THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Autonomous hybrid power supply system based on wind generator, photovoltaic panel, and dieselgenerator**
Author's name:	Karateev Alexander
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Economics, Management and Humanities
Thesis reviewer:	Karel Srdecny
Reviewer's department:	Klepněte sem a zadejte text.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — **ordinarily challenging**

How demanding was the assigned project?

The scope of work is reasonably demanding, according to the topic. It is enough to prove the student´s abilities.

Fulfilment of assignment — **fulfilled with minor objections**

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.

See below.

Methodology — **outstanding**

Comment on the correctness of the approach and/or the solution methods.

Input data (on-site energy consumption) are very rough. It should be discussed.
The author uses combination of monthly and hourly steps calculation, which is not properly.

Technical level — **A - excellent.**

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?

See below.

Formal and language level, scope of thesis — **C - good.**

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?

The Thesis makes sense, steps are logical.
Some author´s decisions are missing justification, specially value of tariff, chosen for final economic evaluation.
The author ignores the rules for writing SI units– he does not use parentheses nor other marks. This makes reading difficult. In economic formulas he uses (m.u.) and (RUB), which is messing (i.e. pg. 33).
There are serious typos: l/s instead l/h (see Table 2), MW instead MWh (see Table 4).

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 uses sources relevant to the topic. Data sources are not discussed, despite how crucial input it is.
Citations are made properly. Sources in Russia language are not written in Russian alphabet (азбука), transcription to Latin alphabet is used instead.

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.

See below.

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. Pose questions that should be answered during the presentation and defense of the student's work.

The economics of renewable energy sources (RES) are most important for most users. The topic of this Thesis was chosen well. To use RES for energy subsidy of Karatayka settlement is a challenge. This place is located very north, so there are few days of none sunlight during the year. But not only economy, this Thesis is concerned to glasshouses emissions too.

The author's overview of energy subsidy in Karatayka is very brief. It is a huge weakness - without a good inputs is impossible to take a good outputs. The current price of electricity in Karatayka is a very important input for this Thesis. This number is not clear. On page 23, the price is 3,71 RUB/kWh (electricity provided by net). On page 36 , the price is 19,76 RUB/kWh (it is for electricity from DPS). Is Karatayka connected to the grid?

The RES overview is sufficient for this thesis. Because the technology is well known, there is no need of detailed description. The chosen Hybrid Power Supply system is properly. Wind potential estimation is in a good detail (one hour step). On the contrary, the solar energy potential estimation seems a bit rough (one month step).

The author did a lot of work, when he designed combination of WP, PV panels and DPS. The decision method is chosen properly and results make sense. Again, the analysis of WT and DPS are in a good detail, in contrast to PV panels. The author does not neglect accumulators and other equipment, which is important part of design.

The economic analysis is performed correctly. The author demonstrates a good knowledge of economic evaluation. The correct calculation of economic criteria is performed, even a sensitivity analysis. During calculation, the author must make some choices - specially the price of electricity for consumers (tariff). The author does not explain the reasons for the chosen tariff.

The environmental benefits are reduced to CO_2 emissions, which is acceptable. Other emissions could also be discussed, in particular NO_x and VOC (volatile organic compounds) from DPS.

To verify the results, author made simulation of the entire Hybrid Power Supply system, using MATLAB. It is the proper method. The results of the WT simulation are in accordance with author's previous calculations, but the results for PV panels differ by 25 %. It is disturbing, but author explains it.

Questions:

1) *The source [4] provided data of energy consumption in winter, spring, summer and autumn. Why did you use only winter and summer data?*
2) *Why did you consider variants with 5, 6 and 7 wind turbines? Why did you not consider variants with 3 or zero wind turbines?*
3) *According to your conclusion at pg. 41, the tariff should be between 13,07 RUB/kWh and 19,67 RUB/kWh. Why did you choose tariff of 15 RUB/kWh?*

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

Date: **11.6.2020** Signature: