

ABSTRACT

The preliminary design of Ethylene 99,95% with the capacity of 50.000 tons/year was produced from dehydration gas of bioethanol with catalyst zeolit acid. This plant will operate 330 days a year and 24 hours a day, will need ethanol as raw material 87,428 tons/year and catalyst zeolit acid 5,1552 tons/year. This plant will need water 108745,80 kg water/hour, fuel gas 435.600 kg/hour and total electricity 898,0324 Hp. This plant will be built at industrial zone in Cirebon, West Java Province, needs about 1,0454 hectare land and 141 total workers. The Ethylene production could be divided into three major step, there are material preparation, chemical reaction, and the last step is purification product. The first step is raw material preparation, vapourize ethanol and than heating this vapour in heater and three heat exchanger to make these vapour suitable as reactor feed at 658,24 K and 1 atm. The next step is chemical reaction between ethanol vapour and catalyst zeolit acid in the solid phase, with 95,8% of ethanol will be converted to ethylen. The last step from ethylene production is purification product with minimum 99,95% ethylene content in the product.

Total Fixed Capital Investment (FCI) for this plant is US \$ 26.241.669,65 and *Working Capital* US \$ 17.623.514,70. This is low risk plant. From economic evaluation we know if *net profit after taxes* is US \$ 3.431.573,42/year, with *Return on Investment (ROI)* 13,08 %, *Pay Out Time (POT)* 4,3 years, *Break Event Point (BEP)* 48,18 %, and *Discounted Cash Flow Rate (DCFR)* 14,30 %. Base on the results we have conclusion that this ethylen from dehidration bioethanol with catalyst zeolit acid with capacity 50.000 tons product/year is feasible.

