

## CHAPTER 7

### PROJECT FINANCIAL AND ANALYSIS

#### 7.1 INTRODUCTION

We have completed a financial evaluation of the Thai PTA project based on assumptions in the INCA technology package, ATC assumptions on local factor costs, and assessment of other fixed costs and owners' expense based on experience in the PTA industry. A financial model was developed for the analysis which included preliminary assumptions for financing and is contained in Appendix. Important assumptions are discussed below.

#### 7.2 ECONOMIC ASSUMPTIONS

##### 7.2.1 Project Basis

The capacity for the base case is 350 thousand metric tons per year base case. The overall material balance is provided in Table 7.1.

**TABLE 7.1**  
**OVERALL PTA MATERIAL BALANCE**  
*(thousand metric tons per year)*

Raw material	para-Xylene	232.8
Solvent	Acetic acid	21.0
Product	PTA	350.0

Source: INCA Process Technology Material Balance for PTA

Other key assumptions are summarized below:

- Project startup: January 1, 2001
- Project life: 15 years
- Terminal value: Neglect
- Duties on imported material and equipment were assumed to be exempted by BOI privilege

##### 7.2.2 Capital Investment

The capital investment for a lump sum turn key engineering, procurement, and construction (EPC) project for a 350 thousand metric ton per year PTA plant was provided by ATC and based on licensing and EPC project proposals from INCA. The total capital investment, including initial charge of catalyst and chemicals, working capital, royalties, and interest during construction, is provided in Table 7.2.

**TABLE 7.2**  
**CAPITAL INVESTMENT, \$MM**  
*(350 kmta base case)*

ISBL	205
OSBL	75
Initial catalyst and chemicals	1
Owner's Costs	40
Royalties*	10
<b>Total project cost</b>	<b>331</b>

Source: INCA Process Capital Investment for PTA

\* INCA's estimation

The ISBL/OSBL capital estimate has an accuracy of +/-20 percent. A complete list of items included in ISBL/OSBL is provided in the technical part as mention earlier. The Thai PTA project has some potential for sharing offsite facilities within the ATC complex which could possibly reduce the OSBL requirements. INCA assumed paid up royalties to be \$10 million for this feasibility study. The licensing agreement has not been negotiated yet.

Owners' costs covers capitalized and expensed items related to: owners participation on the project management team, pre-operational expenses for recruiting, hiring and training, headquarters staffing, startup consumables, licensing and permitting, consultant fees (e.g., EIA), licensor and equipment vendor assistance during startup, special requirements for infrastructure development, marine loading facilities, owner's scope contingency allowance, and other related expenses. Owner's cost was estimated by INCA to be \$40 million for the base case. The decision to capitalize or expense specific items of owner's cost is based on local tax code with some discretion in the interpretation depending on the item and the owners' preferences (tax counsel should be obtained).

Working capital includes 30 days each of raw materials and product, replacement parts, and 45 and 30 days of receivables and payables respectively.

### 7.2.3 Raw Materials, Utilities Prices and Fixed Operating Expenses

Chem Systems forecasts for raw material and product prices were developed for this feasibility study. The forecasts and methodologies used to develop them are described in details in the marketing part.

We have assumed that all utilities which are power, fuel, cooling water, and demineralized water will be purchased "over the fence" from producing companies at Map Ta Phut. Such costs were escalated from 1998 unit prices.

Annual maintenance charges were assumed at 3.0 percent of ISBL capital. Selling administrative expenses were assumed to be 5% of sales revenue include of advertising, plant insurance, benefits, overtime and channel of supply.

#### **7.2.4 Financing**

It was assumed that the project is financed with project financing with key assumptions including a 2:1 debt-to-equity ratio and 10 year loan tenor with payment starting the third year of operation.

#### **7.2.5 BOI Incentives**

The financial evaluation assumes full BOI promotion with incentives provided as per the Investment Promotion Act B.E. 2520 (1977) and B.E. 2534 (1991) and outlined below:

- Tax holiday of eight years (No Tax)
- After eighth years, followed by five years at a reduced tax rate to 15 percent.

#### **7.2.6 PTA Product Revenues**

Base on supply/demand balance of PTA in ASEAN country as details in the marketing part. Such product revenues will be assumed by domestic sale 250,000 Metric Tons in order to serve Thailand's total demand and export sale such remaining capacity 100,000 Metric Tons to outside ASEAN such as China due to there still has more demand of PTA.

#### **7.2.7 PTA Project Utilization Rate**

From our past experience from ATC project which is similar to PTA project. We have assumed that in the plant utilization rate will be 85%, 90%, and 95% for the first three years from the year 2001, 2002, and 2003 respectively. But, in the year 2004 through the end of project (2015) the utilization will go up to 100% from our experience.

### **7.3 PROJECT FINANCIAL RESULTS**

#### **7.3.1 Results form our financial model**

We have successfully developed the financial model base on the above critical assumptions which shown in details in the table 7.3.

**TABLE 7.3 FINANCIAL MODEL (BASED CASE)**  
**Balance Sheet (Unit in Thousand USD)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Assets</b>											
<b>Current Assets</b>											
1 Cash in hand and deposit at bank	40,000	110,800	178,419	235,950	302,827	352,636	408,753	470,688	527,569	589,467	657,293
2 Account receivable	23,741	25,632	27,668	29,908	30,798	31,733	32,667	33,646	34,670	35,738	37,207
3 Inventory	9,228	9,930	10,649	11,472	11,809	12,132	12,507	12,849	13,213	13,600	14,009
4 Other current assets (0.5% of Total assets)	1,816	2,096	2,360	2,573	2,826	2,997	3,194	3,422	3,624	3,851	4,118
<b>Total current assets</b>	<b>74,785</b>	<b>148,458</b>	<b>219,095</b>	<b>279,902</b>	<b>348,260</b>	<b>399,497</b>	<b>457,121</b>	<b>520,605</b>	<b>579,075</b>	<b>642,656</b>	<b>712,626</b>
5 Plant, property and equipment	280,000	261,333	242,667	224,000	205,333	186,667	168,000	149,333	130,667	112,000	93,333
6 Catalyst and chemical	1,167	934	700	467	233	1,167	934	700	467	233	1,167
7 Other assets (2% of Total assets)	7,264	8,382	9,438	10,293	11,303	11,986	12,777	13,687	14,494	15,406	16,472
<b>Total assets</b>	<b>363,217</b>	<b>419,107</b>	<b>471,900</b>	<b>514,662</b>	<b>565,130</b>	<b>599,317</b>	<b>638,832</b>	<b>684,325</b>	<b>724,702</b>	<b>770,295</b>	<b>823,599</b>
<b>Liabilities and Equities</b>											
<b>Current Liabilities</b>											
8 Overdraft and short-term loan	14,332	0	0	0	0	0	0	0	0	0	0
9 Account payable	9,228	9,930	10,649	11,472	11,809	12,132	12,507	12,849	13,213	13,600	14,009
10 Current portion of long-term	0	0	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
11 Other current liabilities (2% of total assets)	7,264	8,382	9,438	10,293	11,303	11,986	12,777	13,687	14,494	15,406	16,472
<b>Total current liabilities</b>	<b>2,160</b>	<b>18,312</b>	<b>42,087</b>	<b>43,765</b>	<b>45,112</b>	<b>46,118</b>	<b>47,284</b>	<b>48,535</b>	<b>49,707</b>	<b>51,005</b>	<b>52,480</b>
<b>Long-term Liabilities</b>											
12 Long-term debt	220,000	220,000	198,000	176,000	154,000	132,000	110,000	88,000	66,000	44,000	22,000
<b>Total liabilities</b>	<b>222,160</b>	<b>238,312</b>	<b>240,087</b>	<b>219,765</b>	<b>199,112</b>	<b>178,118</b>	<b>157,284</b>	<b>136,535</b>	<b>115,707</b>	<b>95,005</b>	<b>74,480</b>
<b>Shareholders' Equities</b>											
13 Registered capital	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000
14 Retained earnings	31,056	70,795	121,813	184,897	256,018	307,258	363,296	424,806	487,996	554,290	628,118
15 Legal reserve	0	0	0	0	0	3,942	8,252	12,984	11,000	11,000	11,000
<b>Total Shareholders' Equities</b>	<b>141,056</b>	<b>180,795</b>	<b>231,813</b>	<b>294,897</b>	<b>366,018</b>	<b>421,199</b>	<b>481,548</b>	<b>547,790</b>	<b>608,996</b>	<b>675,290</b>	<b>749,118</b>
<b>Total Liabilities &amp; Shareholders' Equities</b>	<b>363,217</b>	<b>419,107</b>	<b>471,900</b>	<b>514,662</b>	<b>565,130</b>	<b>599,317</b>	<b>638,832</b>	<b>684,325</b>	<b>724,702</b>	<b>770,295</b>	<b>823,599</b>
Total Assets exclude Cash in hand	363,217	308,307	293,482	278,713	262,302	246,681	230,078	213,657	197,134	180,828	166,306
Total Liabilities & Shareholders' Equities exclude	377,549	419,107	471,900	514,662	565,130	599,317	638,832	684,325	724,702	770,295	823,599
Difference	14,332	(110,800)	(178,419)	(235,950)	(302,827)	(352,636)	(408,753)	(470,688)	(527,569)	(589,467)	(657,293)

**TABLE 7.3 FINANCIAL MODEL (BASED CASE)**  
**Balance Sheet (Unit in Thousand USD)**

<i>Assets</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
<b>Current Assets</b>				
1 Cash in hand and deposit at bank	731,820	811,353	901,827	996,476
2 Account receivable	38,319	39,476	40,678	41,924
3 Inventory	14,459	14,894	15,371	15,832
4 Other current assets (0.5% of Total assets)	4,411	4,730	5,106	5,503
<b>Total current assets</b>	<b>789,010</b>	<b>870,454</b>	<b>962,982</b>	<b>1,059,736</b>
5 Plant, property and equipment	74,667	56,000	37,333	18,667
6 Catalyst and chemical	934	700	467	233
7 Other assets (2% of Total assets)	17,645	18,922	20,424	22,013
<b>Total assets</b>	<b>882,255</b>	<b>946,076</b>	<b>1,021,206</b>	<b>1,100,649</b>
<b>Liabilities and Equities</b>				
<b>Current Liabilities</b>				
8 Overdraft and short-term loan	0	0	0	0
9 Account payable	14,459	14,894	15,371	15,832
10 Current portion of long-term	22,000	0	0	0
11 Other current liabilities (2% of total assets)	17,645	18,922	20,424	22,013
<b>Total current liabilities</b>	<b>54,104</b>	<b>33,816</b>	<b>35,795</b>	<b>37,845</b>
<b>Long-term Liabilities</b>				
12 Long-term debt	0	0	0	0
<b>Total liabilities</b>	<b>54,104</b>	<b>33,816</b>	<b>35,795</b>	<b>37,845</b>
<b>Shareholders' Equities</b>				
13 Registered capital	110,000	110,000	110,000	110,000
14 Retained earnings	707,151	791,260	864,411	941,804
15 Legal reserve	11,000	11,000	11,000	11,000
<b>Total Shareholders' Equities</b>	<b>828,151</b>	<b>912,260</b>	<b>985,411</b>	<b>1,062,804</b>
<b>Total Liabilities &amp; Shareholders' Equities</b>	<b>882,255</b>	<b>946,076</b>	<b>1,021,206</b>	<b>1,100,649</b>
Total Assets exclude Cash in hand	150,435	134,723	119,379	104,173
Total Liabilities & Shareholders' Equities exclude	882,255	946,076	1,021,206	1,100,649
Difference	(731,820)	(811,353)	(901,827)	(996,476)

**Income Statement (Unit in Thousand USD)**  
**(Based Case)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Sales</b>											
16 Sale revenues	192,566	207,906	224,421	242,585	249,805	257,386	264,967	272,908	281,211	289,875	301,788
17 Other income	0	3,540	6,921	9,797	13,141	15,632	18,438	21,534	24,378	27,473	30,865
<b>Total revenues</b>	<b>192,566</b>	<b>211,446</b>	<b>231,342</b>	<b>252,383</b>	<b>262,946</b>	<b>273,018</b>	<b>283,404</b>	<b>294,443</b>	<b>305,590</b>	<b>317,348</b>	<b>332,652</b>
<b>Expenses</b>											
18 Cost of goods sold	112,277	120,815	129,562	139,572	143,681	147,603	152,167	156,326	160,757	165,462	170,437
Land lease	111	111	111	111	111	111	111	111	111	111	111
19 Depreciation & amortization expenses	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	18,900
Administrative management expense	653	686	720	756	794	833	875	919	965	1,013	1,064
20 Selling administrative expense	9,628	10,395	11,221	12,129	12,490	12,869	13,248	13,645	14,061	14,494	15,089
<b>Earning before interest and tax</b>	<b>49,997</b>	<b>59,539</b>	<b>69,828</b>	<b>79,914</b>	<b>85,970</b>	<b>91,701</b>	<b>97,103</b>	<b>103,541</b>	<b>109,797</b>	<b>116,369</b>	<b>127,051</b>
21 Interest expense	18,940	19,800	18,810	16,830	14,850	12,870	10,890	8,910	6,930	4,950	2,970
<b>Earnings before tax</b>	<b>31,056</b>	<b>39,739</b>	<b>51,018</b>	<b>63,084</b>	<b>71,120</b>	<b>78,831</b>	<b>86,213</b>	<b>94,631</b>	<b>102,867</b>	<b>111,419</b>	<b>124,081</b>
22 Income tax	0	0	0	0	0	0	0	0	15,430	16,713	18,612
<b>Net earnings</b>	<b>31,056</b>	<b>39,739</b>	<b>51,018</b>	<b>63,084</b>	<b>71,120</b>	<b>78,831</b>	<b>86,213</b>	<b>94,631</b>	<b>87,437</b>	<b>94,706</b>	<b>105,469</b>
<b>Retaining Earnings</b>											
Beginning of year	0	31,056	70,795	121,813	184,897	256,018	307,258	363,296	424,806	487,996	554,290
Net earnings	31,056	39,739	51,018	63,084	71,120	78,831	86,213	94,631	87,437	94,706	105,469
Dividends	0	0	0	0	0	(23,649)	(25,864)	(28,389)	(26,231)	(28,412)	(31,641)
Legal reserve	0	0	0	0	0	(3,942)	(4,311)	(4,732)	1,984	0	0
End-of-year	31,056	70,795	121,813	184,897	256,018	307,258	363,296	424,806	487,996	554,290	628,118
Accumulate legal reserve	0	0	0	0	0	(3,942)	(8,252)	(12,984)	(11,000)	(11,000)	(11,000)

**Income Statement (Unit in Thousand USD)  
(Based Case)**

	2012	2013	2014	2015
<b>Sales</b>				
16 Sale revenues	310,812	320,198	329,945	340,053
17 Other income	34,591	38,568	43,091	47,824
<b>Total revenues</b>	<b>345,403</b>	<b>358,766</b>	<b>373,036</b>	<b>387,876</b>
<b>Expenses</b>				
18 Cost of goods sold	175,916	181,212	187,009	192,625
Land lease	111	111	111	111
19 Depreciation & amortization expenses	18,900	18,900	18,900	18,900
Administrative management expense	1,117	1,173	1,231	1,293
20 Selling administrative expense	15,541	16,010	16,497	17,003
<b>Earning before interest and tax</b>	<b>133,819</b>	<b>141,360</b>	<b>149,287</b>	<b>157,945</b>
21 Interest expense	990	0	0	0
<b>Earnings before tax</b>	<b>132,829</b>	<b>141,360</b>	<b>149,287</b>	<b>157,945</b>
22 Income tax	19,924	21,204	44,786	47,383
<b>Net earnings</b>	<b>112,904</b>	<b>120,156</b>	<b>104,501</b>	<b>110,561</b>
<b>Retaining Earnings</b>				
Beginning of year	628,118	707,151	791,260	864,411
Net earnings	112,904	120,156	104,501	110,561
Dividends	(33,871)	(36,047)	(31,350)	(33,168)
Legal reserve	0	0	0	0
End-of-year	707,151	791,260	864,411	941,804
Accumulate legal reserve	(11,000)	(11,000)	(11,000)	(11,000)

Statement of Cash Flows ((Unit in Thousand USD)

(Based Case)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Cash flows from Operating activities</b>											
Net Earnings	31,056	39,739	51,018	63,084	71,120	78,831	86,213	94,631	87,437	94,706	105,469
Adjustments to reconcile net income to net cash provided from (used by) operating activities											
Depreciation and amortization	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	19,900	18,900
Provision for bad debts	0	0	0	0	0	0	0	0	0	0	0
Gain on sale facilities/equipment	0	0	0	0	0	0	0	0	0	0	0
Increase in deferred taxes	0	0	0	0	0	0	0	0	0	0	0
(Increase) decrease in prepaid expenses and other assets	0	(279)	(264)	(214)	(252)	(171)	(198)	(227)	(202)	(228)	(267)
Cash provided from operating activities before changes in current accounts	50,957	59,359	70,654	82,770	90,768	98,560	105,915	114,304	107,135	114,378	124,103
(Increase) decrease in current assets/liabilities											
Accounts receivable	0	(1,891)	(2,036)	(2,239)	(890)	(935)	(935)	(979)	(1,024)	(1,068)	(1,469)
Inventories	0	(702)	(719)	(823)	(338)	(322)	(375)	(342)	(364)	(387)	(409)
Accounts payable	0	(702)	(719)	(823)	(338)	(322)	(375)	(342)	(364)	(387)	(409)
Accrued liabilities	0	0	0	0	0	0	0	0	0	0	0
Current deferred income taxes	0	0	0	0	0	0	0	0	0	0	0
Net (increase) decrease in current assets/liabilities	0	(3,295)	(3,474)	(3,885)	(1,566)	(1,579)	(1,685)	(1,663)	(1,752)	(1,842)	(2,287)
Net cash provided from (used by) operating activities	50,957	56,064	67,180	78,885	89,202	96,981	104,230	112,641	105,383	112,537	121,816
<b>Cash Flows from Operating activities</b>	50,957	56,064	67,180	78,885	89,202	96,981	104,230	112,641	105,383	112,537	121,816
Year	1	2	3	4	5	6	7	8	9	10	11
DCR (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
(1+DCR) <sup>n</sup>	1	1	1	1	2	2	2	2	2	3	3
CFO/(1+DCR) <sup>n</sup>	46,324	46,334	50,474	53,880	55,388	54,743	53,487	52,548	44,693	43,388	42,696
Accumulate CFO/(1+DCR) <sup>n</sup>	46,324	92,658	143,132	197,012	252,399	307,143	360,629	413,177	457,870	501,257	543,953
Sum of CFO/(1+DCR) <sup>n</sup>	687,022										
NPV before less initial investment	687,022										
<b>Payback period</b>											
Initial investment (Cash in Hand + PPP + Catalyst)			321,167		365,855						
Year 7			53,487								
Accumulate CFO/(1+DCR) <sup>n</sup> up to year 6			307,143								
Difference between Initial investment and ACC. CFO/(1+DCR) <sup>n</sup>			14,024								
Payback period			6.26								
<b>Internal Rate of Return</b>											
DCR (%) at 19%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Year	1	2	3	4	5	6	7	8	9	10	11
(1+DCR) <sup>n</sup>	1	1	2	2	2	3	4	4	5	6	7
CFO/(1+DCR) <sup>n</sup>	42,464	38,934	38,878	38,043	35,848	32,479	29,089	26,197	20,424	18,175	16,395
Sum of CFO/(1+DCR) <sup>n</sup>	381,876										
DCR (%) at 20%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Year	1	2	3	4	5	6	7	8	9	10	11
(1+DCR) <sup>n</sup>	1	1	2	2	3	3	4	5	6	7	8
CFO/(1+DCR) <sup>n</sup>	42,113	38,293	37,922	36,801	34,391	30,901	27,447	24,514	18,954	16,728	14,965
Sum of CFO/(1+DCR) <sup>n</sup>	363,299										
Approximate of IRR	20.86%										



Statement of Cash Flows ((Unit in Thousand USD)

(Based Case)

	2012	2013	2014	2015
<b>Cash flows from Operating activities</b>				
Net Earnings	112,904	120,156	104,501	110,561
Adjustments to reconcile net income to net cash provided from (used by) operating activities				
Depreciation and amortization	18,900	18,900	18,900	18,900
Provision for bad debts	0	0	0	0
Gain on sale facilities/equipment	0	0	0	0
Increase in deferred taxes	0	0	0	0
(Increase) decrease in prepaid expenses and other assets	(293)	(319)	(376)	(397)
Cash provided from operating activities before changes in current accounts	131,511	138,737	123,026	129,064
(Increase) decrease in current assets/liabilities				
Accounts receivable	(1,113)	(1,157)	(1,202)	(1,246)
Inventories	(450)	(435)	(476)	(462)
Accounts payable	(450)	(435)	(476)	(462)
Accrued liabilities	0	0	0	0
Current deferred income taxes	0	0	0	0
Net (increase) decrease in current assets/liabilities	(2,013)	(2,028)	(2,155)	(2,169)
Net cash provided from (used by) operating activities	129,498	136,709	120,871	126,895
<b>Cash Flows from Operating activities</b>	129,498	136,709	120,871	126,895
Year	12	13	14	15
DCR (%)	10%	10%	10%	10%
(1+DCR) <sup>n</sup>	3	3	4	4
CFO/(1+DCR) <sup>n</sup>	41,262	39,600	31,829	30,378
Accumulate CFO/(1+DCR) <sup>n</sup>	585,215	624,815	656,644	687,022
Sum of CFO/(1+DCR) <sup>n</sup>				
<b>NPV before less initial investment</b>				
<b>Payback period</b>				
Initial investment (Cash in Hand + PPP + Catalyst)				
Year 7				
Accumulate CFO/(1+DCR) <sup>n</sup> up to year 6				
Difference between Initial investment and ACC. CFO/(1+DCR) <sup>n</sup>				
<b>Payback period</b>				
<b>Internal Rate of Return</b>				
DCR (%) at 19%	20%	20%	20%	20%
Year	12	13	14	15
(1+DCR) <sup>n</sup>	9	11	13	15
CFO/(1+DCR) <sup>n</sup>	14,524	12,777	9,414	8,236
Sum of CFO/(1+DCR) <sup>n</sup>				
DCR (%) at 20%	21%	21%	21%	21%
Year	12	13	14	15
(1+DCR) <sup>n</sup>	10	12	14	17
CFO/(1+DCR) <sup>n</sup>	13,147	11,471	8,382	7,272
Sum of CFO/(1+DCR) <sup>n</sup>				
<b>Approximate of IRR</b>				

**Assumptions  
(Based Case)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Production Capacity	350	350	350	350	350	350	350	350	350	350	350
Capacity Utilization	298	315	333	350	350	350	350	350	350	350	350
Utilization Rate (%)	85%	90%	95%	100%	100%	100%	100%	100%	100%	100%	100%
Selling Price of PTA											
Domestic Selling Price	657	673	691	712	734	756	778	801	826	851	886
Export Price	595	610	626	645	664	684	705	726	748	771	803
Product											
% Domestic sales	84%	79%	75%	71%	71%	71%	71%	71%	71%	71%	71%
% Export sales	16%	21%	25%	29%	29%	29%	29%	29%	29%	29%	29%
15 Sales revenues											
Domestic sales	164,234	168,349	172,808	178,009	183,307	188,869	194,432	200,260	206,352	212,710	221,451
Export sales	28,332	39,557	51,613	64,577	66,498	68,516	70,534	72,649	74,859	77,165	80,336
Total sale revenues	192,566	207,906	224,421	242,585	249,805	257,386	264,967	272,908	281,211	289,875	301,788
Feedstocks											
% Domestic paraxylene	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Domestic paraxylene, tons	197,838	209,475	221,113	232,750	232,750	232,750	232,750	232,750	232,750	232,750	232,750
Domestic price, \$/ton	410	417	427	439	452	464	478	491	505	520	536
Domestic paraxylene cost, '000\$	81,114	87,351	94,415	102,177	105,203	107,996	111,255	114,280	117,539	121,030	124,754
<b>Total Paraxylene cost, '000\$</b>	<b>81,114</b>	<b>87,351</b>	<b>94,415</b>	<b>102,177</b>	<b>105,203</b>	<b>107,996</b>	<b>111,255</b>	<b>114,280</b>	<b>117,539</b>	<b>121,030</b>	<b>124,754</b>
Acetic Acid	10,036	10,987	11,249	12,004	12,450	12,924	13,551	13,984	14,431	14,895	15,372
Isobutyl Acetate	614	670	730	793	819	845	872	900	929	958	989
Hydrogen	51	56	61	66	68	70	73	75	77	80	82
Sodium Hydroxide	560	612	667	724	747	771	796	821	848	875	903
Misc. Catalysts	511	559	609	661	682	704	727	750	774	799	824
<b>TOTAL</b>	<b>92,886</b>	<b>100,235</b>	<b>107,731</b>	<b>116,425</b>	<b>119,969</b>	<b>123,310</b>	<b>127,274</b>	<b>130,810</b>	<b>134,598</b>	<b>138,637</b>	<b>142,924</b>
UTILITY COSTS											
Power	5,015	5,480	5,969	6,485	6,693	6,906	7,127	7,355	7,590	7,834	8,085
Cooling water circulation	2,401	2,624	2,858	3,105	3,204	3,307	3,412	3,522	3,634	3,751	3,871
Inert gas	327	357	389	422	436	450	464	479	494	510	526
Demineralized water	985	1,077	1,173	1,274	1,315	1,357	1,400	1,445	1,491	1,539	1,589
Hot Oil (Santotherm 66)	3,595	3,928	4,279	4,648	4,798	4,951	5,109	5,273	5,441	5,616	5,796
<b>TOTAL</b>	<b>12,323</b>	<b>13,466</b>	<b>14,668</b>	<b>15,934</b>	<b>16,446</b>	<b>16,971</b>	<b>17,513</b>	<b>18,074</b>	<b>18,652</b>	<b>19,250</b>	<b>19,867</b>
Labour Cost											
Number of Employee	64	64	64	64	64	64	64	64	64	64	64
AVG. Wage/year	14	15	16	17	17	18	19	20	21	22	23
Labour Cost	918	964	1,012	1,063	1,116	1,172	1,231	1,292	1,357	1,425	1,496
Maintenance Cost											
Maintenance Cost (3% of ISBL)	6,150	6,150	6,150	6,150	6,150	6,150	6,150	6,150	6,150	6,150	6,150
17 Cost of Goods Sold	112,277	120,815	129,562	139,572	143,681	147,603	152,167	156,326	160,757	165,462	170,437
Plant, Property and Equipment											
ISBL	205,000	191,333	177,667	164,000	150,333	136,667	123,000	109,333	95,667	82,000	68,333
OSBL	75,000	70,000	65,000	60,000	55,000	50,000	45,000	40,000	35,000	30,000	25,000
5 Plant, Property and Equipment	280,000	261,333	242,667	224,000	205,333	186,667	168,000	149,333	130,667	112,000	93,333

<b>Depreciation</b>											
ISBL (15 years)	13,667	13,667	13,667	13,667	13,667	13,667	13,667	13,667	13,667	13,667	13,667
OSBL (15 years)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Depreciation Expenses	18,667	18,667	18,667	18,667	18,667	18,667	18,667	18,667	18,667	18,667	18,667
<b>Royalty</b>											
Catalyst and Chemical	10,000	9,000	8,000	7,000	6,000	5,000	4,000	3,000	2,000	1,000	0
	1,167	934	700	467	233	1,167	934	700	467	233	1,167
<b>Amortization</b>											
Royalty (10 years)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0
Catalyst and Chemical (5 years)	233	233	233	233	233	233	233	233	233	233	233
Amortization Expenses	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	1,233	233
<b>Total depreciation and amortization expenses</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>	<b>18,900</b>
<b>Long-term debt</b>											
Long-term Loan (10 years)	220,000	220,000	198,000	176,000	154,000	132,000	110,000	88,000	66,000	44,000	22,000
Begin to repay in 2003			22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
<b>Short-term debt</b>											
Overdraft and short-term loan	- 14,332.40	0	0	0	0	0	0	0	0	0	0
<b>Interest Expense</b>											
Overdraft and short-term loan (Libor approx. 6%)	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Interest rate for long-term debt (Libor+3.0%)	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Interest on short-term loan	-860	0	0	0	0	0	0	0	0	0	0
Interest on long-term debt	19,800	19,800	18,810	16,830	14,850	12,870	10,890	8,910	6,930	4,950	2,970
Interest expense	18,940	19,800	18,810	16,830	14,850	12,870	10,890	8,910	6,930	4,950	2,970
<b>Income Tax</b>											
Tax rate (Tax holiday 8 years and half for the next 5 years)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	15.00%	15.00%
Earning before Tax	31,056	39,739	51,018	63,084	71,120	78,831	86,213	94,631	102,867	111,419	124,081
Income Tax	0	0	0	0	0	0	0	0	15,430	16,713	18,612
<b>Other Income</b>											
Interest Income	0	3,540	6,921	9,797	13,141	15,632	18,438	21,534	24,378	27,473	30,865
Short-term investment and deposits at bank	0	70,800	138,419	195,950	262,827	312,636	368,753	430,688	487,569	549,467	617,293
Interest rate (5% per annum)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Selling & administrative expense (5% of Sales)	9,628	10,395	11,221	12,129	12,490	12,869	13,248	13,645	14,061	14,494	15,089
<b>Administrative management expense</b>											
Number of employees	30	30	30	30	30	30	30	30	30	30	30
Avg. wages per employee (5% increase/yr)	22	23	24	25	26	28	29	31	32	34	35
Total administrative management expense	653	686	720	756	794	833	875	919	965	1013	1064
<b>Cash in hand and deposits at bank</b>											
Cash in hand	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Short-term investment and deposits at bank	0	70,800	138,419	195,950	262,827	312,636	368,753	430,688	487,569	549,467	617,293
<b>Total Debt</b>	<b>222,160</b>	<b>238,312</b>	<b>240,087</b>	<b>219,765</b>	<b>199,112</b>	<b>178,118</b>	<b>157,284</b>	<b>136,535</b>	<b>115,707</b>	<b>95,005</b>	<b>74,480</b>
% of Total Debt & Equities	61%	57%	51%	43%	35%	30%	25%	20%	16%	12%	9%
Cost of Debt	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
<b>Total Equities</b>	<b>141,056</b>	<b>180,795</b>	<b>231,813</b>	<b>294,897</b>	<b>366,018</b>	<b>421,199</b>	<b>481,548</b>	<b>547,790</b>	<b>608,996</b>	<b>675,290</b>	<b>749,118</b>
% of Total Debt & Equities	39%	43%	49%	57%	65%	70%	75%	80%	84%	88%	91%
Cost of Equities	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
<b>Total Debt &amp; Equities</b>	<b>363,217</b>	<b>419,107</b>	<b>471,900</b>	<b>514,662</b>	<b>565,130</b>	<b>599,317</b>	<b>638,832</b>	<b>684,325</b>	<b>724,702</b>	<b>770,295</b>	<b>823,599</b>
WACC	9%	9%	9%	9%	8%	8%	8%	8%	8%	8%	8%

**Assumptions  
(Based Case)**

	2012	2013	2014	2015
Production Capacity	350	350	350	350
Capacity Utilization	350	350	350	350
Utilization Rate (%)	100%	100%	100%	100%
Selling Price of PTA				
Domestic Selling Price	913	940	969	999
Export Price	827	852	877	904
Product				
% Domestic sales	71%	71%	71%	71%
% Export sales	29%	29%	29%	29%
15 Sales revenues				
Domestic sales	228,074	234,961	242,113	249,530
Export sales	82,739	85,237	87,832	90,522
<b>Total sale revenues</b>	<b>310,812</b>	<b>320,198</b>	<b>329,945</b>	<b>340,053</b>
Feedstocks				
% Domestic paraxylene	100%	100%	100%	100%
Domestic paraxylene, tons	232,750	232,750	232,750	232,750
Domestic price, \$/ton	554	571	590	608
Domestic paraxylene cost, '000\$	128,944	132,900	137,323	141,512
<b>Total Paraxylene cost, '000\$</b>	<b>128,944</b>	<b>132,900</b>	<b>137,323</b>	<b>141,512</b>
Acetic Acid	15,862	16,372	16,894	17,436
Isobutyl Acetate	1,021	1,054	1,087	1,122
Hydrogen	85	88	91	93
Sodium Hydroxide	932	962	992	1,024
Misc. Catalysts	851	878	906	935
<b>TOTAL</b>	<b>147,695</b>	<b>152,254</b>	<b>157,293</b>	<b>162,122</b>
UTILITY COSTS				
Power	8,343	8,611	8,886	9,171
Cooling water circulation	3,995	4,123	4,255	4,391
Inert gas	543	561	579	597
Demineralized water	1,639	1,692	1,746	1,802
Hot Oil (Santothem 66)	5,981	6,173	6,370	6,574
<b>TOTAL</b>	<b>20,501</b>	<b>21,159</b>	<b>21,835</b>	<b>22,535</b>
Labour Cost				
Number of Employee	64	64	64	64
AVG. Wage/year	25	26	27	28
Labour Cost	1,571	1,649	1,732	1,818
Maintenance Cost				
Maintenance Cost (3% of ISBL)	6,150	6,150	6,150	6,150
17 Cost of Goods Sold	175,916	181,212	187,009	192,625
Plant, Property and Equipment				
ISBL	54,667	41,000	27,333	13,667
OSBL	20,000	15,000	10,000	5,000
5 Plant, Property and Equipment	74,667	56,000	37,333	18,667

<b>Depreciation</b>				
ISBL (15 years)	13,667	13,667	13,667	13,667
OSBL (15 years)	5,000	5,000	5,000	5,000
Depreciation Expenses	18,667	18,667	18,667	18,667
<b>Royalty</b>				
Catalyst and Chemical	934	700	467	233
<b>Amortization</b>				
Royalty (10 years)	0	0	0	0
Catalyst and Chemical (5 years)	233	233	233	233
Amortization Expenses	233	233	233	233
Total depreciation and amortization expenses	18,900	18,900	18,900	18,900
<b>Long-term debt</b>				
Long-term Loan (10 years)	0			
Begin to repay in 2003	22,000			
<b>Short-term debt</b>				
Overdraft and short-term loan	0	0	0	0
<b>Interest Expense</b>				
Overdraft and short-term loan (Libor approx. 6%)	6.00%	6.00%	6.00%	6.00%
Interest rate for long-term debt (Libor+3.0%)	9.00%	9.00%	9.00%	9.00%
Interest on short-term loan	0	0	0	0
Interest on long-term debt	990	0	0	0
Interest expense	990	0	0	0
<b>Income Tax</b>				
Tax rate (Tax holiday 8 years and half for the next 5 years)	15.00%	15.00%	30.00%	30.00%
Earning before Tax	132,829	141,360	149,287	157,945
Income Tax	19,924	21,204	44,786	47,383
<b>Other Income</b>				
Interest Income	34,591	38,568	43,091	47,824
Short-term investment and deposits at bank	691,820	771,353	861,827	956,476
Interest rate (5% per annum)	5%	5%	5%	5%
Selling & administrative expense (5% of Sales)	15,541	16,010	16,497	17,003
<b>Administrative management expense</b>				
Number of employees	30	30	30	30
Avg. wages per employee (5% increase/yr)	37	39	41	43
Total administrative management expense	1117	1173	1231	1293
<b>Cash in hand and deposits at bank</b>				
Cash in hand	40,000	40,000	40,000	40,000
Short-term investment and deposits at bank	691,820	771,353	861,827	956,476
Total Debt	54,104	33,816	35,795	37,845
% of Total Debt & Equities	6%	4%	4%	3%
Cost of Debt	10%	10%	10%	10%
Total Equities	828,151	912,260	985,411	1,062,804
% of Total Debt & Equities	94%	96%	96%	97%
Cost of Equities	8%	8%	8%	8%
Total Debt & Equities	882,255	946,076	1,021,206	1,100,649
WACC	8%	8%	8%	8%

<b>Financial Ratios (Based Case)</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Short-term Activity Ratios</b>									
Inventory Turnover	12.17	12.17	12.17	12.17	12.17	12.17	12.17	12.17	12.17
Average Number of days Inventory in Stock	30	30	30	30	30	30	30	30	30
Receivables Turnover	8.11	8.11	8.11	8.11	8.11	8.11	8.11	8.11	8.11
Average Number of days Receivables are Outstanding	45	45	45	45	45	45	45	45	45
3 Inventory (Thousand USD)	9,228	9,930	10,649	11,472	11,809	12,132	12,507	12,849	13,213
2 Account receivables	23,741	25,632	27,668	29,908	30,798	31,733	32,667	33,646	34,670
<b>Long-term Activity Ratios</b>									
Fixed Assets Turnover	68.77%	79.56%	92.48%	108.30%	121.66%	137.89%	157.72%	182.75%	215.21%
Total Assets Turnover	53.02%	49.61%	47.56%	47.13%	44.20%	42.95%	41.48%	39.88%	38.80%
<b>Liquidity Analysis</b>									
Payable Turnover	12.17	12.17	12.17	12.17	12.17	12.17	12.17	12.17	12.17
Average Number of Days Payable Outstanding	30	30	30	30	30	30	30	30	30
Account payables	9,228	9,930	10,649	11,472	11,809	12,132	12,507	12,849	13,213
<b>Debt Ratios</b>									
Debt to Total Capital	0.61	0.57	0.51	0.43	0.35	0.30	0.25	0.20	0.16
Debt to Equity	1.57	1.32	1.04	0.75	0.54	0.42	0.33	0.25	0.19
<b>Interest Coverage Ratios</b>									
Time Interest Earned									
<b>Profitability Analysis</b>									
Gross Margin	41.69%	41.89%	42.27%	42.46%	42.48%	42.65%	42.57%	42.72%	42.83%
Margin Before Interest and Tax	25.96%	28.64%	31.11%	32.94%	34.41%	35.63%	36.65%	37.94%	39.04%
Pretax Margin	16.13%	19.11%	22.73%	26.00%	28.47%	30.63%	32.54%	34.68%	36.58%
Profit Margin	16.13%	19.11%	22.73%	26.00%	28.47%	30.63%	32.54%	34.68%	31.09%
Return on Assets	8.55%	10.16%	11.45%	12.79%	13.17%	13.54%	13.93%	14.30%	12.41%
Return on Equity	22.02%	24.69%	24.73%	23.95%	21.52%	20.03%	19.10%	18.39%	15.12%

<b>Financial Ratios (Based Case)</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Short-term Activity Ratios</b>						
Inventory Turnover	12.17	12.17	12.17	12.17	12.17	12.17
Average Number of days Inventory in Stock	30	30	30	30	30	30
Receivables Turnover	8.11	8.11	8.11	8.11	8.11	8.11
Average Number of days Receivables are Outstanding	45	45	45	45	45	45
3 Inventory (Thousand USD)	13,600	14,009	14,459	14,894	15,371	15,832
2 Account receivables	35,738	37,207	38,319	39,476	40,678	41,924
<b>Long-term Activity Ratios</b>						
Fixed Assets Turnover	258.82%	323.34%	416.27%	571.78%	883.78%	1821.71%
Total Assets Turnover	37.63%	36.64%	35.23%	33.84%	32.31%	30.90%
<b>Liquidity Analysis</b>						
Payable Turnover	12.17	12.17	12.17	12.17	12.17	12.17
Average Number of Days Payable Outstanding	30	30	30	30	30	30
Account payables	13,600	14,009	14,459	14,894	15,371	15,832
<b>Debt Ratios</b>						
Debt to Total Capital	0.12	0.09	0.06	0.04	0.04	0.03
Debt to Equity	0.14	0.10	0.07	0.04	0.04	0.04
<b>Interest Coverage Ratios</b>						
Time Interest Earned						
<b>Profitability Analysis</b>						
Gross Margin	42.92%	43.52%	43.40%	43.41%	43.32%	43.35%
Margin Before Interest and Tax	40.14%	42.10%	43.05%	44.15%	45.25%	46.45%
Pretax Margin	38.44%	41.12%	42.74%	44.15%	45.25%	46.45%
Profit Margin	32.67%	34.95%	36.33%	37.53%	31.67%	32.51%
Return on Assets	12.67%	13.23%	13.24%	13.14%	10.62%	10.42%
Return on Equity	14.75%	14.81%	14.32%	13.81%	11.01%	10.80%

And such financial results of project are shown in the table 7.4 as details following.

**TABLE 7.4**  
**Financial Results from the model**

<b>NPV before less the capital investment</b>	<b>687,022</b>	<b>'000 USD</b>
<b>Capital Investment</b>	<b>321,167</b>	<b>'000 USD</b>
<b>IRR(%)</b>	<b>20.86%</b>	
<b>Simple Payback Period</b>	<b>6.26</b>	<b>Years</b>
<b>At Discount Rate</b>	<b>10.00%</b>	

#### **7.4 ASSOCIATED PARAMETER RELATED WITH PTA PROJECT**

From the base case financial model, we try to analyze such parameters from marketing, technical, and management and others which have a major impact on PTA project by adjust only on selected parameter (increase or decrease) without any adjustment on the other parameters in the financial model. Therefore, if this selected parameter has an impact on the financial model such NPV before less initial investment will be significantly changed. And, we concentrated only on NPV before less initial investment nearly to be equal to the initial investment which means that the PTA project just going to fail when it pass at this turning point.

From our analysis base on the financial model but change in the selected parameter which shown in the Appendix, such selected parameters which have an impact on the PTA project are discuss in details below.

##### **7.4.1 Marketing Parameters**

In the marketing part, such parameters that we selected are;

- Demand of PTA is decreased which we will adjust the plant utilization rate in order to serve the limited demand and decrease in quantity of Para-Xylene and the utility.
- PTA price is lower than our expectation in the financial model which means that our sales revenues will be decreased significantly.
- Para-Xylene price is higher than our expectation in the financial model which means that the costs of goods sold will be equal or higher than the operating margin.



After analysis, the results from each selected parameter are mentioned below.

#### **7.4.1.1 Plant Utilization Rate**

When we adjust the plant utilization rate from 85%, 90%, and 95% in the year 2001, 2002, and 2003 respectively and 100% from the year 2004 to the end of project to constant 71.85% through the project period. It means that we produce the PTA lower than our plant capacity and the quantity in use of Para-Xylene and the utility are consumed lower than our expectation at this rate accordingly. Such NPV before less initial investment is significantly changed to be close to the initial investment which means that the PTA project is going to be failed at this point. So, we can conclude that if the demand of PTA in this ASEAN region is changed only about 46%, the PTA project will be failed.

#### **7.4.1.2 PTA Price**

The PTA project has the highest risk to fail after we adjust the PTA price is lower than our expectation only 16.6% in both domestic and export price. Such NPV before less initial investment is very close to the initial investment. Therefore, we can conclude that this parameter is very high sensitivity to the PTA project.

#### **7.4.1.3 Para-Xylene Price**

The major costs of PTA product are based on the Para-Xylene price. So, we try to analyze this parameter by adjust the price higher than the expectation. The results come out with increase about 37.1% of Para-Xylene price, the PTA project is going to be failed by its NPV.

#### **7.4.2 Technical Parameter**

The technical parameter is based on capital investment costs by fixed its debt to equity ratio 2:1. The results come up with increase the initial investment which are ISBL, OSBL and initial chemical and catalyst about 80% and increase debt and equity about 80% to maintain the debt to equity ratio 2:1. Such PTA project is going to be failed at this point by the NPV value.

#### **7.4.3 Management and Other Parameters**

After analyze these two types of parameters such as selling administrative expenses and BOI incentive on PTA project. We have found that there is no impact on this project by concentrate on the NPV value which has not significantly impacted during we changed these parameters. For example, when we change the BOI incentive which is the tax exemption 8 years from the beginning of the project and follow 5 years period 15% income tax to pay the income tax 30%. Such NPV is not significantly changed which means that this parameter is not has an impact to the PTA project.