THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Power supply of remote off-grid residential house**
Author's name:	**Dankov Lev**
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Economics, Management and Humanities
Thesis reviewer:	Vecka Jiří, Ph.D.
Reviewer's department:	Association for District Heating of the Czech Republic

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

The assignment is sufficiently detailed and demanding.

Fulfilment of assignment **fulfilled**

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.

Diploma thesis fulfils the assigned tasks. In first chapter there are correct descriptions of basic off grid technologies for power supply with advantages and disadvantages. Thesis as such is focused on power supply only but I would recommend to use more holistic approach in sense of all energy carriers could be mentioned especially heating could be also one of the theoretical modelled output. However this constrains is described that several heating systems (underfloor heating and fireplace) are already installed thus out of the scope for further modelling. I appreciate quite substantial analysis of the load diagram with characteristics in hourly consumptions time step calculation model. In the next chapter the situation on site is described with detailed potentials for each of the technology identified in second chapter and third chapter is dedicated to design of technical solutions for the modelled building. I would recommend to better describe the conclusion that each variant with included wind or PV is also designed with batteries. This approach definitely has an impact on economic evaluation. Chapter four encompasses economic model, inputs and calculations. 10 different Options/Scenarios are formulated in total, but I would recommend to better describe each of them (only short summary list is mentioned on pg. 47 and 49). Author has chosen as optimal solution for power supply Option 3rd, which is based on hybrid system (wind turbine and diesel generator) with the highest NPV. Overall, the assigned tasks were covered accordingly.

Methodology **correct**

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

The author uses NPV as a key evaluation criterion. I consider this as the correct criterion and approach.

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?

The presented work is at a high professional level. The author correctly describes the evaluation procedure, I would only recommend to better describe and define the Options/Scenarios.

Formal and language level, scope of thesis **B - very 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 scope of the submitted work is sufficient. The thesis contains several typos and typographical errors (e.g. pages 21, 22, 29 etc.).

Selection of sources, citation correctness **A - excellent.**

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?
In principle, the author chose the right literature and relevant sources for this issue. The elements taken over are properly distinguished from author's original work and there is no violation of bibliographic citation standards. The author cited / used a total of 49 sources of literature.

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.

Diploma thesis fulfils the assigned tasks. The presented work is at a high professional level. Author has chosen as optimal solution for power supply of modelled building 3rd Option, which is based on hybrid system (wind turbine and diesel generator) with the highest NPV. Overall, the assigned tasks were covered accordingly.

In relation to the submitted diploma thesis, I would like to ask the author the following questions:

1) In the thesis pg. 20, Table 2, LCOE ranges are mentioned for Conventinal, Non-conventional and Hybrid micro grid systems. Conventional system has lowest LCOE and Hybrid system highest one. However in thesis summary optimal solution Option 3rd is based on hybrid system (wind turbine and diesel generator). Could you please elaborate the reasons why theoretical ranges do not follow real-life application?

2) In thesis pg. 24, existing already installed heating system in the modelled building is described which consists of electric underfloor heating 6,24 kW and fireplace (without installed capacity listed). Would the result of the thesis recommendation be different if there will be no heating system installed yet thus the model could use different heating solutions as well (e.g. higher capacity of underfloor heating, solar thermal, diesel cogeneration etc.)? Are you experience any boundaries/bottlenecks in modelling because of the fact that building has these heating systems already installed?

3) In thesis pg. 37, hybrid system design is described. According to the presented information, investments in batteries are calculated in each of the model Options/Scenarios with Wind or PV employed (means 9 of 10 Options/Scenarios have batteries included, only 1 without batteries). Is it possible to assess economical effectiveness of power supply in Options/Scenarios with PV/Wind but without batteries employed? Will the results of the assessment be the same?

The grade that I award for the thesis is **A - excellent.**

Date: **12.6.2020** Signature: