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**Cover letter for the manuscript “*The energy and carbon inequality corridor for a 1.5°C compatible and just Europe*” by Jaccard and colleagues submitted to Environmental Research Letters**

Dear Prof. Kammen, dear ERL Editors,

We here provide an examination of the corridor of possible distributions of household energy and carbon footprints for the populations of 28 European countries that satisfy both minimum energy use for a decent life and the maximum supply of decarbonised energy compatible with the 1.5°C Paris agreement target by 2050. To date, as the relationship between inequality, energy and carbon continues to garner more research and policy attention (1-5), a quantification of the attainable corridor for a 1.5°C compatible and just transition in Europe is missing in the literature.

We do this by constructing household energy and carbon footprints for harmonized European expenditure deciles in 2015. We find that at 2015 expenditure inequality, this dual goal can only be achieved through CCS deployment, large and fast efficiency improvements, plus extremely low minimum energy use in the bottom decile of 27 GJ per adult equivalent (as compared to 130 GJ/ae in the bottom decile in 2015). When around 50 GJ/ae minimum energy use and no CCS deployment is assumed, the mathematical possible inequality to also achieve the 1.5°C target becomes practically zero.

Our results are timely and significant. Achieving the Paris agreement climate target requires reductions in energy consumption and carbon emissions in Europe, achieving a maximum supply of decarbonised energy by 2050 (6). Also achieving minimum energy use for a decent life for all Europeans by 2050 (7,8) means this corridor of possible inequality must be quantified and well understood. The links between inequality and achieving climate targets are beginning to be recognized in European policy, as, for example, in a just transition mechanism in the EU’s European Green Deal (9), or a discussed widening of the European Central Bank’s (ECB) mandate to include climate change and inequality.

We show that, while reducing inefficiencies in lower-income groups and reducing absolute energy consumption is critical to achieving climate targets, to achieve this along with a just level of minimum energy use for all, inequality within Europe will likely need to be drastically less in 2050. Being the first examination of this inequality corridor in Europe, based on established methods and data, our study is a seminal contribution to this area.

We provide all information to critically judge and replicate our study and for further analyses based on our results in the supplementary materials.

Thank you for your kind consideration

Sincerely,

Helga Weisz

(corresponding author) on behalf of all co-authors

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