



## Review of Master Thesis

Student: **Wanaka Mannaert**

Topic: **Evolvability of the grid; An investigation of mechanisms to minimize the ripple effects due to increased use of distributed energy sources**

Reviewer: **Ing. Michal Valenta, Ph.D.**

### 1 Fulfillment of the assignment

- 1 – assignment fulfilled
- 2 – assignment fulfilled with minor objections
- 3 – assignment fulfilled with major objections
- 4 – assignment not fulfilled

The thesis definitely fulfill its formal specificaion.

### 2 Main written part

Evaluation: 99/100 (A)

The scope of the text corresponds to the expected size of the master's thesis. However, it is significantly above average in terms of the complexity of the topic, the method of processing and the associated argumentation with the use of sources and references to literature.

Although the topic is complicated, the text of the thesis is easy to read and understand. I have no formal or linguistic comments on the text.

Perhaps only information regarding some implementation details, such as the structure of the input data obtained to verify the hypothesis or the scalability of the framework used, could be more detailed, but they are already outside the scope of the work.

### 3 Non-written part, attachments

Evaluation: 85/100 (B)

Part of the submitted work is the source code archive of the application developed in the Python language. The structure of the modules corresponds to the description in the work. The source files are commented and the code is quite understandable. I appreciate that the author included basic unit tests of individual modules. I consider the chosen implementation platform suitable for the application requirements. Using the pypsy framework is a proper software engineering approach.

## 4 Evaluation of results, publication outputs and awards

Evaluation: 90/100 (A)

The work as a whole is based on the theory of design science, takes into account the theory of normalized (software) systems and is based on a number of citations of research works also in the field of electrical network management. It formulates a clear hypothesis, which it verifies through simulation based on real data. Since the the topic of the work lies outside my expertise, I am unable to estimate the publication potential of the work. The author herself does not mention any ambition to publish her work anywhere in the text.

## 5 The overall evaluation

Evaluation: 98/100 (A)

The student met all the sub-goals of the formal assignment. In particular, the quality of the processing of the analytical and design part of the work is very high.

I recommend accepting the thesis for defense and I suggest evaluating it with a grade of excellent.

## 6 Questions for the defense

1. You mentioned that the data transformation model is relatively complex. Can you say more about the structure of the input data? Is there any specification like JSON Schema used to describe their structure? How much of input data from the JSON is necessary for the tool?
2. Do you think the tool you developed in the thesis can be (probably after some refactoring and optimization) used as a general purpose tool to study customer behaviour of the grid usage?
3. You used the PyPSA framework to implement your solution. Does it use any internal data storage (the database) or it works just on the CSV input?
4. How much data you used to verify the hypothesis? What is the limitation of the framework according to requirements of data scalling?

In Zádub - Závěšín, November 17th, 2023  
Ing. Michal Valenta, Ph.D.