

I. IDENTIFICATION DATA

Thesis title:	Energy Flexibility of Single-family House Located in Region of Central Europe
Author's name:	Elizaveta Andreeva
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Dept. Environmental Engineering
Thesis reviewer:	Vojtěch Zavřel
Reviewer's department:	Dept. Environmental Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
Please insert your comments here.	

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>	
The assignment was completely fulfilled. Student provided extensive literature review focusing on building energy flexibility, created a numerical model of family-house in a building simulation tool, prepared simulation-based experiments to analyze the family house potential in terms of energy flexibility.	

Activity and independence when creating final thesis	A - excellent.
<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>	
Student was proactive during the entire term and work independently on given topic. The project was regularly consulted in bi-weekly consultations. The work was delivered on time and in good quality.	

Technical level	B - very good.
<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>	
Student demonstrated very good ability in reviewing current the state-of-the-art in the given field and finding research gap for the diploma thesis. Student shown the capability to learn advanced simulation technique, apply knowledge gained during the study and solve the given research problem with minor guiding.	

Formal level and language level, scope of thesis	A - excellent.
<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>	
The thesis is well organized and satisfies all formal requirements. The thesis is also at very good level from the stylistic point of view.	

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>	
The citation management is excellent. Thesis is supported with numerous international academic literature sources. The student not only collect and review them but provide good synthesis of the information with clear distinguishing of the original and earlier work in the field. The bibliographic citations meet the standards	



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 thesis deals with topic of building energy flexibility. The student demonstrated very good skills to analyze the state-of-the-art as well as to work with the advanced building energy simulation tool (TRNSYS). The two numerical experiments were proposed to predict the energy flexible potential of a typical family house in central Europe region.

The first experiment aimed at the theoretical aspect and revealed the thermal response of the building (including construction thermal mass and heating system), when the heating source is suddenly switched off. The experiment was performed under the constant boundary conditions. The time delay of the temperature during cooling down period was observed for several building configuration to understand impact of storage tank size, wall and insulation thickness.

The second experiment aimed at the practical aspect. The whole-year simulation was executed and the performance of the family house in terms of energy bill and discomfort hours was investigated for three operational scenarios focusing on comfort only, grid requirements only and grid requirements with the indoor temperature feedback.

Both analyses provided very good understanding of the building flexibility potential that may support the demand response services for the smart grid. In addition, the study also revealed the possible impact to the thermal comfort.

To conclude, thesis represents a good quality research elaborating current scientific topic of building energy flexibility. The study offers insights regarding the family-house thermal inertia and its potential for controlled demand response.

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

Date: **6.8.2020**

Signature: