

Energy Saving Potential, Costs and Uncertainties in the Industry: A Case Study of the Chemical Industry in Germany - DTU Orbit (09/11/2017)

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In Germany, 19.6 % of the industrial final energy consumption (FEC) can be allocated to the chemical industry. Energy efficiency measures with focus on the chemical industry could thus significantly contribute to reaching the German goal of reducing greenhouse gas emissions by 80 % in 2050 compared to 1990. To achieve this ambitious goal, energy planners and industries alike require an overview of the existing energy efficiency measures, their technical potential as well as the costs for realizing this potential. Energy efficiency opportunities are commonly presented in marginal cost curves (MCCs), which rank these measures according to specific implementation costs. Existing analyses, however, often do not take uncertainties in costs and potentials into account. The aim of this paper is to create a MCC of energy efficiency measures for the chemical industry in Germany, while quantifying the uncertainties of the results and identifying the most influential input parameters. The identification of energy efficiency measures and the quantification of the associated technical potentials and costs are identified based on literature data and own assessments. Based on these findings, a cost curve is created for the current technical potential. To investigate the uncertainties of the model output, Monte Carlo (MC) simulations are performed to quantify the standard deviations of the implementation potential and costs. Furthermore, a sensitivity analysis, based on Morris Screening and a linear regression, is conducted in order to identify the most influential model input parameters.

General information

State: Published

Organisations: Department of Mechanical Engineering, Thermal Energy, Forschungsgesellschaft für Energiewirtschaft mbH

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Number of pages: 15

Publication date: 2017

Host publication information

Title of host publication: Proceedings of ECOS 2017: 30th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems

BFI conference series: International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (5010984)

Main Research Area: Technical/natural sciences

Conference: 30th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, San Diego, United States, 02/07/2017 - 02/07/2017

Energy Efficiency, Chemical Industry, Marginal Cost Curve, Uncertainty, Sensitivity Analysis

Electronic versions:

ECOS2017_MCC_Chemical_Industry_01d.pdf. Embargo ended: 01/08/2017

Publication: Research - peer-review › Article in proceedings – Annual report year: 2017