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Comparative assessment of selected sugarcane biorefinery-centered systems in Brazil: A multi-criteria method based on sustainability indicators

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9 **Abstract**

10 This work proposes a new sustainability assessment framework aiming to compare
11 selected options of biorefineries subject to provide the same services to a community. At
12 this end, a concept of biorefinery-centered system helps to develop a joint resources and
13 policy-oriented comparison. When an option of biorefinery cannot provide the given
14 amounts of certain services from its own production, it complements its supply portfolio by
15 purchasing the lacking amounts from complementary and conventional production systems.
16 The proposed sustainability assessment framework includes a multi-criteria method used to
17 compare the selected biorefinery options resulting in identifying their respective
18 weaknesses and strengths against categories of criteria. Finally, the methodology helps
19 finding the non-dominated option. Application to selected sugarcane-based biorefineries
20 shows promising results that match with those obtained in a previous work. However, the
21 new methodology allows extended and richer analyses.

22 **Keywords**

23 Multi-criteria method, sugarcane biorefinery, sustainability, LCA

24 **1. Introduction**

25 Two main goals drive the development of biorefineries: substituting fossil-based products
26 for bio-based products and valorising the whole biomass feedstocks into value added

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