DS²BE

Doctoral Seminars on Sustainability Research in the Built Environment

Contribution of mixed mode ventilation to the energy consumption of residential buildings in a Mediterranean climate

Asmaa Tellache[1,2*], Youcef Lazi[3], and Shady Attia[1]

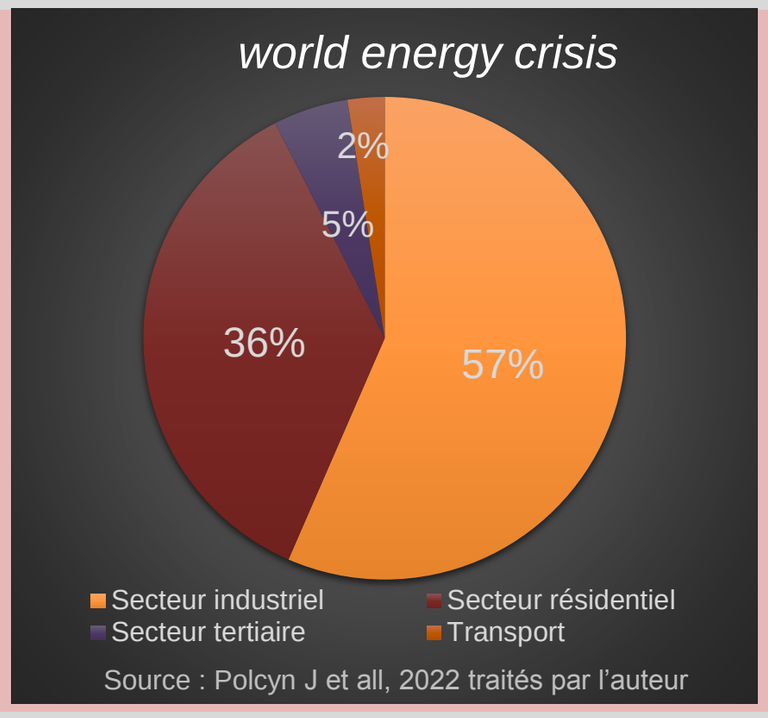
1 Sustainable Building Design Lab, Dept. ArGEnCo, Faculty of Applied Sciences, University of Liege, Belgium
2 Department of architecture, Faculty of sciences, University of Algiers 1, Algeria
3 University of Guelma 08 Mai 1945, Algeria

*Correspondence: asmaa.tellache@student.uliege.be

LIÈGE université

Problem statement

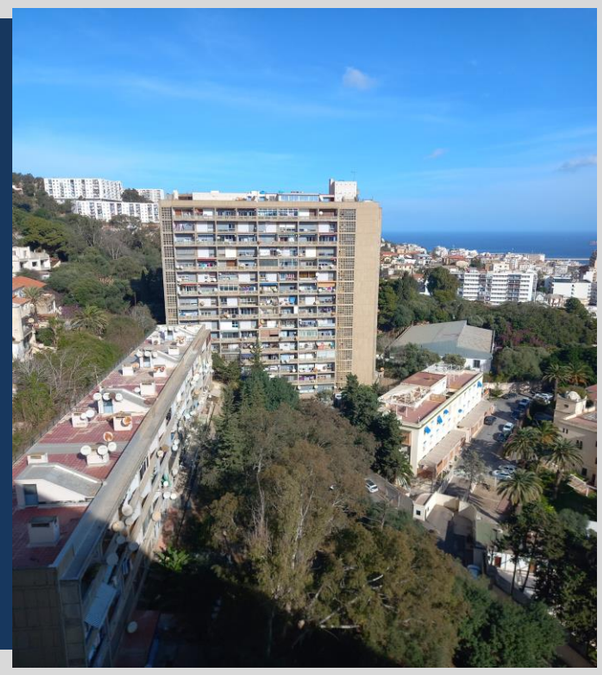
The Mediterranean, located at the crossroads of three continents, accounts for 8% of the world's primary energy consumption.



It is a climate that is not dominated by either a hot or a temperate season, and to ensure thermal comfort in this climate we must mix between heating in winter and cooling in summer which is very **expensive and emits a lot of CO_2.**

This study will explore…

1. What is the impact of natural ventilation on electricity consumption for cooling and thermal comfort?
2. Can we really consider ventilation as a passive cooling strategy for buildings in a Mediterranean climate?
3. What are the guidelines to be applied or the architectural measures to be used for ventilation to have a better thermal comfort?



Hypothesis

The appropriate and practical use of natural ventilation contributes to the reduction of energy consumption in residential buildings in the Mediterranean climate, but requires the consideration of certain conditions;

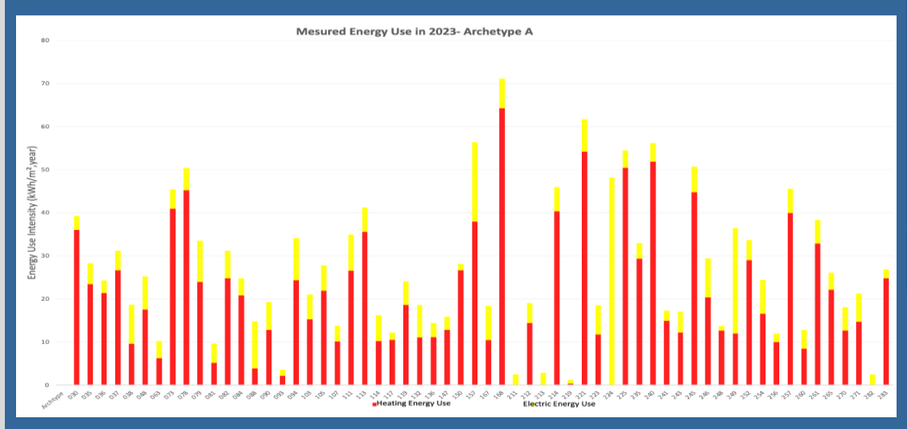
Mixed mode ventilation significantly improves building performance in terms of energy consumption and indoor air quality in residential buildings;

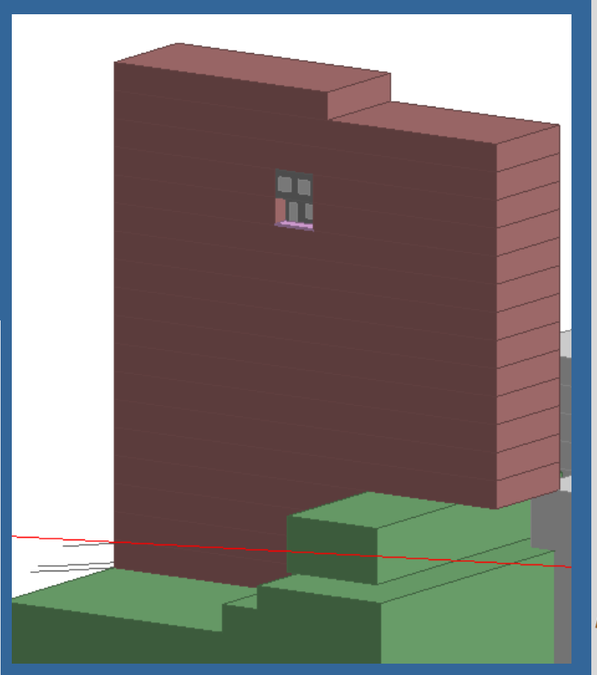
The use of the static and adaptive thermal comfort model in the same building contributes to the sustainable development of the habitat and considerably reduces greenhouse gas emissions and our attachment to the traditional use of fossil fuels;

The efficiency of natural ventilation is dependent on the building typology.

Preliminary results?

This research developed a of benchmark models for residential Buildings under Mediterranean climate.





Methods

This PhD will use energetic documentary (the residents' electricity and gas bills), Measure in situ, numerical simulation and calibration to confirm the model.

https://doi.org/10.7910/DVN/QUVTOZ