

Environmental Rating Systems and Government Buildings

This advice note provides an overview of the nature and application of contemporary environmental rating systems (or rating schemes) for buildings. Discerning use of rating systems can assist departments to: identify opportunities to manage and reduce energy and water usage and waste production; and implement sustainable procurement practices in the planning, delivery and management of government buildings.

What are the objectives of this advice note?

In the Australian context, there are various environmental rating systems which can be used by departments to predict, assess, monitor and improve the environmental performance of their building portfolios. This advice note will assist departments to make informed decisions regarding the application of these systems by:

1. distinguishing between systems that rate entire buildings, components of buildings and building fitouts
2. differentiating between systems that predict performance at the planning and design stage and those that measure performance of existing buildings
3. providing an overview of commonly used environmental rating systems.

Context

The Queensland Government has made a strong commitment to address climate change, and to adopt environmentally sustainable practices, through:

- the establishment of long term goals, in the form of the *ClimateQ: Toward a Greener Queensland* strategy document. *ClimateQ* is the result of the Government's review of the 2007 climate change strategy, *ClimateSmart 2050*, and presents a range of investments and policies to help tackle the climate change challenges across Queensland's key sectors;



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- adoption of the *Strategic Energy Efficiency Policy for Queensland Government Buildings*, which establishes mandatory energy reduction targets and timeframes for all departments, and the associated *Carbon Reduction Strategy for Government Office Buildings* to meet a commitment to achieving carbon neutral government owned office buildings by 2020;
- the establishment of whole-of-Government programs, which seek to progressively improve departments' use of electricity;
- specific water efficiency initiatives such as the requirement to prepare Water Efficiency Management Plans (for owners of non-residential buildings, including Government, with substantial water consumption or premises with cooling towers for air-conditioning);
- reflection of the focus on climate change and sustainability in key whole-of-Government policies, including the *Capital Works Management Framework* (CWMF) and the *Maintenance Management Framework* (MMF), and in the complementary best practice guidelines, the *Building Asset Performance Framework* (BAPF) and the Strategic Asset Management Framework; and
- the sharing of experiences and development of uniform approaches to sustainable procurement, particularly through participation in, and support for, the *Australian and New Zealand Government Framework for Sustainable Procurement* (administered by the Australasian Procurement and Construction Council).

In terms of whole-of-Government policy on the application of environmental rating systems with regards to Queensland Government building assets, the *ClimateSmart 2050* strategy requires a minimum '4½ -Star' (out of 5-Star) energy efficiency rating for all new office buildings, with refurbishments to achieve the same rating wherever possible. Since the release of that strategy, the energy performance standards were extended so that all new government owned office buildings will be designed and operated (and maintained) to target a energy performance standard of 5-Star (out of 5-Star) energy efficiency rating.

As the agency responsible for government office accommodation, the Queensland Department of Housing and Public Works adopted the *Sustainable Office Building Rating Policy* for the application of two rating systems to the design and management-in-use of office buildings within its portfolio. These systems are [Green Star](#) and [National Australian Built Environment Rating System](#) (NABERS).

Distinguishing between building rating systems

A wide range of environmental rating systems is currently available. One key difference between rating systems is the method used to assign a rating. In this respect, there are two main approaches:

1. a **design-based approach** which seeks to predict the performance of new and refurbished buildings based on an analysis of design features; and
2. an **outcome-based approach** which measures an existing building's overall environmental performance during operation.

The focus of a rating system can be another distinguishing feature. Some systems have been designed to measure only specific aspects of a building's environmental performance, or to apply only to certain types of buildings, as illustrated by Table 1. Other systems address environmental performance of particular building components, for example:



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- Window Energy Rating Scheme (WERS), administered by the Australian Window Association, which focuses on performance of an individual building component (windows) of residences;
- Water Efficiency Labelling and Standards (WELS) Scheme, administered by the Australian Department of the Environment, Water, Heritage and the Arts, which focuses on performance of sanitary fixtures and appliances (e.g. toilets, shower heads, dishwashers) of residences.

Table 1: Comparison of commonly used environmental rating systems

Rating System*	Administrator	Focus	Application
Green Star Rating tools include: <ul style="list-style-type: none"> • 'Office Design' • 'Office As Built' • 'Office Interiors' • 'Education' • 'Healthcare' 	Green Building Council of Australia (GBCA)	Overall impact of an entire building on the environment	Office buildings (Note: A rating tool for existing office buildings is currently under development.)
National Australian Built Environment Rating System (NABERS) Rating tools include: <ul style="list-style-type: none"> • 'NABERS OFFICE Energy (previously Australian Building Greenhouse Rating)' • 'NABERS OFFICE Water' • 'NABERS OFFICE Indoor environment' • 'NABERS OFFICE Waste' 	New South Wales Department of Environment, Climate Change and Water (DECCW)	Greenhouse gas emissions (resulting from energy usage), water usage, quality of indoor environment, and waste management for an entire building	Office buildings and residential buildings
Nationwide House Energy Rating Scheme (NatHERS)	Australian Department of the Environment, Water, Heritage and the Arts	Thermal performance of the building envelope (i.e. roof, walls, windows and flooring)	Residential buildings

* Refer to the [resources](#) section of this document for links to further information on these rating systems. The systems listed are provided as examples and do not represent a comprehensive list.



Environmental rating systems for buildings

This section summarises the key features of a selection of commonly used environmental rating systems for buildings. For further information on these rating systems, departments should refer to the various websites listed in the [resources](#) section of this advice note.

Green Star

The Green Star rating system has been developed and is administered by the Green Building Council of Australia (GBCA). Green Star has officially released [rating tools](#) which focus on office accommodation, education and healthcare facilities. With respect to office accommodation, Green Star has released a range of tools to predict/assess performance during the various stages of a building's life cycle i.e. design, construction, fit-out and operation. (N.B. The tool for rating existing office buildings is currently under development.) As education facilities are delivered as integrated fitouts, Green Star has released a single tool to predict/assess building performance from the design stage through to fitout.

The Green Star assessment process evaluates building projects or existing buildings against eight environmental impact categories (management, indoor environment quality, energy, transport, water, building materials, land use and ecology, emissions) plus innovation. Under each category, points are awarded for characteristics/initiatives associated with the building or the design that meet Green Star objectives and the specific requirements/conditions of the relevant rating tool. Points are then weighted and an overall score is calculated to determine the star rating. The Green Star rating scale ranges from '1 Star' (minimum practice) to '6 Star' (world leadership). Formal certification is available for new or refurbished office buildings and education facilities that achieve a rating of '4 Star' (best practice) and above. In relation to existing office buildings (rating tool under development), formal certification will also be available for buildings that do not achieve the best practice benchmark.

National Australian Built Environment Rating System (NABERS) and Australian Building Greenhouse Rating (ABGR)

NABERS is a national initiative managed by the New South Wales Department of Environment, Climate Change and Water (DECCW). NABERS [rating tools](#) evaluate the performance of existing office buildings and residences (excluding apartment blocks). The NABERS assessment process evaluates existing buildings against four environmental indicators: energy, water, indoor environment and waste. Other environmental indicators relating to stormwater runoff, pollution and toxic waste, have been trialled by DECCW and are undergoing further refinement before being released.

NABERS ratings are based on actual building performance data (e.g. for water and energy use) over a 12 month period. In order to ensure realistic comparisons, adjustments (e.g. for building size, climate, number of occupants) are made to this data to take into account the specific nature of the building/site. This adjusted data is then compared to NABERS' benchmark data. Ratings reflect building performance relative to the benchmark data. NABERS ratings range from '1 Star' (poor management or systems) to '6 Star' (market leading performance). A NABERS assessment is structured to recognise the different areas of accountability and responsibility for building owners, commercial tenants or home owners.



NABERS OFFICE Energy (previously known as ABGR) is the only NABERS rating tool that can be applied to new or refurbished buildings. (As a recognised industry standard, NABERS OFFICE Energy is also used to calculate energy credits for office buildings under the Green Star rating system.) Building owners/tenants can enter into a NABERS OFFICE Energy Commitment Agreement whereby they pledge to design, fit-out or upgrade a building/tenancy to achieve a selected star rating in operation. *Guidelines for Conducting an Energy Efficiency Design Review*, published by DECCW, are used by designers to estimate the future energy use of a building. An approved third party consultant is then engaged to review the design and identify risks to achieving the desired star rating. The Commitment Agreement includes a requirement that owners/tenants publish the rating achieved after 12 months of building operation. NABERS OFFICE Energy rates energy performance on a scale of 1 to 6 stars (in half star increments), with 6 stars representing market leading greenhouse performance.

Each of the above rating systems enables building owners and tenants to self-assess their building assets. Departments wishing to track and improve the environmental performance of their building portfolio can download their chosen rating tool (at no charge) from the relevant organisation's website. Refer to the [resources](#) section of this document for web addresses.

Formal certification is required (fees apply) to have a self-assessed building rating accredited. Without certification, organisations are not permitted to promote their buildings as having achieved a star rating or use any associated rating system logo.

Nationwide House Energy Rating Scheme (NatHERS)

NatHERS is an initiative of the Australian Ministerial Council on Energy. The scheme is managed by the Australian Department of the Environment, Water, Heritage and the Arts. NatHERS provides a framework for the assignment of energy efficiency ratings to residential buildings based on the output from accredited computer software tools (e.g. AccuRate, FirstRate¹ and Building Energy Rating Scheme (BERS)).

The scheme, which can be applied at both design and operational stages, evaluates the thermal performance of a dwelling's building envelope (i.e. roof, walls, windows and flooring) and defines the minimum data set that must be used by each accredited software tool. This set of information includes: building material performance characteristics; climate zones; design interpretation guidelines; internal heat loads; occupancy; cooling/thermostat settings; and weather files.

Through the use of weather files (compiled from no less than 25 years of Bureau of Meteorology records), NatHERS enables homes that demonstrate good design practice to receive similar ratings regardless of climate zone. The scheme rates thermal performance on a scale of 1 to 10 Stars (in half star increments), with a '10-Star' home unlikely to need any artificial cooling or heating.

¹ For some house designs, software improvements are being considered to encourage good designs in the Queensland climate.



Evaluating and applying environmental rating systems

Environmental rating systems can play an important role in identifying strategies to design, build, maintain and operate environmentally sustainable buildings. However, it is important to ensure that departments' expectations in terms of required commitment, cost savings and the benefits for the environment align with the reality of adopting a particular rating system. The following matters should be carefully considered when evaluating the suitability of a rating system.

Departments should specifically acknowledge which rating tool is used when referring to environmental rating systems (or schemes). Some appropriate words to express ratings are "5-Star (out of 6-Star) Green Star" or "5-Star NABERS Energy efficiency rating" rather than simply 5-Star.

Cost of obtaining certification

The costs associated with obtaining a certified rating can be significant and should be considered fully before undertaking a certification process. As well as certification fees (these vary between rating systems), there can be considerable financial outlay associated with collecting/collating the material/information needed to justify a self-assessed rating and preparing relevant documentation in the appropriate format. Such outlays can be particularly onerous in the context of small projects.

Costs can also be incurred if an application for certification is not successful in the first instance. For example, the NABERS OFFICE Energy (previously ABGR) Commitment Agreement allows clients to promote their yet-to-be-constructed (or refurbished) building as meeting a particular star rating on the proviso that this rating is 'proven' through an official assessment conducted after 12 months of operation. If a building fails this assessment, the Commitment Agreement can be extended for a further twelve months, with all the attendant cost.

Demand on resources

Different environmental rating systems require varying degrees of effort. A system that predicts or measures performance for one or two environmental indicators inevitably involves a lesser commitment of resources than a system that covers eight categories. Some rating systems will also require the collection and analysis of large quantities of information. It is therefore important to thoroughly investigate the steps required to achieve a particular rating and to establish the required level of resources, skills, training and administration.

Allocation of responsibility

As noted above, it is critical that all parties to a building project (not just departments) fully understand what is involved in achieving a nominated rating. Although a detailed knowledge of the assessment process can be communicated to parties through consultation and documentation, responsibility for the various elements of this process must be embedded in building contracts, leases and service level agreements.



Maintaining a rating over the life of a building

Once a building has achieved an environmental rating (either at the design stage or at completion), it is important to ensure this rating is maintained during operation. Compliance (during operation) with an achieved rating can be determined through an assessment of operational data (e.g. energy and water use) and occupant and maintenance service provider practices. As previously mentioned, such an assessment (conducted after 12 months of operation) is a mandatory requirement of the NABERS OFFICE Energy (previously ABGR) Commitment Agreement.

Limitations of rating systems

It is important to consider environmental rating systems within the context of the relevant project, value-for-money outcomes, and overarching principles of ecologically sustainable development (ESD). For some projects, site characteristics (e.g. climate, remoteness, transport infrastructure) may present obstacles to achieving a desired environmental rating. For example, it is not as difficult for projects in inner-city areas (compared to projects in remote areas) to achieve points in Green Star's 'transport' impact category. Departments should also be aware that it is theoretically possible to achieve a high level of environmentally sustainable design outcomes without meeting all the specific criteria of a multi-category rating system. Conversely, it is theoretically possible to maximise rating points (and ultimately the number of stars) at the expense of ESD principles.

Relationship with Building Code of Australia energy efficiency provisions

Following an agreement between industry and the Australian, State and Territory governments, the *Building Code of Australia* (BCA) (incorporated in the *National Construction Code*) now includes mandatory minimum energy efficiency requirements² for all new and refurbished buildings. Future releases of the BCA will build incrementally upon these existing provisions. Departments striving to meet the criteria of a given environmental rating system will do so in addition to their legal obligation to comply with the BCA. For example, the BCA presently requires all decorative and display lighting in a new commercial building to be: switched separately from other types of lighting; manually switched in each area; and controlled by a time switch (if the area's total lighting output exceeds seven kilowatts). Having met this standard, departments pursuing a Green Star rating would need to go further, ensuring that: all discrete or enclosed spaces are individually switched (i.e. not just spaces containing decorative/display lighting); lighting zones do not exceed 100m²; and that all switches are clearly labelled and easy to access.

² For a new single detached house or one or more attached dwellings, each being a building separated by a fire-resisting wall (including a row house, terrace house, town house or villa unit) the minimum energy rating requirements is currently 6-Star (out of 10-Star) rating using the Building Code of Australia.

For a new or renovated unit building (i.e. a building containing two or more sole-occupancy units, each being a separate dwelling) the minimum energy rating requirements to be considered is 5-Star (out of 10-Star) rating, average for the building, with each individual unit achieving a minimum 4-Star rating. The Queensland Development Code provides flexibility to achieve compliance with these requirements by including optional credits for outdoor living areas and photovoltaic (solar) energy systems based on four designated climate zones in Queensland (refer to the *Queensland Development Code, MP4.1-Sustainable Buildings* and its supporting guideline, and the *Design guide for 6-star energy equivalence housing* available on the Department of Local Government and Planning's website at www.dlgp.qld.gov.au).



Conclusion

This advice note provides a broad overview of commonly used environmental rating systems and highlights important matters related to their use. For further detailed information, departments should consult the [resources](#) listed in the following section.

Resources

AccuRate Software Tool www.hearne.com.au

Building Energy Rating Scheme (BERS) Software Tool www.solarlogic.com.au

Green Star Environmental Rating System www.gbca.org.au

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

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

Water Efficiency Labelling and Standards (WELS) Scheme www.waterrating.gov.au

Window Energy Rating Scheme (WERS) www.wers.net

References

[Australia and New Zealand Government Framework for Sustainable Procurement](#)
(Australasian Procurement and Construction Council) www.apcc.gov.au

[Building Asset Performance Framework](#)
(Department of Housing and Public Works) www.hpw.qld.gov.au

[Building Code of Australia](#)
(Australian Building Codes Board) www.abcb.gov.au

[Capital Works Management Framework](#)
(Department of Housing and Public Works) www.hpw.qld.gov.au

[ClimateQ: Toward a Greener Queensland](#) (*Government- Leading by example*)
(Department of Environment and Resource Management) www.climatechange.qld.gov.au

[ClimateSmart 2050: Queensland Climate Change Strategy 2007](#)
(Department of Environment and Resource Management) www.climatechange.qld.gov.au

[ClimateSmart Buildings: Carbon Reduction Strategy for Government Office Buildings](#)
(Department of Housing and Public Works) www.hpw.qld.gov.au

[ClimateSmart Buildings: Strategic Energy Efficiency Policy for Queensland Government Buildings](#)
(Department of Housing and Public Works) www.hpw.qld.gov.au

[Maintenance Management Framework](#)
(Department of Housing and Public Works) www.hpw.qld.gov.au

[Queensland Development Code, MP4.1-Sustainable Buildings](#)
(Department of Local Government and Planning) www.dlgp.qld.gov.au



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Sustainable Office Building Rating Policy

(Department of Housing and Public Works) www.hpw.qld.gov.au

Strategic Asset Management Framework

(Department of Housing and Public Works) www.hpw.qld.gov.au

For further information

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