

## Carbon Footprint of Educational Establishments: The Case of the University of Alicante

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**Abstract :** Environmental concerns are increasingly obtaining higher priority in sustainability agenda of educational establishments. This is important not only for its environmental performance in its own right as an organization, but also to present a model for its students. On the other hand, universities play an important role on research and innovative solutions for measuring, analyzing and reducing environmental impacts for different activities. The assessment and decision-making process during the activity of educational establishments is linked to the application of robust indicators. In this way, the carbon footprint is a developing indicator for sustainability that helps understand the direct impact on climate change. But it is not easy to implement. There is a large amount of considering factors involved that increases its complexity, such as different uses at the same time (research, lecturing, administration), different users (students, staff) or different levels of activity (lecturing, exam or holidays periods). The aim of this research is to develop a simplified methodology for calculating and comparing carbon emissions per user at university campus considering two main aspects for carbon accountings: Building operations and transport. Different methodologies applied in other Spanish university campuses are analyzed and compared to obtain a final proposal to be developed in this type of establishments. First, building operation calculation considers the different uses and energy sources consumed. Second, for transport calculation, the different users and working hours are calculated separately, as well as their origin and traveling preferences. For every transport, a different conversion factor is used depending on carbon emissions produced. The final result is obtained as an average of carbon emissions produced per user. A case study is applied to the University of Alicante campus in San Vicente del Raspeig (Spain), where the carbon footprint is calculated. While the building operation consumptions are known per building and month, it does not happen with transport. Only one survey about the habit of transport for users was developed in 2009/2010, so no evolution of results can be shown in this case. Besides, building operations are not split per use, as building services are not monitored separately. These results are analyzed in depth considering all factors and limitations. Besides, they are compared to other estimations in other campuses. Finally, the application of the presented methodology is also studied. The recommendations concluded in this study try to enhance carbon emission monitoring and control. A Carbon Action Plan is then a primary solution to be developed. On the other hand, the application developed in the University of Alicante campus cannot only further enhance the methodology itself, but also render the adoption by other educational establishments more readily possible and yet with a considerable degree of flexibility to cater for their specific requirements.

**Keywords :** building operations, built environment, carbon footprint, climate change, transport

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