

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>High-capacity accumulation of electricity from renewable sources</b>
<b>Author's name:</b>	<b>Ayman Anam</b>
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering (FME)
<b>Department:</b>	Department of Energy Engineering
<b>Thesis reviewer:</b>	Ing. Matěj Vodička
<b>Reviewer's department:</b>	FS ČVUT v Praze

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>ordinarily challenging</b>
<i>How demanding was the assigned project?</i>	
The assignment requires a review on renewable sources of electricity and the possibilities of its storage. It also requires the creation of a balance of electricity production from the selected renewable energy source in correlation with the time dependence of its consumption. Based on this balance, a suitable method of storage is to be proposed. The last point of the assignment is to assess the feasibility and economic aspects of the proposed electricity storage solution. The assignment corresponds to the requirements for bachelor theses of the TZSI study program.	

<b>Fulfilment of assignment</b>	<b>fulfilled</b>
<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>	
The assignment was completely fulfilled. All goals were covered.	

<b>Activity and independence when creating final thesis</b>	<b>D - satisfactory.</b>
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
The student prepared the thesis independently, on time and always verified his progress on time at pre-arranged consultations. However, he made a larger number of errors during the course of the work and did not try to improve the complexity of the work. When pointed out to him, he corrected these shortcomings rather reluctantly.	

<b>Technical level</b>	<b>D - satisfactory.</b>
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The technical level of the work is fair. The thesis deals with issues that the student probably did not come into contact during his studies. Therefore, most of the factual information had to be found in the literature. In some parts of the text it is evident that deeper understanding to the subject and its background is missing. The quality of the economic analysis could have been improved by taking into account the time value of money, which the student should have encountered during his undergraduate studies. At beginnings of corresponding chapters, clear explanations of why did the student selected just wind power plants for a review, Denmark as a place of interest, and lead-acid batteries and hydrogen as a type of storage, are missing.	

<b>Formal level and language level, scope of thesis</b>	<b>B - very good.</b>
<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>	
Formally, the work is fine. It contains all the elements of the required structure of a thesis. The language level is also good, however it could be more concise. The thesis contains a small number of grammatical errors and typos. The structure of the thesis is logical. The thesis has 61 pages in total. All pages are numbered. The scope of the thesis meets the requirements for a bachelor's thesis of the TZSI program.	

**Selection of sources, citation correctness****C - good.**

*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?*

The student worked correctly with citations. It is clear in the text, which information is drawn from external sources. A total of 37 sources are cited in the paper, most of which are websites, but there are also scientific publications. The composition of the sources corresponds to the topic and content of the bachelor thesis. I do not find any conflict with citation ethics. The thesis uses the uniform recommended citation style ISO 690, but in some cases the sources contain incomplete bibliographic data.

**Additional commentary and evaluation (optional)**

*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.*

Please insert your comments here.

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

*Summarize your opinion on the thesis and explain your final grading.*

The aim of the presented work was to create a balance of the selected renewable energy source in correlation with the time dependence of its consumption. The student chose wind power plants throughout Denmark as the energy source. Based on this balance, a method of electricity storage was proposed and the economic efficiency of this proposal was further assessed. Despite the fact that the economic return of the proposed solution came out unrealistic, the student did not try to optimize the boundary conditions of the analysis in order to improve the results. Only a very brief sensitivity analysis was presented. The student prepared the thesis independently, on time and always verified his progress on time at pre-arranged consultations. However, he made a larger number of errors during the course of the work and did not try to improve the complexity of the work. When pointed out to him, he corrected these shortcomings rather reluctantly.

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

Date: **21.6.2023**

Signature: