

PEER REVIEW OF MASTER THESIS

AUTHOR: ALEXANDR DOROSHENKO

COST OF ELECTRICAL ENERGY IN COMPLEX ENERGY SYSTEM

1) Overall Approach of Author of Master Thesis.

The author's main goal is complex analysis of electrical energy generation costs in the Kazakhstan. Moreover the problem of replacement of conventional generators by wind farm was investigated in the master thesis.

2) Description of the Master Thesis

In the first part of the thesis the author describes theoretical basis for wind power analyses as well as large potential of Kazakhstan for renewable energy sources. The main investigation is concerning on replacement of convention resources by renewable ones. Widely known problems with grid stability (voltage and frequency stability, control, system balancing, or dynamic stability) will have to be solved of course.

Authors' presumption is that complex description of renewable energy generation costs have to be described. This presumption is according to author of this review correct. In the chapter 2 the author provides large amount of theoretical bases with references to original literature.

In chapter 3, author presents analysis of thermal power plant. Author utilizes EnergyPRO software for modelling. The idea of work is replacement of described thermal power plant.

In following chapter 4 the applicability of combined heat and power unit for needs of the system is discussed. The authors' idea of local CHP-balancing wind power is to reduce additional costs related to building new power lines and balancing generators. Theory of economic analysis is applied on real data. The calculation results in particular electricity – generation costs. Risk analysis is moreover discussed in this thesis.

3) Reached goals and their practical application

As a result of calculations, provided by the author in 4th chapter, are calculated electricity generation costs. The results can be utilised for decision of potential investment into renewable resources in Kazakhstan.

There are some omissions in the reviewed thesis. The author should have described applied data resources and references in more detail. The description of application of EnergyPRO software was not clear for author of this review as well. Moreover the author in this master thesis does not mention smart grid concept. This concept should be mentioned, according to author of this review, in connection with potential replacement of any deterministic resource by intermittent one.

On the other hand, according to opinion of the author of this review, the mentioned omissions don't present serious mistakes and the thesis fulfils the assignment.

Questions for author of the thesis:

- Are there some pilot projects of Smart Grid implementation in Kazakhstan so far?
- How is the final consumer price of electricity influenced by support schemes used for promotion of renewable energy resources in Kazakhstan (e.g. in comparison with Czech Republic)?

Classification:

B (velmi dobře.)

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