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:
A building owner is choosing a heating system for a Class 6 retail building. The building will have electricity and gas connections and whilst unsure as to what extent of energy is to be used, the building owner wishes to use a combination of energy sources to optimise ongoing running costs. The Performance Requirement restricts the use of electricity alone. Therefore, a Performance Solution to meet the Performance Requirements will be explored.

What are the design objectives?
To utilise both gas and electricity as energy sources for heating.

Who should be consulted?
The building owner, building designer, the HVAC engineer, the environmentally sustainable design (ESD) consultant and the regulatory approval authority are the stakeholder group for this scenario.

What is the basis of the Performance Solution?
- Documented evidence provided by the ESD consultant to justify the Performance Solution is to be used to demonstrate compliance with the Performance Requirements.
- The acceptance criterion for the greenhouse gas intensity will be based on the quantified value in JP3(a).
- The ESD consultant is considered to be an appropriately qualified person in relation to energy efficiency and determining greenhouse gas intensity.

What evidence is proposed?
- Calculations of the greenhouse gas intensity using a combination of electricity and gas for heating, ensuring that it is not greater than that outlined in JP3(a).
- A written report from the ESD consultant to document this outcome, providing Evidence of Suitability.

Which DtS Provisions are applicable?
- The DtS Provisions are not applicable for this Performance Solution as Evidence of Suitability and Expert Judgement are the relevant Assessment Methods.

Which Performance Requirement is applicable?
JP3
Heating such as for a conditioned space must, to the degree necessary, obtain energy from-
(a) A source that has a greenhouse gas intensity that does not exceed 100g CO₂-e/MJ of thermal energy load; or
(b) An on-site renewable energy source; or
(c) Another process as reclaimed energy.

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 Part A0.5 and state that any Assessment Method or combination of them may be used to determine that a solution complies with the Performance Requirements. In this scenario, Evidence of Suitability combined with Expert Judgement will be used for the Assessment Methods.

To support this assessment, the ESD consultant sets the basis and undertakes the calculations to demonstrate what mix of electricity and gas energy sources will be equal to or less than 100g CO₂-e/MJ of thermal energy load.

The emission factors and conversions used are based on sources from the National Greenhouse Accounts Factors December 2014, a publication by the Department of Environment specifically for use to estimate GHG emissions for general applications.

The calculations showed that for the heating source, an electricity component of 25% and a gas component of 75% will meet the requirement in JP3(a)¹.

The ESD consultant prepared an Expert Judgement report detailing the approach used for this Performance Solution, including the supporting calculations which are sent out to the stakeholder group for peer review. Each stakeholder is given the opportunity to confirm that they believe the Performance Solution meets the Performance Requirement.

Upon confirmation from the stakeholder group that they are satisfied with the Expert Judgement report, a final report is prepared for submission to the regulatory approval authority.

What should be in the final submission?

The final report includes:

- An overview of the Performance Based Design Brief, outlining:
  - The Performance Solution;
  - The stakeholder group involved;
  - The agreed acceptance criterion;
  - Reference to the relevant NCC Assessment Methods, Performance Requirements and DtS Provisions.

- An outline of the approach used for the Performance Solution, including the detailed calculations and any assumptions made.

- A statement from the stakeholder group acknowledging acceptance of the Performance Solution, and evidence demonstrating the suitability of the ESD consultant to provide Expert Judgement in developing this solution. A summary of the key specifications, including reference to the design and the Performance Requirement being satisfied, and reference to all limitations and conditions of use.

¹ For further information on calculations, please go to the hard copy publication ABRB 2014 at www.abcb.gov.au