



# Improving energy efficiency and reducing costs for your office building – example from Victoria

One of the best ways to reduce the operational cost of your office building is to improve its energy efficiency. We have all heard about the five and six-star NABERS ratings many new buildings have, but the fact is that almost 80% of the buildings we will be using in 2050 already exist today.

If your office building is more than ten years old, it's highly likely that making some modest updates and changes will make an enormous difference to its energy efficiency and pay for themselves in cost savings very quickly.

## What your NABERS rating means

**NABERS ENERGY:** Measures the efficiency of your office building and rates either the base building, tenancy or whole building, comparing the energy consumption against the sector average.

**BASE BUILDING ENERGY RATING:** Measures central services like heating and cooling systems, lifts and lobby lighting.

**TENANCY ENERGY RATING:** Allows tenants to rate the space they occupy within a building, looking at area of office, hours of occupancy and number of occupants.

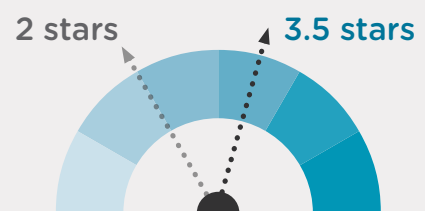
**WHOLE BUILDING ENERGY RATING:** Measures the combined base building and tenant occupied space (usually when one tenant occupies an entire building).

## NABERS star rating guide

★ ★ ★ ★ ★ ★	MAKING A START
★ ★ ★ ★ ★ ★	OPPORTUNITIES FOR UPGRADES
★ ★ ★ ★ ★ ★	MARKET STANDARD
★ ★ ★ ★ ★ ★	HIGH PERFORMANCE
★ ★ ★ ★ ★ ★	SUPERIOR PERFORMANCE
★ ★ ★ ★ ★ ★	MARKET LEADER

## How much could I save?

The case study below is based on simulations of the performance of a office building following implementation of a package of energy efficiency measures. The study finds that energy savings of up to **63%** are possible which would improve the NABERS rating from **2 stars** to **3.5 stars**.



## Two things that will have a significant impact on your building's performance:

1. The operational parameters you set – the hours of operation, set temperatures for heating and cooling, natural ventilation patterns and use of artificial lighting
2. The building's microclimate, that is, the extent to which it is shaded by buildings or natural features, the thermal storage of surrounding areas and how much heat is reflected versus absorbed by the building's exterior.



## CASE STUDY:

### Energy efficiency upgrades for the Knox civic centre in Victoria

The two-story Knox civic centre was built in 1998 and is typical of 'large low-rise' office buildings. It has a capacity of 255 people and a floor area of 6,174 m<sup>2</sup>. Simulations conducted by the UNSW found that **energy savings of 63% are achievable** if a package of cumulative energy efficiency upgrades are implemented. Key upgrades include:



Use energy-efficient light sources and daylight-linked lighting controls.

**Up to 40% in energy savings**



Install mechanical ventilation with heat recovery to reduce heating loads.

**Up to 3% in energy savings**



Replace the building's windows with double-glazed and energy-efficient ones to keep the office air-tight and keep out heat and cold.

**Up to 5% in energy savings**



Refurbish the roof (fitting 80mm of mineral wool under the existing roof) and insulate external walls to reduce both heating and cooling loads.

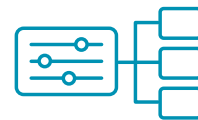
**Up to 5% in energy savings**

**Energy savings of 63%**



Use ceiling fans, introduce night ventilation to the heating, ventilation and air-conditioning (HVAC) system and shade windows to reduce cooling loads.

**Up to 3% in energy savings**



Install a state-of-the-art building automation and controls, with a building management system, to interlock the use of HVAC and lighting systems with both the weather conditions and operational requirements.

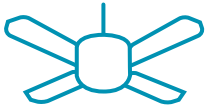
**Up to 7% in energy savings**

\* The information is based on analysis of a 'typical' office building in Victoria and an upgrade simulation conducted by experts at the University of New South Wales (UNSW) on behalf of Department of Climate Change, Energy, the Environment and Water (DCCEEW). Access the full energy efficiency upgrade report [here](#). A complete renovation package can result in a 63% energy savings, resulting in an energy consumption of 38.0 kWh/m<sup>2</sup>a, when compared to the baseline of 102.2 kWh/m<sup>2</sup>a.

## Improving your NABERS rating

Most energy consumption in office buildings is related to heating, ventilation and cooling (HVAC), lighting and appliances. If you want to improve your NABERS rating, here are some key things to consider.

### Cooling is a key problem to tackle:



Ceiling fans are cost effective, and reduce the apparent temperature felt on skin by three degrees, often without the need to run an air conditioner.



Opening windows at night, if that's an option, is a great way to let hot air out and cooler air in.

### Windows and shading can make a big difference:



Are these up to contemporary standards? Do they need replacing? Double glazed windows provide a constant barrier between the outside and inside temperature, meaning they keep heat out when it's hot and in when it's not.

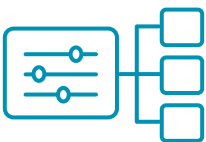


Internal and external window shading can also keep the heat out and reduce glare.

### Automatic settings and sensors balanced with 'common sense' settings:



Have you checked that any automatic settings for cooling, heating and lighting switch them off when they're not needed, such as at night and weekends?



Linking together controls for HVAC, hot water and lighting systems with weather conditions and hours of operation are some of the most important tools in improving energy efficiency.

### The impact of weather and microclimate on your building's site:



Are you shaded by other buildings, trees or hills or is your office in a 'sun trap'?

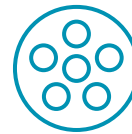


What is the weather like? How much, and when, does it fluctuate across the year?

### Efficient lighting:

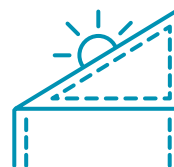


Do you really need your lights on? If your building has high levels of natural light, you might find you can get by with reduced lighting in some areas.



Are you using energy-efficient lighting such as LED lamps and lights?

### Don't forget the roof and external walls:



Insulation is a cost-effective way to reduce the energy needed for heating and cooling and improve the indoor environment.



Solar panels are a great way to cover part of your office's electricity consumption.

### Consider upgrading your HVAC system:



Reductions in energy consumption of 40% may be possible.

## Find out more about how you can improve your energy consumption:

### Visit our website

[nabers.gov.au/ratings/spaces-we-rate/office-buildings](http://nabers.gov.au/ratings/spaces-we-rate/office-buildings)

### Contact the NABERS team

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