

## BAB XI

### KESIMPULAN

#### 11.1 Kesimpulan

Berdasarkan uraian dan hasil perhitungan dari bab–bab sebelumnya pada prarancangan pabrik Propilen glikol dengan kapasitas 100.000 ton/tahun dapat disimpulkan sebagai berikut :

1. Pra rancangan pabrik Propilen glikol dari Gliserol dengan kapasitas 100.000 ton/tahun direncanakan untuk memenuhi kebutuhan dalam negeri .
2. Dari analisis teknis dan ekonomi yang dilakukan, maka pabrik Propilen glikol dari Gliserol dengan kapasitas 100.000 ton/tahun layak didirikan di Kawasan JIPE Gresik, Jawa Timur.
3. Pra rancangan Propilen glikol dari Gliserol merupakan perusahaan berbentuk Perseroan Terbatas (PT) dengan struktur organisasi *line and staff* dengan jumlah tenaga kerja 176 orang yang terdiri dari 131 karyawan shift dan 45 orang karyawan non shift.
4. Dari perhitungan analisa ekonomi, maka Prarancangan pabrik Propilen glikol dari Gliserol ini layak didirikan dengan :
  - *Fixed Capital Investment (FCI)* = US\$ 85.333.280  
= Rp 1.307.608.779.920
  - *Working Capital Investment (WCI)* =US\$ 15.058.814  
=Rp 230.754.490.574
  - *Total Capital Investment (TCI)* = US\$ 100.392.094  
= Rp 1.538.363.270.494,50
  - *Total Production Cost (TPC)* = US\$ 455.103.211  
= Rp 6.973.796.810.741
  - *Total Sales (TS)* = US\$ 539.177.785,34  
=Rp 7.572.751.995.156
  - *Rate of Return (ROR)* = 73,28%.
  - *Pay Out Time (POT)* = 1,94 tahun
  - *Break Event Point (BEP)* = 49,70%.

## **11.2 Saran**

Berdasarkan pertimbangan dari analisa ekonomi yang telah dilakukan Pabrik Propilen glikol dari gliserol dan Hidrogen ini layak untuk dilanjutkan ke tahap rancangan pabrik. Untuk itu disarankan kepada pengurus dan pemilik modal untuk dapat mempertimbangkan dan mengkaji ulang tentang rancangan pabrik Propilen glikol ini.

## DAFTAR PUSTAKA

A. Runberg, J. B., J. Kijenski 1985. Applied Catalyst. *Applied Catalyst*.

Anonim. 1972. *Purifying Propilen glikol Monoesters Using Vacuum Distillation*.

04/886772.

Arredondo, V. M. W. C., OH, US), Corrigan, Patrick Joseph (Glendale, OH, US).

2009. *Process for the conversion of gliserol to propilen glikol and amino alcohols*. United States patent application 7619118.

ATSDR 1997. Propilen glikol. *In: Services, U. D. O. H. A. H. (ed.)*.

Bloom, P. 2011. *Hidrogenolysis Of Gliserol And Products Produced Therefrom*.

United States of America patent application.

BPS 2018. Data Impor Ekspor Propilen Glikol 2012-2017. Jakarta: Badan Pusat

Statistik.

BKPM 2012. Rencana Kerja Badan Koordinasi Penanaman Modal. Jakarta

Branan, Carl. 2002. *Rules of Thumb For Chemical Engineers*.

Houston : El- Sevier.

Brownell, Lloyd E and Edwin H. Young. 1959. *Process Equipment Design*. John

Wiley & Sons, inc.

Buthod, P., 1995, *Pressure Vessel Handbook*, 10th Edition, Pressure Vessel  
Publishing Inc.,  
Oklahoma.

Chatterjee, K., Hall K and Tell S. 2011. Glycerol to Propylene Glycol.  
*Senior*

*Design Report*. University of Pennsylvania.

Cheremisinoff, Nicholas P. 2000. *Handbook of Chemical Processing Equipment*.

Butterworth-Heinemann.

Coulson & Richardson. 1983. *Chemical Engineering Design*. Oxford : Elsevier.

Couper, R. J. 2005. *Chemical Process Equipment: Selection and Design 2nd Edition*. Gulf Professional Publishing, Linacre House, Jordan Hill. Oxford, UK

C. Montassier, D. G., J. Barbier, 1988. *Heterogen Catalyst Fine Chemistry*.

*Heterogen Catalyst Fine Chemistry*.

Dasari, M. A. 2006. *Catalytic Conversion Of Gliserol And Sugar Alcohols To*

*Value-Added Products*. University of Missouri.

Degarmo, E.P., *Ekonomi Teknik*1997, Jakarta:

Prenhallindo. Fessenden, R. J. F. J. S. 1986. *Kimia Organik*, Jakarta, Erlangga.

Fogler, H. S. 2006. *Elements of Chemical Reaction Engineering*, New Jersey, Pearson Education, Inc.

G. Speigth, James. 1980. *Chemical And Process Design Handbook*. New York :

McGraw-Hill.

Gerpen, J. V. 2005. *Biodiesel Production and Fuel Quality*.

Gitosudarmo M. Com, Drs. Indriyo, Drs. Basri. 1989. “ *Manajemen Keuangan*”.

Yogyakarta : BPFE.

Godavarthy, S., Su, W.-y., Diguilio, R. M., Harville, S. & Forkner, M. W. 2011.

- Process for the Production and Purification of Propilen glikol.*  
12/994961. Huntsman 2006. Propilen glikol-USP. Huntsman Corp.
- Industrial Air Tech. 2018. *Blower Products Catalog*.  
[<http://indairtech.com/>], diakses Juni 2019.
- ICIS. 2010. Propilen glikol (PG) Uses And Market Data.
- James, W Lawrie. 1928. *Glycerol and the Glycols*. New York: Chemical Catalog, Co
- Jewett, R.P. 1973. *Hydrogen Environment Embrittlement of Metals*. NASA  
CR-2163
- JFESteel. 2018. *Steel Plate Catalog*. Japan: JFE Corp.
- John G. Frye, A. A. O., Alan H. Zacher. 2011. *Processes And Systems For  
The Production Of Propilen glikol From Gliserol*. United States of  
America patent application.
- Kirk, R. E. & Othmer, D. F. 1997. Glycols (Propylene). *Encyclopedia of  
Chemical  
Technology*. New York: Wiley Interscience.
- Kelly 2011. Employment Outlook and Salary Guide 2010/2011. Kelly Services.
- Kern, D.Q., 1965. *Process Heat Transfer*. Mc. Graw-Hill Book  
Company Inc., Singapura.
- Kirloskar. 2018. *Compressor Pneumatic Catalog*. Kirloskar Pneumatic Co.  
Ltd
- Kofanov, V.J. *Heat Transfer and Hydraulic Resistance in Flowing Liquid  
Suspension in Pipes*. Int.
- Lin, J. 2011. ICISpricing: Mono Propilen glikol (Asia Pacific). March 25,  
2011 ed.: ICISpricing.
- Ling, A. L. 2008. Heat Exchanger Selection and Sizing (Engineering Design  
Guideline).<http://www.klmtechgroup.com/PDF/EDG/ENGINEERIN>

G\_DES IGN\_GUIDELINE-\_HX\_Rev2.pdf. [Diakses tanggal 23 Oktober 2011]

Ludwig, E. E. 1997. *Applied Process Design for Chemical and Petrochemical Plants*, Gulf Professional Publishing.

Macret, R. & Lourenco, C. F. W. 2011. *Purification of Crude Gliserol*.  
United States patent application 12/993137.

Mankenberg. 2018. *Industrial Valve Catalog*. Germany: Mankernberg GmbH

Marlin, T.E. 2003. *Process Control Designing Processes and Control System For*

*Dynamic Performance 2nd Ed.* Mc Graw Hill: New York

Matches, 2022, *Equipment Cost Index*, Matches

Engineering, [<http://matche.com/>], diakses Desember 2023.

Nason, D. D. B. I., WA, US), O'rourke, Thomas C. (Seattle, WA, US),  
Campbell, Scott J. (Seattle, WA, US). 2010. *SECONDARY USER INTERFACE*. United States patent application 20100207971.

Perry, R.H. & Green, D.W., 1997. *Perry's Chemical Engineer's Hand Book 7th*

*Ed.* Mc.Graw Hill Book Co. Inc.

New York. PP Republik Indonesia No. 82

Tahun 2001

PP Republik Indonesia No. 50 Tahun 2012

PP Republik Indonesia No.7 Tahun 2016

PP Republik Indonesia No. 2 Tahun 2018

Rabello, C., Gomes, M.J., Siquera, B.G., De Menezes, R.B. 2013. *Production of*

*Propylene Glycol from Glycerol*. European Patent Application.

Reid, R. C., Praunitz, J.M., Sherwood, T.K. 1977. *The Properties of Gases and*

*Liquids*. McGraw-Hill.

Richard, C. B. 2007. *Standards of The Tubular Exchanger Manufacturers Association*

9<sup>th</sup> Edition. New York: TEMA, Inc.

Smith, Robin. 2005. *Chemical Process Design and Integration*. England: McGraw

Hill

Suppes, G. J., Sutterlin, W. R. & Dasari, M. 2011. *Method of Producing Lower*

*Alcohols from Gliserol*. United States patent application.

Suppes, G. J. C., MO, US), Sutterlin, William Rusty (Tuscaloosa, AL, US). 2010.

*Method of Producing Lower Alcohols from Gliserol*. United States patent application 20100019192.

Suppes, G. J. C., MO, US), Sutterlin, William Rusty (Tuscaloosa, AL, US). 2010.

*Method of Producing Lower Alcohols from Gliserol*. United

States patent application 20100019192.

Suppes, G. J. C., MO, US), Sutterlin, William Rusty (Tuscaloosa, AL, US). 2016.

*Method of Producing Lower Alcohols from Gliserol*. United

States patent application 9404027B2.

S. Peters, Max & Klaus D. Timmerhaus. 1991. *Plant Design And Economics For*

*Chemical Engineers*. New York : McGraw-Hill.

S. Peters, Max & Klaus D. Timmerhaus. 1997. *Plant Design And Economics For*

*Chemical Engineers*. New York : McGraw-Hill.

Tech, O., *A Survey of Recent Chemical Price Trends*, 2010:

New York. Treybal, R. E. 1980. *Mass Transfer Operations*,

McGraw-Hill.

Tuck, M. W. M. L., GB). 2010. *PROCESS FOR THE*

*HIDROGENATION OF GLISEROL TO PROPYLEN GLIKOL.*

United States patent application

20100204527.

Undang – Undang Republik Indonesia No.40 Tahun 2007

Wallas, Stanley M. 1988. *Chemical Process Equipment Selection and Design.*

Butterworth-Heinemann.

*www.alibaba.com*

*www.kig.co.id*

*www.pubchem.ncbi.*

*nlm.gov*

*www.BKMG.go.id*