powder that was converted into gas, which amounted 14.4 kg/hr.

TABLE IV
COLD GAS EFFICIENCY ANALYSIS OF AUTO-THERMAL CONVERSION PROCESS

Parameter	Inlet		Outlet
	Tar	Coal powder	Combustible gas
Flow (kg/hr)	20	14.4	84.52
Calorific Value (Cal/g)	8,560.72	5,293	783.62
Energy (kCal/hr)	175,545.45	76,219.25	66,228.21
	251,764.75		
Cold Gas Efficiency (%)	26.31		

IV. CONCLUSION

An experiment on combustible gas generation from co-gasification of tar and coal powder was conducted in an auto-thermal reactor to determine the temperature of the process, combustible gas composition, and efficiency of the process. From calculation and experiments about oxidizing reactor operation, 20 kg/hr tar was more promising to operate and can reach the optimal temperature which was 1,900ºC. The energy from oxidizing reactor used for the reduction reaction of tar and pyrolysis of coal powder and produce combustible yield gas. Coal powder was fed into the reformer reactor and will be pyrolyzed into fuel gas and charcoal. The coal powder that can be conversion was about 14.4 kg/hr and produce approximately 84.52 kg/hr combustible gas. The calorific value of combustible yield gas amounted to 783.62 Cal/g. It still can be improved by increasing the gas content of carbon monoxide (CO) and reduce carbon dioxide (CO_2) through the reduction reaction of CO_2 to CO in the reactor reductants. Combustible yield gas has advantages levels of hydrogen gas (H_2) as high as 19.2%, which is already exceeding the levels of hydrogen gas from coal gasification is only <10%. Hydrogen gas is the fuel that is environmentally friendly because it does not produce the greenhouse effect. This is due to feed tar has a chemical composition ratio H/C which is higher than coal. Cold gas efficiency (CGE) has a value which was still low at 26.31% compared to gasification which have efficiency 50-70. It is caused by two factors, namely the calorific value fuel gas produced was still low and the remainder of the conversion of coal powder were still mostly in the form of charcoal.

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