Verification using Green Star (JV2) JP1

The Performance Requirements of the National Construction Code (NCC) can be met using either a Performance Solution, a Deemed-to-Satisfy (DTS) Solution or a combination of both solutions. The following demonstrates the performance-based design process, aligning with the ABCB's Development of Performance Solutions guidance document.

Scenario

The energy efficiency of a new Class 5 office building, proposed to be built in Melbourne, is being assessed. The project is registered for and targeting a Green Star — Design & As Built rating. The Verification Method JV2 will be used as the method of demonstrating compliance with the energy efficiency Performance Requirement JP1. This prevents the doubling up of work that would have occurred to satisfy both the Green Star — Design & As Built Greenhouse Gas Emissions Reduction — Reference Building credit pathway and the JV3 Verification Method.

Prepare a performance-based design brief

What are the design objectives?

Meeting the relevant Performance Requirements and to design an energy efficient building that achieves a Green Star — Design & As-Built rating. The rating will be used to attract tenants that appreciate the benefits of a holistically sustainable building and fulfil contractual commitments to a future owner about the building's environmental performance.

Who should be consulted?

The key stakeholders are the property developer/owner, design team, builder, environmentally sustainable design (ESD) consultant and the Appropriate Authority.

What is the basis of the Performance Solution?

- The building is registered for a Green Star — Design & As-Built rating.
- The annual greenhouse gas (GHG) emissions reduction of the proposed building is more than 10% when compared to the annual GHG emissions of the reference building as per the Green Star — Design & As-Built GHG Emissions Reduction — Reference Building credit pathway conditional requirement.
- A thermal comfort level of between a Predicted Mean Vote (PMV) of -1 to +1 is achieved in the proposed building for not less than 95% of the floor area of all occupied zones for not less than 98% of the hours of operation of the building.
- The proposed development complies with the additional requirements of Specification JVa Parts 2 and 4 and Specification JVb.

What evidence is proposed?

A written report consistent with Section 11 'Greenhouse Gas Emissions Report Content' of the Green Star Energy Consumption and Greenhouse Gas Emissions Calculation Guide; explaining: the approach used; the differences to the proposed design compared to a DTS approach; and the total GHG emissions, as determined by the thermal modelling software simulations for both the reference building and the proposed building design. A report detailing the PMV results and compliance with the additional DTS requirements of Specification JVa Parts 2 and 4 and Specification JVb is also required.

Which DTS Provisions are applicable?

In most cases, meeting the Green Star rating requirements are sufficient to meet the Performance Requirement JP1. However, in addition to the Green Star rating, the building must comply with Specification JVa Parts 2 and 4. If the Green Star rating only applies to the base building elements, it may also need to comply with the relevant DTS Provisions for tenant area lighting and services.

Which Performance Requirement is applicable?

JP1 in NCC Volume One Section J — Energy efficiency.

Note: for brevity, the applicable Performance Requirements and DTS Provisions have been limited. This solution may also impact other Performance Requirements and DTS Provisions and must be considered in accordance with Part A2 of NCC 2019.

Carry out analysis, modelling or testing

Which Assessment Methods are the most suitable and where can they be found?

Assessment Methods are listed in clause A2.2 of Part A2. Any Assessment Method or combination of them may be used to determine that a solution complies with the Performance Requirements. In this scenario, the Verification Method JV2 is used as the Assessment Method, as the project is targeting a Green Star — Design & As-Built Rating.

What analysis, modelling or testing is used?

To ensure that the building satisfies the requirements of JV2, the ESD consultant completes the following:

Step 1: Register for a Green Star — Design & As-Built rating. Registering the project ensures that the most recent Green Star — Design & As-Built rating tool is being used, reinforces the commitment to following through with the energy requirements, and adds a layer of oversight from the Green Building Council of Australia (GBCA).

Step 2: Assess reference building. A theoretical reference building is assessed using the Green Star reference methodology. This establishes the base performance for the building's envelope and services. The annual GHG emissions of the reference building are calculated using energy modelling software meeting the requirements of ANSI/ASHRAE Standard 140 and Specification JVb. The reference building GHG emissions are multiplied by 90% to obtain the GHG emissions allowance for Verification Method JV2.

Step 3: Assess proposed building. The annual GHG emissions of the proposed building with the proposed services is calculated to be less than the GHG emissions allowance.

Step 4: Assess the PMV. The PMV of the building is also checked in the same thermal model used in Step 3. It needs to meet the thermal comfort acceptance criteria of PMV -1 to +1 for more than 95% of the floor area of all occupied zones for more than 98% of the hours of operation of the building.

Collate and evaluate results

Based on the analysis by the ESD consultant, the results of the analysis demonstrate that the building meets both the annual GHG emissions reduction criteria and the thermal comfort acceptance criteria, and that the proposed revised building design complies with performance Verification Method JV2 and thus satisfies JP1.

Prepare a final report

What should be in the final submission?

During the modelling process, the ESD consultant develops a report detailing the modelling inputs, the GHG emissions and thermal comfort assessment. This shows that the proposed building satisfies the requirements of the Verification Method JV2. In line with Section 11 'Greenhouse Gas Emissions Report Content' of the Green Star Energy Consumption and Greenhouse Gas Emissions Calculation Guide, the ESD consultant signs and submits this report.

The report verifies the suitability of the proposed building's design against the relevant elements of the Green Star — Design & As-Built Submission Guidelines and Calculator Guide, which are then used by the allowance to establish that the building meets the Performance Requirement JP1. The final report includes:

- The scope of the solution, the Performance Requirement assessed and the assessment method used;
- An overview and outline of the GHG emissions and thermal comfort modelling carried out by the ESD consultant, in accordance with JV2;
- A comparison of the annual GHG emissions of the reference building and the proposed building design with the allowance derived in JV2;
- A summary of the PMV for the building with the acceptance criteria in JV2; and,
- A copy of the Green Star Registration certification email.