

# Preliminary Study on the Potential Utilization of Oil Palm Biomass for Tissue Paper: A Life Cycle Perspective

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The current covid-19 pandemics has made the use of sanitary products such as tissue papers increasing significantly around the globe, including in Indonesia. Several efforts have been initiated to study the application of biomass to substitute the wood-based pulp for the paper. Indonesia is one of the leading palm oil producing countries in the world that generates more than 200 million tonnes of residual biomass comprising of fronds, empty fruit bunches, trunks, shells, and mesocarp fibres. These biomasses can potentially substitute wood in pulp and paper production.

This study will investigate the potential application of oil palm biomass for tissue paper production. The environmental aspect of substituting the existing raw material with oil palm biomass will also be evaluated using life cycle assessment. The scope of the study is from cradle to gate, i.e. from the extraction of biomass raw material at oil palm plantations to tissue producers. The functional unit used is per kg of tissue paper with the inventory of production process is mainly based on the available database (Ecoinvent 3 Database) and from the literature that has been adjusted using Indonesian Dataset. The LCA methods are based on Indonesian National Standards SNI ISO 14040:2016 and SNI ISO 14044:2017, with the impact assessment using IPCC GWP100a.

According to the preliminary study, it is estimated that 0.32 kg CO<sub>2</sub>-eq can be avoided from raw material substitution and transport, therefore, the total emission from oil palm biomass-based tissue paper is 1.56 kg CO<sub>2</sub>-eq/kg. Electricity consumption is located as the hotspot, therefore, further study can be developed to improve the utilization of electricity, such as reducing energy loss, generating self-power plant, using renewable energy source other than fossil mix (e.g., mini-hydropower plant, wind power plant), etc.

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