



## BAB X ANALISA EKONOMI

Analisa ekonomi di dalam suatu perencanaan pabrik adalah sangat penting, karena perhitungan ekonomi ini dapat diketahui apakah pabrik yang direncanakan ini layak untuk didirikan atau dalam artian feasible (memenuhi).

Faktor - faktor yang perlu untuk ditinjau antara lain :

1. Laju pengembalian modal (*Return on Investment*)
2. Lama pengembalian modal (*Pay Back Periode*)
3. Titik impas (*Break Event Point*)

Untuk meninjau faktor -faktor diatas, perlu adanya penaksiran terhadap beberapa faktor , yaitu :

1. Penaksiran modal industri (*Total Capital Investment*) yang terdiri atas :
  - a. Modal tetap (*Fixed Capital Investment*)
  - b. Modal kerja (*Working Capital Investment*)
2. Penentuan biaya produksi total (*Production Cost*) yang terdiri atas :
  - a. Biaya pembuatan (*Manufacturing Cost*)
  - b. Biaya pengeluaran umum (*General Expences*)
3. Total pendapatan

### X.1. Harga Peralatan

Karena harga peralatan cenderung naik tiap tahun, maka untuk menentukan harga sekarang, ditaksir dari harga-harga tahun sebelumnya berdasarkan indeks harga. Contoh perhitungan harga alat dan daftar harga alat secara keseluruhan dapat dilihat pada Appendix D.

### X.2. Penentuan Total Capital Investment (TCI)

#### X.2.1. Modal Tetap (Fixed Capital Investment / FCI)

Proses : Fluid - Fluid

#### A. Biaya Langsung (Direct Cost)

1. Pengadaan alat (E)	=	Rp	55.234.445.826	
2. Instrumentasi dan kontrol (36% E)	=	Rp	19.884.400.497	
3. Perpipaan terpasang (68%E)	=	Rp	37.559.423.162	
4. Pelistrikan terpasang (11%E)	=	Rp	6.075.789.041	+
5. Harga FOB (Free on board)	=	Rp	118.754.058.526	
6. Ongkos angkutan kapal laut (10% FOB)	=	Rp	11.875.405.853	+
7. Harga C (cost) dan F (freight)	=	Rp	130.629.464.379	
8. Biaya asuransi (1% dari 7)	=	Rp	1.306.294.644	+
9. Harga CIF(Cost Insurance Freight)	=	Rp	131.935.759.023	
10. Biaya angkutan barang sampai ke Plant site (20% dari	=	Rp	26.387.151.805	



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11. Pemasangan alat (47%E)	=	Rp	25.960.189.538
12. Bangunan Pabrik	=	Rp	17.185.250.000
13. Service vasilities dan yard improvement (80%E)	=	Rp	44.187.556.661
14. Tanah	=	Rp	12.000.000.000 +
<b>Total Direct Cost (DC)</b>	=	<b>Rp</b>	<b>257.655.907.026</b>

**B. Biaya Tak Langsung (Indirect Cost)**

1. Engineering and Supervision (33% E)	=	Rp	18.227.367.123
2. Ongkos Pemborong (22% E)	=	Rp	12.151.578.082
3. Biaya tak terduga (44% E)	=	Rp	24.303.156.164
4. Biaya kontruksi (41%E)	=	Rp	22.646.122.789 +
<b>Total Indirect Cost</b>	=	<b>Rp</b>	<b>77.328.224.157</b>

$$\begin{aligned} \text{Fixed Capital Investment (FCI)} &= \text{Direct Cost} + \text{Indirect Cost} \\ \text{Fixed Capital Invesment (FCI)} &= \text{Rp } 334.984.131.183 \end{aligned}$$

**X.2.2. Total Product Cost ( TPC )**

**I. Manufacturing Cost**

**A. Direct Production Cost (DPC)**

1. Bahan baku ( 1 tahun )	=	Rp	345.803.325.257
2. Biaya utilitas ( 1 tahun )	=	Rp	3.042.266.223
3. Biaya pengemasan ( 1 tahun )	=	Rp	51.280.116.706
4. Gaji karyawan ( 1 tahun=13 bulan )	=	Rp	13.634.400.000
5. Biaya laboratorium ( 10% gaji)	=	Rp	1.363.440.000
6. Biaya supervisi (10% gaji )	=	Rp	1.363.440.000
7. Biaya pemeliharaan dan perbaikan (4% FCI)	=	Rp	13.399.365.247
8. Operating supplies (15% pemeliharaan)	=	Rp	2.009.904.787 +
<b>Total Direct Production Cost (DPC)</b>	=	<b>Rp</b>	<b>431.896.258.221</b>

**B. Biaya Produksi Tetap (Fixed Charge)(FC)**

Perhitungan depresiasi alat dan bangunan menggunakan metode Straight Line Method

1. Depresiasi alat

$$\text{Harga alat} = \text{FCI} - \text{Harga tanah} - \text{harga bangunan} = \text{Rp } 305.798.881.183$$

$$\text{Harga alat akhir masa pakai ( 1% harga alat)} = \text{Rp } 3.057.988.812$$

Biaya depresiasi alat selama 10 tahun =

$$\text{Depresiasi alat} = \frac{\text{H.alat} - \text{H.alat akhir massa}}$$

$$= \frac{305.798.881.183 - 3.057.988.812}{10} = \text{Rp } 30.274.089.237$$



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2. Depresiasi bangunan

$$\begin{aligned} \text{Harga bangunan} &= \text{Rp } 17.185.250.000 \\ \text{Harga bangunan akhir masa pakai ( 40\% H.bangunan)} &= \text{Rp } 6.874.100.000 \\ \text{Depresiasi bangunan} &= \frac{\text{H.bangunan} - \text{H. akhir masa pakai}}{n} \\ &= \frac{17.185.250.000 - 6.874.100.000}{10} = \text{Rp } 1.031.115.000 \end{aligned}$$

$$\text{Total biaya depresiasi alat dan bangunan} = \text{Rp } 31.305.204.237$$

**B. Biaya Tetap (Fixed Charge)(FC)**

$$\begin{aligned} 1. \text{ Depresiasi alat dan bangunan} &= \text{Rp } 31.305.204.237 \\ 2. \text{ Sewa} &= \text{Rp } - \\ 3. \text{ Asuransi ( 1\% FCI)} &= \text{Rp } 3.349.841.312 \\ 4. \text{ Pajak ( 1\% FCI)} &= \text{Rp } 3.349.841.312 \\ \text{Pinjaman biaya berasal dari bank BRI} & \\ 5. \text{ Bunga bank BRI (9,95\% dari 0,4 TCI)} &= \frac{0,04 \text{ TCI}}{100} \\ \text{Total Biaya Produksi Tetap (FC)} &= \mathbf{38.004.886.861} + \mathbf{0,04 \text{ TCI}} \end{aligned}$$

$$\begin{aligned} \text{Plant Overhead Cost (70\% dari gaji karyawan + biaya supervisi + biaya pemeliharaan dan perbaikan)} & \\ \text{Plant Overhead Cost} &= \text{Rp } 28.397.205.247 \end{aligned}$$

$$\begin{aligned} \text{Direct Production Cost (DPC)} &= 431.896.258.221 \\ \text{Biaya produksi tetap (FC)} &= 38.004.886.861 + 0,04 \text{ TCI} \\ \text{Plant Overhead Cost} &= 28.397.205.247 + \\ \text{Total Biaya produksi (Manufacturing Cost)} &= \mathbf{498.298.350.329} + \mathbf{0,04 \text{ TCI}} \end{aligned}$$

**II. Biaya Pengeluaran Umum ( General Expenses, GE )**

$$\begin{aligned} 1. \text{ Biaya administrasi 20 \% (gaji karyawan + supervisi + pemeliharaan)} &= \text{Rp } 5.679.441.049 \\ 2. \text{ Biaya distribusi dan pemasaran ( 5\% TPC)} &= 0,05 \text{ TPC} \\ 3. \text{ Biaya research \& development (5\% TPC)} &= 0,05 \text{ TPC} \\ \text{Total biaya pengeluaran umum (GE)} &= \mathbf{Rp } \mathbf{5.679.441.049} + \mathbf{0,1 \text{ TPC}} \end{aligned}$$

**III. Total Product Cost**

$$\begin{aligned} \text{Total product cost (TPC)} &= \text{Total biaya produksi} + \text{Total biaya pengeluaran umum ( GE )} \\ \text{Biaya produksi} &= \text{Rp } 498.298.350.329 + 0,04 \text{ TCI} \\ \text{B.peng.umum} &= \text{Rp } 5.679.441.049 + 0,1 \text{ TPC} + \\ \text{TPC} &= \text{Rp } 503.977.791.378 + 0,04 \text{ TCI} + 0,1 \text{ TPC} \\ 0,9 \text{ TPC} &= \text{Rp } 503.977.791.378 + 0,04 \text{ TCI} \\ \text{TPC} &= \text{Rp } 559.975.323.754 + 0,0442 \text{ TCI} \end{aligned}$$



### X.2.3. Modal Total ( Total Capital Investment , TCI)

Total capital investment = Fixed capital investment + Working capital investment

WCI diasumsikan untuk 3 bulan total product cost

$$\text{Total product cost (TPC)} = \text{Rp } 559.975.323.754 + 0,0442 \text{ TCI}$$

$$\text{WCI} = (\text{TPC} / 12) \times 3 \text{ bulan}$$

$$\text{WCI} = \frac{\text{Rp } 559.975.323.754 + 0,0442 \text{ TCI}}{12} \times 3$$

$$\text{WCI} = \text{Rp } 139.993.830.938 + 0,0111 \text{ TCI}$$

$$\text{FCI} = \text{Rp } 334.984.131.183$$

$$\text{TCI} = \text{FCI} + \text{WCI}$$

$$\text{TCI} = \text{Rp } 334.984.131.183 + \text{Rp } 139.993.830.938 + 0,0111 \text{ TCI}$$

$$\text{TCI} = \text{Rp } 474.977.962.121 + 0,0111 \text{ TCI}$$

$$0,9889 \text{ TCI} = \text{Rp } 474.977.962.121$$

$$\text{TCI} = \text{Rp } 480.287.810.695$$

$$\text{WCI} = \text{Rp } 139.993.830.938 + 0,0111 \text{ TCI, maka:}$$

$$\text{WCI} = \text{Rp } 139.993.830.938 + \text{Rp } 5.309.848.574$$

$$= \text{Rp } 145.303.679.512$$

$$\text{TPC} = \text{Rp } 559.975.323.754 + 0,04422 \text{ TCI}$$

$$= \text{Rp } 559.975.323.754 + \text{Rp } 21.239.394.295$$

$$= \text{Rp } 581.214.718.049$$

#

$$\text{Fixed cost , FC} = \text{Rp } 38.004.886.861 + 0,04 \text{ TCI}$$

$$= \text{Rp } 38.004.886.861 + \text{Rp } 19.115.454.866$$

$$= \text{Rp } 57.120.341.726$$

$$\text{General expenses (GE)} = \text{Rp } 5.679.441.049 + 0,1 \text{ TPC}$$

$$= \text{Rp } 5.679.441.049 + \text{Rp } 58.121.471.805$$

$$= \text{Rp } 63.800.912.854$$

#### Komposisi modal :

$$\text{Fixed Capital Investment} = \text{Rp } 334.984.131.183$$

$$\text{Modal sendiri (60\% FCI)} = \text{Rp } 200.990.478.710$$

$$\text{Modal pinjaman (40\% FCI)} = \frac{\text{Rp } 133.993.652.473}{+}$$

$$\text{Total modal} = \text{Rp } \mathbf{334.984.131.183}$$



### X.3. 1. Laju investasi Return On Investment ( ROI )

Laba kotor rata-rata = Rp 163.799.461.730  
 Laba bersih rata-rata = Rp 117.935.612.446  
 Total investasi per tahun = Rp 334.984.131.183

$$\begin{aligned} \text{ROI sebelum pajak} &= \frac{\text{Laba kotor rata-rata / tahun}}{\text{Total investasi / tahun}} \times 100\% \\ &= \frac{\text{Rp } 163.799.461.730}{\text{Rp } 334.984.131.183} \times 100\% \\ &= 48,90 \text{ \%} \end{aligned}$$

$$\begin{aligned} \text{ROI setelah j} &= \frac{\text{Laba bersih rata-rata / tahun}}{\text{Total investasi / tahun}} \times 100\% \\ &= \frac{\text{Rp } 117.935.612.446}{\text{Rp } 334.984.131.183} \times 100\% \\ &= 35,21 \text{ \%} \end{aligned}$$

### X.3. 2. Lama Pengembalian Modal, Pay Back Period ( PBP )

Tabel IX.1 Pay Back Period

FCI = **Rp 334.984.131.182,96**  
 TCI = Rp 480.287.810.695,13

Thn Ke -	Cash Flow	Net Cash Flow	Cumulative Cash Flow
0	Rp 334.984.131.183	Rp 334.984.131.183	Rp -
1	Rp 102.572.904.542	Rp 232.411.226.641,06	Rp 102.572.904.542
<b>2</b>	<b>Rp 130.024.617.566</b>	<b>Rp 102.386.609.075,06</b>	<b>Rp 232.597.522.108</b>
3	Rp 157.476.330.590	-Rp 55.089.721.515,05	Rp 390.073.852.698
4	Rp 157.476.330.590	-Rp 212.566.052.105,17	Rp 547.550.183.288
5	Rp 157.476.330.590	-Rp 370.042.382.695	Rp 705.026.513.878
6	Rp 157.476.330.590	-Rp 527.518.713.285	Rp 862.502.844.468
7	Rp 157.476.330.590	-Rp 684.995.043.876	Rp 1.019.979.175.058
8	Rp 157.476.330.590	-Rp 842.471.374.466	Rp 1.177.455.505.649
9	Rp 157.476.330.590	-Rp 999.947.705.056	Rp 1.334.931.836.239
10	Rp 157.476.330.590	-Rp 1.157.424.035.646	Rp 1.492.408.166.829

$$\begin{aligned} \text{PO} &= 2 + \text{Rp } 334.984.131.183 - \text{Rp } 232.597.522.108 \text{ )} / \text{Rp } 157.476.330.590 \\ &= 2,65 \text{ tahun} \end{aligned}$$

### X.3. 3. Laju Pengembalian Modal , Internal Rate Of Return ( IRR )

$$\sum_{n=1}^n \frac{\text{CF}}{(1+i)^n} \text{ ket : } n : \text{ tahun produksi ke } n$$

CF : cash flow tiap tahun ( berdasarkan tabel cash flow )  
 I : capital interest rate



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Total modal investasi pada akhir konstruksi = Rp 480.287.810.695  
 Dengan cara Trial akan diperoleh harga i = 0,2629  
 = 26,29 %

Tahun	Cash flow	Trial i	
		Disc Factor	Present value
0	Rp 480.287.810.695		
1	Rp 102.572.904.542	0,79183562	Rp 81.220.879.353,61
2	Rp 130.024.617.566	0,62700365	Rp 81.525.909.466,94
3	Rp 157.476.330.590	0,49648382	Rp 78.184.450.363,00
4	Rp 157.476.330.590	0,39313357	Rp 61.909.232.644,06
5	Rp 157.476.330.590	0,31129717	Rp 49.021.935.548,33
6	Rp 157.476.330.590	0,24649618	Rp 38.817.314.676,17
7	Rp 157.476.330.590	0,19518446	Rp 30.736.932.391,89
8	Rp 157.476.330.590	0,15455401	Rp 24.338.597.884,61
9	Rp 157.476.330.590	0,12238137	Rp 19.272.168.719,90
10	Rp 157.476.330.590	0,09690593	Rp 15.260.389.646,49
Total			Rp 480.287.810.695,00

**X. 3. 4 . Break Event Point ( BEP )**

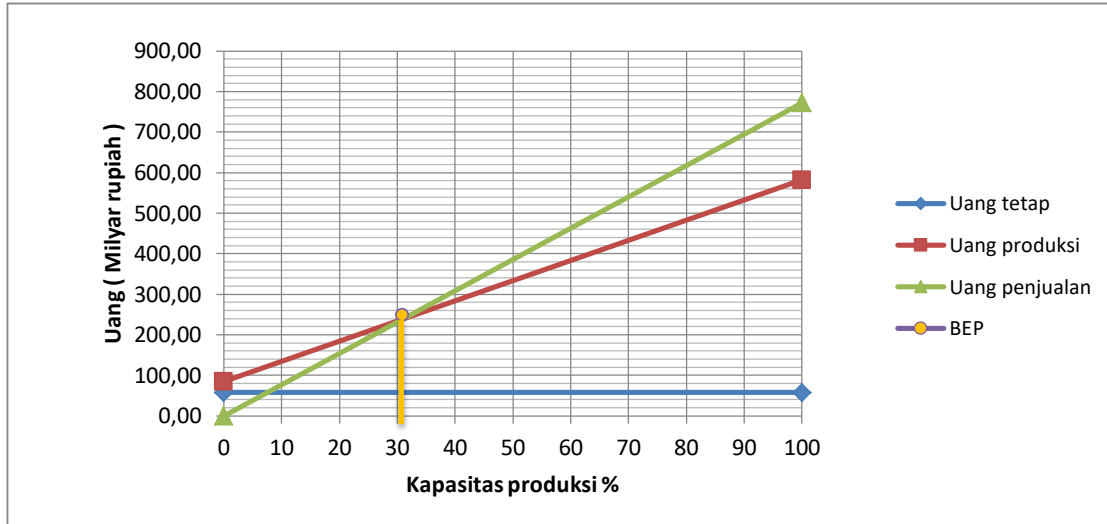
**Fixed Cost (FC)** = Rp 57.120.341.726  
**Variable Cost (VC)** = Rp 431.896.258.221  
**Semi Variable Cost (SVC)** = Rp 92.198.118.102  
**Total penjualan ( S )** = Rp 771.851.614.049

$$\begin{aligned}
 \text{BEP} &= \frac{\text{FC} + 0,3 \text{ SVC}}{\text{S} - 0,7 \text{ SVC} - \text{VC}} \times 100 \% \\
 &= \frac{\text{Rp } 57.120.341.726,44 + \{ 0,3 \text{ Rp } 92.198.118.102 \}}{\text{Rp } 771.851.614.049 - \{ 0,7 \text{ Rp } 92.198.118.102 \} - \text{Rp } 431.896.258.221} \times 100 \% \\
 &= \mathbf{30,8 \%}
 \end{aligned}$$

Kapasitas %	Milyar rupiah		
	Biaya tetap	Biaya produksi	Biaya penjualan
0	57,12	84,78	0
100	57,12	581	771,85



**Grafik BEP :**



Grafik X.1 Break Event Point (BEP)