



China CTO/MTO Quarterly

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1. Existing Plants Quarterly Business Analysis

Methodology: For CTO/MTO projects successfully started up and in stable operation, most important factors affecting on their profitability are costs of production and sales price of products, while cost affecting factors mainly include raw material and utilities price, capital investment and operating rate (determining depreciation and financial expense), and byproduct income (to deduct main product cost) etc.

In this chapter we shall study existing CTO/MTO projects in stable operation and, based on the project fundamental data and the current quarter performance, calculate ethylene/propylene or downstream product cost, and estimate the current quarter profit on the basis of market situation. It must be noticed that profit is estimated on ethylene/propylene and derivatives, value of other byproducts will be deducted the cost of ethylene/propylene.

1.1 Shenhua Baotou CTO Project (Project A)

1.1.1 Basic Information of Project A

Tab 1.1.1 Basic Information of Project A (up to 2015Q2)

Company	Shenhua Baotou Coal Chemical Co., Ltd
Shareholder	China Shenhua Energy Co 100% Holdings
Startup	2010
Investment	CNY 18bn
Coal Gasification	7 GE gasifiers, 1500t/d coal feed (5 operation +2 standby)
MTO Capacity	600kt/a
MTO Process	DICP DMTO
MTO Designer	SEG LPEC
PE Capacity	300kt/a
PE Process	Univation Unipol Process, HDPE/LLDPE
PP Capacity	300kt/a
PP Process	Grace UNIPOL Process (original Dow)
Byproducts	10kt/a MTBE, 20kt/a butane-1, 60kt/a 2-PH
Coal Consumption for Gasification t/t Olefin (5600 kcal bituminous coal)	4.68
Coal Consumption for Power t/t Olefin (5000 kcal fuel coal)	3.02

1.1.2 Operation Information of Project A

Tab 1.1.2 Operation Information of Project A (2015Q2)

PE Sales	79.8kt
PP Sales	80.9kt
Operation Rate (E)	107.13%
Coal Price of Gasification (E)	254 CNY/t
East China PE Average Price (including VAT)	10823 CNY/t
East China PP Average Price (including VAT)	9658 CNY/t
PE/PP Cost (E) (excluding VAT)	4985 CNY/t
Operating Profit CNY/t Olefin (E)	3423
Total Profit in Q2 (E)	CNY 550mn

1.1.3 Assessment

Project A is the world's first CTO demonstration plant. It entered commercial operation in Jan.2011, maintained stable operation, and reflected good economy.

China Shenhua Baotou Coal Chemical produced 525kt of PE/PP in total in the year of 2014, and sold 265.5kt of PE at CNY8871.8/t and 268.1kt of PP at CNY8628.9/t averaged price. In 2014, China Shenhua coal chemical sector realized CNY5.88bn revenue and CNY3.82bn cost, and gained profit of CNY1.408bn. Business cost of coal chemical sector reduced by 1.2% comparing to 2013, and the business income dropped by only 1.8%, a much smaller reduction than those of coal and power generation sectors, reflecting better economy of CTO process. In the coal market downturn, the importance of coal chemical business is particularly evident.

In Q2 2015, project A maintained over 100% of operating rate and continued the everlasting stable production. Taking averaged PE/PP price on East China market in Q2 and the project A PE/PP cost estimate as bases, project A Q2 total profit is calculated around CNY550mn. In comparison to Q1, Q2 business profit enjoyed greater gain owing to PE/PP price rising up in the quarter.

Project A operated stably with high operating rate, low energy consumption and low depreciation; plant is near to coal mine, with low transportation cost; has self-owned railway, transportation of raw materials and polyolefin products is convenient, with controllable transportation cost; polyolefin products sold by Shenhua Group, with controllable sales cost; but after plant put into operation, the annual continuous technical inputs impacted project's overall profit.

1.2 Ningbo Fude MTO Project (Project B)

1.2.1 Basic Information of Project B

Tab 1.2.1 Basic Information of Project B (up to 2015Q2)

Company	Ningbo Fude Energy Co., Ltd
Shareholder	Fund Energy Investment Holding Co., Ltd 100% Holdings
Startup	2013
Investment	CNY 6bn
MTO Capacity	700kt/a
MTO Process	DICP DMTO
MTO Designer	SEG LPEC
PP Capacity	400kt/a
PP Process	Sinopec 2 nd generation ring tube polypropylene technology
MEG Capacity	500kt/a
MEG Process	Shell EO/EG technology
Byproducts	23.7kt/a C5+, 22.6kt/a C4
Methanol Consumption t/t Olefin	2.65
Coal Consumption for Power t/t Olefin (5000 kcal fuel coal)	1.34

1.2.2 Operation Information of Project B

Tab 1.2.2 Operation Information of Project B (2015Q2)

PP Sales	120kt
MEG Sales	112kt
Operation Rate (E)	92%
Methanol Price (E)	2484 CNY/t
East China PP Average Price (including VAT)	9658 CNY/t
East China MEG Average Price (including VAT)	7337 CNY/t
PP Cost (E) (excluding VAT)	7369 CNY/t
MEG Cost (E) (excluding VAT)	5166 CNY/t
Operating Profit CNY/t PP (E)	287 CNY/t

Operating Profit CNY/t MEG (E)	1105 CNY/t
Total Profit in Q2 (E)	CNY 158mn

1.2.3 Assessment

Project B has started up since February 2013, each technical indicators have reached the design value, the device operated well, product quality meet standards, realized long period full load stable operation. The project has two advantages: 1 Ningbo Chemical Industry Park has good logistics conditions for transportation and storage of the raw material methanol; 2 Ningbo's plastics processing and chemical fiber industry developed, PP and MEG have big market space and short transportation distance.

In Q2 2015, a trouble in EG plant interfered the feed to neighboring 400kt/a PP plant and forced the plant shut down for 3 days, after that but the load was reduced to 70% and the low load would be maintained until Sep this year. General operating rate of the plant in Q2 was calculated 92%.

Outsourced methanol to olefins cost was obviously affected by raw material methanol prices. In Q2 2015, East China methanol price rose 371 CNY/a, prices of PP and MEG went up by CNY785/t and 1343/t respectively in comparison to the prices of Q1, by-product prices also have a certain level rise. Profit margin of polypropylene was acceptable, and MEG margin increased by large. ASIACHEM estimated that in Q2, the profit contribution was totalized up to CNY155mn.

1.3 Datang Duolun CTP Project (Project C)

1.3.1 Basic Information of Project C

Tab 1.3.1 Basic Information of Project C (up to 2015Q2)

Company	Datang Inner Mongolia Duolun Coal Chemical Co., Ltd.
Shareholder	Datang Group 100% Holdings
Startup	2012
Investment	CNY 22.1bn
Coal Gasification	3 Shell gasifiers, 2800t/d coal feed
MTO Capacity	460kt/a
MTO Process	Lurgi MTP
MTO Designer	Wuhuan Engineering
PP Capacity	460kt/a

PP Process	Grace UNIPOL Process (original Dow)
Byproducts	182.2kt/a gasoline, 36.4kt/a LPG
Coal Consumption for Gasification t/t Olefin (5600 kcal bituminous coal)	5.21
Coal Consumption for Power t/t Olefin (5000 kcal fuel coal)	3.75

1.3.2 Operation Information of Project C

Tab 1.3.2 Operation Information of Project C (2015Q2)

PP Sales	10.7 kt
Operation Rate (E)	9.3%
East China PP Average Price (including VAT)	9658 CNY/t
PP Cost (E) (excluding VAT)	12601 CNY/t
Operating Profit CNY/t Olefin (E)	-4646
Total Profit in Q2 (E)	CNY -49.71mn

1.3.3 Assessment

Datang Duolun project laid corner stone in Jul 2005 and outputted polymer grade propylene of 99.7% purity in Sep 2011. In Mar 2012, the project formally started trial production.

In 2014, Datang Duolun produced in total 387.1kt of methanol, 99.1kt of propylene and 92.1kt of PP. Through successive equipment maintenance and technical revamping, the project is now ready for long term stable operation.

In Q2 2015, Datang Duolun project produced 10.7kt of PP. The plant was shut down for maintenance during Apr – May. Process units were restarted one by one starting from Jun 7th, but only a single 230kt/a PP line was put in operation.

Frequent outage for maintenance resulted lower operating rate and less PP output, greatly increased the depreciation cost and affected on profitability of the general project. It is predicted that starting from Jul, both PP lines will be put in practical production. The project is scheduled to realize 180kt of PP and CNY2bn business income in 2015.

This is the part of sample report. The full report has about **60 pages**, and **covers almost all operating CTO/MTO projects**, and keeps updating.

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