

# BIM Model and BES Model Approach in Designing a Bioclimatic Building

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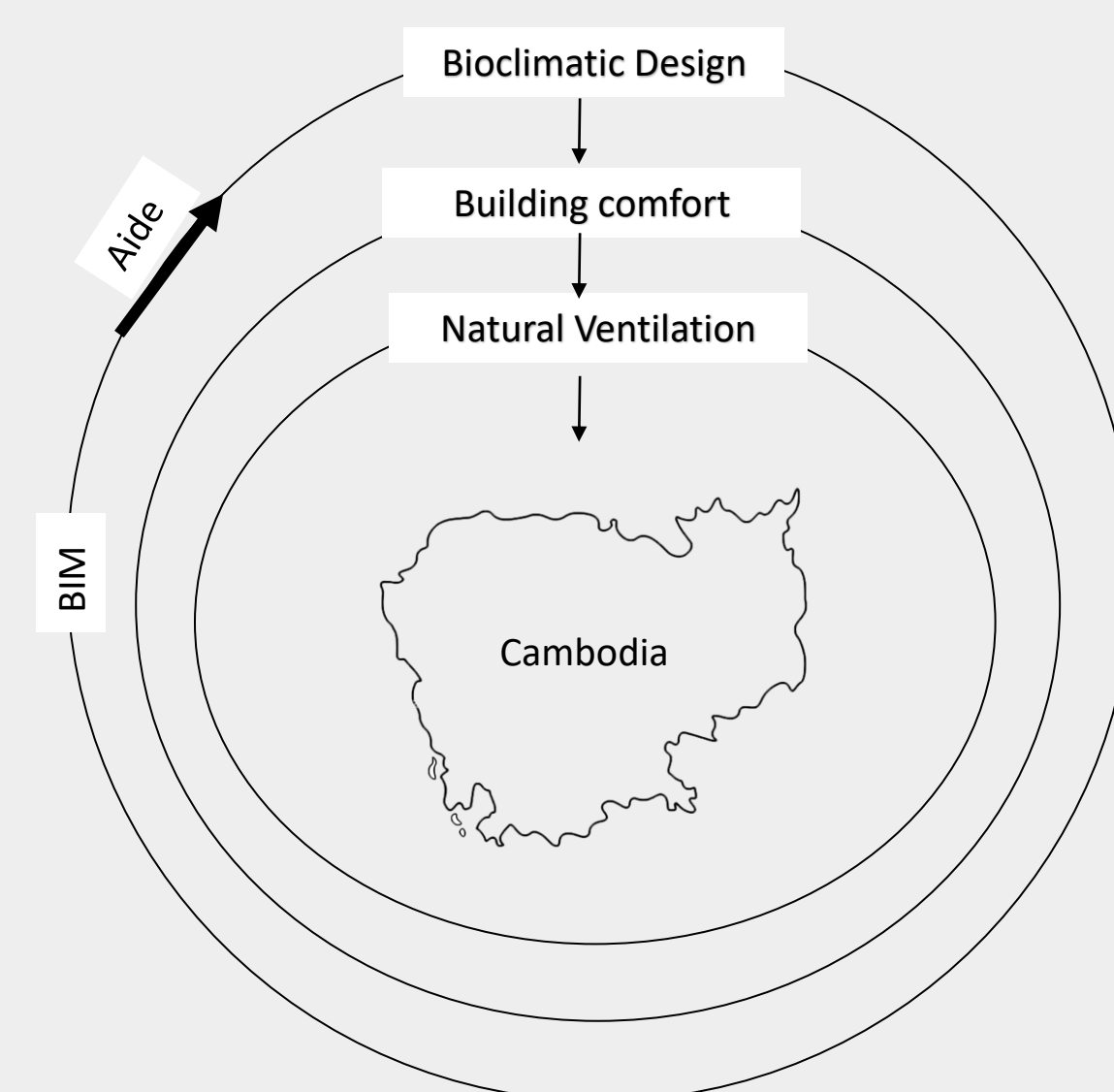
## 1. RESEARCH CONTEXT

Bioclimatic design is one of the fundamental concepts introduced in 1963 which aims to provide optimum comfort to the occupant and use as little energy as possible, taking into account the climatic and environmental conditions of the site and to promote sustainable construction.

At the same time, BIM has also been sought to aid sustainable construction as it can facilitate the workflow between different stakeholders and improve the initial design phase (Haug et al., 2020). Recently, it has also been used to analyze the thermal comfort, energy performance of the building and realization of a bioclimatic design.

### RESEARCH OBJECTIVE

- Find bioclimatic design concept to achieve standard thermal comfort in building specific in tropical region by using BIM as instrument
- BIM to facilitate at the early stage of this design process to avoid certain conflicts between architect and engineer



### RESEARCH STATEMENT

- What are the effective bioclimatic design strategies to obtain thermal comfort and low energy consumption in buildings in tropical regions?
- How effective is the BIM model in analyzing and improving the design quality of a bioclimatic building?
- What are the prospects for the application of BIM and bioclimatic design in the AEC sector in Cambodia

## 2. METHODOLOGY

5 case study buildings  
(Phnom Penh, Cambodia)

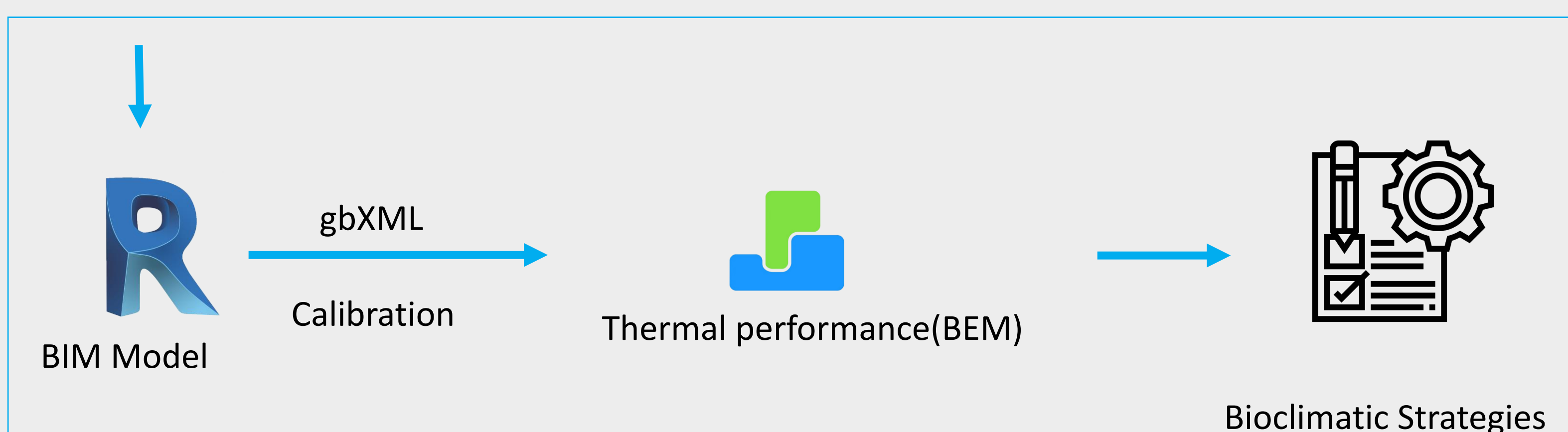


Thermal comfort analysis

In-situ measurement  
Air temperature, Data Logger  
Relative humidity, Data Logger  
Air velocity, Hot-wire anemometer  
(01/Apr – 01/May, 2021, 25/June – 05/Aug, 2021)

Survey and interview  
ASHRAE Questionnaire

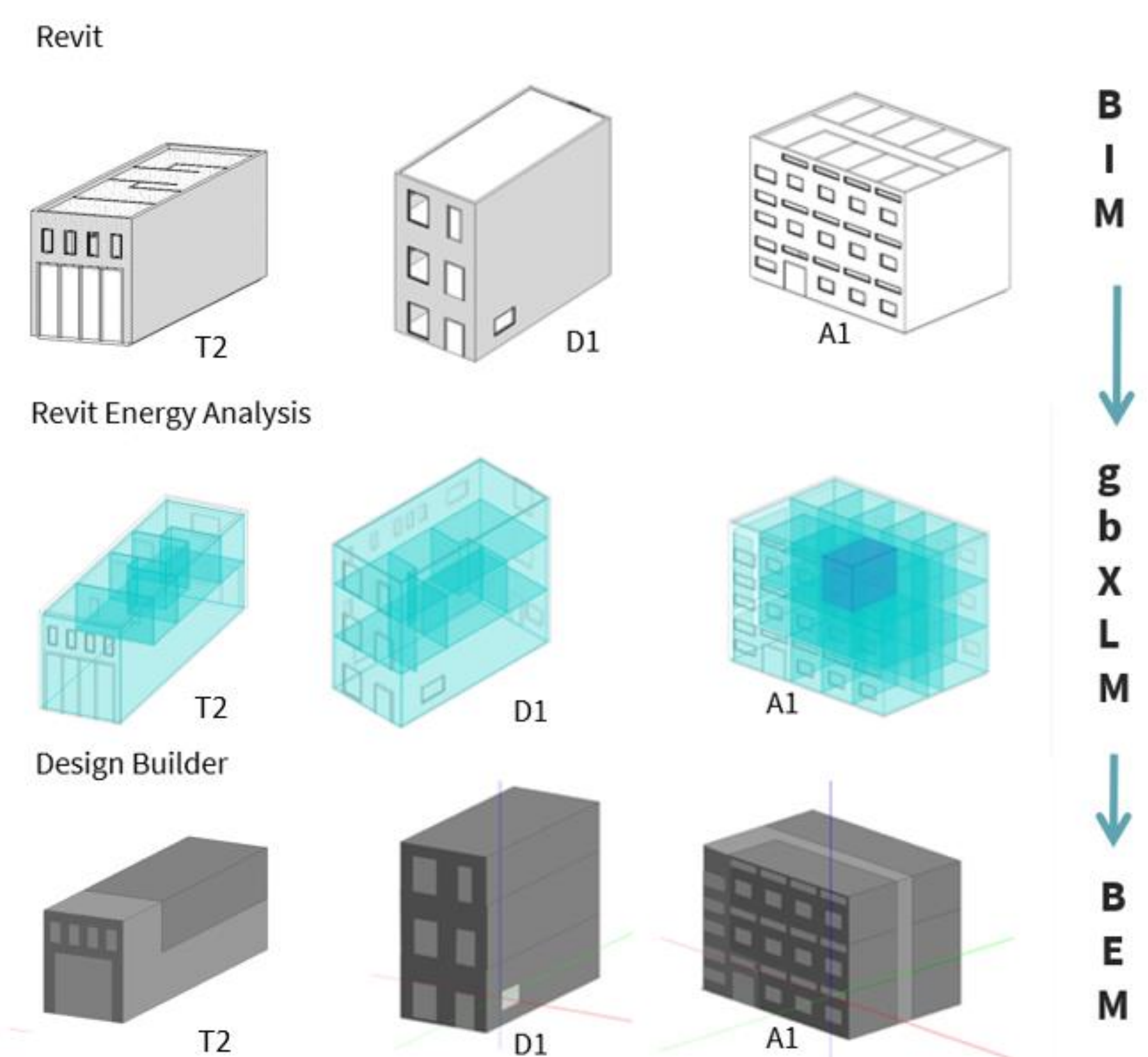
Numerical models and simulations



## 4. CONCLUSION

BIM model and BES model can be used to analyze thermal performance of building to achieve bioclimatic principles. However, calibration is needed to have an accurate simulation. A calibration can be differed depending on the type of building and climate condition that the building is located.

## 3. RESULTS



### Measurement and simulation

Comparison of temperature between result from measurement and simulation before calibration.

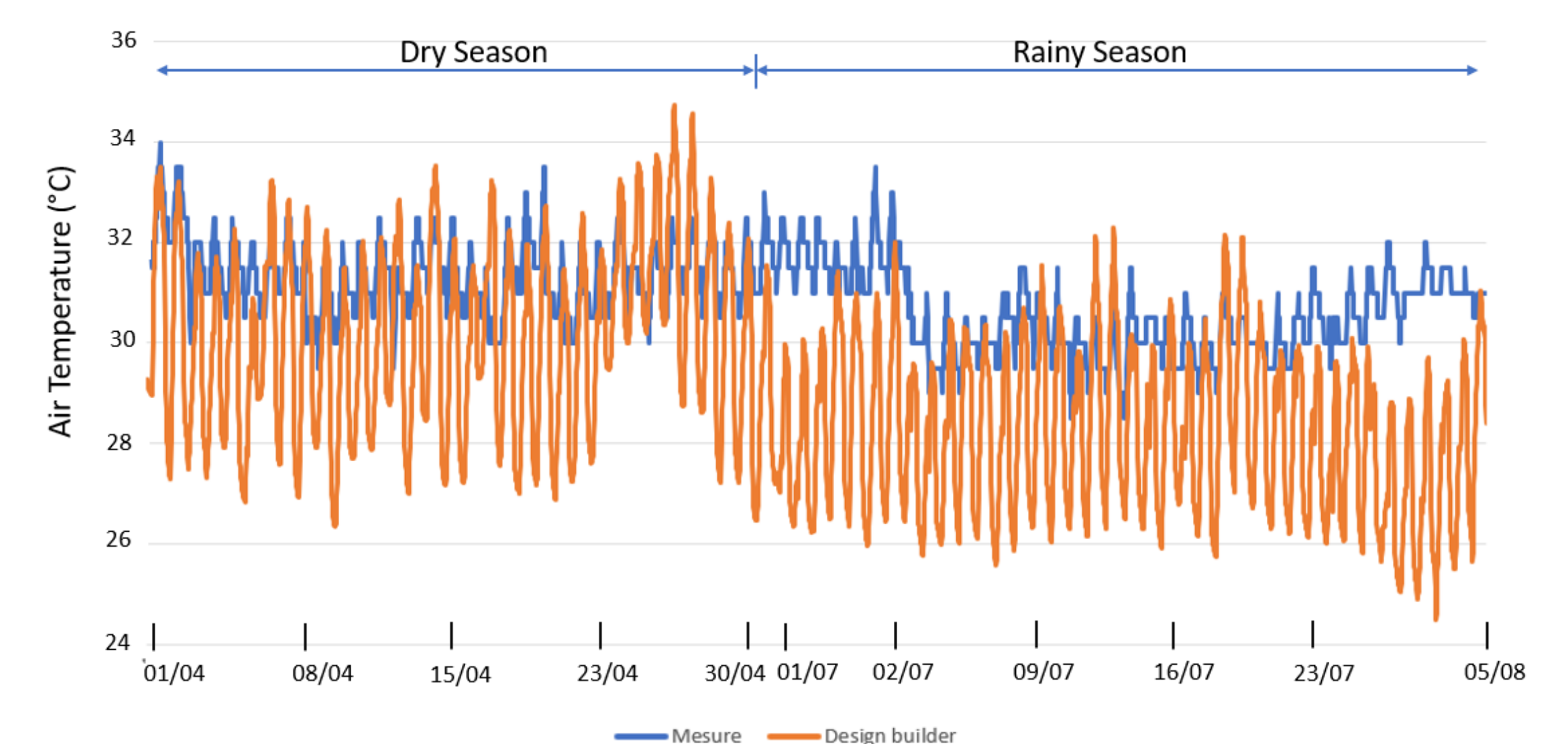


Fig1. Comparison results of air temperature of T2

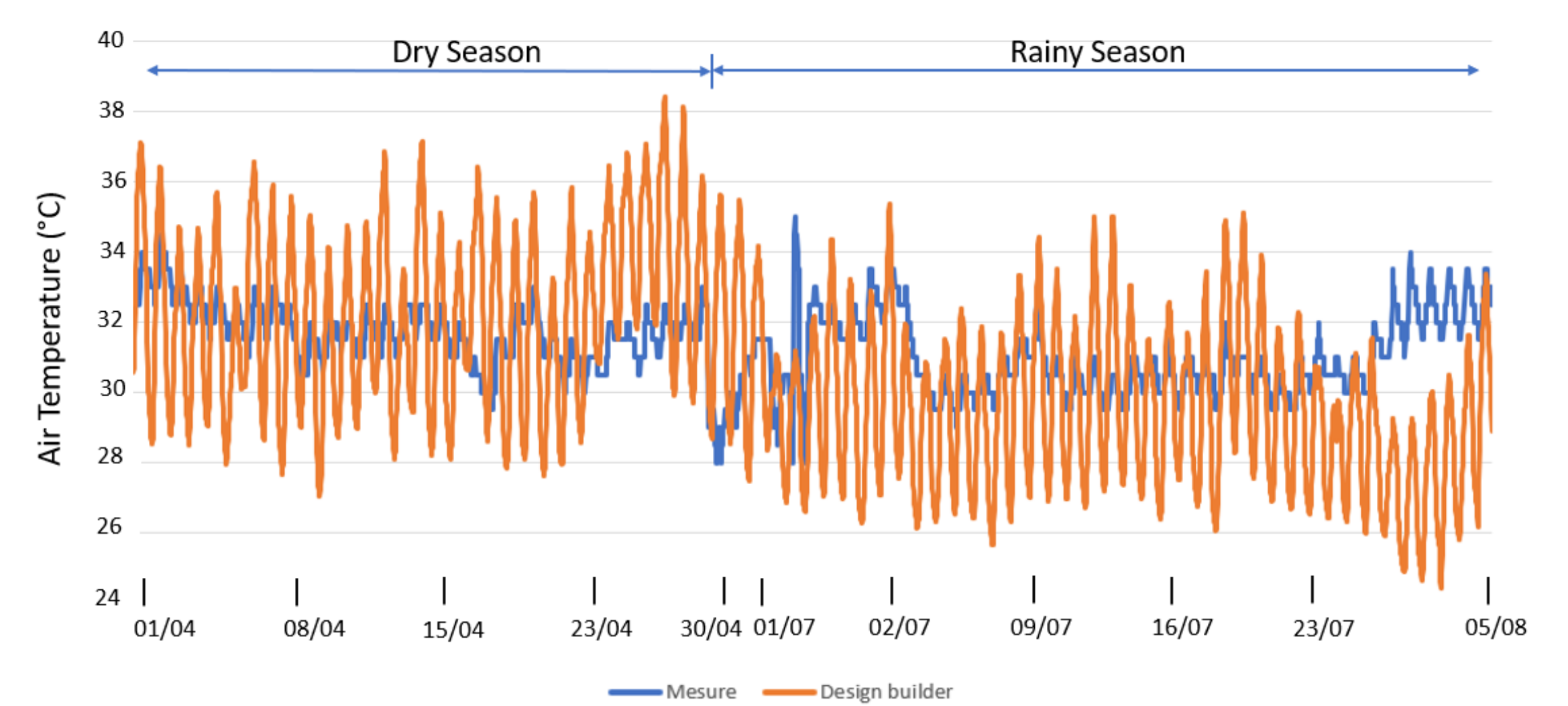


Fig 2. Comparison results of air temperature of D1

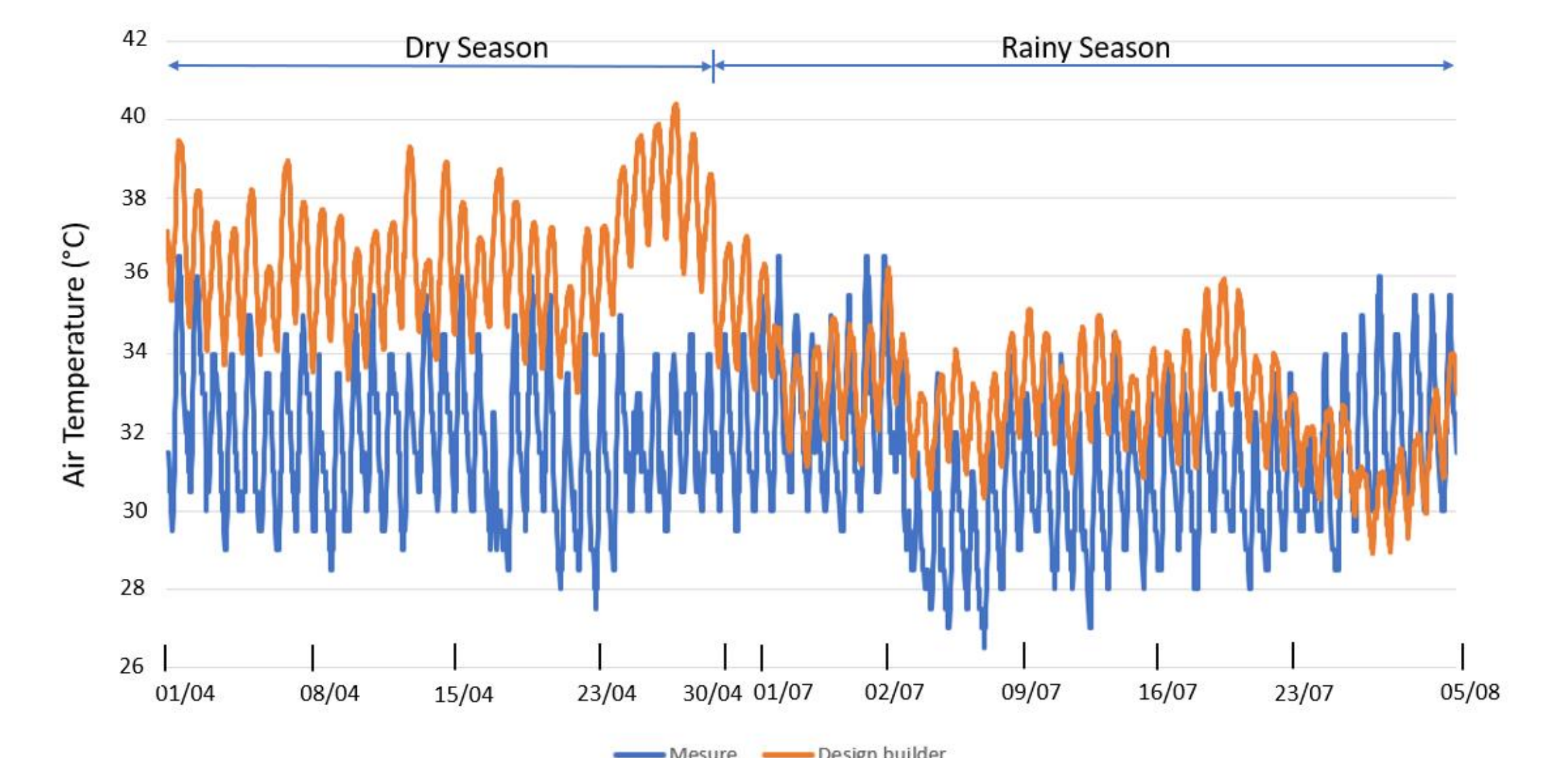


Fig 3. Comparison results of air temperature of A1