



## **Modeling climate change impact in hospitality sector, using building resources consumption signature**

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Hotels are one of building types that consumes more energy and water per person and are vulnerable to climate change because in the occurrence of extreme events (heat waves, water stress) same failures could compromise the hotel services (comfort) and increase energy cost or compromise the landscape and amenities due to water use restrictions.

Climate impact assessments and the development of adaptation strategies require the knowledge about critical climatic variables and also the behaviour of building.

To study the risk and vulnerability of buildings and hotels to climate change regarding resources consumption (energy and water), previous studies used building energy modelling simulation (BEMS) tools to study the variation in energy and water consumption. In general, the climate change impact in building is evaluated studying the energy and water demand of the building for future climate scenarios. But, hotels are complex buildings, quite different from each other and assumption done in simplified BEMS aren't calibrated and usually neglect some important hotel features leading to projected estimates that do not usually match hotel sector understanding and practice.

Taking account all uncertainties, the use of building signature (statistical method) could be helpful to assess, in a more clear way, the impact of Climate Change in the hospitality sector and using a broad sample. Statistical analysis of the global energy consumption obtained from bills shows that the energy consumption may be predicted within 90% confidence interval only with the outdoor temperature.

In this article a simplified methodology is presented and applied to identify the climate change impact in hospitality sector using the building energy and water signature. This methodology is applied to sixteen hotels (nine in Lisbon and seven in Algarve) with four and five stars rating. The results show that is expect an increase in water and electricity consumption (manly due to the increase in cooling) and a decrease in gas consumption (for heating). The hotels in Algarve are more vulnerable than Lisbon hotels.