

Opponent's Report on Dissertation Thesis

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Author:	Mgr. Lukáš Rečka
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Title of the Thesis:	Three essays in energy and environmental economics
Type of Defense:	DEFENSE
Date of Pre-Defense:	December 5, 2018
Opponent:	Prof. Ing. Jaroslav Knápek, CSc.

Address the following questions in your report, please:

- a) Can you recognize an original contribution of the author?
- b) Is the thesis based on relevant references?
- c) Is the thesis defensible at your home institution or another respected institution where you gave lectures?
- d) Do the results of the thesis allow their publication in a respected economic journal?
- e) Are there any additional major comments on what should be improved?
- f) What is your overall assessment of the thesis? (a) I recommend the thesis for defense without substantial changes, (b) the thesis can be defended after revision indicated in my comments, (c) not-defensible in this form.

(Note: The report should be at least 2 pages long.)

- a) The presented dissertation is appropriately divided into four main parts: Introduction, Dissertation core, Conclusions and Appendices. The author's motivation for selecting the dissertation's focus and objectives of the thesis are clearly defined in the Introduction. The general objective of the thesis is to contribute to the understanding of the links between ecological problems and the development of the Czech Republic's energy system in the EU context. The specific objectives of the work are then: a) identification of drivers of air pollutant emissions reduction from large stationary emission sources since 1990, b) assessment of the impact of lifting brown coal mining limits in North Bohemia on the Czech energy system, c) analysis of the impact of increase in RES power generation in Germany on transmission grids in Central Europe.

The core of the dissertation (chapters 2, 3, 4) is focused on solving the individual goals of the thesis and contains the results of the author's own research. Two of the three solved tasks (Chapters 3 and 4) have already been published by the author in prestigious scientific journals.

The first task addressed (Chapter 2) deals with the ex post analysis of the evolution of SO₂, NO_x, CO and PM emissions in order to identify key factors for the reduction of these emissions since the early 1990s. The key contribution of the author is to extend the analysis of the change of emissions from the usual three factors to five factors (intensity factor is decomposed into 3 individual factors - fuel-fuel factor, fuel-factor, fuel-intensity factor).

The second part of the dissertation thesis deals with ex ante analysis of the impacts of various variants of breaking the brown coal mining limits. For the assessed 4 scenarios of breaking the territorial limits, it finally evaluates the external costs associated with the emission of pollutants from the combustion of brown coal released by breaking the territorial limits. The contribution can be documented, among other things, by the fact that this part of the work was published in the renowned journal *Energies* (the dissertant is the first author).

The third part of the dissertation focuses on a significant aspect of the rapid development of electricity generation from RES, namely the impact on the transmission system in Central Europe. As a result, it is concluded that PV electricity is a key factor causing an increase in electricity flow volatility, while wind electricity is identified as a key factor causing loop flows. The contribution of this part of the dissertation can be demonstrated again by its publication in the prestigious journal *Energy Policy*.

The results of the work are concisely summarized in Conclusions.

- b) Analyzes (= 3 solved tasks), which form the core of the dissertation, are based on relevant scientific literature, usually articles in renowned foreign journals with IF. Part of all three parts of the dissertation thesis is an expert discussion of the issues, which together with the range of the referenced literature proves a very good orientation of the author in the given issue. Relevant primary data sets were used for the analysis, and the author would be able to deal with changes in the data collection and reporting methodology - see the procedure for identifying pollutant emission data by sector (the first task solved).
- c) I currently work at CTU FEE, I have long-term experience in cooperation with TU Wien in the field of energy economics. I am of the opinion that the submitted thesis is both from the point of view of used methodological procedures, as well as obtained results and their discussion, fully comparable with the dissertation at CTU FEE. From the point of view of the number and quality of publication outputs, I can also say, that number and the quality of the publications in prestigious journals is comparable with PhD students at TU Wien in the field of energy economics.
- d) The core of the dissertation consists of two articles already published in prestigious journals covering the area of economics. The first article is published in the journal *Energies* (L. Rečka, M. Ščasný: Impact of Reclassified Brown Coal Reserves on the Energy System and Deep Decarbonization Target in the Czech Republic) in 2017 (IF 2017 = 2,676) and the second article in the *Energy Policy* in 2017 (IF 2017 = 4.039). In both cases, journals have demanding opponent process and are also the most prestigious magazines in the area (eg *Energy Policy* is in Q2 in the field of Energy and Fuel and in the 1st decile in Economics). It can be said that the results of the dissertation research have a significant publishing potential and have already been accepted by the scientific community. Also the first problem (LMDI Decomposition of Air Pollutants in the Czech Republic between 1990 and 2016) has in my opinion a significant publication potential and can be expected to be published in a prestigious journal.
- e) The dissertation is elaborated at a very good level both from a formal point of view (structuring work, referencing, quality of figures processing, tables, formulas, etc.) as well as from the point of view of its own content. The author's motivation and goals are clearly defined, the results of each of the three solved tasks are summarized and discussed in the relevant chapter of the work and summarized in Conclusions.

The author of the work appropriately incorporated all my comments from PRE-DEFENSE. I have no other comments to do.

f) I recommend the thesis for defense without substantial changes.

Date: 8.5.2019	
Opponent's Signature:	
Opponent's Affiliation:	Prof. Ing. Jaroslav Knápek, CSc. UDB FEL ČVUT