Answer to Reviewers (Sustainability)

Paper id: Sustainability, 2141400

TITLE: Management of Railway Power System Peaks with Demand-Side Resources: An Application to Periodic Timetables

Cartagena, January 15, 2023

Dear Editors,

Authors thank you and the reviewers for the time dedicated to analyse our paper and for their useful suggestions according to which modifications and additions have been included in the revised version of the paper. A color copy (document sustainability_railways_2002_COLORED.pdf), in which the modifications and the new text have been market with background in yellow (answer to reviewers) or in green (typos, grammar, punctuation...) is enclosed, including the modified version of the paper without marks or background.

Here, we provide responses to the Reviewers' comments, suggestions and mandatory changes. For the sake of clarity, the specific Reviewers' comments appear underlined *and the answers, below in italic, with blue color.*

Also, the original text has been revisited for the improvement of English language and the correction of document editing errors. Authors apologize for some potential mistakes in the revisited version after this review.

COMMENTS FOR THE AUTHORS. Reviewer comments and answers

REVIEWER 3. Comments and Suggestions for Authors

The introduction of new technologies in railways is entailed and simulated. The Smart Grids DER policies in PPS, have been identified and simulated for RPS to make easier the implementation of periodic timetables. Train models, "hotel load" models and ESS models have been revisited and linked to improve the usefulness of simulations results. Braking energy can therefore be harvested by ESS and energy efficiency improved both in the RPS and PPS. This is an interesting and comprehensive study, which should give a guideline for the improvement of the social and economic benefits of railway transportation on the overall energy.

On behalf of authors, we thank you very much for the general comments about our manuscript. Those comments are all valuable and very helpful for revising and improving the original version of our manuscript.

I would like to recommend it for publication after minor revision.

Thanks for your recommendation

1) The full names of the abbreviations appeared for the first time should be provided, such as "HVAC" in the Abstract part.

We have changed the abstract and fixed this mistake

2) I note that is mainly based on theoretical predication. Have the authors ever put it practical study and case study?

Thanks for this comment. Fortunately, we have had the support and help of the Spanish manufacturer Patentes Talgo S.A., and this has been relevant for us, but it is not a railway operator, and the paper is of mainly of interest for operators. Fortunately, last September, we could discuss some of our research work with SBB-CFF-FFS staff in charge of "Smart Grid" project and it has been of a great interest for us to open this new link with expert energy railway staff. We expect that the present work can be of interest for Swiss Railways and other operators, and some collaboration (data exchange, measurements…) can be possible in the near future to get more real data and experiences to refine model from this leading initiative in Europe engaged by SBB team. Thanks so much