

# Earth walls and Energy Efficiency

## Introduction

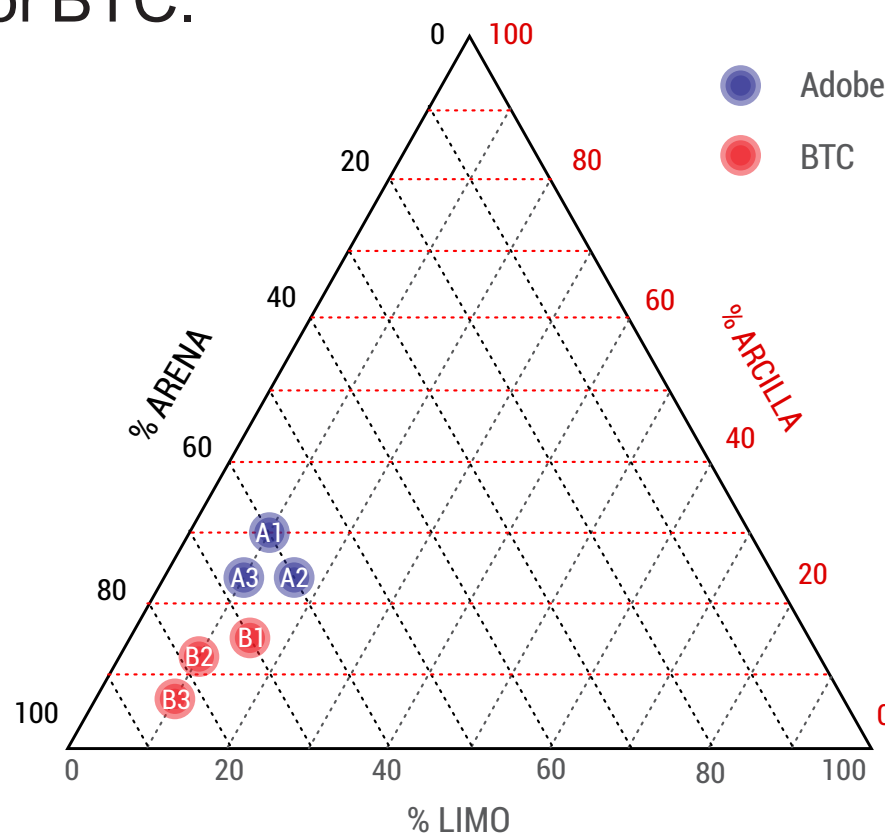
The earth is an ancient material. Various cultures around the planet have used it through local techniques that are still in force. Some built examples are still standing after thousands of years, demonstrating both their cultural value and their durability, mechanical resistance and hygrothermal comfort..It is worth highlighting the importance of energy efficiency and the environment as an intrinsic part of current problems, providing a transdisciplinary approach to addressing problems from various places. Having quantitative data and specific characteristics of the material at the local level will allow it to enter the catalog of standardized materials, to enable its evaluation in terms of energy efficiency. This work aims to be an advance towards the inclusion of unconventional techniques within the regulatory range in order to incorporate more sustainable materials and techniques, with less incorporated energy and lower CO2 emissions.



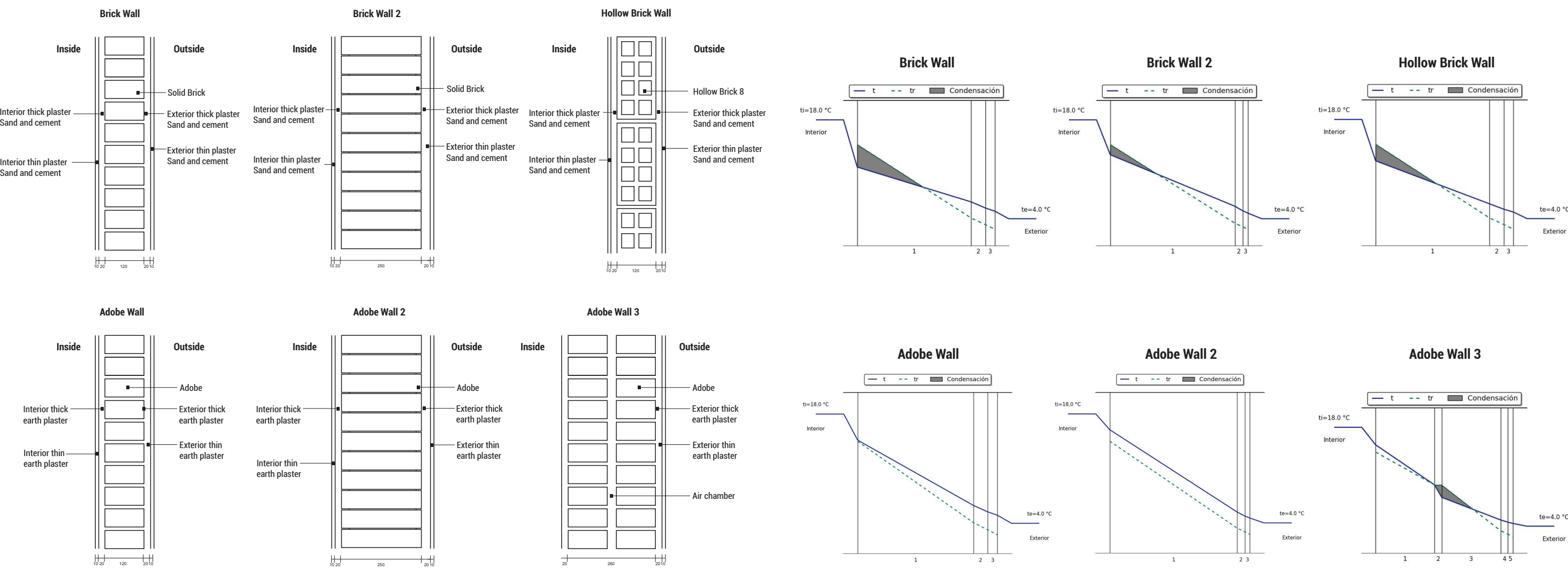
## Results obtained

For this research work, field tests were carried out to determine its granulometric composition by sedimentation, obtaining a composition that is within the margins established by the ABNT NBR 16814:2020 standard for adobes and by the UNE 41410 - 2008 standard for BTC.

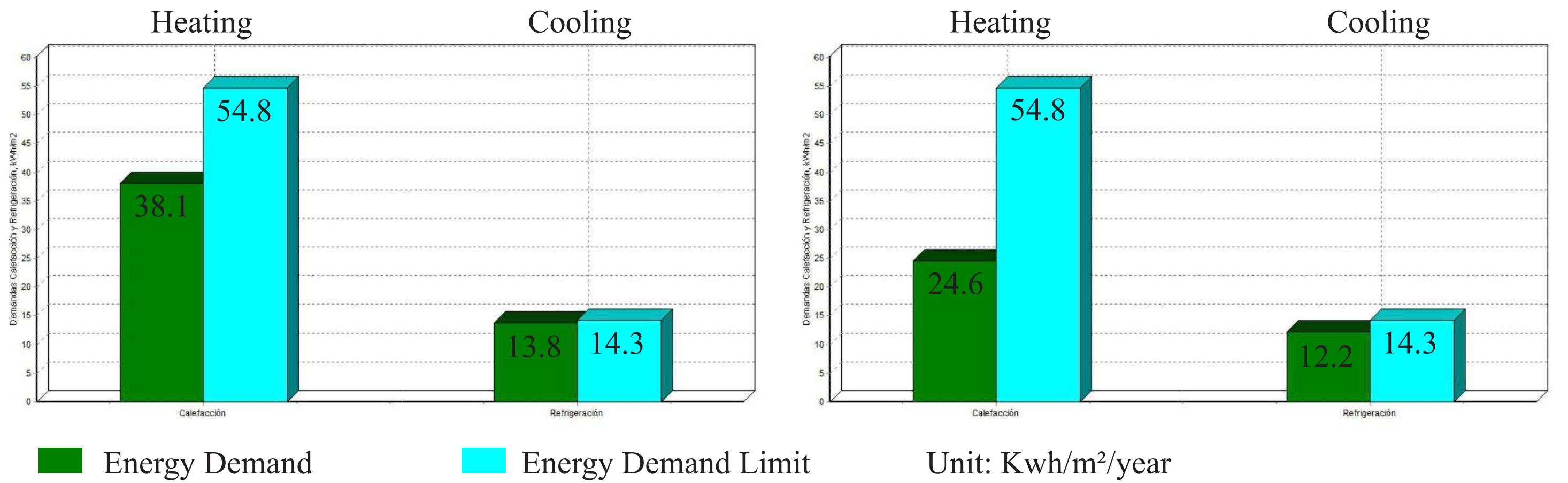
Type	Id	Site	% Sand	% Silt	% Clay
Adobe	A1	Montevideo	60	10	30
	A2	Canelones	60	15	25
	A3	Canelones	65	10	25
BTC	B1	Rocha	70	15	15
	B2	Canelones	75	10	15
	B3	Colonia	80	10	10



The values of permeability to water vapor (WVP) represented in table the below correspond to fired ceramics to be able to complete the simulation of condensation risk in HTERM 3.0, these values could not be obtained in the laboratory. Despite this, according to the bibliography consulted, the results could have been more favorable, therefore we are within the safety margin.



To calculate energy consumption in the hot and cold periods, a single-family home of 100 m<sup>2</sup> was taken, with walls and openings to the outside in all cardinal orientations. The simulation of energy consumption was carried out with the same envelope criteria as for the comparison of condensations (Comparison of traditional ceramic walls with adobe walls).



## Conclusions

Energy efficiency in construction not only implies taking into account an enclosure that meets the construction requirements in its composition for low energy consumption in interior conditioning, but also taking into account the orientations of the enclosures, openings and their respective protections, sunlight , winds, and a whole set of decisions that end up affecting the energy consumption of a space, variables that must be taken into account as a whole when designing a space.Based on the data collected, we can conclude that earth as a construction material can not only offer resistance to mechanical stress and good hygrothermal performance, but also contributes to reducing the environmental impact as it is a material that has very low embodied energy for its obtaining.

