

# **Modeling the decarbonization of transport: The relevance of disaggregating transport demand**

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## **Abstract-**

The transport sector accounts for almost a fourth of the emissions in Europe, which makes it one of the priority sectors to decarbonize. As such, it should be modeled appropriately in all national energy and climate planning exercises. Unfortunately, most of these deal with transport demand in an aggregated way, unable to capture the differences existing in urban or rural environments in terms of potential for modal shift or penetration of transition technologies, and also erring in the estimation of the cost of these changes. This in turn may result in the wrong strategies being pursued to decarbonize transport. To overcome these problems, this paper proposes a methodology in which urban and non-urban areas are separated into different categories to represent their different configurations. The methodology allows representing a more realistic modal shift among demands, indicating where and how different paths and policies could be applied, which also makes it possible to understand the impact of deploying Low Emission Zones (LEZ). When applied to the case of Spain, results show that the decarbonization strategies assuming disaggregated demands differ significantly from the aggregated demand version, in particular for large metropolitan or suburban areas. Overall costs are also overestimated by the aggregated demand model, showing significant differences among urban areas. The disaggregation of transport demand presented in the paper allows therefore for a significantly better planning and budgeting of decarbonization strategies at a national or regional level.

**Index Terms-** Low Emissions Zones; metropolitan transport; sport utility vehicles; TIMES model; transport decarbonization

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