Research

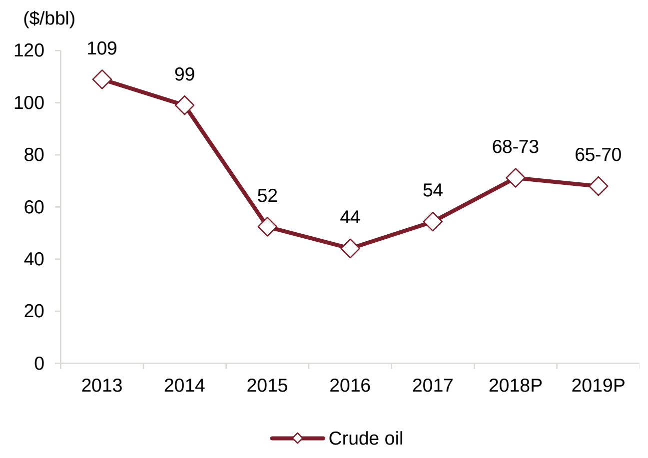
CRISIL
An S&P Global Company

Petrochemicals: Capacity additions can bridge demand-supply gap

August 2018

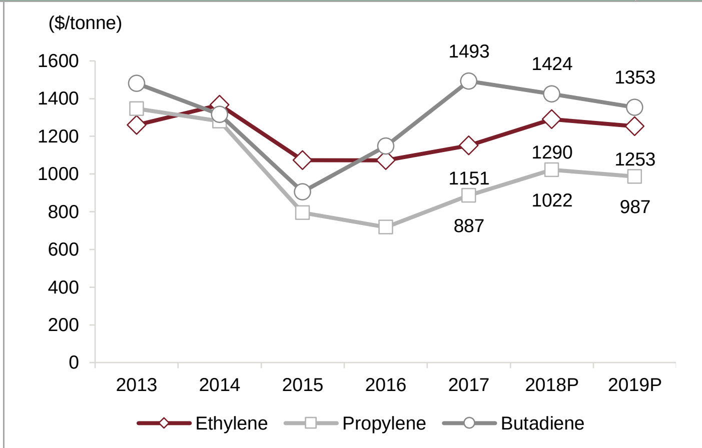
Screenshots

Crude oil prices flare up … 1



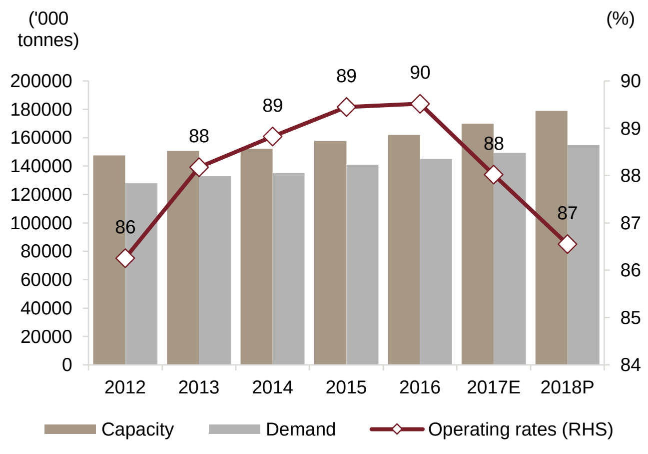
Source: CRISIL Research

… inflaming petrochemical prices 2



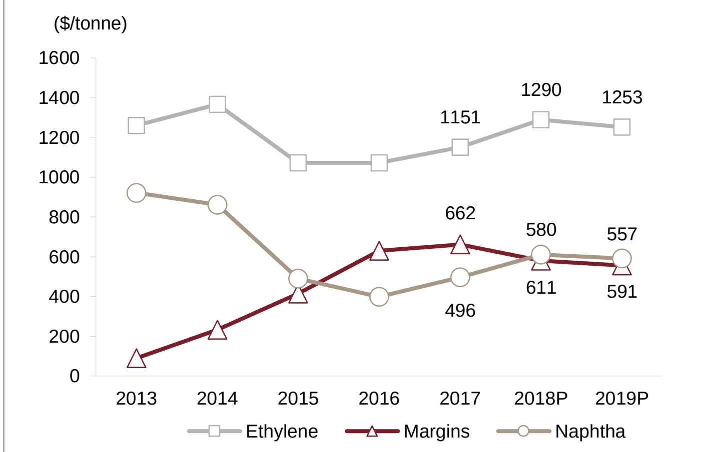
Source: CRISIL Research

Global ethylene capacities are expanding… 3



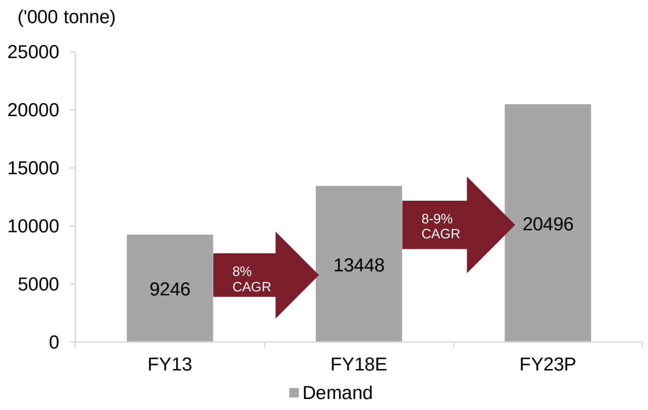
Source: CRISIL Research

… stifling cracker margins 4



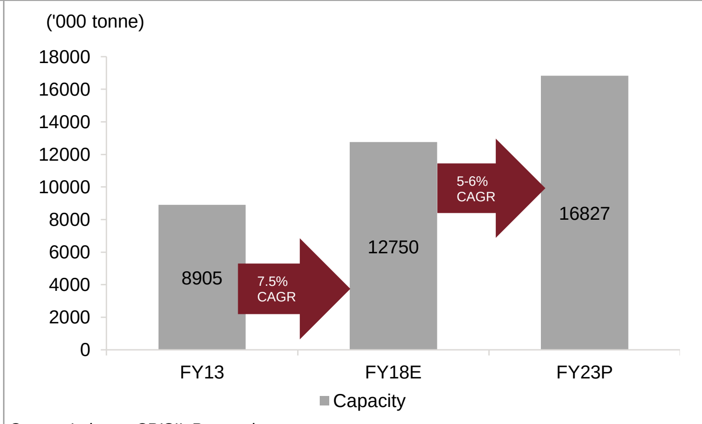
Source: CRISIL Research

Domestic polymer demand on a fast clip… 5



Source: Industry, CRISIL Research

…but capacity expansion is lagging 6



Source: Industry, CRISIL Research

Demand foreseen steady over the next 5 years

CRISIL Research expects domestic demand for petrochemicals, to grow at a compounded annual rate (CAGR) of 8-9% between fiscals 2018 and 2023.

Demand grew ~8.5% on-year in fiscal 2018, owing to healthy offtake from end-use segments.

Long term demand will remain robust from major consumer segments such as packaging, automobiles, consumer durables, construction, and irrigation. Demand growth could also arise from continued substitution of metal pipes with plastic pipes, and glass and metal containers with plastic containers. Increasing use of plastics for packaging due to its superior quality and cost-effectiveness will also contribute.

Polymers and elastomers: Growth forecast

Polymer/Elastomer	FY18 E	FY19 E	Long term CAGR [1]
PE	9.0	8.5-9.5	8-9
PP	10.0	8-9	9-10
PVC	3.5	8-9	9-10
PS	6.0	8-9	8-9
ABS	12.0	8-9	7-8
SBR	2.0	8-9	7-8
PBR	4.0	8-9	7-8
Overall demand growth	8.0	8-9	*8-9*

Note: CAGR is for the period from FY18 to FY23

Source: Industry, CRISIL Research

Capacity addition trails demand growth

Domestic petrochemicals capacity, however, may not keep pace. It is expected to expand at 4-5% CAGR between fiscals 2018 and 2023, vis-à-vis 8-9% demand growth.

Overall, we expect domestic petrochemical capacity to reach ~36 million tonne (MT) in fiscal 2023, from ~29 MT in fiscal 2018.

India is a net importer of most polymers. In fact, import dependency for polyethylene (PE) and polyvinyl chloride (PVC) was 37% and 55%, respectively, in fiscal 2018. This provides enormous opportunity for players to expand existing and add new capacities.

In the past, scope for polymer capacity addition was constrained by the unavailability of feedstock olefins, owing to lack of sufficient cracker capacity. Cracker capacity addition has challenges, such as high capital cost and cost competitiveness.

However, we see this situation gradually changing. Domestic players are recognising the demand-supply mismatch, and adding cracker capacities.

Investments in dual feed crackers provide players with flexibility to switch between feedstocks. For instance, in times of rising crude oil prices, and consequently, naphtha prices, players with dual feed crackers are better positioned to offset the risk of volatile raw material costs, by increasing the proportion of gas as a feedstock. This also helps players maintain, or even possibly, improve margins.

Another emerging trend is the integration of refineries with downstream petrochemical units. With high severity fluid catalytic cracking (HS-FCC), refineries are increasing the slate (or proportion) of propylene to address the downstream demand-supply mismatch.

However, setting up greenfield and brownfield units takes up to 2 and 5 years, respectively. Consequently, we expect India to remain a net importer in the medium term, with capacity additions lagging demand growth.

Prices set to tango with crude oil and feedstock prices

Global petrochemicals prices are set to rise in 2018, following uptick in feedstock prices, fuelled by rising crude oil prices. In fact, in the first half of 2018, petrochemical prices (except butadiene) have already climbed, given high crude oil and naphtha prices. For the entire year, butadiene prices are expected to correct from high levels of 2017, with easing supply. Prices of butadiene almost doubled on account of supply constraints and healthy downstream synthetic rubber demand, as prices of natural rubber increased.

CRISIL Research expects crude oil prices to flare up further in 2018 to range between $68-73/bbl (25-30% on-year increase). Naphtha prices will rise at a similar pace. However, ethylene prices are expected to strengthen only 10-14%. The rise in ethane capacity in the US will arrest the sharp rise in ethylene prices. With capacity addition expanding ~5% on-year against 3-4% demand growth, we expect ethylene prices to range between $1,260-1,310 per tonne in 2018.

Petrochemical prices has increased in 2017 too, owing to a rise in feedstock prices, following recovery in crude oil prices. However, higher capacity additions put a brake on the pace of rise.

Petrochemicals, actual prices and forecasts

Prices ($ / tonne)	Actuals 2017	YTD 2018	Forecast 2018			Forecast 2019		
Crude	54	71	68	-	73	66	-	71
Naphtha	496	601	600	-	630	580	-	610
Ethylene	1,151	1,293	1,260	-	1,310	1,230	-	1,280
Propylene	887	1,042	1,000	-	1,050	960	-	1,010
Butadiene	1,493	1,429	1,370	-	1,470	1,300	-	1,400
Benzene	820	868	830	-	880	830	-	880
Toluene	654	737	710	-	760	700	-	750
Styrene	1,219	1,357	1,310	-	1,360	1,260	-	1,310
HDPE	1,154	1,221	1,190	-	1,240	1,150	-	1,200
PP	1,046	1,216	1,160	-	1,210	1,130	-	1,180
PVC	898	942	920	-	970	900	-	950
PS	1,355	1,518	1,470	-	1,520	1,410	-	1,460
ABS	1,849	2,020	1,940	-	1,990	1,910	-	1,960
SBR	1,912	1,771	1,670	-	1,770	1,730	-	1,830
PBR	2,127	1,886	1,800	-	1,900	1,830	-	1,930

Source: CRISIL Research

Cracker margins slipping for naphtha, yet should end above the 5-year average

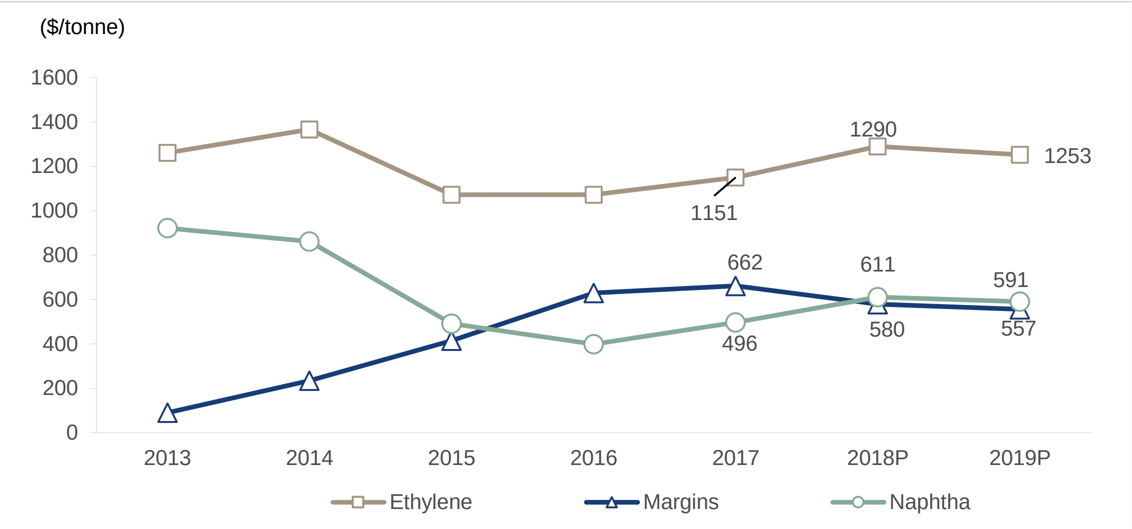
On the other hand, ethylene cash cost is expected to spurt 40-45% on-year, on account of steeper rise in naphtha prices.

(Note: Ethylene cash cost is calculated as: naphtha cost minus by-product credit + $100 per tonne conversion cost; where by-product credit includes respective proportionate realisations for propylene, butadiene, benzene, toulene, mixed xylenes, and fuel oil)

Consequently, we expect cracker margins to contract in 2018 and range between $570-590 per tonne. This is because the increase in ethylene cash cost is expected to outpace the rise in ethylene prices. This figure, however, remains above the 5-year average of $400 per tonne.

Cracker margins rose ~5% on-year in 2017 to $660 per tonne, owing to higher increase in ethylene prices vis-à-vis rise in ethylene cash cost. High butadiene prices owing to supply constraints that year had supported the overall increase in cracker margins.

Cracker margins to contract in 2018



E: Estimated; F: Forecast
Source: CRISIL Research

Tolling margins under pressure for elastomers in 2018

Tolling margins too, are expected to decline in 2018, because of slower rise in realisation compared with feedstock prices, amid increasing supply and steady global demand across products.

(Note: Tolling margin is the difference between the price of a product and its feedstock)

- Tolling margins of integrated producers of PE shrunk in 2017, as higher capacity addition resulted in steeper decline in product realisation. In 2018, tolling margins are expected to continue being under pressure, as the rise in PE prices is likely to be restricted. For one, feedstock naphtha prices would increase at a higher pace. Second, higher capacity additions in PE would cap sharp price rise.
- Tolling margins (PP-P spreads) of polypropylene (PP) declined in 2017, as higher capacity addition kept pressure on PP realisation. In 2018, tolling margins are expected to be range-bound with some upside, given similar price movement in propylene and PP prices as incremental supply matches demand growth.
- Tolling margins of PVC producers improved in 2017, as supply constraints owing to environmental concerns

supported rise in PVC prices, while raw material prices were lower. In 2018, PVC margins are expected to be range-bound, given similar price movement in product prices and feedstock cost.

- In 2017, Acronitrile Butadiene Styrene (ABS) spreads improved, owing to relatively steeper price increase in ABS compared with increase in feedstock styrene and butadiene prices. In 2018, ABS margins will continue to be stable as players pass on the price increase in feedstock to end users.
- Polystyrene (PS) margin contracted marginally in 2017 because of a steeper rise in feedstock styrene prices. In 2018, PS margins are expected to rise, supported by relatively steeper increase PS prices compared to styrene prices.
- In 2017, both Styrene Butadiene Rubber (SBR) and Polybutadiene Rubber (PBR) margins rose, owing to relatively steeper increase in product prices vis-à-vis that in feedstock butadiene prices. In 2018, SBR and PBR margins are expected to contract, owing to inability of synthetic rubber players to pass on the price rise, given relatively lower natural rubber prices.

Tolling margins, actuals and forecasts

Margins/Spreads ($/tonne)	Actuals 2017	YTD 2018	Forecast 2018	Forecast 2019
Cracker margin	662	623	550 - 570	530 - 550
HDPE				
- Integrated (PE-naphtha)	690	584	530 - 550	510 - 530
- Non-integrated	61	-8	-20 - 0	-20 - 0
PP				
- Non-integrated	142	153	140 - 160	140 - 160
PVC				
- EDC	446	455	440 - 460	420 - 440
- VCM	180	184	180 - 200	170 - 190
PBR	634	404	400 - 420	500 - 520
SBR	487	360	300 - 320	420 - 440
ABS	495	522	470 - 490	520 - 540
PS	185	215	200 - 220	200 - 220

A: Actuals, P: Projected
Source: CRISIL Research, Industry

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