

Abstract

This thesis introduces stochastic elements into the TIMES-CZ energy system model focusing on the impact of extreme events such as pandemic or recent war in Ukraine. The objective is to improve the model's precision in the face of these market uncertainties. Natural gas prices and European Union Allowance (EUA) prices, after a selection process, are represented as random variables allowing for probabilistic forecasting. These variables are derived from an analysis that combines model-based forecasts, which also include external predictions. The results of this comprehensive analysis are then integrated into the TIMES-CZ model. The correctness of these results is validated using sensitivity analysis, which evaluates the impact of results with uncertain parameters on the model's output. The findings highlight the importance of including uncertainty in energy systems modelling and could have implications for energy planning and decision-making in uncertain contexts.

Keywords

TIMES-CZ Model, Stochasticity, Energy System Modelling, Uncertainty Analysis, Sensitivity Analysis

JEL Classification

C12, C33, G21, L25, M31

Title

Introducing stochasticity into the energy system model Times-CZ - a reflection of a war-related extreme environment