

## Opponent's review of Master thesis

**Student:** Luis Perez Maroto

**Topic:** Analysis of installation of small wind turbine on premises

Master thesis of Luis Perez Maroto is dealing with attractive topic of decentralised renewable energy production with focus on electricity generation from small wind power turbines. The general structure of the thesis is logical and clear, starting with more general introduction, with main emphasis on description and comparison of technologies of small wind turbines.

In analytical part, thesis compares the situation in Spain and Czech Republic, both from regulatory and technical point of view. Economic calculation of profitability of Vortex Bladeless technology was made, concluding that selected technology seems to be more expensive than its alternatives and unless the costs of this technology will be reduced in a future (which might be the case as Vortex technology is at a prototype stage) the use of Vortex turbines might be limited for specific circumstances in off-grid systems.

Technologies selected for the comparison are interesting sample of solutions for small local electricity production. However, their comparison could be better structured to provide a clearer picture of their advantages and disadvantages. Also, more detailed description of Vortex technology would be helpful as this is a truly innovative concept, using a unique vortex effect for electricity generation. For somebody who is not familiar with this concept, it is quite difficult to understand its principles, construction and its advantages and disadvantages compared to more traditional technologies that are used for comparison.

The thesis also contains a relatively detailed analysis of environmental impacts, based on life-cycle analysis, stressing the GHG reduction as a main motivation for electricity generation from renewable sources. However, there might be other motivations for deployment of local electricity generation (other than absence of local grid network) that could be elaborated in a greater detail in the thesis.

### General comments:

- All partial tasks of the thesis were fulfilled
- Student proved the ability to work individually, using different sources of data and information
- References used throughout the thesis are properly quoted
- The selection of references is good, providing the necessary starting point for the analysis.
- The analytical part contains relevant information necessary for comparison of technologies, as well as economic calculations are performed on satisfactory level and are a good start for possible more detailed analysis, however, structure of the analytical part could be improved as well as language to ensure better understanding of the content.

**Conclusion:**

Based on information given above, I recommend evaluating the thesis by grade

- C -

**Questions:**

Based on the conclusions of the economic analysis, the vortex technology seems to make economic sense only in places without (or very expensive) grid connection. Could you elaborate this issue in a greater detail? In case other technologies are more competitive in on-grid connection, why they are not as well competitive in off grid? Are there any other limitations (other than costs) for installation of this technology? What would be the typical case for vortex technology?

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