

INTISARI

Metanol sebagai *building block* untuk membuat senyawa kimia lainnya diantaranya asam asetat dan formaldehid. Metanol dan produk-produk turunannya menjadi bahan baku barang keseharian manusia, seperti akrilik, serat sintesis, *adhesive*, cat, *plywood* (kayu lapis), hingga bahan kimia di farmasi dan agrokimia.

Pabrik metanol yang dirancang dengan kapasitas 725.000 ton/tahun dan beroperasi secara kontinyu selama 330 hari/tahun dan 24 jam/hari. Kebutuhan gas alam sebanyak 430.436,65 ton/tahun dengan bantuan *steam* sebanyak 802.578,14 ton/tahun dan oksigen sebanyak 230.226,62 ton/tahun.

Gas alam dari *battery limit* menuju *desulfurizer*. Gas alam bebas sulfur lalu masuk ke *prereformer*. Selanjutnya, gas dari *prereformer* masuk ke *steam reformer*. Sisa gas alam yang belum ter-reform dikonversi dalam *autothermal reformer*. *Syngas* dari *autothermal reformer* yang sudah didinginkan dipisahkan dalam *separator drum*. *Make-up* umpan hasil pemisahan reaktor kemudian masuk reaktor. Produk dari reaktor kemudian dipisahkan dalam *separator drum*, fasa cair hasil pemisahan diumpankan menuju menara distilasi. Campuran air-metanol dimurnikan dalam menara distilasi dan dihasilkan metanol dengan kemurnian 99,98%.

Pabrik direncanakan berada di Bontang, Kalimantan Timur dengan luas 8 ha. Pertimbangan pemilihan lokasi pabrik diantaranya karena kedekatan dengan sumber bahan baku yaitu gas alam, dan dekat dengan air laut, serta infrastruktur transportasi yang mendukung. Pabrik menyerap tenaga kerja sebanyak 234 orang. Keperluan utilitas berupa air 430.656 kg/jam, listrik 14.551 kWh, dan udara instrumen sebesar 257,304 kg/jam.

Pabrik metanol dari gas alam tergolong pabrik *low risk*. Modal tetap sebesar \$56.727.382 + Rp366.916.768.446 dan modal kerja sebesar \$64.888.855 + Rp1.432.107.000. Nilai ROI sebelum pajak 43,90% dan setelah pajak 32,93%. Nilai POT sebelum pajak sebesar 1,86 tahun dan setelah pajak sebesar 2,33 tahun. Nilai DCFRR sebesar 31,10%. Nilai BEP sebesar 46,53% dan SDP sebesar 30,69%. Berdasarkan hasil evaluasi teknis dan ekonomi, pabrik ini layak untuk dikaji lebih lanjut.

Kata kunci : metanol, reforming, gas alam

ABSTRACT

Methanol as a building block to make other chemical compounds including acetic acid and formaldehyde. Methanol and its derivative products are used as raw materials for daily human goods, such as acrylic, synthetic fibers, adhesives, paints, plywood (plywood), to chemicals in pharmaceuticals and agrochemicals.

The methanol plant is designed with a capacity of 725,000 tons/year and operates continuously for 330 days/year and 24 hours/day. The need for natural gas is 430,436.65 tons/year with the help of steam as much as 802,578.14 tons/year and oxygen as much as 230,226.62 tons/year.

Natural gas from the battery limit to the desulfurizer. The sulfur-free natural gas then enters the prereformer. Next, the gas from the prereformer enters the steam reformer. The remaining unreformed natural gas is converted in an autothermal reformer. Syngas from the autothermal reformer that has been cooled is separated in a drum separator. Make-up feed from the separation of the reactor then enters the reactor. The product from the reactor is then separated in a separator drum, the liquid phase resulting from the separation is fed to a distillation tower. The water-methanol mixture was purified in a distillation tower and produced methanol with a purity of 99.98%.

The factory is planned to be in Bontang, East Kalimantan with an area of 8 ha. Considerations for choosing a factory location include the proximity to the source of raw materials, namely natural gas, and proximity to sea water, as well as supporting transportation infrastructure. The factory absorbs a workforce of 234 people. Utility needs in the form of water are 430.656 kg/hour. The electricity requirement is 14,551 kWh. Instrument air requirement is 257,304 kg/hour.

The methanol plant from natural gas is classified as a low risk plant. The fixed capital for this factory is \$56,727.382 + IDR 366,916,768,446 and the working capital is \$64,888,855 + IDR 1,432,107,000. The ROI value before tax is 43.90% and after tax is 32.93%. POT value before tax is 1.86 years and after tax is 2.33 years. The DCFRR value is 31.10%. BEP value is 46.53% and SDP is 30.69%. Based on the results of technical and economic evaluations, this plant deserves further study.

Keywords : methanol, reforming, natural gas