# Article information:

Occupant behavior modeling for building performance simulation: Current state and future challenges - ScienceDirect
<https://www.sciencedirect.com/science/article/abs/pii/S0378778815302164>

# Article summary:

1. Building simulation is a cost-effective method to support energy efficient design and operation of buildings, but lacks scientific and robust methods to define and model energy related occupant behavior in buildings.

2. Occupant behavior affects building energy consumption significantly and is a leading source of uncertainty in predicting building energy use.

3. Several stochastic models have been developed to describe window operations, blinds, lighting, air-conditioning and clothing adjustment, but there are still research needs to be addressed by the large group of researchers involved in International Energy Agency Energy in Buildings and Communities Program (IEA EBC) Annex 66: Definition and Simulation of Occupant Behavior in Buildings.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article "Occupant behavior modeling for building performance simulation: Current state and future challenges" provides a comprehensive overview of the importance of occupant behavior in building energy consumption and the need for accurate modeling to support energy-efficient design and operation. The article highlights the significant impact that occupant behavior has on building energy consumption, which is often a leading source of uncertainty in predicting building energy use.

The article presents various studies that demonstrate how occupant behavior affects building energy consumption significantly, such as the study by Li et al. [7], which investigated cooling electricity use in 25 households in a large residential building in Beijing during summer. The results showed that with an identical building envelope, the measured electricity consumption for air-conditioning in different apartments varied widely due to the operating mode of the split-type air conditioning (AC) system.

The article also discusses how occupants' movements and presence are fundamental to occupant behavior simulation by providing information about whether a room is occupied, the number of occupants, or the specific individual in the room. The article highlights various stochastic models developed to describe window operations, blinds, lighting, operation of air-conditioning, and clothing adjustment.

However, one potential bias in this article is its focus on modeling occupant behavior as a means to support energy-efficient design and operation without considering other factors such as comfort and health needs. While it is essential to reduce energy consumption in buildings, it should not be at the expense of occupants' comfort and health needs.

Another missing point of consideration is how cultural differences may affect occupant behavior models' accuracy across different regions worldwide. The article acknowledges that these models require large amounts of data to establish statistical relationships between environmental factors and targeted operations but barely scratches the surface considering numerous building typologies, cultures, climates etc.

Overall, this article provides valuable insights into current state-of-the-art research on occupant behavior modeling for building performance simulation while highlighting future research needs. However, it is essential to consider other factors such as comfort and health needs and cultural differences that may affect the accuracy of occupant behavior models across different regions worldwide.

# Topics for further research:

* Cultural differences in occupant behavior modeling for building energy consumption
* Balancing energy efficiency and occupant comfort in building design and operation
* Impact of indoor air quality on occupant behavior in buildings
* Human-centric building design and operation for improved occupant well-being
* Role of building automation systems in occupant behavior modeling and energy efficiency
* Integration of renewable energy sources in building design and operation for sustainable energy consumption

# Report location:

<https://www.fullpicture.app/item/3253c33aac2c530d20781fd2efa4dc8f>