# Spatial analysis of electricity demand patterns in Greece: Application of a GIS-based methodological framework

Hristos Tyralis (1), Nikos Mamassis (2), and Yorgos N. Photis (3)

(1) National Technical University of Athens, School of Civil Engineering, Department of Water Resources and Environmental Engineering, Zografou, Greece (montchrister@gmail.com), (2) National Technical University of Athens, School of Civil Engineering, Department of Water Resources and Environmental Engineering, Zografou, Greece (nikos@itia.ntua.gr), (3) National Technical University of Athens, School of Rural and Surveying Engineering, Department of Geography and Regional Planning, Zografou, Greece (yphotis@gmail.com)

We investigate various uses of electricity demand in Greece (agricultural, commercial, domestic, industrial use as well as use for public and municipal authorities and street lightning) and we examine their relation with variables such as population, total area, population density and the Gross Domestic Product. The analysis is performed on data which span from 2008 to 2012 and have annual temporal resolution and spatial resolution down to the level of prefecture. We both visualize the results of the analysis and we perform cluster and outlier analysis using the Anselin local Moran's I statistic as well as hot spot analysis using the Getis-Ord Gi* statistic. The definition of the spatial patterns and relationships of the aforementioned variables in a GIS environment provides meaningful insight and better understanding of the regional development model in Greece and justifies the basis for an energy demand forecasting methodology.