

REFUSA: IS-ENABLED POLITICAL DECISION SUPPORT WITH SCENARIO ANALYSES FOR THE SUBSTITUTION OF FOSSIL FUELS

Completed Research Paper

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Abstract

Fossil fuels in the transport and mobility sector can be replaced with several renewable fuels, such as renewable electricity, hydrogen and biomass-to-liquid. When these alternative fuels are used, aspects such as safeguarding supply, economic efficiency, and environmental protection must be taken into account to ensure sustainable change and to create a sustainable society. We introduce a scenario simulation, analysis and optimization prototype, called REFUSA (REnewable-FUels-Scenario-Analyses). The underlying optimization model that supports policy-making substituting fossil fuels with renewable fuels is outlined. To analyze future fuel markets, essential key factors and all major cause and effect laws are modeled and simulated holistically. To check feasibility, these key factors and their relationships were implemented with Microsoft Excel/VBA in the prototype system REFUSA. After each year is simulated, the consumption of different fuels, total emissions, fuel prices and total cost, subsidy costs, etc. are extracted and thus serve as a basis for political decision-making.

Keywords: Decision support system (DSS), Green by IS, renewable fuels, optimization model, transport and mobility