

Mangalore Refinery & Petrochem (MRPL)

₹ 47

At the crack of dawn...

Mangalore Refinery & Petrochemicals (MRPL), a standalone refinery with a capacity of 15 MMTPA, is all set to complete its Phase III expansion and upgradation project, to enter the league of complex refineries. While the capacity of MRPL has already increased from 11.8 MMTPA to 15 MMTPA, the commencement of operations at all secondary processing units shall enhance the complexity of the refinery from six to 10. The operational efficiencies that will kick in due to higher complexity will boost refining margins from US\$2.5/barrel in FY13 to US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively. We expect MRPL to grow at a CAGR of 4.4% in revenues over FY13-16E on the back of higher capacity utilisation and realisation due to rupee depreciation. We expect the company to report a net profit of ₹ 650.2 crore and ₹ 1096.2 crore in FY15E and FY16E, respectively, against a loss of ₹ 756.9 crore in FY13. We initiate coverage on MRPL with a BUY rating.

Capacity expansion & upgradation project to boost refining margins

Higher complexity on commissioning of Phase III project will lead to an increase in distillate yield from 76.5% to 80.1%, better capability to handle heavier & sourer crude and production of higher margin value-added products. Additionally, MRPL would save on freight cost due to the single point mooring facility, commissioned in August 2013. We believe these benefits will translate into an improvement of US\$3.5-4/barrel in refining margins in the next couple of years.

Best placed to play refining cycle among PSU peers

MRPL has managed its business better than its peers in terms of better cash conversion cycle (only PSU refinery which has a negative working cycle), which is mainly due to the higher percentage of sourcing of crude from NIOC of Iran that offers a 90 day credit period. The recent truce between Iran and the six western nations will benefit MRPL in terms of better credit period, lower pressure on working capital & reduction in interest expense. Also, the completion of Phase III project will allow MRPL to regain its edge over peer PSU refiners in terms of GRMs. Overall, we prefer MRPL because of its lower policy leverage, improving GRM outlook and lowest gearing on the balance sheet amongst PSU refineries.

An investment opportunity; ready to unfold

Given the improvement in complexity, better distillate yield and access to cheaper crude oil, we expect MRPL to achieve higher profitability. We value the stock at 5.5x FY16E EV/EBITDA multiple to arrive at a target price of ₹ 61. We initiate coverage on MRPL with a BUY recommendation.

Exhibit 1: Valuation Metrics

Year to March 31	FY12	FY13	FY14E	FY15E	FY16E
Revenues (₹ Crore)	54060.7	66086.2	71249.0	74102.0	75345.8
EBITDA (₹ Crore)	1638.8	318.0	215.5	2339.9	3088.5
Net Profit (₹ Crore)	908.6	-756.9	-595.2	650.2	1096.3
Shares in Issue (In Crore)	175.3	175.3	175.3	175.3	175.3
EPS (₹)	5.2	-4.3	-3.4	3.7	6.3
P/E (x)	9.1	-10.9	-13.8	12.7	7.5
Price/Book Value (x)	1.1	1.3	1.4	1.3	1.2
EV/EBITDA (x)	7.2	42.8	67.8	6.4	4.1
RONW (%)	12.6	-11.7	-10.1	10.4	15.4
ROCE (%)	9.3	-2.1	-3.6	9.1	14.4

Source: Company, ICICIdirect.com Research

Rating Matrix

Rating	: Buy
Target	: ₹ 61
Target Period	: 12-15 months
Potential Upside	: 30%

YoY Growth (%)

	FY13	FY14E	FY15E	FY16E
Revenues	22.2	7.8	4.0	1.7
EBITDA	-80.6	-32.2	985.8	32.0
Net Profit	PL	NA	LP	68.6

Current & target multiple

	FY13	FY14E	FY15E	FY16E
PE (x)	-10.9	-13.8	12.7	7.5
Target PE (x)	NA	NA	16.3	9.7
EV to EBITDA (x)	42.8	67.8	6.4	4.1
Price to book (x)	1.3	1.4	1.3	1.2
RoNW (%)	-11.7	-10.1	10.4	15.4
RoCE (%)	-2.1	-3.6	9.1	14.4

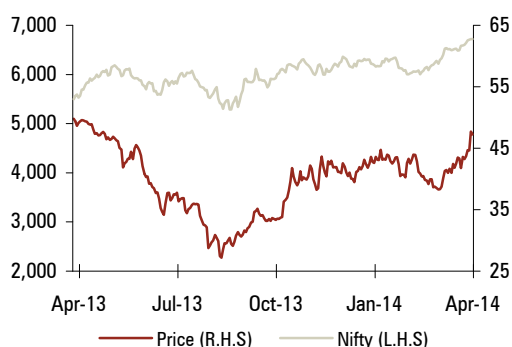
Stock Data

Bloomberg Code/Reuters Code	MRPL IN/MRPL.NS
Sensex	22446
Average volumes	88923
Market Cap (₹ crore)	8237.5
52 week H/L	53/26
Equity Capital (₹ crore)	1752.7
Promoters Stake (%)	88.6
FII Holding (%)	0.5
DII Holding (%)	2.9

Comparative return matrix (%)

Company	1M	3M	6M	12M
MRPL	23	8	41	-7
HPCL	15	27	59	7
IOC	10	31	34	-3
BPCL	18	28	37	18

Price movement



Analyst's name

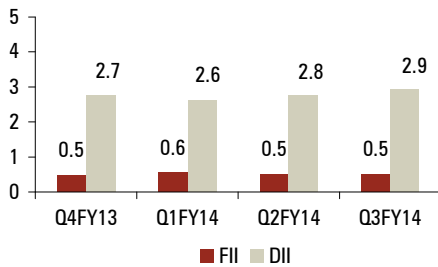
Mayur Matani
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Shareholding pattern (Q3FY14)

Shareholder	Holding (%)
Promoters	88.6
Institutional investors	3.4
Non promoter corporate holding	1.0
General public	7.0

FII & DII holding trend (%)

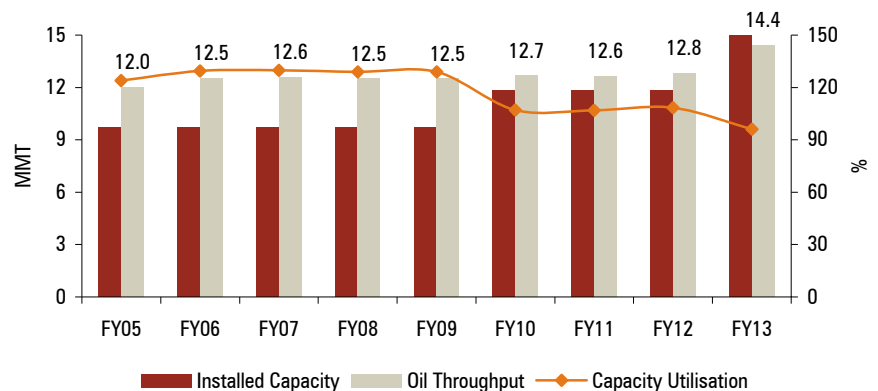


Company Background

Mangalore Refinery & Petrochemicals (MRPL), a subsidiary of ONGC, is a standalone refinery operating in the port city of Mangalore, Karnataka. MRPL was set up in 1988 as a joint venture (JV) oil refinery promoted by Hindustan Petroleum Corporation (HPCL), a public sector oil marketing company (OMC) and Indian Rayon & Industries (IRIL, AV Birla Group). The company, through phase I, started with an initial processing capacity of 3 MMTPA, which was later expanded to 9 MMTPA in 1999, through phase II. On March 28, 2003, ONGC acquired the total shareholding of the AV Birla Group and further infused equity capital of ₹ 600 crore, thus making MRPL a majority held subsidiary of ONGC. The lenders also agreed to the debt restructuring package (DRP) proposed by ONGC, which included, inter alia, conversion up to ₹ 365 crore of their loans into equity. Subsequently, ONGC has acquired the equity allotted to lenders pursuant to the DRP raising ONGC's holding in MRPL to 71.62%. In 2011, at a Nelson Complexity of 6.0, the nameplate capacity of MRPL was increased to 11.8 MMTPA. In March 2012, as a part of the phase III expansion and upgradation project, the nameplate capacity was increased to 15 MMTPA. MRPL had a throughput of 14.4 MMTPA in FY13. MRPL is now a 'Mini Ratna, Category 1' and a Schedule "A" public sector enterprise.

MRPL is strategically located on the west coast of South India, close to the Middle East and Far East crude and product markets. The refinery is designed to maximise middle distillates, with the capability to process crudes of various American Petroleum Institute (API) and with high degree of automation. It has two hydrocrackers producing premium diesel (high cetane) and also two continuous catalyst regeneration units (CCRs) producing unleaded petrol of high octane. MRPL exported ~47% of its throughput in FY13, where the exported products are fuel oil, naphtha, motor spirit, mixed xylene, HSD and ATF. MRPL has signed a three year contract with State Trading Corporation (STC), Mauritius for the supply of 1.1 MMT of liquid fuel to meet its demand requirement. MRPL also has a JV with Shell, which supplies ATF to both domestic & international airports. With regard to sourcing, MRPL buys crude oil from ONGC, Saudi Aramco (National Oil Company of Saudi Arabia), ADNOC (National Oil Company of Abu Dhabi), NIOC (National Oil Company of Iran), Kuwait Petroleum Corporation (KPC), Nigeria, Angola, Egypt, etc. The company has been expanding its crude basket and added three new crudes namely Zafiro, Rabi, Aseng and Hungo in FY13.

Exhibit 2: MRPL's operational performance



Source: Company, ICICIdirect.com Research

MRPL is currently implementing its Phase III refinery expansion & upgradation project at Mangalore at a total approved cost of ₹ 15008 crore, which includes: - (1) capacity addition of 3 MMTPA and upgradation project (₹ 12160 crore), (2) polypropylene unit (₹ 1804 crore) and (3) single point mooring (SPM) facility (₹ 1044 crore).

Exhibit 3: Refinery expansion schedule

Project Name / Description	Govt/Board	Original Approved	Actual / Anticipated	Physical	Capex (₹ crore)	Commitment (₹	Financial
	Sanction Date	Compln. Date	Compln. Date	Progress %		Crore)	Progress %
Phase III Refinery Project, Mangalore*	1/12/2008	31/10/2011	Mar-14	99.4	12160	10941	89.2
SPM & Associated Facilities	29/7/2010	28/4/2012	Aug-13	100.0	1044.0	1044.0	100.0
Polypropylene Unit, Phase III Refinery Project	23/7/2009	30/4/2012	Jul-14	93.4	1804.0	1298.0	72.0

Source: Company, Industry, ICICIdirect.com Research

*Commissioned Units: CDU/VDU, HGU and DHDT, Mechanically completed Unit: CHTU, SRU Block, PFCCU, DCU - BOP and CDSP

Exhibit 4: Major units of Phase III refinery project

Units	Capacity
Crude & Vacuum Distillation Unit (CDU/VDU)	3 MMTPA
Petrochemical Fluidised Catalytic Cracking (PFCC)	2.2 MMTPA
Delayed Coker Unit (DCU)	3 MMTPA
Diesel Hydrotreating Unit (DHDT)	3.7 MMTPA
Coker Heavy Gas Oil Hydro Treater Unit (CHT)	0.65 MMTPA
Polypropylene unit	0.44 MMTPA
Hydrogen Generation Unit (HGU)	70 KTPA
3 Sulphur Recovery Unit (SRU)	185 TPD
Captive Power Plant (CPP)	116 MW

Source: Company, ICICIdirect.com Research

Investment Rationale

Capacity expansion and upgradation project to boost refining margins

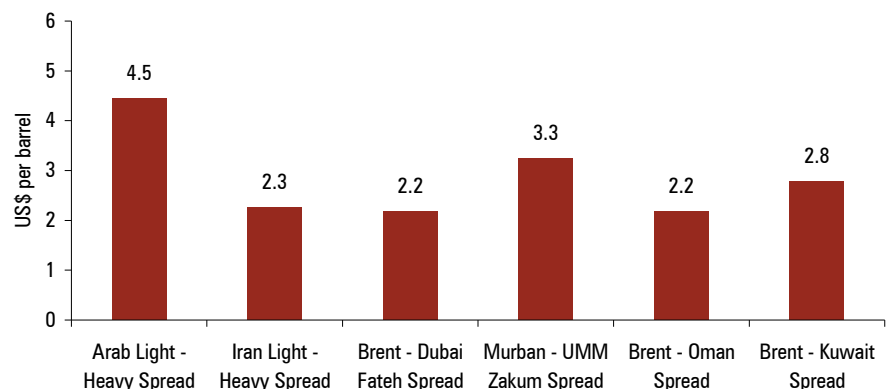
Completion of Phase III capacity expansion and upgradation project would pave the way towards higher profitability for MRPL. The increase in nameplate capacity from 11.8 MMTPA to 15 MMTPA through its crude & vacuum distillation units (CDU/VDU) would enable MRPL to process heavier and sour grade of crudes, which trade at a discount to light crudes, thus boosting its gross refining margins (GRMs). MRPL's upgradation project through its PFCC, DCU, DHDT, CHT, HGU and SRU units would increase the Nelson Complexity of the refinery from six to 10 while the MRPL refinery will enter the high complexity league of refineries. Higher complexity would enable MRPL to increase its distillate yield by substituting low value naphtha and fuel oils with higher value-added products, thereby increasing refining margins.

Exhibit 5: Price point, API and sulphur content of different varieties of crude

Crude	Region	API	Sulphur Content (%)	Price (US\$/bbl)
Brent	Europe	37.9	0.5	107.0
Arab Light	Saudi Arabia	32.5	1.8	106.6
Arab Heavy	Saudi Arabia	27	2.8	102.1
Iran Light	Iran	34	1.4	106.8
Iran Heavy	Iran	31	1.7	104.5
Dubai Fateh	UAE	31	1.7	104.8
Murban	UAE	40	0.8	109.7
UMM Zakum	UAE	34	1.8	106.5
Oman	Oman	33	1.1	104.8
Kuwait	Kuwait	30.5	2.5	104.2

Source: Bloomberg, ICICIdirect.com Research

Exhibit 6: Different crude oil spreads



Source: Bloomberg, ICICIdirect.com Research

The increase in nelson complexity from 6 to 10 through its Phase III expansion & upgradation project would enable MRPL to process heavier and sour grade of crudes, which trade at a discount to light crudes, thus boosting its gross refining margins (GRMs)

Post the completion of the phase III project, the MRPL refinery will enter the high complexity league of refineries

Exhibit 7: Nelson Complexity of complex Indian refineries

Company	Refinery	Capacity (mmtpa)	Nelson Complexity
Bharat Oman Refinery Limited	Bina	6	9.1
Essar Oil	Vadinar	20	11.8
HPCL Mittal Energy Limited	Bhatinda	9	9.6
MRPL	Mangalore	15	10.0
IOCL	Paradip	15	13.0
Reliance	Jamnagar	33	11.3
Reliance	Jamnagar SEZ	29	14.0

Source: Industry, ICICIdirect.com Research

The commissioning of CDU/VDU units on March 29, 2012 has increased the nameplate capacity of the refinery from 11.8 MMTPA to 15 MMTPA. All secondary units (except polypropylene unit) that will increase the Nelson Complexity of the refinery have either been mechanically completed or commissioned (commissioned units: CDU/VDU, HGU and DHDT, mechanically completed unit: CHT, SRU, PFCC, and DCU). The DCU will crack the residual fuel oil into gasoil and petcoke. The DHDT & CHT units will remove sulphur impurities from diesel using the hydrogen generated from HGU, thus making it BS III/IV compliant. The sulphur recovery unit will be used to recover sulphur from hydrogen sulphide. The PFCC will convert vacuum gas oil into propylene, which will then feed into polypropylene unit to produce polypropylene. Since the 116 MW captive power plant (CPP) in Phase III has been partially commissioned (GTG/HRSG1/GTG2) due to a delay in execution by BHEL, the complete benefit of the above-mentioned secondary units will accrue to the refinery only towards the end of Q4FY14, when the CPP is likely to get fully commissioned.

We expect the proportion of light distillates to increase from 21% to 23.6% & the proportion of middle distillates to increase from 55.5% to 56.5%, thus improving the distillate yield from 76.5% to 80.1%.

Exhibit 8: MRPL's product slate pre & post expansion and upgradation project (in %)

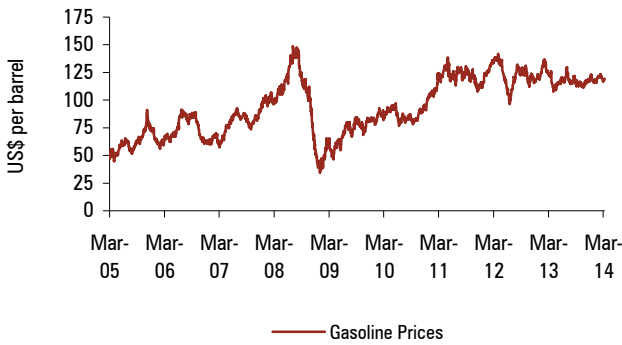
Products	Pre-expansion	Post-expansion
LPG	2.0	6.6
Gasoline	7.7	7.3
Naphtha	10.3	5.0
Mixed Xylene	1.1	1.7
Polypropylene	0.0	3.0
Diesel	42.6	39.3
ATF / Kerosene	13.0	17.2
Fuel Oil	14.6	4.8
Petcoke	0.0	2.9
others	1.9	3.1
Fuel & Loss	7.0	9.1
Total	100.0	100.0

Source: Company, ICICIdirect.com Research

Capacity expansion and upgradation project will contribute incremental US\$ 1.5 per barrel to refining margins.

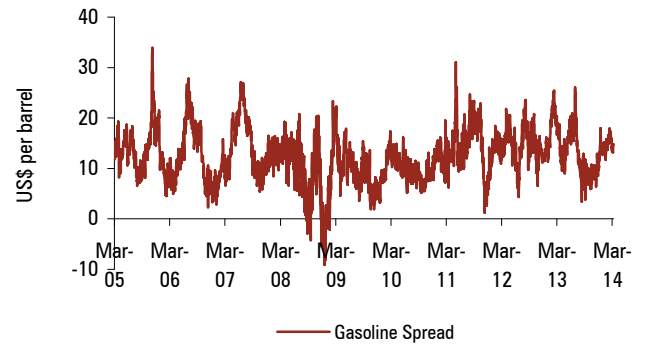
Post completion of Phase III project, the refinery will produce higher proportion of light & middle distillates, which trade at a higher premium to crude as compared to heavy distillates. We expect the proportion of light distillates to increase from 21% to 23.6% and the proportion of middle distillates to increase from 55.5% to 56.5%, thus improving the distillate yield from 76.5% to 80.1%. Hence, capacity expansion and upgradation projects will contribute incremental US\$1.5/barrel to refining margins.

Exhibit 9: Gasoline price trend



Source: Reuters, ICICIdirect.com Research

Exhibit 10: Gasoline spread trend



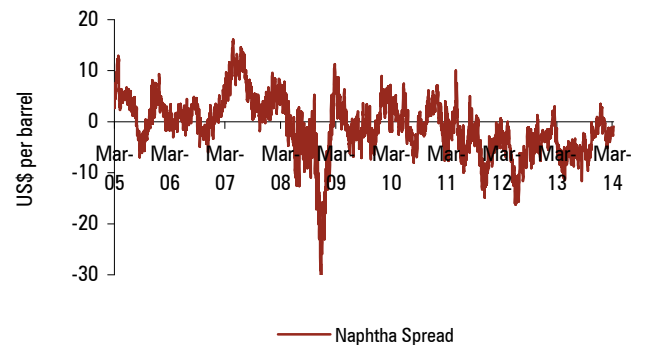
Source: Reuters, ICICIdirect.com Research

Exhibit 11: Naphtha price trend



Source: Reuters, ICICIdirect.com Research

Exhibit 12: Naphtha spread trend



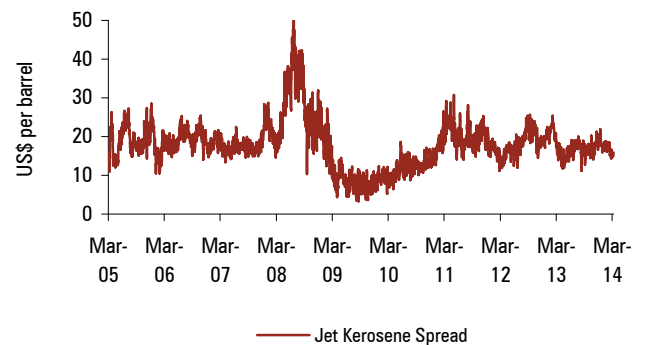
Source: Reuters, ICICIdirect.com Research

Exhibit 13: Jet kerosene price trend



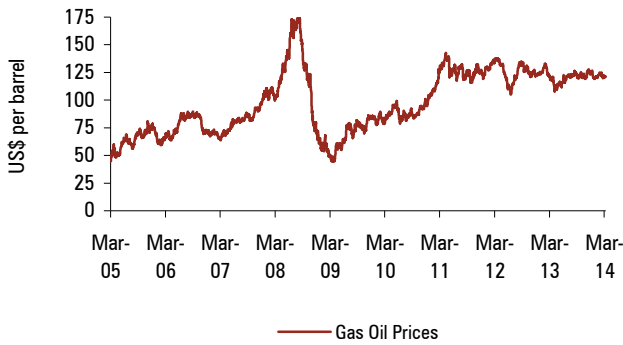
Source: Reuters, ICICIdirect.com Research

Exhibit 14: Jet kerosene spread trend



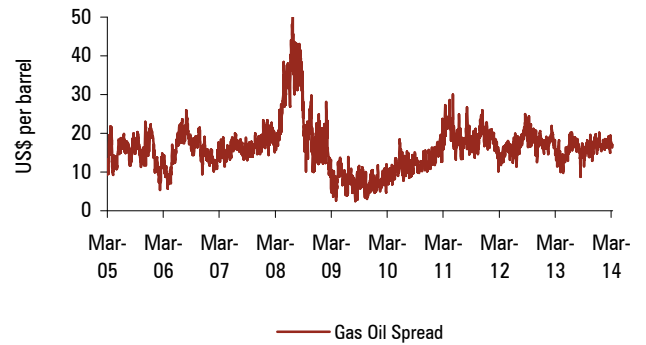
Source: Reuters, ICICIdirect.com Research

Exhibit 15: Gas oil price trend



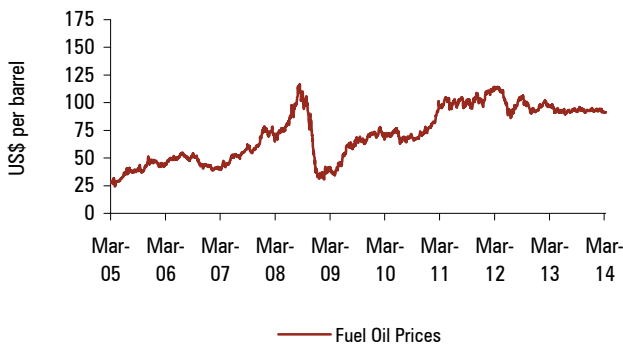
Source: Reuters, ICICIdirect.com Research

Exhibit 16: Gas oil spread trend



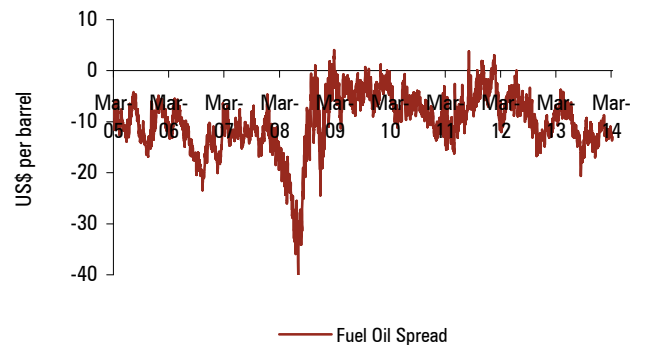
Source: Reuters, ICICIdirect.com Research

Exhibit 17: Fuel oil price trend



Source: Reuters, ICICIdirect.com Research

Exhibit 18: Fuel oil spread trend



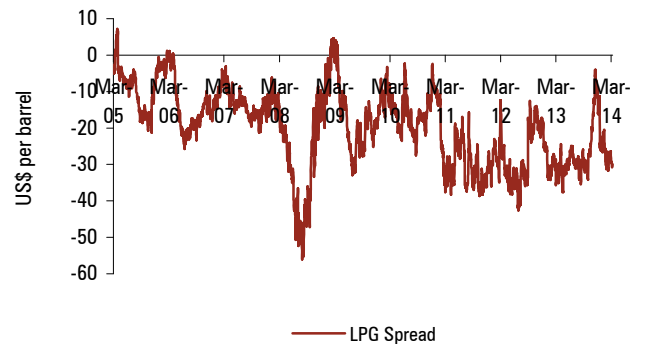
Source: Reuters, ICICIdirect.com Research

Exhibit 19: LPG price trend



Source: Reuters, ICICIdirect.com Research

Exhibit 20: LPG spread trend

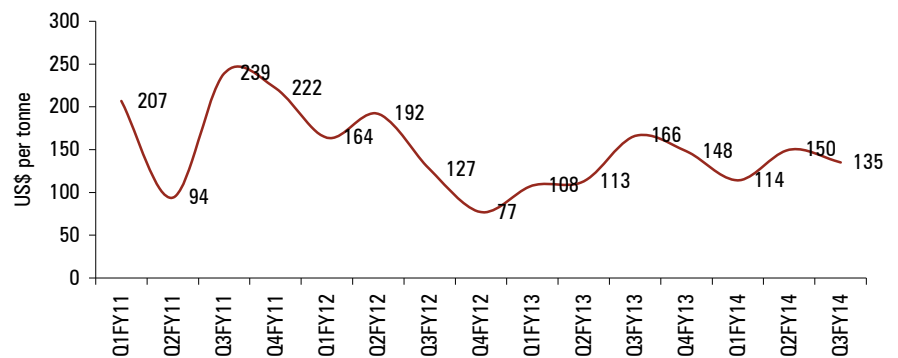


Source: Reuters, ICICIdirect.com Research

Downstream integration into petrochemicals to further boost GRMs

MRPL is foraying into the petrochemical business by setting up 2.2 MMT PFCC and 440 kilo tonnes per annum (KTPA) polypropylene units under its Phase III expansion project. The decision to produce polypropylene instead of propylene is mainly on account of its higher marketability. Under this project, the PFCC will convert heavy vacuum gas oil into propylene, which will later feed into a polymerisation unit to produce polypropylene. As on January 2014, PFCC has achieved mechanical completion and the polypropylene unit has reached 93.4% completion. It is expected to be commissioned in Q2FY15E. These units, once commissioned, will produce higher margin yielding products that will contribute US\$1.5-2/barrel to refining margins. We believe the ₹ 1800 crore polypropylene unit will generate an RoCE of 13-16%.

Exhibit 21: PP-Propylene spread

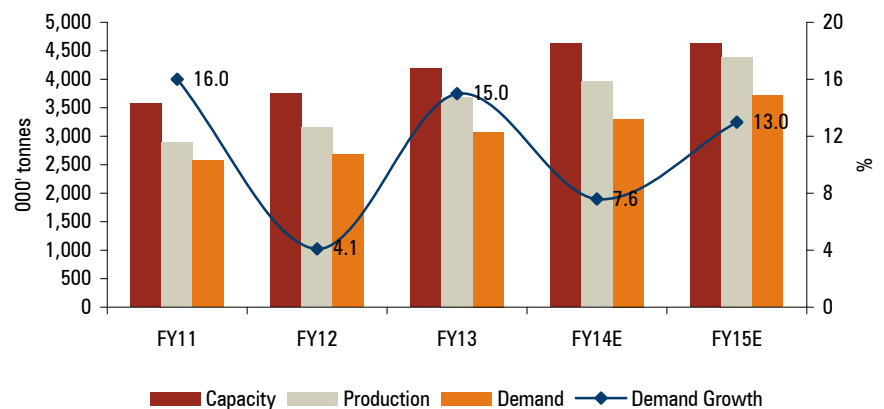


The polypropylene (PP) project, which is expected to be commissioned in Q2FY15, will produce higher margin yielding PP that will contribute \$ 1.5-2/ barrel to refining margin

Source: RIL, ICICIdirect.com Research

Polypropylene (PP) finds widespread usage in woven sacks, films for packaging, various consumer items and wide variety of injection moulded items like auto parts, appliances, furniture and houseware. Domestic demand for PP is expected to increase at a CAGR of 10% from 2012-13 through 2017-18. We expect capacity addition to grow at a CAGR of 8.8% from 2012-13 through 2017-18.

Exhibit 22: Demand/supply scenario for PP in India



Domestic demand for PP is expected to increase at a CAGR of 10% from 2012-13 through 2017-18. Capacity addition is expected to grow at a CAGR of 8.8% from 2012-13 through 2017-18.

Source: Industry, ICICIdirect.com Research

Exhibit 23: Expected PP capacity in FY13-18

Company	Location	Capacity (tonnes)	Expected commissioning
MRPL	Mangalore	440,000	2014-15
OPAL	Dahej	340,000	2014-15
BCPL	Dibrugarh	60,000	2014-15
IOCL	Paradip	6,80,000	2015-16
RIL	Jamnagar	2,00,000	2016-17

Source: Industry, ICICIdirect.com Research

Healthy demand is expected to drive up operating rates despite capacity addition. Between 2012-13 and 2017-18, domestic installed capacity of PP is expected to increase 40% from 4200 KTPA to 5900 KTPA. Therefore, steeper growth in demand compared to supply will lead to an increase in operating rates from 87% in FY13 to 93% in FY18E.

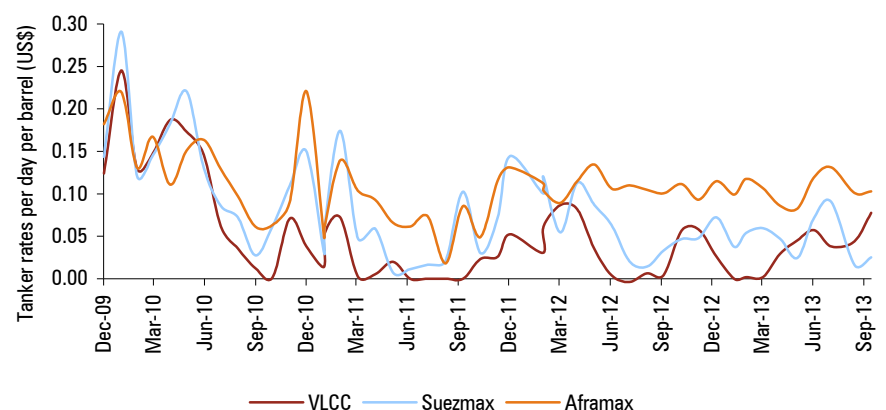
Apart from setting up its own petchem project, the company also has a 3% stake in ONGC Mangalore Petrochemicals Ltd (OMPL), in which ONGC has a 46% stake while the remaining 51% is yet to be tied up. OMPL is setting up a paraxylene unit with a capacity of 920 KTPA and a benzene unit with a capacity of 200 KTPA for which raw materials will come from MRPL. The estimated capex for this petchem project is ₹ 5750 crore.

Single point mooring to facilitate cheaper sourcing of crude oil

MRPL has set up a single point mooring (SPM) facility along with a coastal booster pumping station in its Mangalore port limits 16 km inside the sea with draft availability of 30 metre at an estimated cost of ₹ 1044 crore. This facility will enable the company to receive very large crude carrier (VLCC) and Suezmax tankers, compared to MRPL's current arrangement with Aframax tanker, which will reduce freight costs and allow access to cheaper Venezuelan, West African and Latin American country's crudes. It will also result in de-congestion at Mangalore port, which will lead to lower demurrage for MRPL. The benefits that accrue to MRPL on account of the SPM facility will lead to an increase in GRMs by US\$0.5 per barrel.

Single point mooring (SPM) will enable the company to receive very large crude carrier (VLCC) and Suezmax tankers, compared to MRPL's current arrangement with Aframax tanker, which will reduce freight costs and allow access to cheaper crudes

Exhibit 24: Tanker rates per day per barrel



Source: Industry, ICICIdirect.com Research

SPM facility will lead to an increase in GRMs by US\$0.5 per barrel

Exhibit 25: Transport cost from Arab Gulf to India for FY12 (US\$/bbl)

Tanker Type	West Coast (Vadinar)	East Coast (Paradip)
VLCC	0.49	0.99
Suezmax	0.70	1.42
Aframax	0.92	1.87

Source: MoPNG, IOCL, ICICIdirect.com Research

Exhibit 26: Transport cost from different regions (US\$/bbl)

Region	FY10	FY11	FY12	FY13 (Upto Jan 13)
Arab Gulf	0.58	0.69	0.62	0.64
Far East	0.92	1.22	1.28	1.31

Source: MoPNG, IOCL, ICICIdirect.com Research

Resolution of Iran's issue to restore long term supply of cheaper oil

Iran has been an important source of crude oil for MRPL, contributing 48-59% of its throughput in FY10-12. With Iran being the major source of crude oil, MRPL benefited in terms of cheaper crude oil, long term agreement for crude oil sourcing and 90 days credit period provided by National Iranian Oil Company (NIOC). However, sanctions from the UN, US and EU on Iran imposed restrictions on crude oil import from Iran, mode of payment, insurance for cargo, insurance for vessels and availability of vessels to perform Iranian voyages, making it difficult to lift crude oil from Iran. Consequently, MRPL has been unable to import full contractual quantity of crude oil under its term contract with NIOC, Iran since FY13.

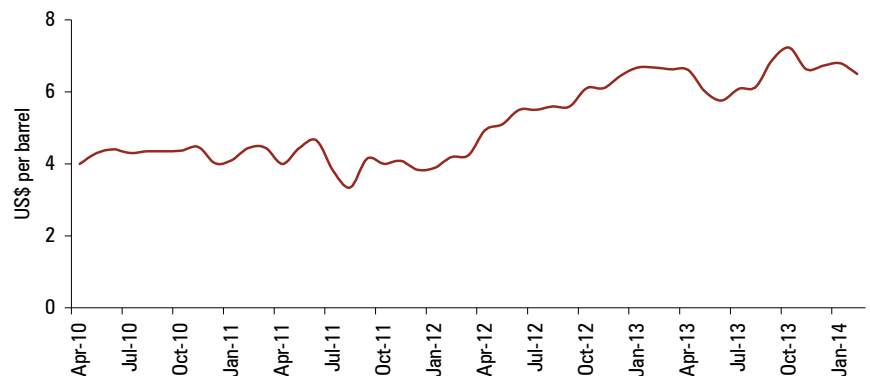
Exhibit 27: Crude oil sourcing from Iran (MMT)

Year	India's import	MRPL's import	MRPL's Throughput	MRPL's throughput (%) from Iran
FY10	21.2	7.3	12.5	58.4
FY11	18.5	7.1	12.6	56.3
FY12	18.1	6.2	12.8	48.4
FY13	13.3	4.0	14.3	28.0
FY14E	11.0	3.9	14.4	27.1

Source: Ministry of Petroleum & Natural Gas (MoPNG), ICICIdirect.com Research

However, the recent truce between Iran and the six western nations over the former's nuclear programme will end the long standing payment crisis for MRPL. This will ease the payment and insurance issues for MRPL. MRPL will also benefit from better credit period (creditor days declined from 88 days in FY12 to 69 days in FY13), lower pressure on its working capital and reduction of interest expense. This geo-political development will also ensure supply of Nowrooz and Soroosh crudes, heavier grades of crude that trade at a discount of US\$6-7/barrel to Iran heavy crude.

Exhibit 28: Discount of heavier grades of crudes Nowrooz and Soroosh compared to Iran Heavy



Source: Bloomberg, ICICIdirect.com Research

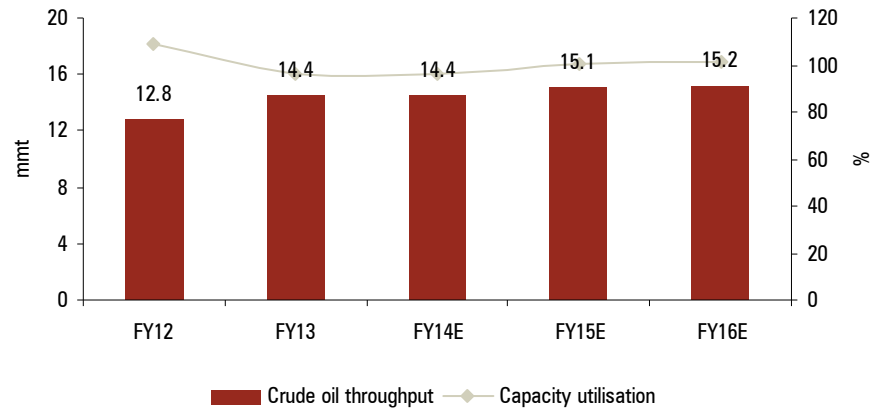
Sanctions from US, UN & EU on Iran, have brought down the sourcing of Iranian crude from 48-59% of MRPL's throughput in FY10-12 to 28% in FY13.

The recent truce between Iran and the six western nations could benefit MRPL in terms of better credit period, lower pressure on working capital & supply of Nowrooz and Soroosh crudes that trade at a discount of US\$6-7/barrel to Iran heavy crude

Higher complexity to boost GRMs to US\$5.7/barrel in FY15E

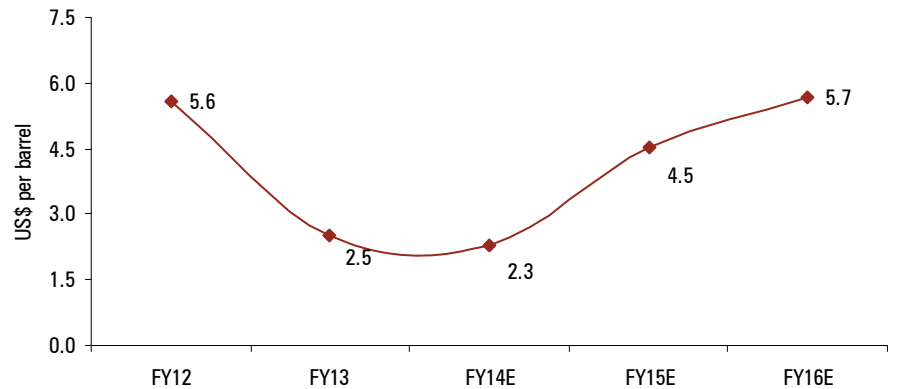
The commissioning of CDU/VDU units had already increased MRPL's capacity from 11.8 MMTPA to 15 MMTPA. However, the throughput is expected to increase from 14.4 MMTPA in FY13 to 15.2 MMTPA in FY16E post the commissioning of all secondary units. Given the improvement in complexity, better distillate yield and access to cheaper crude oil, we expect MRPL's refining margins to increase from US\$2.5/barrel in FY13 to US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively.

Exhibit 29: MRPL's throughput trend



Source: Company, ICICIdirect.com Research

Exhibit 30: MRPL's refining margins trend



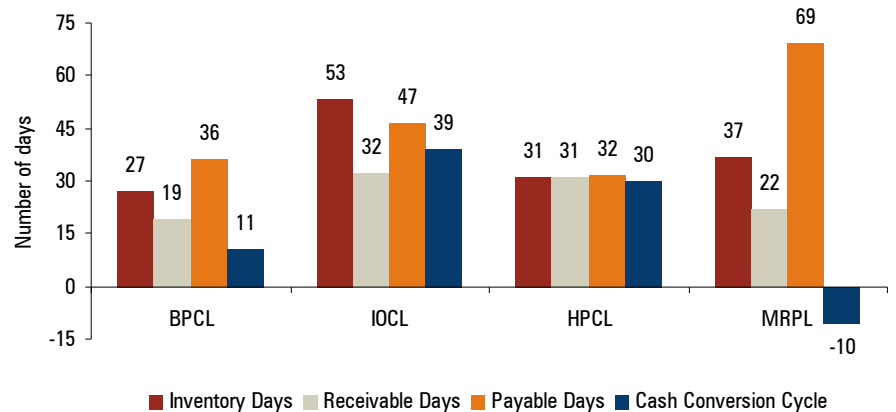
Source: Company, ICICIdirect.com Research

Improvement in complexity, better distillate yield and access to cheaper crude oil, is expected to increase MRPL's refining margins from US\$2.5/barrel in FY13 to US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively.

MRPL - Best placed to play refining cycle among PSU peers

We have used working capital metrics to assess the divergence in the operational performance of PSU refineries. As seen from the chart below, MRPL has been able to manage its business better than its peers in terms of better cash conversion cycle. Among the four PSU companies in our comparison purview, MRPL is the only PSU refinery that has a negative working capital cycle. This is mainly attributable to the higher percentage of sourcing of Iranian crude (90 day credit period provided by NIOC of Iran) compared to other PSU refineries.

Exhibit 31: Operational matrix comparison among PSU refineries from FY13



MRPL is the only PSU refinery that has a negative working capital cycle, which is attributable to the higher percentage of sourcing of Iranian crude compared to other PSU refineries.

Source: Company, ICICIdirect.com Research

Historically, MRPL has reported higher and more stable GRMs than the other PSU refineries. FY13 was a difficult year for the company as the weak macro environment, reduced supply of Iranian crude and unplanned shutdown due to shortage of water has had an adverse impact on the GRMs of MRPL. However, with most issues easing away and MRPL entering the high complexity league of refineries, we believe the GRMs of the company will regain their edge over other PSU refineries.

Exhibit 32: Refining margins of PSU refineries

Company	FY09	FY10	FY11	FY12	FY13
MRPL	5.3	5.5	6.0	5.6	2.5
HPCL	4.0	2.7	5.3	2.9	2.1
BPCL	5.2	3.0	4.5	3.2	5.0
IOC	3.7	4.5	5.7	3.6	2.2
CPCL	1.2	4.8	5.0	4.2	1.0

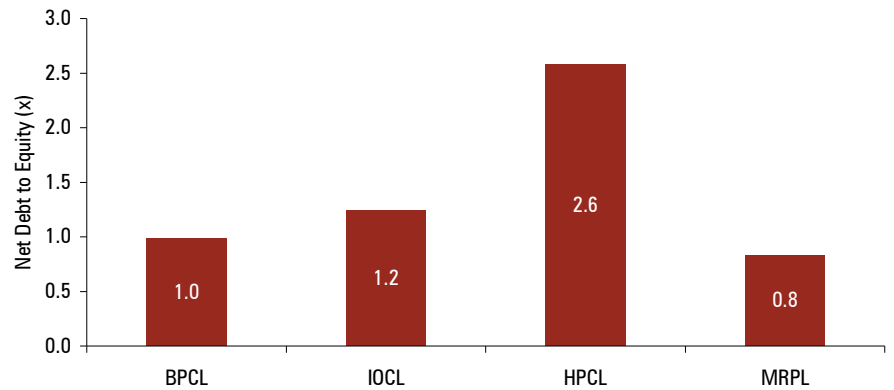
Source: Company, ICICIdirect.com Research

Apart from refinery operations, fortunes of oil marketing companies depend on quantum of gross crude oil under-recoveries, sharing of subsidy burden and when they are compensated. This makes their earnings more volatile and highly leveraged to the government's compensation. Hence, we prefer MRPL as the best refining play among PSU peers due to its lower policy leverage & improving GRM outlook.

Even on the leverage front, MRPL is the least stressed, given that its net debt to equity at 0.8x is lower than the net debt-equity ratio of PSU oil marketing company with the lowest balance sheet gearing (BPCL: 1.0x).

On the leverage front, MRPL is the least stressed, given that its net debt to equity at 0.8x is lower than the net debt-equity ratio of PSU oil marketing company with the lowest balance sheet gearing (BPCL: 1.0x)

Exhibit 33: Net debt to equity ratio comparison among PSU refineries fro FY13



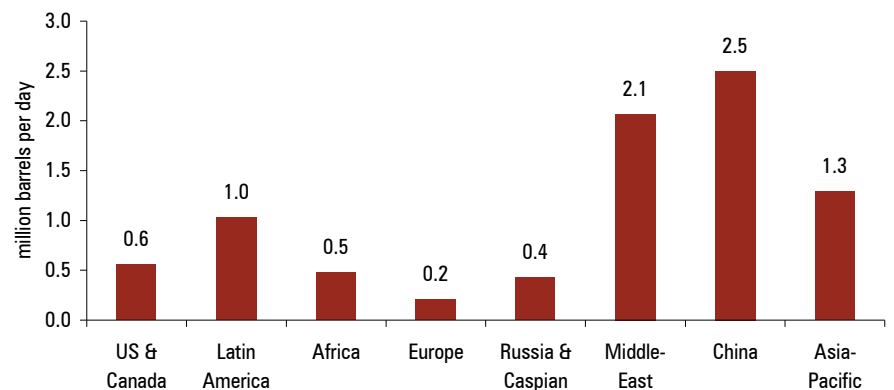
Source: Company, ICICIdirect.com Research

Refining net capacity addition globally only to meet demand growth

Although the complexity of a refinery is an important determinant of gross refining margins, macroeconomic factors like crude oil prices, demand-supply of petroleum products and capacity utilisation of refineries worldwide also play a very important role in determining GRMs. Since the pricing of petroleum products produced domestically is linked to international prices, global benchmarks of GRM need to be tracked to determine the trend in domestic refining margins.

In 2013-18, new crude distillation capacity of 8.6 million barrels per day (mbpd) is expected to be added to the global refining system, most of which is expected from China and the Asia Pacific region (44.3% of global capacity additions).

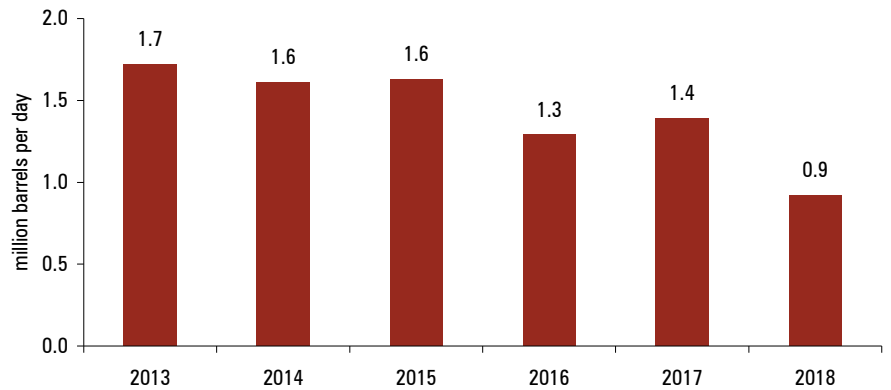
Exhibit 34: Crude distillation capacity additions in 2013-18



Source: Opec, ICICIdirect.com Research

In 2013-18, new crude distillation capacity of 8.6 million barrels per day (mbpd) is expected to be added to the global refining system, most of which is expected from China and the Asia Pacific region (44.3% of global capacity additions).

Exhibit 35: Crude distillation capacity additions in 2013-18

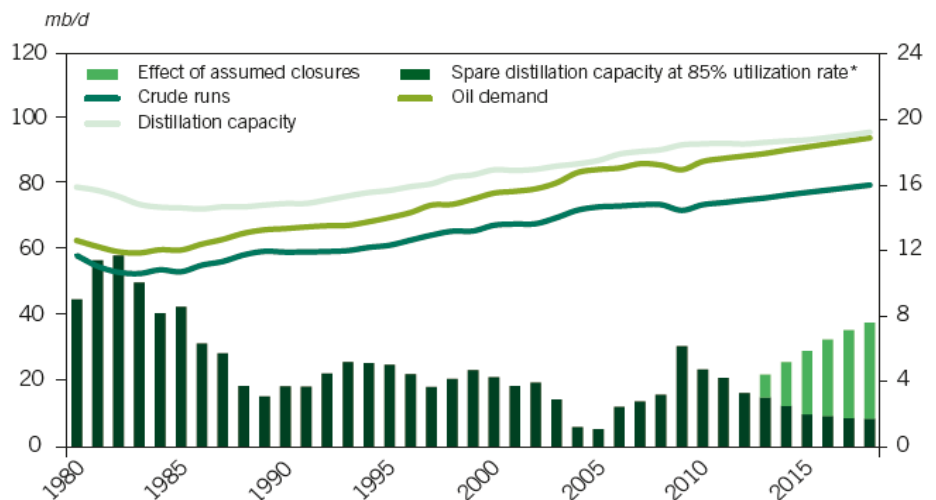


Source: Opec, ICICIdirect.com Research

Crude distillation capacity is expected to increase by an average of 1.7 mbpd per annum in 2013-18 while demand is expected to increase by an average of 0.9-1 mbpd per annum, in the same period

Crude distillation capacity is expected to increase by an average of 1.7 mbpd per annum in 2013-18. In the same period, demand is expected to increase by an average of 0.9-1 mbpd per annum. However, expected refinery closures of 5.9 mbpd by 2018 will ensure the net capacity addition does not outpace demand growth. The same phenomenon was witnessed in 2008-12, where refinery closures of 4.4 mbpd brought down the spare capacity below 4 mbpd, thus having limited impact on GRMs.

Exhibit 36: Global oil demand, refining capacity and crude runs,, 1980-2018



* Effective 'spare' capacity estimated based on assumed 85% utilization rate; accounted for already closed capacity.

Source: Opec, ICICIdirect.com Research

Expected refinery closures of 5.9 mbpd by 2018 will ensure that the net capacity addition does not outpace demand growth, thus keeping global refining margins stable in 2013-18

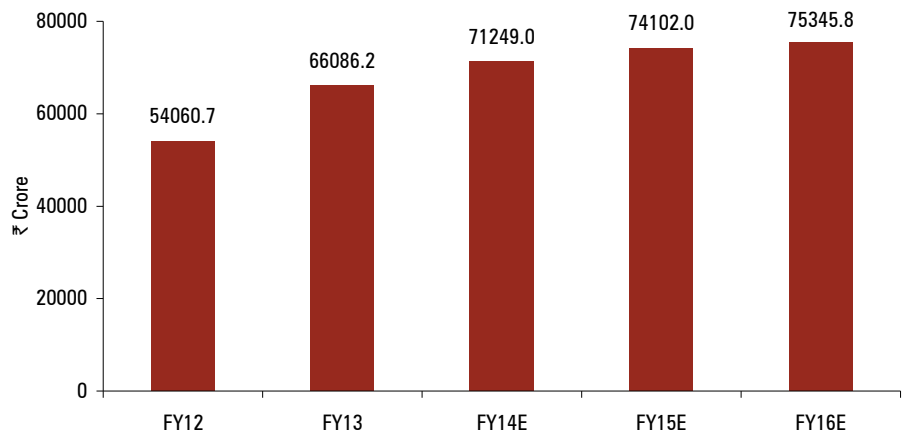
However, the expected refinery closures will not be enough to take the refinery capacity utilisation to levels witnessed in 2004-05, the golden era of refining. Lastly, in spite of the surplus capacity in 2013-18, there will be a deficit of middle distillate globally, which will provide some support to the Asia-Pacific refining margins that have higher share of middle distillate in their product slate. Overall, global refining margins are likely to remain stable in 2013-18 with a tendency to spike during times of refinery outages.

Financials

Growth in revenues due to higher throughput and currency depreciation

The variables that drive MRPL's revenue growth are throughput, prices of petroleum products and exchange rate. We expect revenues to increase from ₹ 66,086.2 crore in FY13 to ₹ 75,345.8 crore in FY16E at 4.4% CAGR over FY13-16E mainly on account of an increase in throughput, higher blended realisations of petroleum products reflected in higher GRMs and rupee depreciation. The decline in the rupee from ₹ 54.4/US\$ in FY13 to ₹ 60/US\$ in FY16E will contribute greatly to revenue growth. The throughput in FY13-16E is expected to increase from 14.4 MMTPA in FY13 to 15.2 MTPA in FY16E, implying an increase in capacity utilisation from 96.1% to 101%.

Exhibit 37: Trend in revenues



Revenues are expected to increase from ₹ 66,086.2 crore in FY13 to ₹ 75,345.8 crore in FY16E at 4.4% CAGR on account of an increase in throughput, higher blended realisations of petroleum products reflected in higher GRMs and rupee depreciation

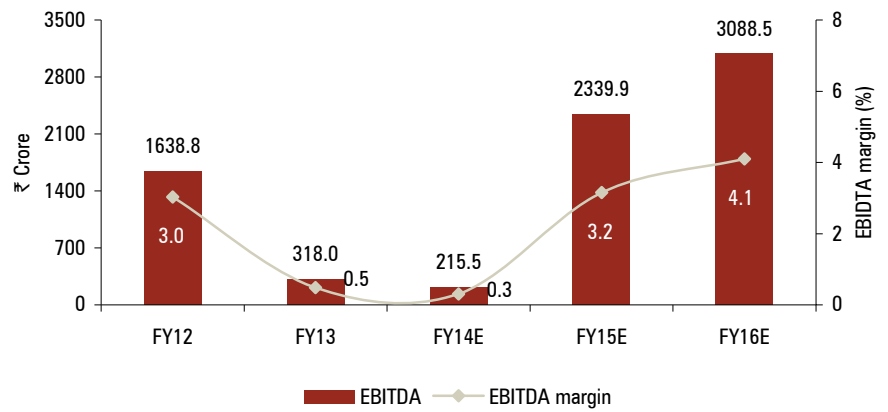
Source: Company, ICICIdirect.com Research

Higher refining margins to drive EBITDA growth

The EBITDA of MRPL has declined sharply from ₹ 2048 crore in FY11 to ₹ 318 crore in FY13 on the back of a decline in refining margins from US\$6/barrel to US\$2.5/barrel. The GRMs declined due to a weak macro environment and inventory losses. However, post the completion of the Phase III expansion and upgradation project, we expect the EBITDA to increase from ₹ 318 crore in FY13 to ₹ 3088.5 crore in FY16E mainly due to an increase in complexity resulting in higher GRMs of US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively. The EBITDA margin is expected to increase from 0.5% in FY13 to 4.1% in FY16E.

Exhibit 38: Trend in EBITDA & EBITDA margin

The EBITDA is expected to increase from ₹ 318 crore in FY13 to ₹ 3088.5 crore in FY16E mainly due to an increase in complexity resulting in higher GRMs of US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively.

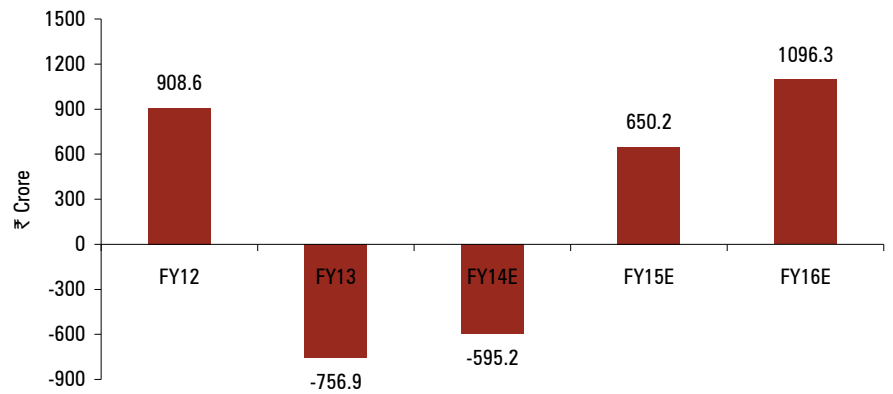


Source: Company, ICICIdirect.com Research

Profitability sensitive to refining margins

MRPL's earnings are highly correlated to refining margins. The company reported a loss in FY13 and is expected to report a loss in FY14E as well, mainly due to lower GRM, which has dipped from US\$5.6/barrel in FY12 to US\$2.5/barrel in FY13. The GRMs are expected to drop further to US\$1.9/barrel in FY14E. However, with the commencement of operations of the secondary units under Phase III expansion & upgradation project, operational efficiencies will kick in leading to increase in GRMs to US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively. We expect the bottomline to increase from a loss of ₹ 756.9 crore in FY13 to a profit of ₹ 1096.3 crore in FY16E.

Exhibit 39: Trend in net profit



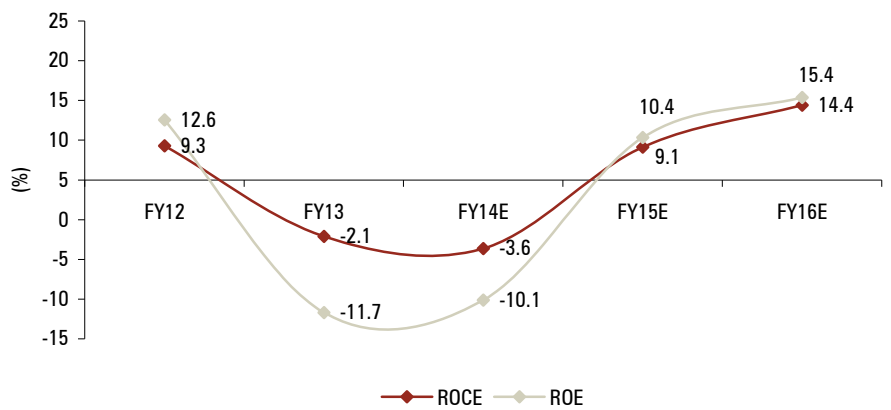
The bottomline is expected to increase from a loss of ₹ 756.9 crore in FY13 to a profit of ₹ 1096.3 crore in FY16E due to the commencement of operations of the secondary units under Phase III expansion & upgradation project

Source: Company, ICICIdirect.com Research

Return ratios set to recover post commissioning of Phase III project

Historically, MRPL has enjoyed good return ratios (in excess of 18%). However, with the onset of capex on Phase III expansion & upgradation project and decline in GRMs from US\$6/barrel in FY12 to US\$2.5/barrel in FY13, the company reported a loss in FY13, with return ratios entering the negative zone. However, we expect return ratios to bounce back into the positive territory, given the benefit of incremental GRMs will start accruing to MRPL from FY15 onwards. We expect the RoCE of the company to increase to 9.1% and 14.4% in FY15E and FY16E, respectively, with the RoE of the company increasing to 10.4% and 15.4% in FY15E and FY16E, respectively.

Exhibit 40: Trend in return ratios



The benefit of incremental GRM from FY15 onwards will lead to the RoCE of the company increasing to 9.1% and 14.4% in FY15E and FY16E, respectively

Source: Company, ICICIdirect.com Research

Risks & concerns

Delay in execution

The commissioning of MRPL's ambitious project (refinery expansion & upgradation and polypropylene unit) has got delayed due to a delay in commissioning of the captive power plant (CPP) being built by Bhel. The company has an existing power plant for its existing capacity under phase I & II and has been running some of the units of Phase III with the extended steam and power facilities of phase I & II. The PFCCU and DCU, the main margin drivers of the company, will be commissioned only on the availability of steam and power from Bhel's captive power plant of Phase-III project. We expect the PFCCU and DCU to be commissioned by the end of FY14 and polypropylene unit to be commissioned by July 2014. Any further delay in commissioning of the secondary processing units would have an adverse impact on the refining margins and profitability of the company.

Decline in refining margins

The global economic situation and demand-supply balance plays a very important role in determining gross refining margins. Any slowdown in the global economy and weaker demand will lead to a decline in gross refining margins and will have a negative impact on the profitability of the company.

Every US\$1 change in GRMs will change the FY15E & FY16E earnings by ₹ 2.6-2.7 per share

Exhibit 41: Sensitivity of EPS to change in refining margins

Refining Margins	FY15E			FY16E		
	US\$ 3.5/bbl	US\$ 4.5/bbl (Base Case)	US\$ 5.5/bbl	US\$ 4.7/bbl	US\$ 5.7/bbl (Base Case)	US\$ 6.7/bbl
EPS (₹)	1.1	3.7	6.3	3.6	6.3	8.9

Source: ICICIdirect.com Research

Volatility in crude oil prices & exchange rate

MRPL imports 80% of its crude oil requirement and exports ~47% of the total production volume. Hence, it is exposed to the risk of volatility in prices of international crude oil & petroleum products along with foreign exchange volatility. Although a depreciating rupee (₹) against the US dollar is beneficial for refining margins, exposure to foreign loans (ECB) has a negative impact on the profitability of the company. Also, MRPL's longer credit period will have an adverse impact on profitability in the phase of depreciation of the rupee.

Sourcing of crude oil

MRPL has been highly dependent on Iran for its supply of oil. The recent truce between Iran and the six western nations is a positive development. However, if tensions rebuild between Iran and western countries on non-fulfilment of conditions laid out in the peace talks, imports from Iran would drop further. This would also lead to an increase in working capital and higher crude oil costs for the company.

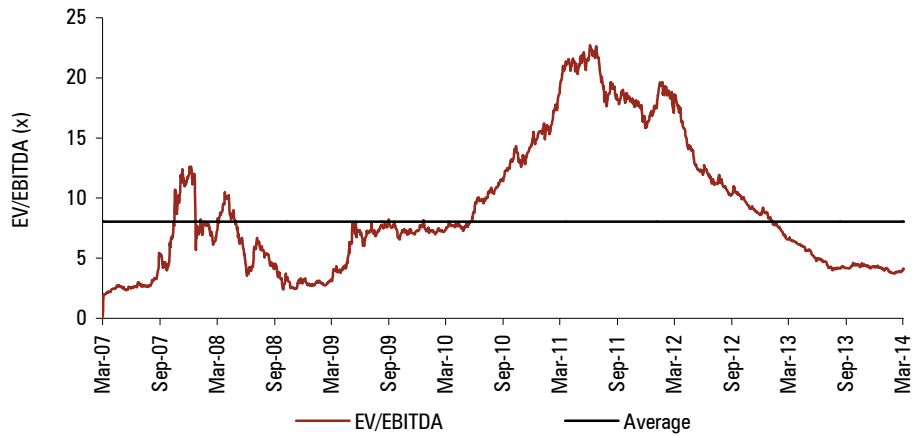
Other risks

Delay in development of infrastructure for marketing new products like petcoke and polypropylene could be a risk for the company. Other factors like shortage of water, depleted reservoirs due to poor monsoons and natural calamities could impact the operations of the company.

Valuation

We expect an improvement in complexity, better distillate yield and access to cheaper crude oil to pave the way towards higher profitability. With the commencement of operations at all secondary processing units, operational efficiencies will kick in that will boost refining margins from US\$2.5/barrel in FY13 to US\$4.5/barrel and US\$5.7/barrel in FY15E and FY16E, respectively. We expect the company to report net profit of ₹ 650.2 crore and ₹ 1096.2 crore in FY15E and FY16E, respectively, against a loss of ₹ 756.9 crore in FY13. At the current price, the stock is trading at cheap valuations based on all valuation metrics. The stock is trading at 1.2x FY16E book value against a historical six year average of 1.7x. MRPL is trading at low valuations in spite of expected improvement in return ratios. On an EV/EBITDA basis, it is trading at 4.1x FY16E EBITDA. We value the stock at 5.5x FY16E EV/EBITDA multiple to arrive at a target price of ₹ 61.

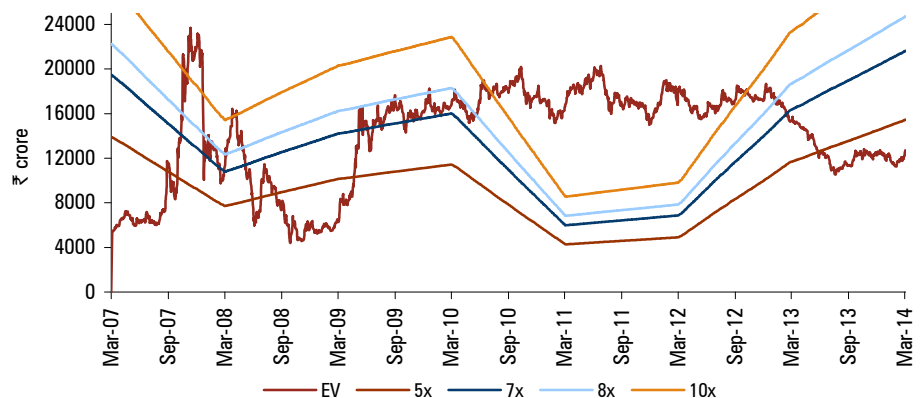
Exhibit 42: EV/EBITDA trend



On an EV/EBITDA basis, it is trading at 4.1x FY16E EBITDA against a historical six year average of 8x

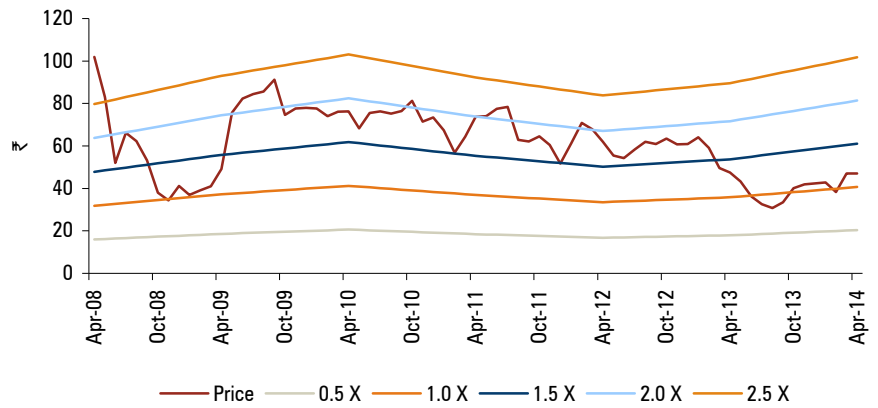
Source: ICICIdirect.com Research

Exhibit 43: EV trend



Source: ICICIdirect.com Research

Exhibit 44: P/BV trend



MRPL is trading at 1.2x FY16E book value against a historical six year average of 1.7x

Source: ICICIdirect.com Research

Exhibit 45: Peer Comparison

Company	Stock Price	Currency	Mcap (₹ crore)	P/E			EV/EBITDA			P/BV			ROE		
				FY14	FY15	FY16	FY14	FY15	FY16	FY14	FY15	FY16	FY14	FY15	FY16
Domestic															
MRPL	47.0	Indian rupee	8238	N.A.	12.7	7.5	67.8	6.4	4.1	1.4	1.3	1.2	-10.1	10.4	15.4
BPCL	447.0	Indian rupee	32322	17.2	16.0	11.6	10.4	10.6	6.7	1.8	1.7	1.4	10.7	10.8	12.8
CPCL	68.5	Indian rupee	931	N.A.	3.4	3.8	9.9	6.1	6.1	0.5	0.5	0.4	-5.2	17.7	15.4
Essar Oil	52.2	Indian rupee	7378	N.A.	6.2	4.8	6.9	5.7	5.6	3.1	2.1	1.5	-7.1	38.0	35.0
HPCL	303.0	Indian rupee	10272	15.6	11.1	9.2	10.2	7.8	7.9	0.7	0.7	0.6	4.8	6.5	7.1
IOCL	274.0	Indian rupee	66526	16.3	10.5	9.8	5.3	3.8	7.3	1.0	1.0	0.9	6.5	9.4	8.0
Average				N.A.	10.0	7.8	18.4	6.7	6.3	1.4	1.2	1.0	-0.1	15.5	15.6
International															
Bangchak Petroleum	30.0	Thai baht	7849	8.3	8.2	7.4	6.9	5.8	5.3	1.1	1.1	1.0	13.9	14.0	14.0
Cosmo Oil	197.0	Japanese yen	9900	17.1	5.8	7.6	13.6	9.0	8.7	0.7	0.6	0.6	5.2	8.0	8.5
Thai Oil	53.0	Thai baht	20178	11.1	9.6	9.0	7.2	6.7	6.3	1.3	1.1	1.0	11.7	11.7	12.0
Western Refining	39.5	US dollar	19233	12.6	10.3	8.9	7.9	7.6	6.5	4.4	2.4	1.7	35.3	30.1	25.4
Tesoro Corp	52.4	US dollar	42193	17.4	9.3	8.0	7.1	4.9	4.3	1.7	1.4	1.2	10.3	14.2	16.7
HollyFrontier Corp	48.9	US dollar	59367	13.1	11.0	10.2	6.2	5.5	4.8	1.6	1.5	1.4	12.1	14.2	14.3
Nestle Oil	15.3	Euro	33102	10.2	12.5	11.8	5.9	6.5	6.3	1.5	1.3	1.2	14.7	10.5	10.7
Motor Oil	10.0	Euro	9380	8.4	24.5	9.4	6.4	9.2	6.5	2.1	1.9	1.6	22.4	6.7	18.5
Average				12.3	11.4	9.0	7.7	6.9	6.1	1.8	1.4	1.2	15.7	13.7	15.0

Source: Bloomberg, ICICIdirect.com Research

Financial summary

Profit and loss statement

	(₹ Crore)				
(Year-end March)	FY12	FY13	FY14E	FY15E	FY16E
Revenue	54,060.7	66,086.2	71,249.0	74,102.0	75,345.8
Growth (%)	38.0	22.2	7.8	4.0	1.7
(Inc)/(Dec) in stock in trade	-150.2	-1116.2	-171.3	0.0	0.0
Raw material Costs	51236.8	65400.2	69844.8	71060.7	71532.8
Employee Costs	160.6	184.6	213.2	240.0	260.0
Ex. Duty & Sales Tax	-22.5	0.0	0.0	0.0	0.0
Other Expenditure	1197.2	1299.6	1146.8	461.4	464.5
Op. Expenditure	52,421.9	65,768.1	71,033.5	71,762.1	72,257.3
EBITDA	1,638.8	318.0	215.5	2,339.9	3,088.5
Growth (%)	-20.0	-80.6	-32.2	985.8	32.0
Depreciation	433.9	604.4	726.1	992.3	1162.4
EBIT	1204.9	-286.4	-510.6	1347.5	1926.1
Interest	206.7	328.6	354.5	501.3	441.3
Other Income	322.0	138.1	281.2	96.0	104.0
PBT	1320.2	-476.9	-583.9	942.3	1588.8
Growth (%)	-24.0	-136.1	22.5	-261.4	68.6
Tax	411.6	280.1	11.3	292.1	492.5
Reported PAT	908.6	-756.9	-595.2	650.2	1,096.3
Growth (%)	-22.8	-183.3	-21.4	-209.2	68.6

Source: Company, ICICIdirect.com Research

Balance sheet

	(₹ Crore)				
(Year-end March)	FY12	FY13	FY14E	FY15E	FY16E
Source of Funds					
Equity Capital	1,752.7	1,752.7	1,752.7	1,752.7	1,752.7
Preference capital	4.6	0.0	0.0	0.0	0.0
Reserves & Surplus	5,471.9	4,715.0	4,119.8	4,525.6	5,377.4
Shareholder's Fund	7,229.2	6,467.7	5,872.4	6,278.2	7,130.1
Loan Funds	5,751.7	6,979.8	8,229.8	8,479.8	6,229.8
Deferred Tax Liability	453.1	734.3	884.3	1,034.3	1,184.3
Minority Interest	0.0	0.0	0.0	0.0	0.0
Source of Funds	13434.0	14181.8	14986.6	15792.3	14544.2
Application of Funds					
Gross Block	9,024.3	11,338.5	16,373.5	22,408.5	22,958.5
Less: Acc. Depreciation	4,964.4	5,557.8	6,286.9	7,279.2	8,441.6
Net Block	4,059.8	5,780.7	10,086.6	15,129.3	14,516.9
Capital WIP	7,089.2	7,554.5	4,264.5	559.5	209.5
Total Fixed Assets	11,149.0	13,335.2	14,351.1	15,688.7	14,726.3
Investments	42.3	15.0	15.0	15.0	15.0
Inventories	7,817.6	6,715.3	7,222.5	7,511.7	7,637.8
Debtor	3,459.3	3,972.7	4,294.5	4,466.4	4,541.4
Cash	2,234.7	1,605.8	1,866.4	1,848.9	1,856.9
Loan & Advance, Other CA	1,453.2	1,057.3	907.3	757.3	607.3
Total Current assets	14,964.8	13,351.0	14,290.7	14,584.3	14,643.4
Current Liabilities	12,388.6	12,373.9	13,664.2	14,211.3	14,449.9
Provisions	333.4	145.5	6.0	284.3	390.6
Total CL and Provisions	12,722.1	12,519.4	13,670.2	14,495.7	14,840.5
Net Working Capital	2,242.8	831.6	620.5	88.6	-197.1
Miscellaneous expense	0.0	0.0	0.0	0.0	0.0
Application of Funds	13434.0	14181.8	14986.6	15792.3	14544.2

Source: Company, ICICIdirect.com Research

Cash flow statement

	(₹ Crore)				
(Year-end March)	FY12	FY13	FY14E	FY15E	FY16E
Profit after Tax	908.6	-756.9	-595.2	650.2	1,096.3
Less: Dividend Paid	203.7	0.0	0.0	244.4	244.4
Add: Depreciation	433.9	604.4	726.1	992.3	1,162.4
Add: Others	106.0	281.2	150.0	150.0	150.0
Cash Profit	1,244.7	128.7	280.8	1,548.1	2,164.3
Increase/(Decrease) in CL	2,675.2	-202.7	1,150.8	825.5	344.8
(Increase)/Decrease in CA	-5,317.2	984.8	-679.0	-311.2	-51.1
CF from Operating Activities	-1397.3	910.9	752.6	2062.4	2458.0
Purchase of Fixed Assets	3,025.8	2,790.6	1,742.0	2,330.0	200.0
(Inc)/Dec in Investments	52.6	27.3	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
CF from Investing Activities	-2,973.3	-2,763.3	-1,742.0	-2,330.0	-200.0
Inc/(Dec) in Loan Funds	4,194.7	1,228.1	1,250.0	250.0	-2,250.0
Inc/(Dec) in Sh. Cap. & Res.	-4.6	-4.6	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
CF from financing activities	4,190.2	1,223.5	1,250.0	250.0	-2,250.0
Change in cash Eq.	-180.4	-628.9	260.7	-17.6	8.0
Op. Cash and cash Eq.	2,415.1	2,234.7	1,605.8	1,866.4	1,848.9
Cl. Cash and cash Eq.	2,234.7	1,605.8	1,866.4	1,848.9	1,856.9

Source: Company, ICICIdirect.com Research

Key ratios

(Year-end March)	FY12	FY13	FY14E	FY15E	FY16E
Per share data (₹)					
Book Value	41.2	36.9	33.5	35.8	40.7
Cash per share	12.8	9.2	10.6	10.5	10.6
EPS	5.2	-4.3	-3.4	3.7	6.3
Cash EPS	7.7	-0.9	0.7	9.4	12.9
DPS	1.0	0.0	0.0	1.2	1.2
Profitability & Operating Ratios					
EBITDA Margin (%)	3.0	0.5	0.3	3.2	4.1
PAT Margin (%)	1.7	-1.1	-0.8	0.9	1.5
Fixed Asset Turnover (x)	4.8	5.0	5.0	4.7	5.1
Inventory Turnover (Days)	60.1	36.9	37.0	37.0	37.0
Debtor (Days)	23.4	21.9	22.0	22.0	22.0
Current Liabilities (Days)	88.3	69.1	70.0	70.0	70.0
Return Ratios (%)					
RoE	12.6	-11.7	-10.1	10.4	15.4
RoCE	9.3	-2.1	-3.6	9.1	14.4
RoIC	11.2	-2.4	-4.2	10.4	16.7
Valuation Ratios (x)					
PE	9.1	-10.9	-13.8	12.7	7.5
Price to Book Value	1.1	1.3	1.4	1.3	1.2
EV/EBITDA	7.2	42.8	67.8	6.4	4.1
EV/Sales	0.2	0.2	0.2	0.2	0.2
Leverage & Solvency Ratios					
Debt to equity (x)	0.8	1.1	1.4	1.4	0.9
Interest Coverage (x)	5.8	-0.9	-1.4	2.7	4.4
Debt to EBITDA (x)	3.5	21.9	38.2	3.6	2.0
Current Ratio	1.2	1.1	1.0	1.0	1.0
Quick ratio	0.6	0.5	0.5	0.5	0.5

Source: Company, ICICIdirect.com Research

Annexure

What is refining?

Refining is a process of converting crude oil into usable products. Oil refining produces a wide variety of products that can be seen in use around us every day: gasoline for motor vehicles, kerosene, jet fuel, diesel and heating oil to name just a few. Petroleum products are also used in the manufacture of rubber, nylon and plastics. The main refinery outputs can be summarised as follows:

Petroleum gas is the lightest hydrocarbon chain, commonly known by names such as methane, ethane, propane and butane. It is a gas at room temperature, easily vaporised and used for heating, cooking and making plastics. It is often liquefied under pressure to create liquefied petroleum gas (LPG) supplied by pipeline, in filled tanks or in large bottles.

Naphtha is a light, easily vaporised, clear liquid used for further processing into petrochemicals, as a solvent in dry cleaning fluids, paint solvents and other quick-drying products. It is also an intermediate product that can be further processed to make gasoline.

Gasoline is a motor fuel that vaporises at temperatures below the boiling point of water i.e. it evaporates quickly if spilt on the ground. Gasoline is rated by octane number, an index of quality that reflects the ability of the fuel to resist detonation and burn evenly when subjected to high pressures and temperatures inside an engine. Premature detonation produces "knocking" (backfiring), wastes fuel and may cause engine damage. Previously, a form of lead was added to cheaper grades of gasoline to raise the octane rating but with the environmental crackdown on exhaust emissions, this is no longer permitted. New formulations of gasoline designed to raise the octane number contain increasing amounts of aromatics and oxygen-containing compounds (oxygenates). Cars are now also equipped with catalytic converters that oxidise unreacted gasoline.

Kerosene is a liquid fuel used for jet engines or as a starting material for making other products.

Gasoil or diesel distillate is a liquid used for automotive diesel fuel and home heating oil, as well as a starting material for making other products.

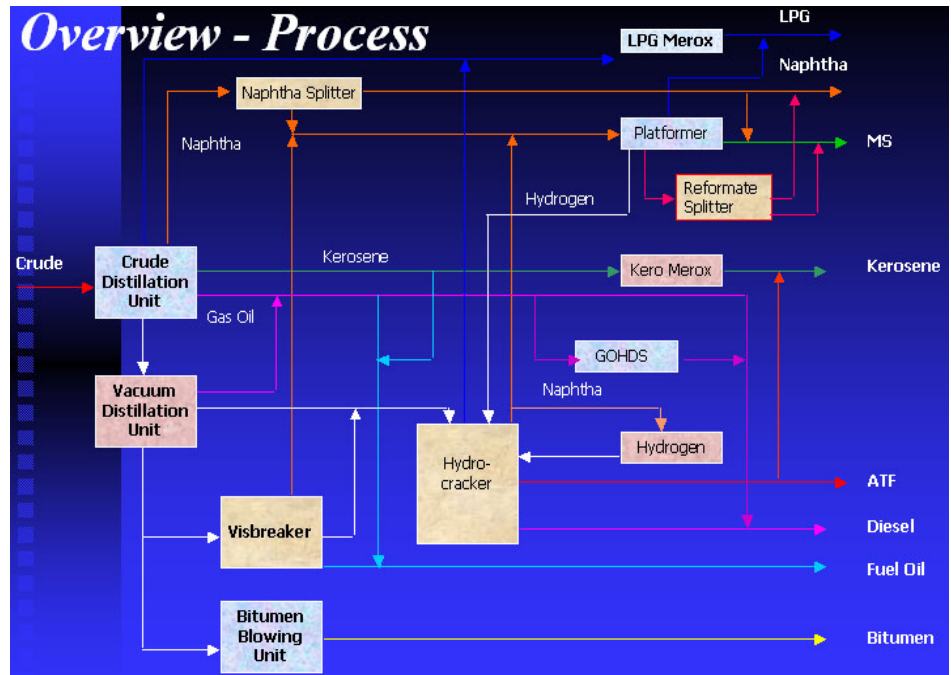
Lubricating oil is a liquid used to make motor oil, grease and other lubricants. It does not vaporise at room temperature and varies from the very light through various thicknesses of motor oil, gear oils, vaseline and semi-solid greases.

Heavy gas or fuel oil is a liquid fuel used in industry for heat or power generation and as a starting block for making other products. Heavy grades of fuel oil are also used as 'bunker oil' to fuel ships. However, because most contaminants of oil (sulphur, metals, etc) have very high boiling points they tend to concentrate in the heavy fuel oil. Taken together with a heavy fuel oil's low hydrogen to carbon ratio, this makes it the most potentially polluting fraction of oil.

Residuals (or resid) are solids such as coke, asphalt, tar and waxes. They are generally the lowest value products in the barrel but can also be used as a starting material for making other products.

Refining process in MRPL

Exhibit 46: Process block diagram



Source: Company, ICICIdirect.com Research

The refining process is classified into

- Primary processing units
- Secondary processing units
- Treating units

Primary processing unit

The crude unit is the primary processing unit in an oil refinery wherein crude oil is separated into various products depending on the relative volatility of hydrocarbon components.

Secondary processing unit

Secondary processing units receive feedstock from the crude unit and upgrade it to value-added products. The main secondary processing units in MRPL are:

- Hydrocracker unit
- Continuous catalytic regeneration platforming unit
- Visbreaker unit
- Bitumen unit

Treating unit

These processes add value to products from the refinery and, thereby, increase profitability. Treating units play an important role in removing impurities like sulphur, nitrogen and metals from products, thereby meeting stipulated product specifications. The important treating units in MRPL are:

- LPG/naphtha/kerosene mercox unit
- Diesel hydrotreater unit
- Sulphur recovery unit

Brief description of different units in MRPL refinery

Crude & vacuum distillation unit

Distillation or fractionation is a process by which crude oil is separated into groups of hydrocarbon compounds of differing boiling point ranges called "fractions" or "cuts". Two types of distillation can be performed. Atmospheric distillation takes place at atmospheric temperature, when the crude is heated to 350-400 degree centigrade. In vacuum distillation, to recover additional heavy distillates from residual fuel oil (or other heavy products), it is piped to second distillation column where the process is repeated in vacuum conditions.

Hydrocracker units

Cracking processes break down heavier hydrocarbon molecules into lighter products such as petrol and diesel, using heat (thermal) or catalyst (catalytic). Hydrocracking uses hydrogen as a catalyst. The hydrocracker units at MRPL produce high quality sulphur free diesel and ATF. The plant is designed for 100% conversion of low value vacuum gas oils to lighter, low sulphur valuable products.

Visbreakers

Visbreaker are used to upgrade heavy vacuum residue to gas, naphtha & gas oil. This is the first unit in India to have a vacuum flash column producing vacuum gas oil, which is used for supplementing the feed stock to hydrocracker Unit and extracting maximum value from short residue.

Platforming Unit

The continuous catalytic regeneration platforming unit (CCR), a state-of-the-art Unit, produces lead free, high octane motor spirit (Petrol). Hydrogen produced as a by-product is used in the hydrocracker Unit. The other by-product is LPG.

Merox Unit

LPG Merox Unit reduces the sulphur content in LPG. The kerosene merox unit converts mercaptans to disulphide.

Hydrogen unit

The hydrogen plant produces hydrogen by steam reforming of naphtha. Hydrogen purity of 99.9% is achieved.

Nelson complexity

There are several measures of complexity. The most recognised is the Nelson Complexity Index (NCI), which represents a standard measure to ascertain refinery complexities. Developed by Wilbur L Nelson in 1960, this captures the proportion of the secondary conversion unit capacities relative to primary distillation or topping capacity. It is an indicator of not only the investment intensity or cost index of the refinery but also the value addition potential of a refinery. Nelson assigned a factor of one to the primary distillation unit. All other units are rated in terms of their costs relative to the primary distillation unit (atmospheric distillation unit). The complexity of an individual refinery is calculated by summing the following equation for all major refinery processes: (complexity factor x unit capacity)/crude distillation capacity). In the below example it is $3520.5/800=4.4$

Exhibit 47: Nelson Complexity

Refinery Units	Capacity (A)	Complexity factor (B)	A*B
Crude Distillation	800	1	800
Vaccum Unit	79	1	79
Seme-regen reformer	20	3.4	68
Continuous-regen reformer	50	5.8	290
Cat Cracker	45	12	540
Residue Hydrocracker	27	12	324
Mild Hydrocracker	54	7	378
Residue Hydrotreating	27	6	162
Alkylolation	5	9	45
MTBE	5	9.1	45.5
BTX	28	15	420
Bitumen production	5	1.5	7.5
Hydrotreating (Naphtha)	76	1.2	91.2
Hydrotreating (Distillate)	159	1.7	270.3
			3520.5

Source: ICICIdirect.com Research

Single point mooring

Single point mooring (also known as single buoy mooring) is a loading buoy anchored offshore, that serves as a mooring point and interconnect for tankers loading or offloading gas or liquid products providing advantages like minimised freight charges, reduction in wharfage charges, no dredging, cleaning of silt required as in the case of crude oil terminal (COT), and higher pumping rate from SPM resulting in minimum time for crude unloading.

Tax benefits

MRPL will avail following special tax incentives from the Government of Karnataka for its Phase III project-

- Exemption from payment of entry tax on plant & machinery and capital goods during the initial period of four years from the date of commencement of project implementation
- Exemption from payment of entry tax on crude oil throughput in Phase III for 15 years from the start of commercial production of Phase-III
- Exemption from central sales tax for 15 years from the date of commencement of commercial production for all interstate sales

The Phase-III project is eligible for income tax benefit under section 80 (IB) of the Income Tax Act, 1962 as it successfully commissioned CDU & VDU unit of Phase-III on March 29, 2012.

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