

Three Essays in Energy and Environmental Economics

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Academic Year: **2018/2019**

Abstract

This thesis consists of three articles that share the main theme – energy and environment. The dissertation aims mainly at the Czech energy system and analyses its development after the Velvet Revolution and its possible future development.

The first article applies Logarithmic Mean Divisia Index decomposition to analyse the main driving forces of significant reduction in air quality pollutants during the transition of the Czech economy towards market economy in the

1990s. It continues then to investigate how the driving forces affected the emissions volumes during the succeeding post-transition period up to 2016.

The second article reacts on the 2015 governmental decision to lift brown coal mining limits in the North Bohemia coal basin. The paper analyses the impacts of maintaining the ban on mining coal reserves and compares them with three alternative options that would each weaken the environmental protections of the ban. The impacts of each of these alternative governmental propositions are analysed on the Czech energy system, the fuel- and the technology-mix, the costs of generating energy, related emissions and external costs associated with the emissions.

The third article analyses the impact of massive increase in wind and solar installations in Germany on transmission networks in the Central Europe. The German policy “*Energiewende*” and insufficient transmission capacity between the northern and the southern part of Germany and the German-Austrian bidding zone have all heavily contributed to congestion in the Central European transmission system. The article assesses this impact on relevant transmission grid. Two scenarios for the year 2025 are evaluated on the basis of four representative weeks.

JEL Classification

C61, C63, D62, Q4, Q51, Q53, Q58

Keywords

energy system modelling, LMDI, TIMES, ELMOD, emission, energy, externalities,