

Building energy analysis for commercial buildings

1. Summary

The Building Code of Australia (BCA) 2006 introduces energy efficiency measures for Class 5 - 9 buildings, providing a number of options for demonstrating compliance. One option is the use of energy rating and building energy analysis software. This Practice Note advises on the qualifications and experience required to use this software for Class 3 and Class 5 - 9 buildings. For guidance on requirements for Class 1 and 2 buildings, see Practice Note 2006-55.

2. Background

BCA verification methods JV2 and JV3 apply to Class 3 and Class 5 - 9 buildings. They require the annual energy consumption of the proposed building to be determined and compared with the stated values in table JV2 or, in the case of JV3, a reference building. 'Annual energy consumption' is the theoretical amount of energy used in a year by a building's services, excluding kitchen exhaust and the like.

The BCA requires the annual energy consumption to be calculated using a method that complies with the Australian Building Codes Board (ABCB) Protocol for Building Energy Analysis Software. The Protocol is available from the ABCB's website (www.abcb.gov.au).

To meet the Protocol, evidence must be available that demonstrates that the building energy analysis software complies with the Protocol. Also, a training program for users must be available. The training program needs to include training in the current version of the software. The Protocol also requires that trainers be "technically qualified and well versed in the functionality of the program and the calculation methods employed"¹.

Programs currently meeting this Protocol are:

- BEAVER / ESP
- DOE Suite
 - eQUEST
 - Visual Doe

- EnergyPlus
- TRACE 700
- TAS
- ICE
- IES Apache
- E20-II HAP

3. Using building energy analysis software

The Buildings (Interim) Regulations 2005 (the Regulations) do not prescribe a class of building practitioner for persons using building energy analysis software. However, as such persons would only be involved where a BCA alternative solution is being undertaken, consideration needs to be given to clause A0.9 of the BCA Volume One.

Clause A0.9 outlines various methods to determine whether an alternative solution meets the relevant performance requirements. Where JV2 or JV3 is used to demonstrate compliance, the assessment methods used would be a combination of verification methods and expert judgement. The BCA defines expert judgement as:

"the judgement of an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements."

To use building energy analysis software under JV2 and JV3, the software user needs a comprehensive knowledge of building services, so that the energy used by these services can be determined. The software assesses the energy contribution of various components such as the building fabric, air infiltration and natural ventilation, internal heat sources, air-conditioning systems and vertical transport systems.

The category of registered building practitioner most likely to have the relevant qualifications and experience for this task is 'mechanical engineer'. Mechanical engineers design hydraulics, smoke exhaust systems, fire services, sprinkler systems, heating, ventilation and air-conditioning systems, lift services, air services and vertical transport systems.

¹ Australian Building Codes Board, "Protocol for Building Energy Analysis Software", Version 2005.1, May 2005, ABCB

4. Relevant building surveyor's role

To perform a building energy analysis, a person needs to demonstrate to the relevant building surveyor (RBS) that they have the relevant qualifications and experience. One mandatory qualification under the ABCB Protocol is training in the use of the specific software package.

It is expected that most people undertaking this energy modelling will be mechanical engineers registered with the Building Practitioners Board. However, there may be situations where an architect, services draftsman or other consultant is deemed by the RBS to have the appropriate qualifications and experience.

5. Further considerations for registered building practitioners

Registered building practitioners using building energy analysis software for the purpose of JV2 and JV3 need to be aware of regulation 1502 of the Regulations - any analysis that they undertake must fall within their area of competence and expertise.