



Green Star Office v3 Greenhouse Gas Emissions Calculator Guide

Date issue: September 2013

Change Log

Version	Release Date	Description of changes
V1.0	February 2010	Factsheet updated
V1.0R	April 2011	Rebranded. Content unchanged
V1.1	September 2013	Rebranded. Content expanded as outlined below, but otherwise unchanged. Expanded to clarify Route 2 approach for performance of NABERS 5.5 stars and provide clarification on NABERS factor to be used in calculation of Ene-1 Greenhouse Gas Emissions points.

Introduction

There are two credits within Green Star – Office Design v3 rating tool that directly target greenhouse gas emissions. These credits are the Ene-Conditional Requirement and Ene-1 'Greenhouse Gas Emissions' (Ene-1). Ene-Conditional Requirement must be achieved for the project to be eligible for assessment and certification, whilst Ene-1 rewards predicted 'net zero greenhouse gas emissions in operation' with the maximum 20 points.

To demonstrate compliance with these credits energy modelling is required. There are then two options available to the project team to determine the predicted greenhouse gas emissions resulting from this energy use.

Method for determining greenhouse gas emissions

There are two steps for determining the greenhouse gas emissions of the project. Please refer to the explanations and diagram below for further details:

Step 1: Determine the predicted energy consumption

The first step in identifying the predicted greenhouse gas emissions is to model the predicted energy consumption of the building. At present, energy modelling must be carried out in accordance with the NABERS Energy Guide to Building Energy Estimation Modelling (available from www.nabers.com.au).

Step 2: Determine the predicted greenhouse gas emissions resulting from the energy consumption

The project team is then required to choose between the two alternative routes detailed below to establish the greenhouse gas emission resulting from the energy consumption.

Route 1

Route 1 requires the project team to enter the predicted energy consumption for electricity (kWh/annum) and gas (MJ/annum), calculated using the NABERS Energy Guide to Building Energy Estimation Modelling, into the Green Star – Office v3 Energy Calculator (Energy Calculator). The data required to be entered in to the white cells of the Energy Calculator include:

- The location of the building (State);
- The Net Lettable Area (NLA) of the building; and
- The total predicted energy consumption of the building for electricity (kWh/annum) and gas (MJ/annum).

The Energy Calculator then calculates the building's predicted greenhouse gas emissions per square metre of NLA (kgCO₂-e/m²) and confirms automatically whether Ene-Conditional Requirement has been met and how many points have been achieved in Ene-1 'Greenhouse Gas Emissions'.

Route 2

Route 2 requires the project team to use the predicted greenhouse gas emissions (kgCO₂-e/m²) figure reported in the NABERS Energy Rating Calculator to demonstrate compliance with Ene-Conditional Requirement and establish how many points the project has achieved in Ene-1.

Please refer to notes and clarifications for further detail on this process.

Step 1: Use the NABERS Energy Guide to Building Energy Estimation Modelling to determine the energy consumption of the building

Step 2, Route 1: Enter modelled kWh/annum and MJ/annum into Ene-1 Calculator

Step 2, Route 2: Determine modelled normalised emissions using the NABERS Rating Calculator

Points will be automatically calculated by the Ene-1 Calculator

Points to be established manually by comparing your project against the Ene-1 benchmarks in the Ene-1 Calculator

Notes and clarifications

Differing outcomes between Route 1 and Route 2

The answer you get from the Energy Calculator used in Route 1 may differ from the answer you get from the NABERS Energy Rating used in Route 2. The National Greenhouse Accounts (NGA) Factors used in the Green Star – Office v3 Energy Calculator are the emissions factors that were current at the time of the rating tool release in 2008, however Route 2 allows project teams to use the NABERS result which incorporates NGA Factors which are updated each year.

Route 2: What output from the NABERS Rating Calculator can be used for 'Normalised emissions'?

There has been some conjecture on the point of which NABERS 'normalised emissions' output (GHG intensity scope 1 & 2, GHG intensity scope 1,2 & 3 or Benchmarking factor) must be used when using Route 2 approach to target points in Ene-1 'Greenhouse Gas Emissions'. When this guide was originally published NABERS certificates were reporting a value called 'normalised emissions'. In late 2011 'normalised emissions' was re-named 'Benchmarking Factor' in NABERS energy calculators. Since this change, there has been a lack of consistency in the output used by project teams, and accepted within Green Star assessments. In recognition of the precedence set by this inconsistency, the GBCA has confirmed that it will accept any of the below three NABERS emission outputs for Green Star Office v3 projects targeting points in Ene-1 using the Route 2 option detailed in this guide:

- Greenhouse gas intensity (scope 1 & 2), expressed in kg CO₂-e/m² p.a.
- Greenhouse gas intensity (full fuel cycle - scope 1, 2 & 3), expressed in kg CO₂-e/m² p.a.
- Benchmarking factor

It is acknowledged that this can result in a significant variation in the number of points available to be claimed by project teams.

All Green Star – Office v3 projects registered after the **1st of November 2013** will be required to use the following output when targeting points in Ene-1 using the Route 2 option detailed in this guide:

- Benchmarking factor

Route 2: Extrapolation of benchmarking factor for NABERS ratings higher than 5 stars

Background to issue

In August 2011 a sixth star was added to the NABERS energy rating scheme. Updates to the online NABERS Rating Calculator at this time resulted in Benchmarking Factor not being reported for NABERS ratings of 5.5 stars and higher. This creates a problem for projects with a modelled NABERS rating of 5.5 stars, and higher, that wish to use the NABERS Benchmarking Factor to target Ene-1 'Greenhouse Gas Emissions' credit points.

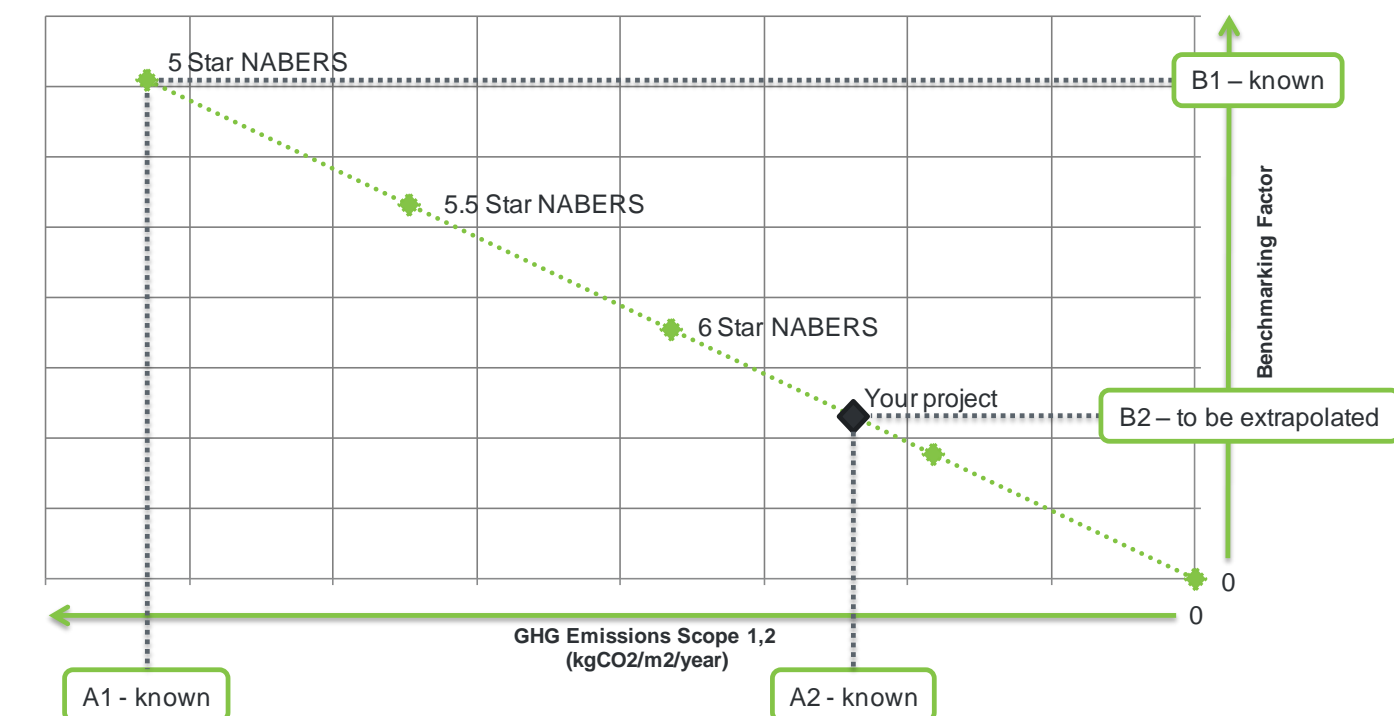
To allow all projects to continue using 'Route 2' to establish the number of points which are available, the GBCA has approved a methodology to extrapolate NABERS benchmarking factor for all projects that are modelled with a NABERS rating of higher than 5 Stars. This approach is detailed below and does not require a credit interpretation request for use in Green Star submissions.

Extrapolation Method

'Benchmarking factor' does not technically exist for NABERS beyond 5 Stars NABERS. Beyond 5 Stars NABERS ratings relate to the percent emission reduction from NABERS 5 Stars. For example:

- a NABERS 5.5 Star Energy rating relates to a 25% emission reduction on 5 Stars.
- a NABERS 6 Star Energy rating relates to a 50% emission reduction on 5 Stars.

Based on an understanding of how NABERS benchmarking continues beyond 5 Stars, the following methodology is used to determine an extrapolated proxy 'Benchmarking Factor'. The extrapolation of the NABERS benchmarking factor is shown graphically in the below figure.



To determine an extrapolated figure for your project please use the following steps:

1. Determine Greenhouse Gas Intensity, scope 1 & 2 ("A2" in below equation) for your project using the NABERS Rating Calculator. This must be done by entering all relevant building information and the predicted energy consumption information into the NABERS Rating Calculator for your building. You must include a copy of the results page in your Green Star submission.
2. Determine the maximum Benchmarking factor ("B1" in below equation) and Greenhouse Gas Intensity (scope 1 & 2) for your project to achieve a 5 Star NABERS Energy rating. This must be done by modifying energy inputs in the NABERS Rating Calculator to achieve a 5 Star NABERS Energy rating.
3. Using the below equation determine an extrapolated benchmarking factor for your project ("B2" in the below equation).

Extrapolation equation:

$$B2 = \left(\frac{A2}{A1} \right) \times B1$$

Where:

A1 = The Greenhouse Gas Intensity (scope 1 & 2) threshold for a 5 Star NABERS Energy rating. This is the highest GHG intensity that achieves a 5 Star NABERS rating, see the above figure for a graphical representation. This figure should be based on the same postcode, NLA, hours of operation and approximate energy mix as the project seeking certification. Regarding energy mix, the relative contribution of each energy source as a percentage of total energy consumption should be within +/-10% of the modelled energy mix for your project.

A2 = The Greenhouse Gas Intensity (scope 1 & 2) modelled for your project.

B1 = The benchmarking factor threshold for a 5 Star NABERS Energy Rating. This is the highest benchmarking factor that achieves a 5 Star NABERS rating, see the above figure for a graphical representation. This figure should be based on the same postcode, NLA, hours of operation and the same approximate energy mix as the project seeking certification. Regarding energy mix, the relative contribution of each energy source as a percentage of total energy consumption should be within +/-10% of the modelled energy mix for your project.

B2 = The extrapolated 'benchmarking factor' for your project.

The following must be included when using this approach in a Green Star submission:

- The Ene-1 short report or energy modelling report must reference this guide and methodology used, and must include calculations listed in step 3 used to determine an extrapolated NABERS Benchmarking Factor.
- A separate 'print out' copy of the NABERS Rating Calculator results page for steps 1 and 2 detailed above. Mark-up each results page to confirm figures 'A1', 'A2' and 'B1' used in step 3 calculation.