Abstract

The current study aims to assess the environmental and economic performance of syngas production from plastic waste in Lahore.Life cycle assessment was conducted in Gabi software utilizing foreground data from LWMC and pilot scale plants of syngas gasification while background data from Eco invent database. The MPW generation of Lahore city is 630.1314 t/day.Currently,there is no existing gasification plant for syngas in Lahore city ,thus a small scale syngas plant was proposed .Attributional LCA was conducted and ReCipe (H) was utilized for modelling.LCA modelling results showed that syngas production is environmental friendly as majority of the overall reduction in the impacts with metal depletion 0.00862 kg Cu eq.,human toxicity,cancer 0.452 kg 1,4-DB eq.,acidification potential 10.8kg SO2 eq.,marine eutrophication 0.0115 kg N eq.,stratospheric ozone depletion 0.000231 kg CFC-11 eq and climate change 1.56E+03 kg CO2 eq.Hotspot identification was carried out to highlight the environmental impacts of individual categories of gasification contributed around 50% , palletization 30% and shredding and sorting shows 10% of total impacts. Economic analysis showed that 1175USD/day revenue could be generated for syngas. The syngas production form MPW and its utilization as alternative renewable fuel is environmentally and economic option for utilizing plastic solid waste. Gasification technology has the ability to produce environment friendly energy in the form of syngas. Moreover, it facilities to achieve Famous Sustainable Development Goals (SDGs) and circular plastic economy.