

Environmental Impact Scenario of Thermal Waste Treatment Based on Life Cycle Analysis in Denpasar City, Bali

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ABSTRACT

According to Presidential Regulation (PERPRES) No. 35 year of 2018 on the acceleration of development of waste to energy projects, Denpasar City, Bali is one of the Indonesian major cities selected for waste to energy projects implementation. The generation of waste in Denpasar City reaches 750 tons/day. Sanitation strategy of Denpasar City (Strategi Sanitasi Kota Denpasar) mentioned that 20% of waste is reduced at the source while 80% of the waste is managed at the final treatment site. This study used life cycle analysis (LCA) approach to analyses environmental impact from implementation of landfilling (conventional) and various thermal waste treatment scenarios, using OpenLCA 1.9 Software and IPCC Method. The scenarios to be discussed within are landfilling (Scenario 1), gasification (Scenario 2), incineration (Scenario 3), and pyrolysis (scenario 4). Emission inventories were created to estimate emissions of nitrogen oxide (NO_x), sulphur oxide (SO_x), volatile organic compounds (VOC), polychlorinated biphenyls (PCBs), carbon dioxide (CO₂), and carbon monoxide (CO) from each scenario Therefore, environmental impacts from each scenario were analysed by classifying the impacts to acidification, eutrophication, global warming potential, and photochemical oxidation.

Keywords: Denpasar City, impact scenario, LCA, thermal, waste to energy