

I. IDENTIFICATION DATA

Thesis title:	Economical efficiency of energy storage into hydrogen using a tungsten carbide catalyst
Author's name:	Grinikov Ivan
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Economics, Management and Humanities
Thesis reviewer:	Marek Adamec
Reviewer's department:	External person

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The assignment is challenging because of urgent necessity of energy sector transformation. This transformation brings demand for storage of production from alternative low-carbon (mostly intermittent) resources.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
Author fulfilled the task. Primary goals have been achieved.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
Author has chosen correct methodology.	

Technical level	C - good.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
Technical level of the thesis is good, but obvious logical connection between particular chapters is not very obvious. All thesis seems to be fragmented.	

Formal and language level, scope of thesis	B - very good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
Thesis is compendious and correctly structured according to commonly used outlines. On the other hand Introduction provides description in large detail at the beginning of the work without general a priori description of theoretical basis.	

Selection of sources, citation correctness	A - excellent.
<i>Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?</i>	
Citation is conducted correctly.	

Additional commentary and evaluation (optional)
<i>Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.</i>
Economical part of the thesis should be better explained and it should have larger fraction in overall thesis framework.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Autor starts his thesis with short introduction to principles of chemical theoretical basis. Theoretical description is amended by brief historical development. Experimental procedure description follows in chapter 2 of the thesis. This procedure shows that cubic tungsten carbide can be used for purposes of hydrogen production.

Energy accumulation represents following step of theoretical basis of the thesis. Chapter 4 represents optimization task. Relative efficiency based on platinum fraction is concluded. Specific CAPEX and OPEX is calculated, and various possible solutions are compared.

At the end final summary is provided. Surprising result is that, the obtained tungsten carbide does not have sufficient efficiency for its successful use in the commercial field.

Author of this review has following questions:

- 1. Are there some major differences in lifetime of presented projects?*
- 2. Do author of this thesis see some possibility of technological development of the projects connected with possible CAPEX decreases?*

The grade that I award for the thesis is **B - very good**.

Date: **3.6.2022**

Signature: