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The design of a waste heat system capable of harnessing energy from the surface of a cyclone dust collector attached to a downdraft biomass gasifier

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Abstract content
 (Max 300 words)
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The gas leaving the reactor of a downdraft biomass gasifier contains large quantities of heat energy; this is due to the fact that the gas passes through a hot bed of charcoal before leaving the reactor. This heat is normally wasted in the gas scrubber/cooler that cools it from between 500°C -600 °C to room temperature (around 25 °C. The waste heat stream under consideration is the raw syngas that emanates from a gasification process in a downdraft gasifier situated at Melani village, Eastern Cape. This loss of heat is undesirable as it impacts on the thermal efficiency of the system. This study seeks to design a cyclone water containment that will harness the heat from the surface of the cyclone. The design will rely on the surface temperature measurements using thermocouples and an infrared camera as well as thermodynamics equation to predict the heat flow dynamics, and prediction of the maximum temperature that the water would attain. The water container will be manufactured and its performance will be monitored using a custom built data acquisition system consisting of type k thermocouples and a data logger. The final paper will present the initial results.

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yes

Level for award
 (Hons, MSc,
 PhD, N/A)?

PHD

Main supervisor (name and email)
and his / her institution

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