

Carbon Dioxide Reduction by Diffusing Low Carbon Vehicles

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[Abstract]

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To visualize the difference between ideal and actual fuel consumptions, the chassis dynamometer test for 24 commercial vehicles (the Japanese Kei- and compact-car, and station wagon type internal combustion engine vehicles with/without the idling stop mechanism, hybrid vehicles) was carried out under several kinds of test conditions including the speed pattern originally modified by NIES and the use of auxiliary devices. Additional CO₂ emissions by using auxiliary devices were estimated and their contribution to the emission was also analyzed. As for three types of electric vehicles (EVs) whose differences are vehicle type, weight, and battery capacity, the possibility of substitution was examined using long-term travel activity data collected in Tsukuba-city in around 2007. If consumers will accept alternatives in less than 7% irregular conditions, EVs were replaceable for most passenger vehicles. From the trip data of 2005 Road Traffic Census Survey (ODS2005CENSUS), the target vehicle range for practical plug-in EVs and substitution potential of battery EVs within the current passenger vehicle demand have been estimated. Consumer preferences for EVs were evaluated by conjoint analyses, and further measures to gain acceptability to diffuse plug-in EVs on road were discussed. Data concerning transportation ways were quantitatively and qualitatively collected through reference survey and measurement study and the database was constructed using the data. Electrically-powered personal mobility was examined on road in Tsukuba-city with respect to fuel economy and vehicle performance. CO₂ emission by population density was analyzed using ODS2005CENSUS. To clarify merits and problems in introducing electrically-powered transportation systems into Japan, field surveys and interviews in Europe and US were conducted.