

Macroeconomic Effects of the Energy Transition

Topic: Energy Systems

Author: Anett GROSSMANN

Co-Authors: Christian Lutz

This paper is based on the study "Macroeconomic Effects of the Energy Transition" in Germany conducted by GWS/EWI/Prognos. The goal was to analyze the effects of the German energy transition on the economy, energy system and emissions.

Two scenarios have been defined. The Counter-Factual scenario describes the development without the energy transition and is based on the assumptions of the reference scenario given in the "Energy Scenarios 2010". The Energy Transition scenario is based on historical developments up to 2013 and the expected development up to 2020 based on the Energy Reference Forecast. The main differences between the Counter-Factual and Energy Transition scenario are the expansion of renewable energy in gross electricity production and the improvements in energy efficiency. All other exogenous variables (e. g. population) and model relations are the same for both scenarios. Differences in results can be interpreted as consequences of the exogenous impulses. For calculating the economic effects, the model PANTA RHEI is used. PANTA RHEI shows the interrelations between the economy, energy system and environment. The economic core of the model consists of Input-Output tables, system of national accounts and the labor market. The economic module is extended by an environmental module which includes i. a. energy balances and energy prices. Both modules are linked consistently.

The Counter-Factual and Energy Transition scenario have been implemented into the model. The results show that investments in renewable energy and energy efficiency have a positive effect on GDP and employment. EEG surcharge leads to increased electricity prices for most consumer groups except the electricity-intensive industries. As a consequence, the price index rises. In combination with decreasing investments in the electricity market from 2013 onwards, employment and GDP effects become lower over time.