

I. IDENTIFICATION

Bachelor Thesis:	Review of Methods for District Heating Modelling and Assessment
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Opponent:	Ing. Jindřich Boháč, Ph.D.

II. EVALUATION OF THE THESIS

It should be noted that thesis as a whole fulfilled the terms of assignment. The breakdown of the thesis is clear and contains everything it is supposed to contain, depending on the assignment. Thesis is written in an intelligible form (except for the chapter below) and without much misspelling or textual error.

My following assessment is presented in chronological order of its own thesis:

I completely miss the list of used characters including units of quantities. In Chapter 3 student stated a few equations where used very confusing labelling and this would solve that.

Chapter 2 nicely analyses district heating networks and their generations, however in Chapter 2.2 I would have imagined a deeper focus on the CZ after all. I would certainly welcome an extension of Chapter 2.2.2 (even in relation to the terms of assignment of the thesis), when the future transformation of district heating networks is to be evaluated, with which surely the potential contribution of technology is closely linked. At the same time, this chapter misspells the marking of Figure 6, which is above it and not below it, as any other. In Figure 5, the vertical axis is misnamed when there should be the Share of Renewable Energy.

As for Chapter 3, I find it inappropriately written. The search failed to summarise and give the necessary information to the reader here, and the terms Approaches, Models, Methods, Tools are very intertwined and confusing, despite the student's attempts to separate them with chapters. If, however, I should already accept the author's breakdown of the thesis, I am missing a deeper analysis of the other approaches (computational and physical) in Chapter 3.1.

As part of your defence, could you indicate any modelling approaches that would fall into these categories you have listed? Although the chapter about Key Performance Indicators gives a very broad list of parameters, some of them are debatable from my point of view, but what is unacceptable is the fact that the vast majority of these equations are completely lacking in units. Furthermore, in these equations, I do not consider it appropriate to choose the designation of mass flow as Q . You're also label as Q heat loss, or the amount of energy (equations 3, 5, and 6). In equation 6, you use the k symbol for the coefficient of heat transmission, and in the preceding equation, you use the U symbol (and in addition you have the capital K in the legend...) - this needs to be unified, otherwise the text is opaque. There is also a legend error in equation 6 when the T_{DH} temperatures differ. In equation 7, you use the HDD (Heating Degree Day) parameter with unit $[k]$ - what is that? Kelvin? Heating Degree Day usually has a $[day \cdot ^\circ C]$ unit. Otherwise, equation 7 is technically exactly the same as equation 5, so there is no need to re-state it ... Equation 8 for the LF (load factor) does not entirely provide a dimensional analysis of the equation - it seems that $LF = [h^2]$ which is nonsense.

Sub-chapter 3.2, although this subject (assessment methods) is also mentioned in the terms of assignment, has a scope of only half page and this is insufficient. There is also an error in the designation of the IRR parameter in Equation 12. Overall, as I mentioned earlier, Chapter 3 is unsystematic and there is not a good synthesis of information for readers of the search.

Chapter 4 "Tools," on the other hand, is conceived appropriately and very clearly from my point of view – except perhaps for the poor quality of the pictures used, I have no comment. This chapter is followed by chapters 5 and 6, where I also have no substantive comments.

In conclusion, I would just like to make the point that you give examples of Czech environments at work several times (splitting resources etc.), but you have not touched the Czech district heating networks as such. Yes, I know

that the CZ is not exactly a shining example of such good practise at the moment, but **could you also find and depict with just one slide of such a network that has already passed, or is undergoing a transformation in CZ?**

I have to say that the citations are made correctly and the student has found a really large amount of bibliography sources.

III. OVERALL ASSESSMENT AND CLASSIFICATION

I rate submitted bachelor thesis with a grade

C
Good

Date: 22.1.2021

Signature: