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Critique of BASIX DIY Function

Report Prepared By

Energy Partners

For

ABSA

Association of Building Sustainability Assessors

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1. Introduction

BASIX has introduced a new method for assessing building thermal performance called DIY. It is not a simple Deemed to Comply provision, it is an attempt at a rating tool that awards different heating and cooling loads according to project specifications.

The Association of Building Sustainability Assessors (ABSA) engaged Energy Partners, as an independent technical expert, to provide a review of the DIY tool with consideration to its validity as a method for estimating heating and cooling loads as well as its role in the broader context of delivering more sustainable homes and appropriate assessment methods.

A trial version of DIY is operating on the BASIX website at www.basix.nsw.gov.au

ABSA has asked the DOP to provide background information regarding the methodology behind the tool which they may or may not get. So, our analysis was based on whatever information we could extrapolate from the on-line tool.

NSW assessors have been asked to submit comparisons of projects rated by both NatHERS and DIY. ABSA expects to receive about 100 such examples. They will also be seeking input from Certifiers and council officers regarding the impact of DIY on the compliance checking process.

There is a very limited period for feedback on the new DIY - end of November. We are aiming to have our submission completed by the middle of next week to present to the DG of DOP, Minister and Premiere.

The timeframe and budget place constraints on the extent of services requested from Energy Partners.

It is understood that ABSA is seeking to engage other experts to each provide independent reports and that, accordingly, this brief assessment reported here should be treated as just one contribution to the debate.

2. Methodology

Several dwellings known to pass the "Thermal Comfort" requirements of BASIX using the simulation method were resubmitted using the DIY function and comparisons made between the results. Each dwelling was rated using the FirstRate version 4.05 software package recently accepted for use in NSW for this purpose.

The FirstRate values for separate Heating and Cooling annual consumptions (in MJ/m²) and Nett Conditioned Floor Areas (NCFA in m²) were applied for the purpose. Additionally, the input echo pages of the FirstRate report were used to ensure that identical data was input to the DIY function to ensure direct comparability between the two methods irrespective of the accuracy of the FirstRate analysis.

Each dwelling is described in brief in the Appendix to allow the reader to concur the general nature of the thermal comfort performance anticipated and to draw any potential inferences from discernible trends observed. These descriptions are included in the Appendices.

We expect the DIY method to be simpler / cheaper and hence less reliable / repeatable. Accordingly we expect it to compensate for its simplicity by biasing its results to avoid the possibility of inadvertently lowering the standards of new dwellings in NSW by ensuring that few, if any, dwellings which would fail the rigorous simulation assessment method would pass the DIY assessment method.

It is noted that the number of dwellings that could be included in the sample is only small but the results are of such concern that expanding the sample size in the near future is highly recommended to establish whether the observations made in this small set have a general applicability.

3. Results and Critique

Location	CZ#		House 1 (NCFA = 245.1 m²)			House 2 (NCFA = 212.0 m²)			House 3 (NCFA = 209.3 m²)			
			SIM	DIY	CAP	SIM	DIY	CAP	SIM	DIY	CAP (DIY)	CAP (SIM)
Wagga	20	Heating	203.0	103.7	207.3							
		Cooling	63.0	58.8	67.3							
Sydney West	28	Heating							66.0	58.4	111.9	115.0
		Cooling							20.7	42.2	54.6	54.6
Canberra	24	Heating				253.0	126.9	253.9				
		Cooling				47.0	25.9	51.7				
Coffs Harbour	11	Heating							19.0	29.5	59.1	82.9
		Cooling							33.0	66.2	77.3	48.6

The rated values for MJ/m² vary radically between the two assessment methods and the simpler method is often giving lower values despite requiring lesser insulation than was included in the FirstRate assessment – especially in the projected Heating values. If this relativity is common, the switch to the DIY alternative will result in a drastic lowering of standards for new housing in NSW and much greater energy consumption (unless the energy provisions of the BCA are used to limit this economic and environmental detriment).

The apparent lead that BASIX offered to environmental performance relative to the parallel requirements in Victoria will be lost entirely if the DIY alternative is not at least as rigorous as the assessment methods used in that state (5 stars FirstRate/NatHERS).

Detailed descriptions and commentary on the three houses and their assessments and on the assessment methods themselves can be found in the Appendix.

4. Recommendations

From the modest analysis reported here we can make the following recommendations:

1. It is noted that the number of dwellings that could be included in the sample is only small but the results are of such concern that expanding the sample size in the near future is highly recommended to establish whether the observations made in this small set have a general applicability.

2. We expect the DIY method to be simpler / cheaper and hence less reliable / repeatable. Accordingly we recommend that it be recalibrated to compensate for its simplicity by biasing its results to avoid the possibility of inadvertently lowering the standards of new dwellings in NSW by ensuring that few, if any, dwellings which would fail the rigorous simulation assessment method would pass the DIY assessment method.

3. The DIY assessment method should be refined to not allow any significant number of Approvals to be granted to dwellings which would fail the Simulation assessment method.

4. The DIY assessment method should be refined to ensure that dwellings which would be assessed as having illegally poor performance in Victoria and the ACT do not get Approval to be built in NSW.

5. The mechanism by which the Caps appear to differ according to which assessment method is selected should be established and corrected.

Appendix 1 : Supporting Data

'DIY' Thermal Comfort Testing Summary:

House 1: House in Boorowa NSW, CZ20 (Wagga)

House Description:

1 storey, CSOG, Brick Veneer 3 bedroom detached dwelling, large amount of glazing (much North facing), H-shape design means that some of the house blocks out other sections from sun, Courtyard on west side, Pergola on west entry and some north windows.

Issues with DIY method process:

· Window number appears limited until calculation button is pressed and more window boxes appear.

· There are not window shading options – i.e. a different summer eave and winter eave could not be chosen (This house has summer pergolas of up to 5m and winter eave of only 0.7m). Adjustable summer shading was left out of the assessment for this reason (only fixed eaves were entered).

· No L-shape shading.

· Only obstruction shading from ground up is allowed.

Other notes:

· No cross ventilation bonus was used in either method on this house.

· Many users will only use this software once, therefore more likely to be inconsistent and contain errors.

Insulation:

	FirstRate Simulation	DIY Requirements
Ext. Walls	R2.5	R1.46
Ceiling	R4	R1.25
Roof	Anticon Blanket (55mm)	Anticon Blanket (55mm)
Windows	SG Alum	SG Alum

Scores:

	SIMULATION	DIY	MAX CAP
HEATING	203	103.7	207.3
COOLING	63	58.8	67.3

Note: The DIY Cooling does not include any benefit of the summer pergola shading.

Note: The Thermal Comfort results impact on the 'Energy' section of the BASIX certificate (Lower heating and cooling scores make Energy target easier to achieve).

House 2: Jerrabomberra (Greater Queanbeyan Council) NSW (CZ24 Canberra)

House Description:

Lower level entry is Brick Cavity, Upper level is Brick Veneer (majority), 5 bedroom house, Poor orientation, high area of glazing in all directions.

Issues with DIY method process:

· After selecting no foil in the roof and clicking on the forward arrow to move to the next page, an error appeared claiming not all fields had been completed but failing to mention which field was incomplete. The solution is that you must select foil in the roof to continue without the error.

Other notes:

· Cross flow ventilation bonus was claimed in both methods

· Not enough window directions to match simulation, i.e. WSW windows were entered as SW, etc.

· Max number of windows allowed in DIY was 15 but dwelling had more than 15 windows with different overshadowing and shading (Eaves).

· Window section is split into two, can be confusing since you need to split the windows by eave size before the page where you enter the window eave. (Small Instructions at top of page must be carefully read and understood so time is not wasted here)

Insulation:

	FirstRate Simulation	DIY Requirements (added insulation)
Floor	R2.0	R1.3
Cav. Brick Wall	R2.0	R1.0
Brick Veneer Wall	R2.0	R1.56
Ceiling	R4.0	R4.5
Roof	None	Foil
Windows	DG 6/12/6 Alum	DG 3/6/3 Alum

Scores:

	SIMULATION	DIY	MAX CAP
HEATING	253	126.9	253.9
COOLING	47	25.9	51.7

Note: score jumped to approx 460 heating when SG aluminium was used but returned to the scores above when DG windows were put in, these scores are exactly the same as those shown before any windows were entered.

House 3: House in Campbelltown 2560 (CZ28, Western Sydney)

Description:

Cavity brick ground floor, Brick veneer up to sill level of 1st floor, then FC for the top half of the 1st floor. Slab on ground and timber upstairs. Average to good orientation.

Insulation:

	FirstRate Simulation	**DIY Requirements (added insulation)**
Floor	Nil	Nil
Cav. Brick Walls	R1.5	R1.0
Brick Veneer Wall	R1.5	R1.16
Framed Wall	R1.5	R1.3
Ceiling (framed)	R4.0	R2.0
Ceiling (flat)	R4.0	R1.93
Roof	Anticon Blanket (55mm)	Anticon Blanket (55mm)
Windows	SG Alum	SG Alum

Scores:

	SIMULATION	DIY	MAX CAP
HEATING	66	58.4	111.9
COOLING	20.7	42.2	54.6

NB: Some trouble was encountered changing to the Coffs Harbour Zone on the slower computer, and when it was achieved, the heating and cooling caps for the same house were vastly different. (NB: this was Jim's house and these inputs should be checked again when in further study.)

Other Note: The DIY is currently disabled but doesn't tell you this until you have completed the thermal comfort section.