

MODELLING RESIDENTIAL ENERGY CONSUMPTION BEHAVIOUR TO SUPPORT LOW CARBON LIVING TARGETS

Research outline

Purpose of the study - Improve sustainability assessment tools such as BASIX by incorporating human behavioural factors, which ultimately would contribute to low carbon living (LCL) targets.

Aim - Establish a model of residential energy consumption behaviour to inform sustainability assessments, dwelling design and policy decisions.

Research questions

1. What behaviours contribute to the actual residential energy consumption?
2. What are the attributes that influence residential energy consumption behaviour?
3. How can the evidence on potential energy consumption behaviours and their influential attributes, inform sustainability assessment, dwelling design and policy decisions?

Methodology

Research sample – 23 Free standing houses and 7 apartment units with BASIX certification and located in Greater Sydney region.

Face to face interviews were conducted in both cool and warm seasons.

Results

- Based on the evidence, the model of residential energy consumption behaviour (Figure 1) is developed.
- According to this model the actual energy consumption in dwellings is a result of a combination of three behaviours namely, energy use behaviour, adaptive behaviour and investment behaviour.

- The identified energy consumption behaviours are shaped by influential attributes at two levels. At internal level, personal and social attributes influence residents' energy consumption behaviours directly while at external level physical environmental and contextual attributes, economic and governance attributes influence behaviours mainly through internal influential attributes.
- This model successfully enables to understand the reasons behind the energy consumption in dwellings.

Conclusion

Findings of the study would successfully contribute to the evaluation of the actual residential energy consumption in dwellings.

This model could be adapted and used to explain actual energy consumption patterns for specific needs of residents such as for thermal comfort (Figure 2), visual comfort and hot water consumption.

Anticipated impacts

In addition to the theoretical contributions of this model to the field of behaviour in LCL, it would inform the BASIX assessment tool, sustainability policy, building designs and government educational programs on LCL.

Further information

<http://www.lowcarbonlivingcrc.com.au/research/program-1-integrated-building-systems/rp1017-validating-and-improving-basix-energy>

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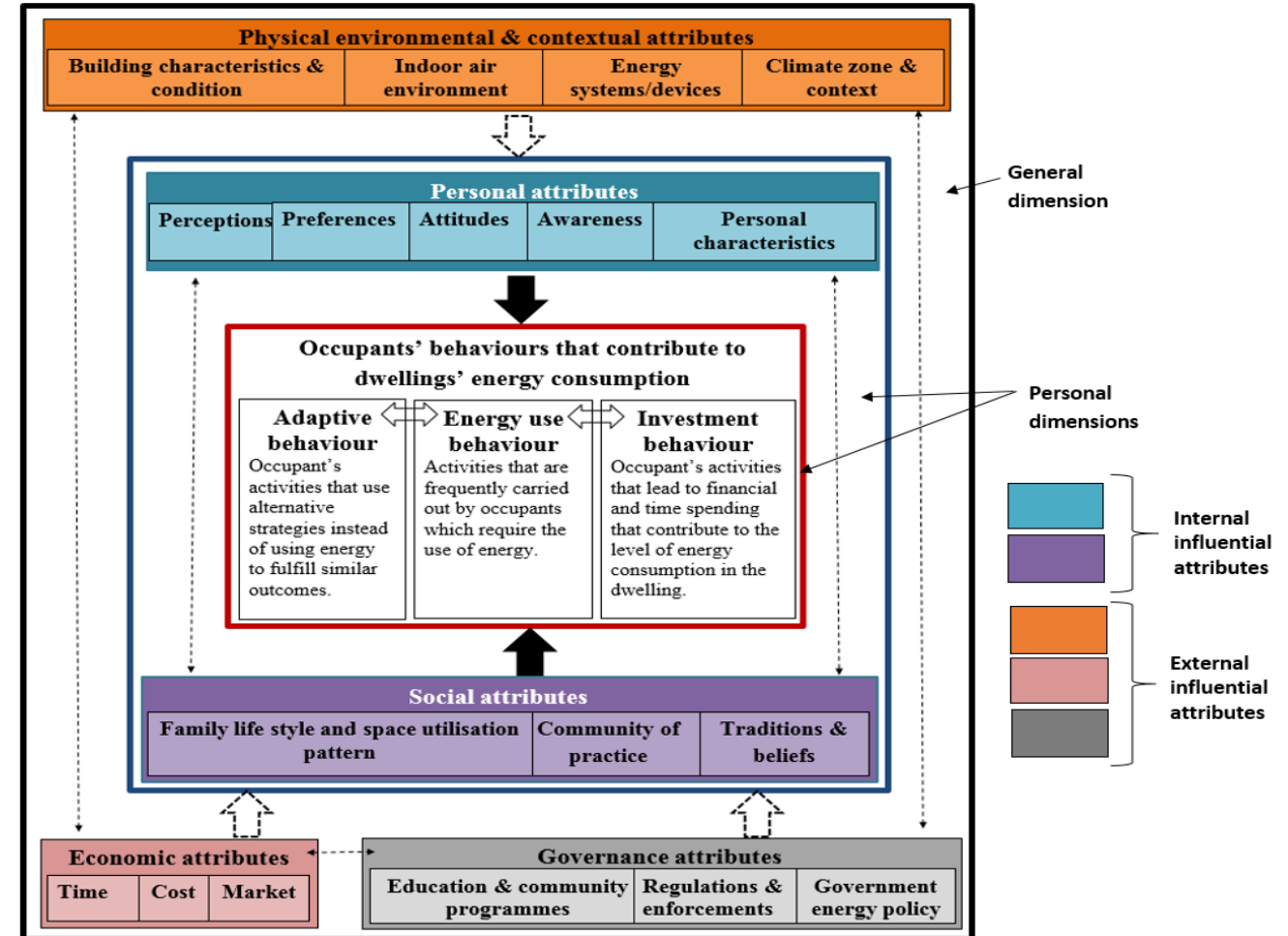


Figure 1 The model of residential energy consumption behaviour

Incorporating residents' actual energy consumption behaviour would improve the accuracy of sustainability assessments.

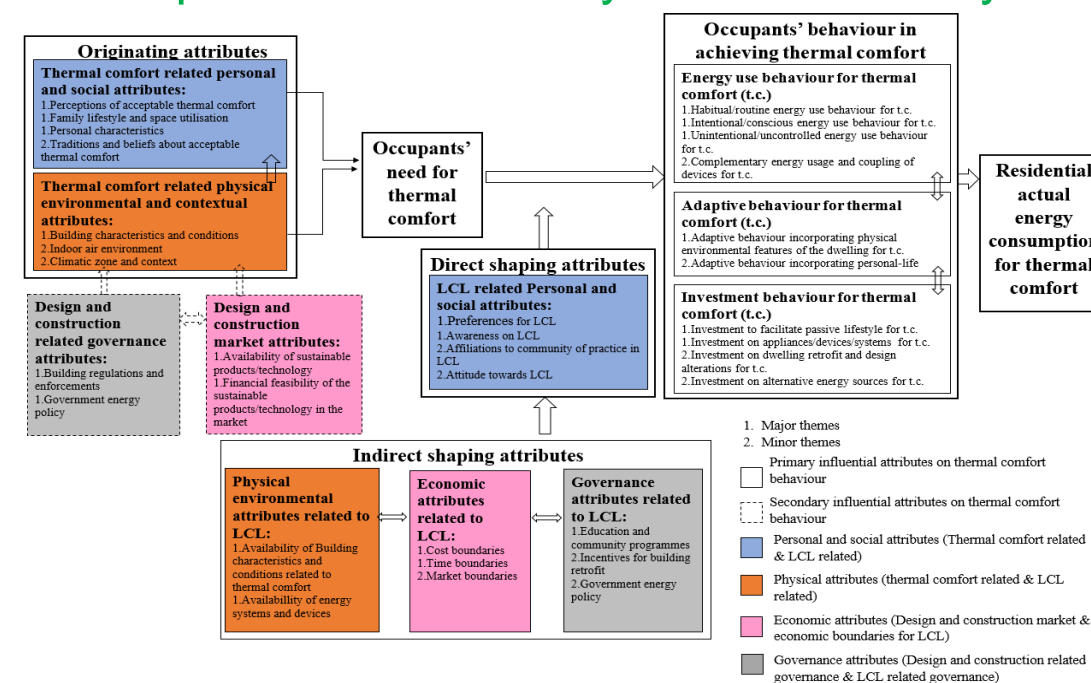


Figure 2 Application of the model to understand residential energy consumption behaviour for thermal comfort

