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Electricity Consumption Risk Map – The use of Urban Climate Mapping for smarter analysis: Case study for Birmingham, UK.

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Climate is a key driving factor in energy consumption. However, income, vegetation, building mass structure, topography also impact on the amount of energy consumption. In a changing climate, increased temperatures are likely to lead to increased electricity consumption, affecting demand, distribution and generation. Furthermore, as the world population becomes more urbanized, increasing numbers of people will need to deal with not only increased temperatures from climate change, but also from the unintentional modification of the urban climate in the form of urban heat islands. Hence, climate and climate change needs to be taken into account for future urban planning aspects to increase the climate and energy resilience of the community and decrease the future social and economic costs. Geographical Information Systems provide a means to create urban climate maps as part of the urban planning process. Geostatistical analyses linking these maps with demographic and social data, enables a geo-statistical analysis to identify linkages to high-risk groups of the community and vulnerable areas of town and cities. Presently, the climatope classification is oriented towards thermal aspects and the ventilation quality (roughness) of the urban areas but can also be adapted to take into account other structural "environmental factors". This study aims to use the climatope approach to predict areas of potential high electricity consumption in Birmingham, UK. Several datasets were used to produce an average surface temperature map, vegetation map, land use map, topography map, building height map, built-up area roughness calculations, an average air temperature map and a domestic electricity consumption map. From the correlations obtained between the layers it is possible to average the importance of each factor and create a map for domestic electricity consumption to understand the influence of environmental aspects on spatial energy consumption. Based on these results city planners and local authorities can guide their directives and policies towards electricity consumption, demand, generation and distribution.