

## Comment on **essd-2022-390**

Anonymous Referee #1

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Referee comment on "Quantifying greenhouse gas emissions from wood fuel use by households" by Alessandro Flammini et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-390-RC1>, 2022

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This study quantified the greenhouse gas (GHG) emissions from non-renewable woodfuel use in households. In IPCC's reports, CO<sub>2</sub> emissions from household woodfuel combustion are considered carbon neutral because this part of emissions is covered by the land use change sector. Extensive burning of biomass does lead to CO<sub>2</sub> emissions if the wood is removed faster than the growth of new trees. From this point of view, the authors estimated CO<sub>2</sub> emissions from non-renewable woodfuel combustion in household. Both the IPCC method and the method presented in this study make sense. The dataset is valuable. Still, I have some major concerns as listed below,

### Major concerns

- The most important parameter to calculate the non-renewable biomass consumption is NRBf (non-renewable biomass fraction). It seems that NRBf values were directly borrowed from previous work. What is the contribution of this work? Are there any updates on NRBf? These should be made clearer.
- Still for NRBf, are there temporal changes in NRBf? The non-renewable fraction of biomass should vary over time. Assuming consistent values for individual places may lead to temporal bias, which should be addressed.
- To improve the quality of biomass burning activity data, the UNSD fuelwood data were gap filled using IEA's solid biofuel data. However, both sets of data for biofuel statistics are subject to high uncertainty. The authors assumed an uncertainty of  $\pm 5\%$ , which adopted the uncertainty level considered for "stationary non-energy intensive industries" or "well-developed statistical systems" in IPCC (lines 35-37, page 4). However, household biomass burning doesn't belong to "stationary non-energy intensive industries" or "well-developed statistical systems". The biomass statistics should have uncertainty much larger than 5%. We typically assume a CV of 20% for biomass. The uncertainty of the work is likely underestimated and should be reconducted.

Specific comments,

- Line 24, page 2, the term "household food system" should be defined before being used.
- Lines 21-22, page 4, "The same NRBf is assumed for all years and countries reported." Does it mean all years and countries use the same NRBf value? It is clearly not the case.
- Line 1, page 5, there are two "Flammini et al., 2022" in the reference list. Please distinguish in the main text.
- Line 8, page 5, remove the second "with"
- Line 31, page 6, "1.2 Gt CO<sub>2</sub>eq": It is not very clear what this value stands for. Does it stand for the total GHG emissions from household energy consumption or something else? In addition, this sentence needs reference.
- Line 33, page 6, "EDGAR-FOOD". reference is needed.
- Line 1, page 7, the terms "pre- and post-production" were brought up here all of a sudden. They should be defined in the method section. How their emissions were estimated should be provided.
- Content in the discussion section should be based on the content in the result section. However, it seems that many of the current content in the discussion section were based on something else that were not mentioned in the result section, nor in the method section.