

## How to catch the rebound effect in interindustry modelling

Topic: Modelling energy use and production in interindustry models

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Increases in energy efficiency are reduced by the rebound effect. Efficiency gains on the micro level do not lead to proportionate reductions of energy consumption on the macro level. Most of the empirical approaches assume an autonomous increase of energy efficiency and analyze rebound effects on macro and sector level. Any cost and investment needed to reach additional energy efficiency in already highly efficient market economies are often neglected. In the applied CGE models the economy and its sectors adjust smoothly to the positive efficiency "shock" via reduced costs and prices in the more efficient industries, as substitution between factor inputs is possible in no time according to substitution elasticities. Sometimes lower short-term and significantly higher long-term substitution elasticities are used to calculate the respective effects. Rigidities due to long-life cycles of energy intensive capital stocks are thus accounted for quite generically. There is some understanding about how the rebound effect on the sector and macro level will change with assumptions about the central parameters in sensitivity analyses. Policies and their additional effects on top of energy efficiency are only rarely considered in these approaches. The German energy-economy INFORUM-type model PANTA RHEI, including a time series of national IO tables, will be applied to better understand the rebound effect in this type of model by a set of simulations. Starting from an autonomous increase in energy efficiency in some industries, the analysis will be broadened towards necessary investment for energy efficiency improvement and the role of technical progress for the effects. The impact of different model characteristics and scenario assumptions will be shown.