

ESD Tools

Building design for a sustainable future



What's included in this fact sheet:

What are ESD Tools?
Why use them?
Voluntary or mandatory?
Which tool for SDAPP?

An overview of the following tools:

- BESS
- STORM
- MUSIC
- Green Star
- NatHERS
- NABERS

What are they and why use them?

Environmentally Sustainable Design (ESD) tools are an effective way of measuring a proposed building design or actual performance. Benchmarks allow proposed designs and/or actual buildings to compare their performance with buildings of the same type. In most cases they provide instant and reliable feedback on various measurements including energy use, greenhouse gas emissions, potable water saving, treatment of stormwater, embodied energy emissions, daylight and ventilation.

As the Sustainable Design Assessment in the Planning Process (SDAPP) framework is implemented at the design stage, the most common tools that are recommended to demonstrate 'best practice' are design rating tools, including:

- Built Environment Sustainability Scorecard (BESS)
- Sustainable Tools for Environmental Performance Strategy (STEPS)
- Sustainable Design Scorecard (SDS)
- Green Star
- NatHERS tools including Firstrate, Accurate and Building Energy Ratings Scheme (BERS)
- Stormwater Treatment Objective Relative Measure (STORM)
- Model for Urban Stormwater Improvement Conceptualisation (MUSIC).

Voluntary or Mandatory?

In most cases ESD tools are not mandated, however there are exceptions to this:

- The NatHERS* tools are most commonly used to demonstrate compliance with energy standards in Part 3.12 of Volume 2 of the National Construction Code (NCC) for single residential houses and multi-residential housing.
- The NABERS* tool is enacted through Commercial Building Mandatory Disclosure Scheme, which requires any commercial office space of 2000m² or more offered for sale or lease provide information in regards to its operational energy performance.

The other ESD tools listed are generally not mandated within Australia and are generally used voluntarily. The Green Building Council Australia released their first Green Star rating tool in 2003 and have been successful with transforming the top end of the commercial building sector through their rating scheme. There has been a healthy level of competition from various business owners to design and build their offices with the highest Green Star ratings.

Which tool for SDAPP?

The most commonly used tools at the planning stage in Victoria are STEPS for residential developments and the SDS for non-residential developments. These two tools have been recently integrated into the new Built Environment Sustainability Scorecard (BESS). BESS differs from other tools as it is free for applicants to use and is focused on improving designs and buildings to a 'best practice' level of the SDAPP program. BESS provides flexibility for the property owners to decide which solutions are appropriate for their budget and their desired level of performance.



Table 1: Tool applicability overview



| | | Residential | | | Non-residential | | | | |
|--|------------|-------------|--------|----------|-----------------|--------|-----------------|-----------------|-----------------------|
| | | Extension | Single | Multiple | Office | Retail | Food & Beverage | Public Building | Recreational Facility |
| Mandatory | NatHERS | ✓ | ✓ | ✓ | | | | | |
| | NABERS | | | | ✓ | ✓ | | | |
| Requirement depends on Responsible Authority | BESS | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | STORM | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | MUSIC | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Green Star | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

BESS

(Built Environment Sustainability Scorecard)
www.bess.net.au

Administrator: Council Alliance for a Sustainable Built Environment (CASBE)

Applicability: Residential, non-residential and mixed use – Building Classes 1-10

Free and simple online assessment rating tool for most types of development.

Measure of performance

Demonstrates 'best practice' in the following categories:

- Indoor Environment Quality
- Energy Efficiency
- Water Efficiency
- Stormwater Management
- Transport
- Waste
- Urban Ecology
- Management

Pros

- Free to use online
- Simple interface and easy to use
- Provides benchmarks and measures the percentage improvement of a development compared to a conventional design
- Adopted by councils across Victoria
- Caters to residential, non-residential and mixed-use development of various sizes
- Specifically formulated for assessment in the planning process

- Interactive with scoring generated immediately, allowing user to improve their score by upgrading design features

Cons

- Requires an understanding of the NatHERS energy rating scheme
- Limited applicability to rural areas/ areas without reticulated services, i.e. gas & water

STORM

(Stormwater Treatment Objective - Relative Measure)
www.storm.melbournewater.com.au

Administrator: Melbourne Water

Applicability: Stormwater impact of all development types up to ~1 hectare

Measure of performance

The elements of a development that affect or treat stormwater are assessed and given a score from 0% to 100%+. 100% STORM rating = 45% reduction in the typical annual load of total nitrogen and achievement of best practice water quality objectives.

Pros

- Free to use online
- Simple interface and easy to use
- Interactive scoring
- Perfect for smaller developments of 10 dwellings or less

Cons

- Doesn't allow sequential treatment trains
- Restricted to sites up to 1 hectare
- Assumes rainwater tanks are connected to toilets for flushing
- Several buildings on a large site may require more treatment than a single large building, depending on the site coverage and other aspects

Table 2: What do the tools cover?

| | Indoor Environmental Quality | Energy | Water | Stormwater | Materials | Transport | Waste | Ecology | Innovation | Management | Emissions |
|------------|------------------------------|--------|-------|------------|-----------|-----------|-------|---------|------------|------------|-----------|
| NatHERS | | ✓ | | | | | | | | | |
| NABERS | ✓ | ✓ | ✓ | | | | ✓ | | | | |
| BESS | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| STORM | | | | ✓ | | | | | | | |
| MUSIC | | | | ✓ | | | | | | | |
| Green Star | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

MUSIC

(Model For Urban Stormwater Improvement Conceptualisation)

toolkit.ewater.com.au/tools/MUSIC

Administrator: ewater Co-operative, Research Centre

Applicability: Stormwater impact of all development types

Measure of performance

MUSIC models stormwater treatment elements and provides the litres of stormwater treated or stored for reuse and pollution reduction.

Pros

- Designed to simulate more complex urban stormwater systems, multiple treatment types and treatment trains
- Better for larger developments

Cons

- Requires a sound knowledge of urban stormwater management principles and practices
- Licensed software
- Cost

Green Star

www.gbca.org.au

Administrator: Green Building Council of Australia (GBCA)

Applicability: Office, office interiors, retail, healthcare, multi-residential, education, industrial and convention centre buildings, residential neighbourhoods

Measure of performance

4 Star Green Star (score 45-59): 'Australian Best Practice'

5 Star Green Star (score 60-74): 'Australian Excellence'

6 Star Green Star (score 75-100): 'World Leadership'

Certification is required for claiming a particular star rating.

Reviews environmental sustainability in the following categories:

- Management
- Indoor Environment Quality
- Energy

- Transport
- Water
- Materials
- Land Use & Ecology
- Emissions
- Innovation

Pros

- Members can download tool components from the website www.gbca.org.au
- Provides benchmarks and scores a development

- Detailed analysis that is suited to larger developments aiming for the top of the property market
- Independent verification of rating
- National/International marketing through GBCA

Cons

- Green Star Certification requires an accredited professional
- Not suited to all types of developments
- Relatively high cost of assessment
- Tradable points scoring system may encourage adoption of non-optimal measures

NatHERS

(Nationwide House Energy Rating Scheme)
www.nathers.gov.au

Administrator: Australian Federal Government
Applicability: Residential – Building Class 1-2

NatHERS provides a framework that allows various computer software tools to rate the potential energy efficiency of Australian homes. NatHERS is referenced by the National Construction Code (NCC) Part 3.12 for Class 1 - Section J for Class 2. A dwelling can be rated before or after it is built. The rating depends on:

1. Layout of the home
2. Construction of its roof, walls, windows and floor
3. Orientation of windows and shading to the sun's path and local breezes
4. How well these suit the local climate.

NatHERS includes the following tools:

1. AccuRate
2. BERS Professional
3. FirstRate 5

Measure of performance

- NatHERS uses computer simulations to assess the potential thermal comfort on a scale of zero to 10 stars
- 0 stars means the building shell has extremely poor thermal performance
- 6 stars indicates good, but not outstanding, thermal performance
- Occupants of a 10 star home are unlikely to need any artificial cooling or heating
- Some builders are currently designing homes with 7 and up to 8 star ratings
- Minimum requirement for NCC is currently 6 Star for single dwelling, or 6 Star for Class 1, or a 6 Star average (5 Star Minimum) for Class 2

Pros

- Allows for different elements in a building to be interchanged to improve thermal performance
- Encourages going beyond minimum compliance by defining star bands up to 10 stars

Cons

- Training is required for each of the NatHERS software interfaces
- Requires licensed specialists to complete
- Limited to residential only
- Only addresses thermal efficiency of the building fabric or 'envelope'
- Does not measure actual performance
- Only considers a predicted energy of heating and cooling

NABERS

(National Australian Built Environment Rating Scheme) www.nabers.com.au

Administrator: NSW Office of Environment and Heritage
Applicability: Constructed office, retail, hotel and residential buildings

NABERS rates a building on the basis of its measured operational impacts on the environment according to the following categories:

- Energy
- Water
- Waste (Office only)
- Indoor Environment (Office only)

Ratings are awarded in a scale of 0 to 5 Stars, including half Star increments.

NABERS applies to offices, residential, retail and hotels.

Official ratings are only obtained after occupation of a building, based on actual performance.

NABERS normally requires accredited assessors to conduct reviews, however, NABERS Home (online tool) can be used by anyone. NABERS can be used to inform projects during the design phase in order to establish benchmarks and likely outcomes.

NABERS is currently used by the mandatory Commercial Buildings Disclosure scheme for office buildings.

Pros

- Predictive energy modelling can be undertaken to ascertain a 'NABERS base building rating'

- Using NABERS during the design phase enables teams to identify the most important aspects in terms of efficiency
- Free access to the website which can be used to benchmark the energy use of existing buildings
- Distinguishes between tenancy and base building, thus detailing and identifying potential improvements

Cons

- Official ratings can only be achieved for buildings more than 12 months old
- Not all categories are available for all building types (e.g. Waste and Indoor Environment)

Where can I find out more?

BESS www.bess.net.au
Green Star www.gbca.org.au
NatHERS www.nathers.gov.au

NABERS www.nabers.com.au
STORM storm.melbournewater.com.au
MUSIC ewater.org.au/products/music