



MTO ECONOMIC ANALYSIS

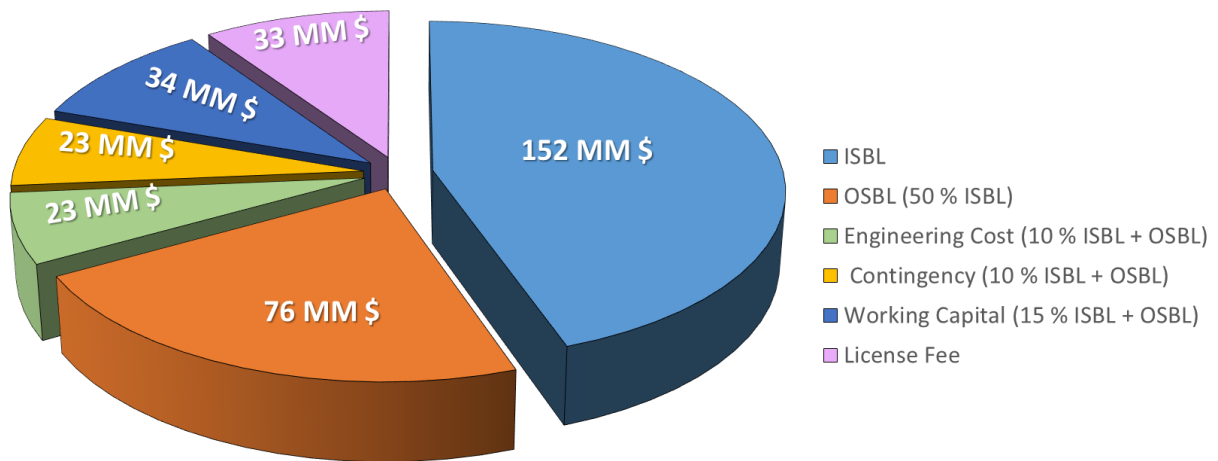
<i>UNIT</i>	<i>EQUIPMENT TYPE</i>	<i>ASPEN 2013</i>	<i>ASPEN 2018</i>	<i>LANG FACTOR</i>	<i>ISBL</i>
VS-101	Feedstock Storage Tank(s)	\$4,642,300	\$5,922,308	4	\$23,689,000
P-101	Centrifugal Pump	\$16,000	\$20,412	4	\$81,000
HX-101	TEMA Heat Exchanger	\$2,748,000	\$3,505,698	3.5	\$12,269,000
H-101	Electric Heater	\$10,000	\$12,757	2	\$25,000
R-201	MTO Reactor (Vertical Vessel)	\$1,741,200	\$2,221,296	4	\$8,885,000
HX-201	TEMA Heat Exchanger	\$138,900	\$177,198	3.5	\$620,000
VS-201	Catalyst Regeneration Chamber	\$3,000	\$3,827	4	\$15,000
P-201	Centrifugal Pump	\$111,500	\$142,244	4	\$568,000
HX-202	TEMA Heat Exchanger	\$82,700	\$105,503	3.5	\$369,000
CR-201	Electric Cooler	\$3,100	\$3,955	2	\$7,000
QT-301	Quench Tank	\$20,100	\$25,642	4	\$102,000
HX-301	TEMA Heat Exchanger	\$35,300	\$45,033	3.5	\$157,000
C-301	Stage 1 Compressor	\$3,881,700	\$4,951,990	2.5	\$12,379,000
CR-301	Electric Immersion Tank Cooler	\$3,700	\$4,720	2	\$9,000
C-302	Stage 2 Compressor	\$3,092,500	\$3,945,186	2.5	\$9,862,000
D-301	Dryer (Molecular Sieve)	\$10,000,000	\$12,757,271	2	\$25,514,000
HX-302	TEMA Heat Exchanger	\$44,300	\$56,515	3.5	\$197,000
HX-303	TEMA Heat Exchanger	\$35,300	\$45,033	3.5	\$157,000
CR-302	TEMA Heat Exchanger	\$44,300	\$56,515	3.5	\$197,000
P-301	Centrifugal Pump	\$14,100	\$17,988	4	\$71,000
T-301	Methanol/Water Tower	\$504,200	\$643,222	4	\$2,572,000
RD-301	Methanol/Water Tower Reflux Drum	\$100,000	\$127,573	4	\$510,000
P-301	Centrifugal Pump (Methanol/Water Tower)	\$20,000	\$25,515	4	\$102,000
HX-304	Methanol/Water Tower Condenser	\$300,000	\$382,718	3.5	\$1,339,000
HX-305	Methanol/Water Tower Re-Boiler	\$92,000	\$117,367	3.5	\$410,000
T-401	De-Methanizer	\$143,000	\$182,429	4	\$729,000
T-402	De-Ethanizer	\$514,000	\$655,724	4	\$2,622,000
T-403	Ethane/Ethylene Tower	\$736,000	\$938,935	4	\$3,755,000
T-404	De-Propanizer	\$543,000	\$692,720	4	\$2,770,000
T-405	Propane/Propylene Tower	\$3,493,000	\$4,456,115	4	\$17,824,000
T-406	C4+ Tower	\$1,612,000	\$2,056,472	4	\$8,225,000
RD-401	De-Methanizer Reflux Drum	\$39,000	\$49,753	4	\$199,000
RD-402	De-Ethanizer Reflux Drum	\$90,000	\$114,815	4	\$459,000
RD-403	Ethane/Ethylene Tower Reflux Drum	\$100,000	\$127,573	4	\$510,000
RD-404	De-Propanizer Reflux Drum	\$88,000	\$112,264	4	\$449,000

RD-405	Propane/Propylene Tower Reflux Drum	\$128,000	\$163,293	4	\$653,000
RD-406	C4+ Tower Reflux Drum	\$59,000	\$75,268	4	\$301,000
P-401	Centrifugal Pump (De-Methanizer)	\$8,000	\$10,206	4	\$40,000
P-402	Centrifugal Pump	\$9,000	\$11,482	4	\$45,000
P-403	Centrifugal Pump (De-Ethanizer)	\$12,000	\$15,309	4	\$61,000
P-404	Centrifugal Pump (Ethane/Ethylene Tower)	\$15,000	\$19,136	4	\$76,000
P-405	Centrifugal Pump (De-Propanizer)	\$12,000	\$15,309	4	\$61,000
P-406	Centrifugal Pump (Propane/Propylene Tower)	\$16,000	\$20,412	4	\$81,000
P-407	Centrifugal Pump (C4+ Tower)	\$13,000	\$16,584	4	\$66,000
HX-401	De-Methanizer Condenser	\$480,000	\$612,349	3.5	\$2,143,000
HX-402	De-Methanizer Re-Boiler	\$21,000	\$26,790	3.5	\$93,000
HX-403	De-Ethanizer Condenser	\$195,000	\$248,767	3.5	\$870,000
HX-404	De-Ethanizer Re-Boiler	\$49,000	\$62,511	3.5	\$218,000
HX-405	Ethane/Ethylene Tower Condenser	\$826,000	\$1,053,751	3.5	\$3,688,000
HX-406	Ethane/Ethylene Tower Re-Boiler	\$42,000	\$53,581	3.5	\$187,000
HX-407	De-Propanizer Condenser	\$92,000	\$117,367	3.5	\$410,000
HX-408	De-Propanizer Re-Boiler	\$97,000	\$123,746	3.5	\$433,000
HX-409	Propane/Propylene Tower Condenser	\$936,000	\$1,194,081	3.5	\$4,179,000
HX-410	Propane/Propylene Tower Re-Boiler	\$55,000	\$70,165	3.5	\$245,000
HX-411	C4+ Tower Condenser	\$68,000	\$86,749	3.5	\$303,000
HX-412	C4+ Tower Re-Boiler	\$82,000	\$104,610	3.5	\$366,000
Valves	Throttling Valves (FOUR)	\$4,000	\$5,103	2.5	\$12,000
TOTAL ISBL COST FOR MTO PLANT					\$153,000,000

<i>Utilities</i>			
Cooling Water	consumption	1374	MT per hour
	Cost	0.03	\$ per MT
	Operating Hours	8000	hr/yr
	Annualized Total Cost	330,000	\$ per year
Refrigerant-Freon 12	consumption	1442	MT per hour
	Cost	0.2	\$ per MT
	Operating Hours	8000	hr/yr
	Annualized Total Cost	2,308,000	\$ per year
MP Steam	consumption	18	MT per hour
	Cost	118	\$ per MT
	Operating Hours	8000	hr/yr
	Annualized Total Cost	16,992,000	\$ per year
Electricity	consumption	7188	kW
	Cost	0.06	\$ per kWh
	Operating Hours	8000	hr/yr
	Annualized Total Cost	3,451,000	\$ per year
Total Cost of Utilities		23,000,000	\$ per year

<i>Raw Materials</i>			
Methanol	consumption	208.333	MT per hour
	Cost	300	\$ per MT
	Operating Hours	8000	hr/yr
	Annualized Total Cost	500,000,000	\$ per year
SAPO-34	consumption	20833	kg per year
	Cost	350	\$ per kg
	Annualized Total Cost	7,291,550	\$ per year
Total Raw Material Cost		507,300,000	\$ per year
<i>Total Variable Cost of Production</i>			
Total Cost of Utilities		23,000,000	\$ per year
Total Raw Material Cost		507,300,000	\$ per year
By Product Revenue		99,326,400	\$ per year
VCOP		431,000,000	\$ per year

Total Capital Cost



<i>COMPONENTS</i>		<i>APPROXIMATIONS</i>
Total ISBL		\$153,000,000
OSBL	50 % of ISBL	\$76,500,000
Engineering Cost	10 % of ISBL + OSBL	\$22,950,000
Contingency	10 % of ISBL + OSBL	\$22,950,000
Working Capital	15 % of ISBL + OSBL	\$34,425,000
License fee	\$20 per MT	\$33,000,000
TOTAL CAPITAL EXPENDITURE		\$342,000,000

<i>COMPONENTS</i>			<i>APPROXIMATIONS</i> <i>(Yearly Basis)</i>
Total ISBL			\$153,000,000
Operating Labor	Operators per shift	4.8	\$288,000
	No. of shift positions	4	
	Avg. Salary per year	\$15,000	
Supervision & Management	25 % of Operating Labor		\$72,000
Direct Salary Overhead	50 % of Operating Labor plus Supervision		\$180,000
General & Administrative	65 % of Operating Labor Plus Supervision and overhead		\$351,000
Maintenance (Material + Labor)	5 % of ISBL		\$7,650,000
Rent of Land (and/or buildings)	1 % of ISBL plus OSBL		\$2,295,000
Property Taxes & Insurance	1 % of ISBL plus OSBL		\$2,295,000
TOTAL FIXED COST OF PRODUCTION (YEARLY BASIS)			\$13,000,000

<i>COMPONENTS</i>	<i>VALUE</i>	<i>UNIT</i>
Total Capital Cost (TCC)	342,000,000	\$
Total Fixed Cost of Production (FCOP)	13,000,000	\$ per Yr
Total Variable Cost of Production (VCOP)	430,973,600	\$ per Yr
Main Product Revenue (MPR)	724,590,000	\$ per Yr
Capital Cost of Production (CCOP)	443,973,600	\$ per Yr
Working Capital (WC)	34,425,000	\$
Fixed Capital Investment (CC - WC)	307,575,000	\$
Inside Battery Limit Cost (ISBL)	153,000,000	\$
Interest Rate in China	15	%

Year	Gross Profit (MM\$)	Depreciation 7 Year %	Depreciation Charge (MM\$)	Taxable Income (MM\$)	Tax (25% in China) Due (MM\$)	After Tax Cash Flow (MM\$)	Discount Factor	Present Value (MM\$)	Present Value of Cash Flow (MM\$)
1	-171	0	0	-171	0	-171	0.870	-149	-149
2	-86	0	0	-86	0	-86	0.756	-65	-213
3	-86	0	0	-86	0	-86	0.658	-56	-270
4	134	14.29	43.95	90	0	134	0.572	77	-193
5	281	24.49	75.33	205	22	258	0.497	128	-65
6	281	17.49	53.79	227	51	229	0.432	99	34
7	281	12.49	38.42	242	57	224	0.376	84	119
8	281	8.93	27.47	253	61	220	0.327	72	191
9	281	8.92	27.44	253	63	217	0.284	62	252
10	281	8.93	27.47	253	63	217	0.247	54	306
11	281	4.46	13.72	267	63	217	0.215	47	353
12	281	0	0	281	67	214	0.187	40	393
13	281	0	0	281	70	210	0.163	34	427
14	281	0	0	281	70	210	0.141	30	457
15	281	0	0	281	70	210	0.123	26	483
16	281	0	0	281	70	210	0.107	22	505
17	281	0	0	281	70	210	0.093	20	525
18	281	0	0	281	70	210	0.081	17	542
19	281	0	0	281	70	210	0.070	15	556
20	281	0	0	281	70	210	0.061	13	569
21	281	0	0	281	70	210	0.053	11	580
22	281	0	0	281	70	210	0.046	10	590
23	281	0	0	281	70	210	0.040	8	599
24	281	0	0	281	70	210	0.035	7	606
25	281	0	0	281	70	210	0.030	6	612
Net Present Value (NPV) with 7 Years MACRS in MM \$									612

