



Energy consumption in different buildings in France under future climate conditions

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Meteorological conditions have an impact on energy consumption in buildings, through heating and cooling demands essentially, so climate change is expected to impact building energetic demand. In order to have a first guess of this possible impact, first evaluations have been conducted for different types of buildings in France without any other changes than meteorological conditions. Energy consumption is evaluated using a thermal model for building based on the description and modelisation of the structure of the building as well as of its equipment, using an occupation scenario. Different types of building have been considered : an office building, a hotel, a school, a shop and a nursing home. Current climate conditions have been taken as representative of the climate of south-west or north east of France through observed air temperature, relative humidity and solar radiation yearly evolution. For future climate conditions, future yearly evolution of the same variables have been constructed in adding modelled differences between future and current climate to the observed series. The model results used are current climate and future climate under IPCC A2 simulations of Meteo-France ARPEGE-Climat model in its variable resolution version. Current climate is for years 1960-1990 and future climate for years 2070-2100. Another approach consisted in assuming that future climate for north-east of France will resemble current climate of south west, and then using current south west conditions as future north east ones. Results show that both approaches lead to similar results : annual energy consumption is increasing in the office building where increase in cooling demand exceeds decrease in heating. For less air conditioned buildings, energy demand is reduced because of the decrease in heating needs. This first step needs now to be studied in more details in making hypotheses on changes in building equipments and occupant behaviour.