



## INTISARI

Pabrik Etil Tersier Butil Eter dari Isobutilen dan Etanol dengan kapasitas 50.000 ton/tahun dirancang untuk beroperasi selama 330 hari/tahun. ETBE yang dihasilkan memiliki kemurnian sebesar 96% dan bahan bakunya berupa 3522 kg/jam Isobutilen dan 2889 kg/jam Etanol. Berdasarkan tinjauan kondisi operasi, pemilihan bahan baku dan jenis produk, maka pabrik ini tergolong pabrik beresiko rendah. Secara umum, proses pembuatan ETBE dari bahan baku berupa Isobutilen dan Etanol terdiri dari 2 proses utama yaitu, proses reaksi antara Isobutilen dan Etanol, dan proses pemisahan antara ETBE dan campuran C4 sisa. Proses reaksi dilakukan dalam reaktor *adiabatic fixed bed* pada tekanan 19 atm dan suhu 77°C dengan katalis *Amberlyst 15*, dan proses pemisahan terjadi pada menara distilasi pada suhu 109°C dan tekanan 5 atm untuk memisahkan 6363,183 kg/jam ETBE dengan 4395,981 kg/jam campuran C4.

Pabrik ini direncanakan akan didirikan di Cilegon, Banten dengan luas tanah 45 Ha dan mempekerjakan 206 orang karyawan. Untuk mendukung proses, pada utilitas dibutuhkan *steam* sebanyak 2.869 kg/jam, air pendingin sebanyak 25.963 kg/jam, kebutuhan listrik 492.951 kVA, dan udara tekan sebanyak 10,08 m<sup>3</sup>/jam.

Modal tetap yang diperlukan sebesar US\$ 16,287,029 + Rp 90.070.229.451 modal kerja US\$ 3,569,518 + Rp 321.326.551.920. Laba sebelum pajak Rp 106.355.239.257 dan laba sesudah pajak Rp 53.177.619.628. Dari hasil perhitungan diperoleh *Return on Investment (ROI)* sebelum pajak 36,81 %, sesudah pajak 18,41 %. *Pay Out Time (POT)* sebelum pajak 2,14 tahun, sesudah pajak 3,52 tahun. *Break Even Point* 53,09 %, *Shut Down Point* 38,88 % dan *Discounted Cash Flow Rate Of Return* 25,05 %. Berdasarkan hasil perhitungan evaluasi ekonomi tersebut, maka pabrik ETBE dengan produksi sebesar 50.000 ton/tahun ini cukup menarik untuk dikaji lebih lanjut.



## ABSTRACT

*Ethyl Tert Butyl Ether plant from Isobutylene and Ethanol is designed in capacity of 50,000 tons per year and operates 330 days/year. The product is ETBE with 96% purity . The raw materials are 3522 kg/hr of Isobutylene and 2889 kg/hr of Ethanol. Based on operating conditions, raw material selection and product type, the plant is low risk. In general, the process of manufacturing of ETBE from Isobutylene and Ethanol consists of two main processes, the reaction process between Isobutylene and Ethanol, and separation process of ETBE and C4 mixture. The reaction of ETBE from Isobutylene and Ethanol in the adiabatic fixed bed reactor with catalyst Amberlyst 15 performed at 19 atm and 77°C, and the separation process performed in distillation tower at 5 atm to separate 6363,183 kg/hr of ETBE and 4395,981 kg/hr of C4 mixture.*

*The plant will be established in Cilegon, Banten with 45 Ha of land area and 206 labours. To support the process, the utility uses 2869 kg steam/h, cooling water about 25,963 kg/hour, needs 492,951 kVA of electricity, and compressed air up to 10.08 m<sup>3</sup>/hr.*

*Fixed capital is about US\$ 16,287,029 + Rp 90.070.229.451 and working capital is US\$ 3,569,518 + Rp 321.326.551.920. Profit before tax is about Rp 106.355.239.257 and profit after tax is about Rp 53.177.619.628. From the calculation of Return on Investment (ROI) before taxes is 36.81 % and after tax is 18.41%. Pay Out Time (POT) before tax is 2.14 years and 3.52 years after tax. Break Even Point is 53.09%, Shut Down Point is 38.88% and Discounted Cash Flow Rate Of Return is 25.05%. Based on economic evaluations, so Ethyl Tert Butyl Ether plant from Isobutylene and Ethanol in capacity of 50,000 tons/year is feasible.*