Design

### Sun, climate and comfort: The movement of the sun and climate zones affects heating and colling energy requirements and factors influencing our perception of thermal comfort. Look for Nationwide House Energy Rating Scheme (NatHERS) software tools.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 11)

### Siting and solar access: The degree to which north facing windows and roof are exposed to the sun is known as solar access. High exposure to the sun is known as good solar access. Siting and general layout of living areas and garages/carports can make the best use of solar access on a lot.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 20)

### Windows: Window size, orientation, shading and internal coverings can have a significant impact on energy efficiency and occupant comfort. Look for Windows Energy Ratings Scheme (WERS) labels.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 29)

### Insulation: Insulation is the cornerstone to all energy efficient house design. It reduces the cost of heating and cooling by over 40%.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 49)

### Thermal mass: A building material which has high thermal mass is a dense heavyweight material like bricks or concrete while materials like timber or plasterboard are light weight and have much lower thermal mass.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 69)

### Air leakage and air movement: Uncontrolled air leakage can significantly reduce the energy efficiency of a house. Reducing uncontrolled air leakage can prevent heat loss in winter and prevent the entry of warm air in summer. This can save up to 20% on heating and cooling costs and improve comfort.

### <https://assets.sustainability.vic.gov.au/susvic/Guide-Energy-Smart-Housing-Manual.pdf> (page 79)

### Green roofs, walls and facades: A green roof is a vegetated cover or a permanent rooftop planting system covering a significant portion of a building’s roof. They mitigate stormwater run-off, reduce the urban heat island effect and increase biodiversity.

### <https://melbourne.vic.gov.au/community/greening-the-city/green-infrastructure/Pages/green-roofs-walls-facades.aspx>

<https://www.wbdg.org/resources/extensive-vegetative-roofs>

### Design for sustainable transport: Features linked with cycling include end-of-trip facilities including showers and secure bike parking. Cycling is also space-efficient, allows more space for trees and green space and requires less space to be paved with heat-creating and water-displacing impermeable surfaces.

### <https://ovga.vic.gov.au/case-good-design-transport-guide-government#transport>

### <https://bicyclenetwork.com.au/tips-resources/inspiration/sustainable-transport/>

## Energy Use

**Solar power:** A solar photovoltaic (PV) system, often referred to as solar panels or solar power, generates renewable electricity by converting energy from the sun.

<https://sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/solar-power>

**Solar hot water systems:** A solar hot water system uses the sun's energy to heat water. When there isn’t enough sunshine to fully heat the water, a gas or electric booster will kick in as a back-up. There are 2 types of solar hot water systems: close-coupled systems and pumped systems.

[https;//sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/water-heating/choose-the-right-hot-water-system/solar-hot-water-systems](https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/water-heating/choose-the-right-hot-water-system/solar-hot-water-systems)

**Lighting:** An LED, or light emitting diode, is a semiconductor that converts electricity into light. LEDs use much less energy to provide the same amount of light as other forms of lighting. One of the main reasons LEDs are so efficient is that most of their energy is used to solely create light, rather than creating light and heat, as less efficient forms of lighting do.

<https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/lighting/choose-the-right-led-lighting>

**Insulation:** Insulation if the most cost-effective way to improve the energy efficiency and comfort of a building. When fully insulated, the cost of heating and cooling can be reduced by around 40 to 50%

<https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/building-or-renovating/key-principles-of-energy-efficient-design/planning-and-design/insulation>

**Air sealing and ventilation:** Air sealing is the prevention of excess air movement from inside to outside a building. Limiting air loss through gaps and cracks will save you energy and reduce your heating costs during winter. Air sealing should always be partnered with natural ventilation, which allows control of the flow of air when and where you want it.

<https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/building-or-renovating/air-sealing-and-ventilation>

## Water Conservation

**Stormwater harvesting:** Stormwater can be a good alternative to mains water for many purposes. Harvesting stormwater involves capturing, treating, managing and storing runoff from urban areas. It’s different from harvesting rainwater as it comes from drains rather than roofs.

<https://www.epa.vic.gov.au/for-community/environmental-information/water/stormwater/harvest-stormwater>

**Water reuse:** Recycled water can be substituted for water that is currently harvested from stressed and over-allocated watercourses, groundwater sources, or drinking water supplies. It can provide increased water security for many people in rural and urban areas. Recycled water use has the added benefit of protecting our waterways and bays from treated wastewater discharges.

<https://www.epa.vic.gov.au/about-epa/publications>

**Water sensitive urban design (WSUD):** WSUD involves integrating the urban water cycle into urban design to minimise environmental damage and improve recreational and aesthetic outcomes. Stormwater is rainwater that has fallen onto roads or roofs and often contains chemicals or pollutants. WSUD is an approach to planning and designing urban areas to make use of this valuable resource and reduce the harm it causes to our rivers and creeks.

<https://www.water.vic.gov.au/about-us/water-for-victoria>

<https://www.melbournewater.com.au/building-and-works/stormwater-management/introduction-wsud>

<https://www.melbourne.vic.gov.au/planning-requirements-water-sensitive-urban-design>

## Environmentally friendly materials and products

**Material selection:** Choose materials that have reduced impact on the environment and that provide a healthier indoor environment byreusing existing materials, maximising use of recycled materials, using locally produced materials and using non-toxic materials.

<https://www.buyingfor.vic.gov.au/sites/default/files/2018-08/Victorias-Social-Procurement-Framework.PDF> (page 16)

**Recycled materials:** Recycled materials in pavement construction can include recycled crushed concrete, crushed brick, glass fines and reclaimed asphalt pavement.

<https://www.sustainability.vic.gov.au/research-data-and-insights/research/research-reports/recycled-products-in-pavement-construction>

## Operation and Maintenance

**Optimising processes:** Optimising operational processes increases energy efficiency, material efficiency and the overall productivity of the business. The main objective is to reduce process cycle times, waste and costs, while improving the quality of products and services of the business.

<https://www.sustainability.vic.gov.au/circular-economy-and-recycling/in-a-business-2/materials-efficiency-for-business/process-optimisation>

**E-Waste:** Electronic waste, when sent to landfill, can be a risk to the environment and is a waste of valuable resources which could otherwise be recycled. Electronic waste is any electronic item with a plug, battery or a power cord that is no longer wanted.

<https://www.sustainability.vic.gov.au/circular-economy-and-recycling/in-a-business-2/e-waste-in-the-workplace>

**Improving processes to reduce waste:** Recycling materials and resources saves items from going to landfill and saves on purchasing costs. Undertaking an internal waste assessment can highlight ways to improve processes to reduce waste and reduce costs.

<https://www.sustainability.vic.gov.au/circular-economy-and-recycling/in-a-business-2/materials-efficiency-for-business/materials-efficiency-best-practice>

**Reducing waste during construction:** Designing for improved waste processes can reduce the overall waste generation at a building or business. Efficient waste management systems can relate to garbage, recycling, organics and bulky/hard waste services.

<https://www.sustainability.vic.gov.au/circular-economy-and-recycling/for-developers-of-residential-commercial-and-industrial-buildings/commercial-and-industrial-facilities/waste-management-plan>

<https://www.epa.vic.gov.au/for-business/waste/waste-classification/how-to-classify-waste>

**Reducing food waste:** Food waste that ends up in landfill also wastes the valuable resources we utilise to grow food (water, soils and energy). Food waste can be reduced by efficient food planning and improving the use of organic waste and composting.

<https://www.sustainability.vic.gov.au/circular-economy-and-recycling/at-home/avoid-waste/food-waste/how-to-save-food>

## Sustainable tradespeople and professionals

**Green Living Builders:** <https://www.mbav.com.au/>

**Green painters:** <https://greenpainters.org.au/>

**Landscapers:** <https://www.sgaonline.org.au/>

**Renovate and build green:** <https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/building-or-renovating>

**Buy recycled materials:** <https://directories.sustainability.vic.gov.au/buy-recycled/>

**Sourcing eco-friendly materials:** <https://www.ecospecifier.com.au/>

## Other useful links

**Sustainability Victoria:** <https://www.sustainability.vic.gov.au/>

**Sports Environment Alliance:** <https://www.sportsenvironmentalliance.org/>

**Commercial and industrial facilities – design self-assessment:** <https://assets.sustainability.vic.gov.au/susvic/Guide-Commercial-and-Industrial-facilities-Design-self-assessment.pdf>

**ESD guide for office and public buildings:** <https://www.dcceew.gov.au/search?search_api_fulltext=esd%20design%20guide.pdf>

**Home energy efficiency scorecard:** <https://www.homescorecard.gov.au/>

**Green Building Council of Australia:** <https://www.gbca.au/>

**Building and designing a sustainable home:** <https://www.yourhome.gov.au/getting-started/welcome>

**Water efficiency labelling and standards:** <https://www.waterrating.gov.au/>

**Department of Industry, Science, Energy and Resources:** <https://www.dcceew.gov.au/>

**Energy rating:** <https://www.energyrating.gov.au/>

**Clean Energy Council – Technologies:** <https://www.cleanenergycouncil.org.au/resources/technologies>

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