

Sustainable Energy Supply in Germany – Scenario Analysis with Different CO₂ Certificate Prices

Dr.-Ing. Markus Blesl, Dipl.-Ing. Uwe Remme, Dr. rer. pol. Ulrich Fahl

Institute of Energy Economics and the Rational Use of Energy (IER), University of Stuttgart, Germany
Corresponding author Markus Blesl <MB@ier.uni-stuttgart.de>

The member states of the European Union committed themselves in the Kyoto protocol to reduce their greenhouse gas emissions until 2012 by eight percent compared to 1990. Therefore the European Union decided at the end of 2002 to introduce the CO₂ certificate system starting in 2005 with a pilot phase. The regulation applies to energy-intensive enterprises (e.g. power stations, chemistry companies, steel plants among other things). At the beginning these companies will receive an initial amount of tradable CO₂ certificates free of charge, with an annually decreasing number distributed until 2012. Companies can save CO₂ emissions by applying more energy efficient techniques or by substitution of carbon-rich by carbon-poorer sources of energy. Higher CO₂ emissions are connected with the purchase of CO₂ certificates or the payment of a penalty (up to 100 € per ton of CO₂).

The effects of the CO₂ certificate system were examined with the energy systems model TIMES D2 for Germany. Within the model prices of CO₂ certificates were varied within the framework of a scenario analysis. The effects on the German energy system and fulfilling of reduction targets are analyzed. It is pointed out, which sectors, technologies and measures to what extent and at which system costs are able to contribute to the avoidance of the CO₂ emissions.

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