Review of: "Technical and Financial Viability of a 1 MW CSP Power Plant with Organic Rankine Module: Case Study for a Northeastern Brazilian City"

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Potential competing interests: No potential competing interests to declare.

The objective of this study is relevant, as it intends to contribute to increase the share of Concentrated Solar Thermal Power Plants in the actual energy mix.

In the introduction more up to date data on the renewable energy installed capacity, and CSP in particular, would have been expected and perhaps some other more recent references to related work.

In relation to the methodology of the study and clarity of description: The model developed to carry out the study focusses on the solar field, as the ORC Power Block (BOP) is a commercial Tuboden module that has not been simulated, and only basic technical specifications are introduced as input data. A considerable part of the description is dedicated to collector performance characterization, describing basically optical and geometric losses. In my opinion, this part could have been simplified and the values concerning the selected type of collector summarized in a table. The terms used to include some of the losses, namely, “field efficiency” and “HCE efficiency” are inadequate and misleading in my opinion. However, the description included of the thermal losses model is relevant. On the other hand, a much more detailed description of the solar field design based on nominal conditions, would have been expected. The authors only refer to the type of collector and number of collector assemblies, but the solar field configuration is not clearly specified. Additional information is required to justify the results presented that establish the relation between the number of collector assemblies and the solar multiple (SM). It is not clear if the off-design performance of the ORC steam generator has been somehow simulated in order to take into account the interaction between the BOP and the solar field at off-design conditions.

Discussion of the results comments: In the study the TES capacity and the solar field dimension, characterized by a SM value, are considered as totally independent parameters, modifying their values within quite wide ranges. However, in my opinion a significant part of the computations and results presented in figure 4 could have been omitted, as those two parameters do have a logical relation, confirmed in the results. The results presented in tables 6 and 7 could infer that the design point selected (day, hour, DNI and ambient temperature assumed) could be improved, as a value of the solar multiple as infrequent and high as 4.27 implies, according to the results, a remarkable increase in the annual net energy generated, even without TES.

In relation to the TES capacity, data on the number of hours of extended performance could have further illustrated some of the results.

I consider that, apart from the previous remarks, the study produces reasonable and interesting results and could perhaps give way to further analysis of possible STP plants configurations that may compete with other power plants in this particular favorable geographical area.