On the substitution of energy sources: Prospective of the natural gas market share in the Brazilian urban transportation and dwelling sectors

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Abstract

The substitution process resultant of the competition between two opponents fighting for the same resource or market is pointed out through a dynamic model derived from biomathematics. A brief description of the origin of the method based on coupled nonlinear differential equations (NLDE) is presented. Numerical adherence of the proposed model to explain several substitution phenomena which have occurred in the past is examined. The proposed method is particularly suitable for prospective analysis and scenarios assessment. In this sense, two applications of the model to prospect the dynamic substitution process in the Brazilian case are done: firstly, the development of the urban gas pipeline system in substituting for the bottled LPG in the dwelling sector and, secondly, the substitution of the urban Diesel transportation fleet by compressed natural gas (CNG) buses.

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