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## Academic

“CLEANER PRODUCTION FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS”

## Behavior of the Energy Consumption of the Air Conditioning System for an Office Building in Four Climatic Zones of Colombia

BALBIS-MOREJON, M. <sup>a\*</sup>, TOVAR-OSPINO, I. R. <sup>bc</sup>, SOUSA-SANTOS, V. <sup>a</sup>, CASTRO-PEÑA, J.J. <sup>a</sup>

*a. Universidad de la Costa, Barranquilla, Colombia*

*b. Universidad Autónoma del Caribe, Barranquilla, Colombia*

*c. REFRINORTE SA, Barranquilla, Colombia*

*\*Corresponding author, milenbalbis@gmail.com*

### Abstract

In Colombia, the use of air conditioning systems increases and becomes a fundamental need to ensure comfort in buildings. The analysis of the energy behavior was carried out for four climatic zones of Colombia, including Bogotá, Medellín, Cali and Barranquilla. For each location, a large office building with an air conditioning system was simulated with the EnergyPlus V8.6 simulation tool. The air conditioning system corresponds to a centralized system, where two scenarios were generated, one with variable VAV air volume and the other with constant air volume with Fan Coil FC type terminal units. The results indicate that in Medellín, Cali and Barranquilla the VAV air conditioning system, with 33.5%, 9.7% and 14.9%, respectively, presents greater savings in the total energy consumption of the building, in the case of Bogotá, the use of the FC system with 0.32% has greater potential. The cooling and pumping subsystems also present savings potentials, although to a lesser extent than the global system. The study showed the importance of verification and prediction of energy consumption, considering energy consumption data systems and subsystems installed in the building and basic configurations of air conditioning equipment.

**Keywords:** energy consumption, air conditioning systems, simulation, buildings, climate.