The Performance Requirements of the National Construction Code (NCC) can be met using either a Performance Solution or a Deemed-to-Satisfy (DtS) Solution or a combination of both solutions. The following demonstrates the performance based design process that should be used in conjunction with the Development of Performance Solutions Guidance document.

**Scenario:**

The energy efficiency of a Class 5 building design, proposed to be built in Melbourne, is being assessed. As the initial design has a level of thermal performance above what is prescribed in the DtS Provisions, it is proposed to take advantage of the higher efficiency by using more cost effective glazing that differs from the DtS Provisions. As the design differs from what is prescribed in the DtS Provisions, a Performance Solution will be used.

**Prepare a Performance-Based Design Brief**

**What are the design objectives?**
- To reduce costs to the client by using more cost effective glazing, whilst meeting the relevant Performance Requirements of the NCC.

**Who should be consulted?**
- Building designer, client, builder, environmentally sustainable design (ESD) consultant and the regulatory approval authority.
- This group formed the stakeholder group for this project.

**What is the basis of the Performance Solution?**
- Verification Method JV3 provides an alternative method to the DtS Provisions to meet the energy efficiency Performance Requirements.
- The acceptance criteria is design with a heating and cooling load less than the ‘reference building’ modelled using JV3.

**What evidence is proposed?**
- A written report explaining the approach used, the modifications made to the design, the heating and cooling energy use, as determined by the energy rating software simulations for both the ‘reference building’ and the proposed design.

**Which DtS Provisions are applicable?**
- The DtS Provisions of NCC Volume One Parts J1 to J7, specifically J2 Glazing.

**Which Performance Requirement is applicable?**

JP1 in NCC Volume One Section J - Energy Efficiency.

Note: for brevity, the applicable Performance Requirements have been limited. This solution may also impact other Performance Requirements and must be considered in accordance with A0.7.
Which Assessment Methods are the most suitable and where can they be found?

Assessment Methods are listed in A0.5 and state that any Assessment Method or combination of them may be used to determine that a Performance Solution complies with the Performance Requirements. In this scenario, Verification Method JV3 will be used as the Assessment Method.

The ESD consultant undertook the following analysis to determine whether the Performance Solution, using JV3 satisfies the Performance Requirement.

Step 1: A theoretical reference building is assessed, using the DtS Provisions to establish the base performance for the envelope as well as services. The annual energy consumption of the reference building is calculated, the result of which becomes the acceptance criteria.

Step 2: The annual energy consumption of the proposed building (which has glazing in accordance with the DtS) with the proposed services is calculated to be far less than the acceptance criteria.

Step 3: The annual energy consumption of the proposed building with the services modelled to the minimum DtS Provisions is also calculated to be far less than the acceptance criteria.

Due to the annual energy consumption being significantly less than the acceptance criteria, a decision is made to further reduce costs by revising the design to include more cost effective glazing that has a lower level of thermal performance, resulting in the following additional steps.

Step 4: The annual energy consumption of the revised proposed building (which includes the cost effective glazing) with the proposed services is calculated to be less than the acceptance criteria.

Step 5: The annual energy consumption of the revised proposed building with the services modelled to the minimum DtS Provisions is also calculated to be less than the acceptance criteria.

Based on the analysis, a comparison of the annual energy consumption of steps 4 and 5, with the acceptance criteria determined in step 1, shows that the revised design is less than the acceptance criteria and complies with Verification Method JV3. Subsequently the proposed revised building design satisfies JP1.

Upon confirmation from the stakeholder group that they were satisfied with the proposed revised design, the ESD consultant developed a report detailing the modelling inputs and the energy assessment done in accordance with the approach in JV3.

What should be in the final submission?

The building designer, client and builder reviewed the final report and agreed that the proposed revised building design satisfied the requirements of JV3. This report was retained as evidence that the design had met Performance Requirement JP1. The building designer supplemented this report with a cover letter for submission to the regulatory approval authority. It summarised the key points relevant to this Performance Solution which included:

- Scope of the solution, stakeholders involved, the Performance Requirement assessed and the approach used
- Overview and outline of the modelling carried out by the ESD consultant, in accordance with JV3
- Comparison of the annual energy consumption of the ‘reference building’ and the proposed revised building design with the acceptance criteria in JV3.