

India

Underweight (no change)

Highlighted Companies

Bharat Petroleum

REDUCE, TP Rs375, Rs425 close

We reiterate our Reduce rating with a TP of Rs375 (Sep 2022F). The upside risk is successful strategic sale at a premium valuation.

Meghmani Finchem Ltd

NOT RATED

The company is a chloroalkali producer but is expanding its product portfolio to include high-value products like epichlorohydrin and CPVC.

Pidilite Industries Limited

HOLD, TP Rs1500, Rs2474 close

Despite input cost pressure, the company managed to maintain EBITDA margin in the desired 20-24% band.

Summary Valuation Metrics

P/E (x)	Mar21-A	Mar22-F	Mar23-F
Bharat Petroleum	5.19	10.18	11.07
Meghmani Finchem Ltd	32.72	28.62	29.24
Pidilite Industries Limited	115.66	86.94	75.2

P/BV (x)	Mar21-A	Mar22-F	Mar23-F
Bharat Petroleum	1.57	2.09	1.91
Meghmani Finchem Ltd	4.84	5.45	5.76
Pidilite Industries Limited	25.96	23.14	20.82

Dividend Yield	Mar21-A	Mar22-F	Mar23-F
Bharat Petroleum	20.48%	5.15%	4.63%
Meghmani Finchem Ltd	0%	0%	0%
Pidilite Industries Limited	0.53%	0.67%	0.83%

Analyst(s)



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Chemicals - Overall

Assessing import substitution opportunities

- We have identified import substitution opportunities in chemicals where imports are over US\$200m and import volume CAGR is >5% over last decade.
- We believe import substitution opportunities in acrylonitrile, acrylates, styrene, vinyl chloride, and polyethylene are compelling.
- Adanis and Reliance have announced VCM plants. IOCL has announced new styrene capacity, and BPCL is commissioning acrylates capacity.

Compelling import substitution opportunities in chemicals space

While India will struggle to reduce imports of chemicals which are based on natural gas as using LNG to make even methanol is simply not viable, there are many other compelling opportunities. We see big opportunities in acrylates (300KT net imports in India, growing at a 9% CAGR over last decade), styrene (900KT net imports in CY19, growing at a 6% CAGR over last 10 years), acrylonitrile (170KT net imports, growing at a 95% CAGR), and vinyl chloride monomer or VCM (growing at a 5% CAGR over CY11-CY20, 460KT net imports). HDPE and LDPE have perennial demand and multiple new capacities are also being commissioned. Despite having a 2.9mt capacity, India still net imports ~0.5mt of polypropylene. Chemicals, which are based on natural gas like methanol or acetic acid, (which use methanol as a key input) will remain at bay for Indian companies. Installing capacities based on imported natural gas is simply not viable.

Recent supply chain crisis has lifted spreads which are likely to fall

Most chemicals as well as their raw materials move in containers (barring natural gas) and hence, unavailability of containers has impacted the chemical trade. This has resulted in multi-decade high spreads for many chemicals like vinyl acetate monomer (VAM). However, container congestion has eased at ports (first signs of the same are visible now as container freight rates have fallen). We expect a steep correction in VAM prices as the rise was led by congestion in American ports. Please note that the US accounts for 31% of global VAM exports.

We remain Underweight on chemicals

BPCL is commissioning its acrylates plant, but it will form a small part of the overall business. We are negative on other parts of the business and hence, we have retained Reduce rating on it. Styrene capacity of IOCL is too far into the future and hence, it is not right to ascribe any value currently. Fall in VAM prices will be positive for adhesive companies like Pidilite (we have held on to Pidilite because of high valuation). Fall in VCM prices will be positive for PVC users. Meghmani Finechem (unrated) uses PVC to make CPVC and hence, stands to benefit.

Figure 1: Container freight rates have fallen by 20% from their peak



KEY CHARTS

Figure 2: Value-wise, styrene is the largest net imported organic chemical in India

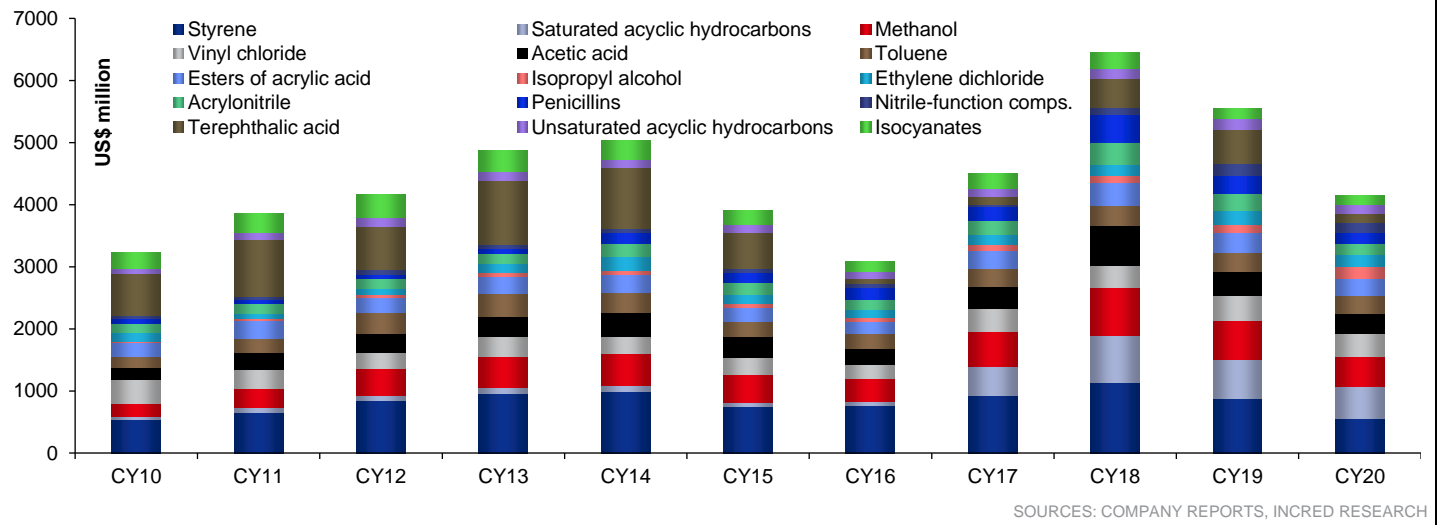


Figure 3: Indian styrene imports were increasing at a 6.5% CAGR before the COVID-led decline in 2020

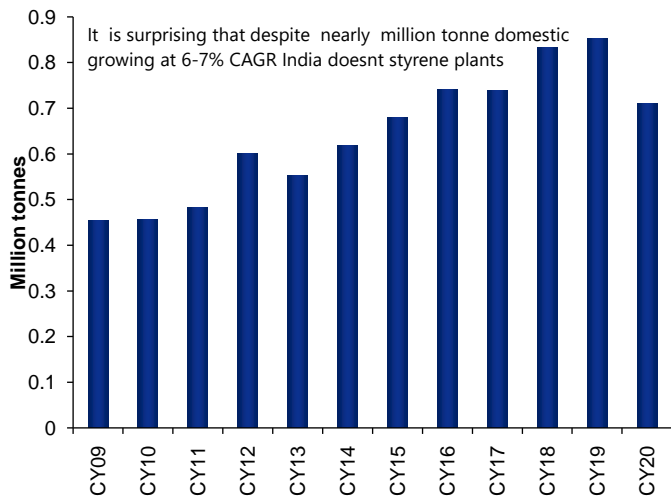


Figure 4: Styrene has wide consumer applications and hence, its demand can grow in high single digits over the coming years, in our view

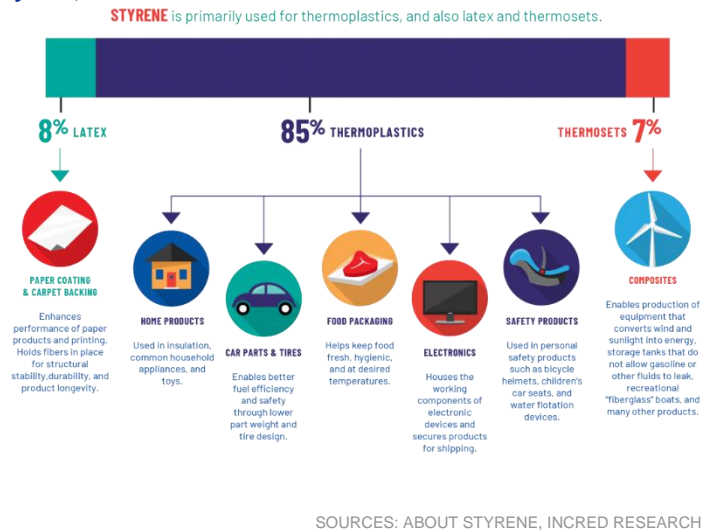


Figure 5: Vinyl chloride, acetic acid, toluene, ethylene glycol, vinyl acetate and acrylonitrile are other important imported petrochemicals

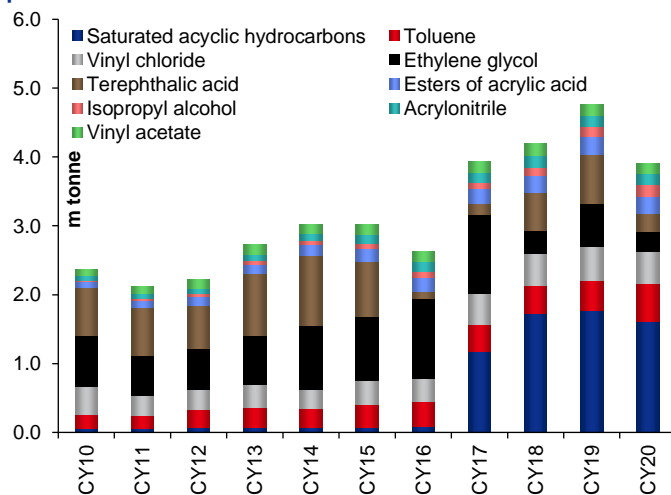


Figure 6: While import substitution plays a role in many, capacities are a few and far in between

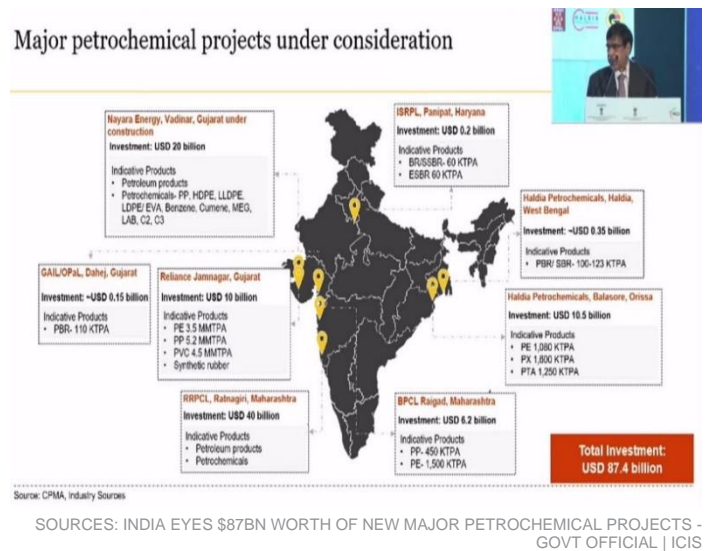
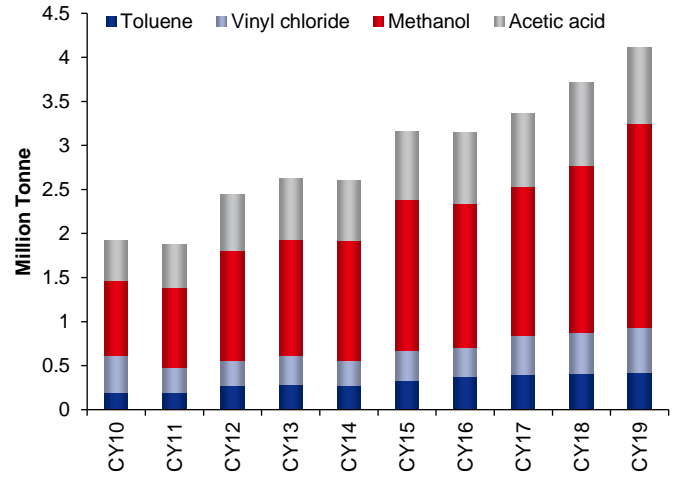
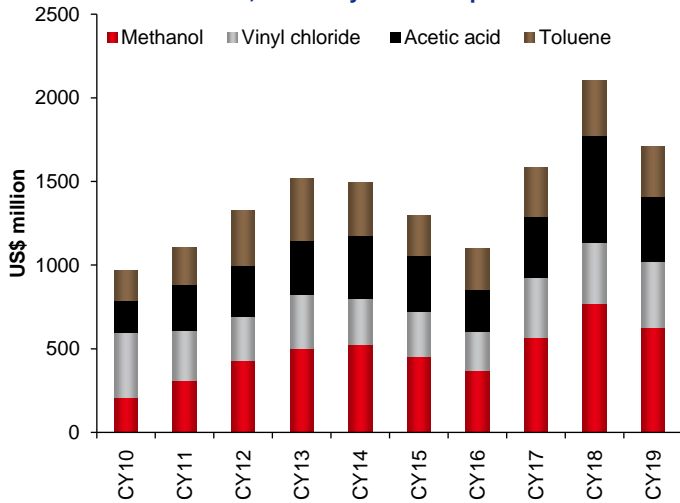


Figure 7: Methanol, vinyl chloride, acetic acid and toluene import value has been volatile, driven by crude oil prices

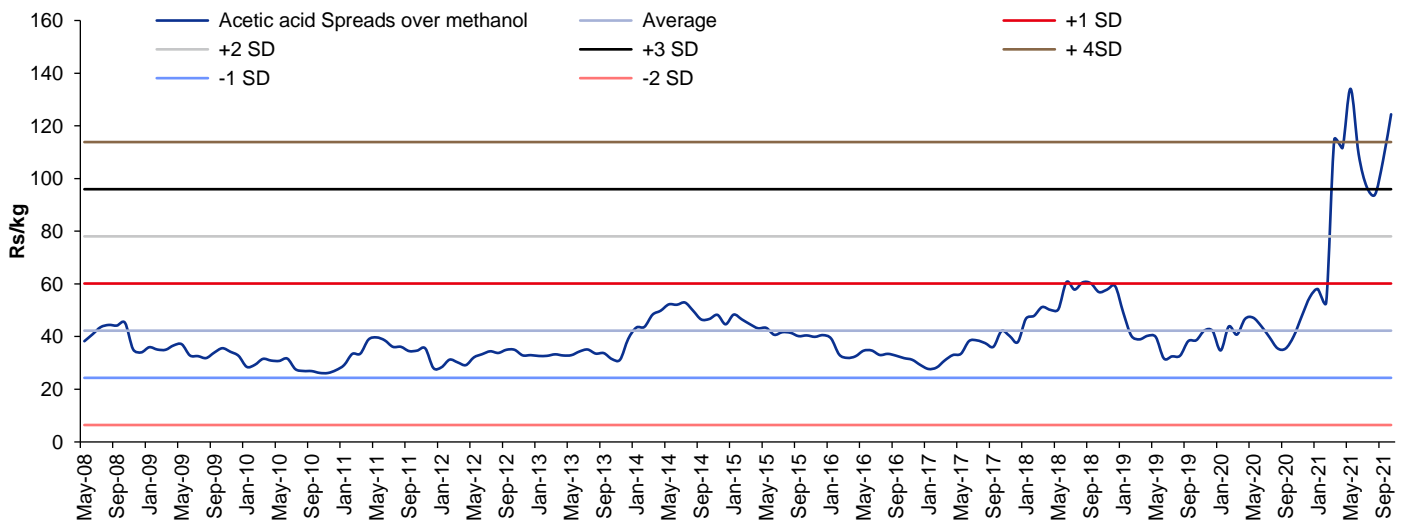
Figure 8: However, their import volume has been growing consistently



SOURCES: INCRED RESEARCH, COMPANY REPORTS

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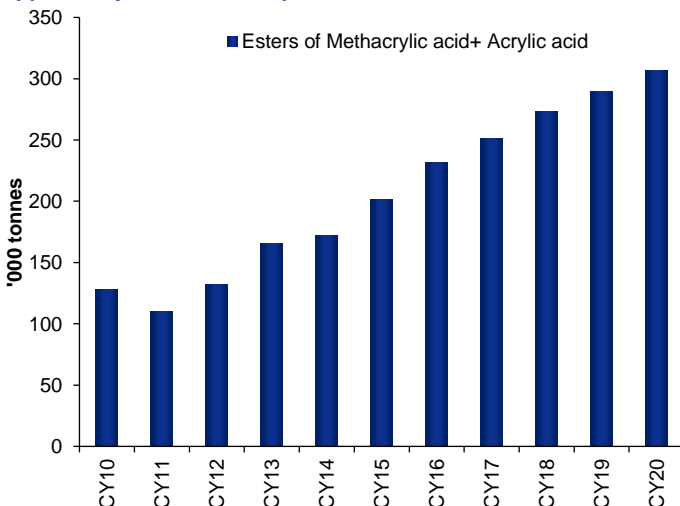
Figure 9: Acetic acid spreads over methanol have increased only in the recent past, but sustainability of the same is a big question mark and hence, companies may not rush to put acetic acid plants so soon



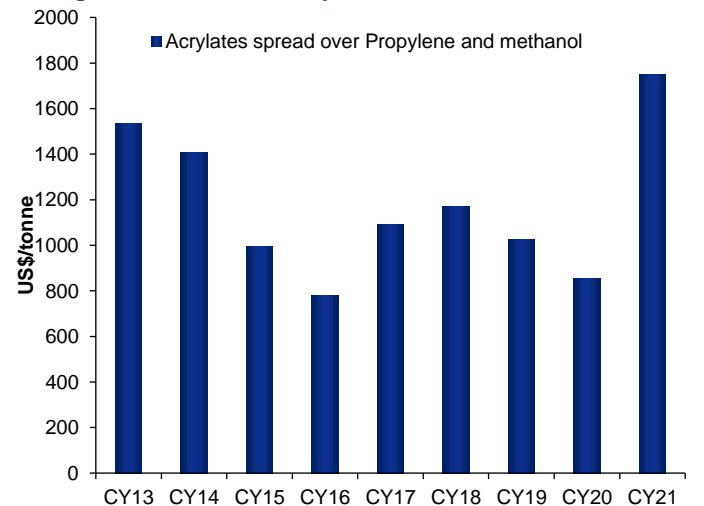
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 10: Acrylates provide a big import substitution opportunity to Indian companies

Figure 11: Acrylates spreads over propylene and methanol are the highest since the last 10 years

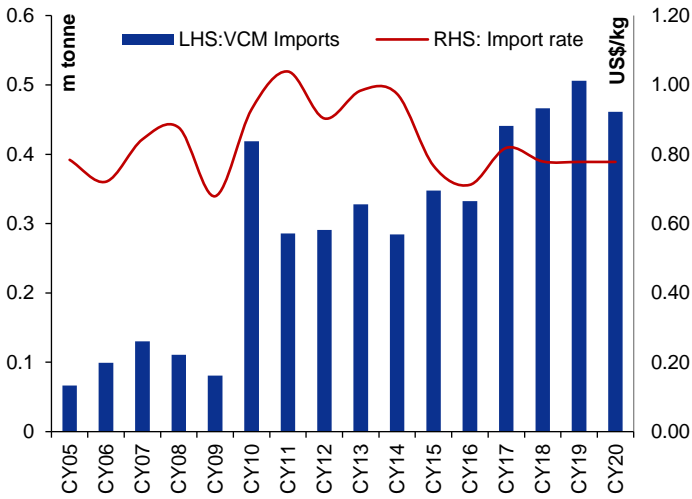


SOURCES: COMPANY REPORTS, INCRED RESEARCH



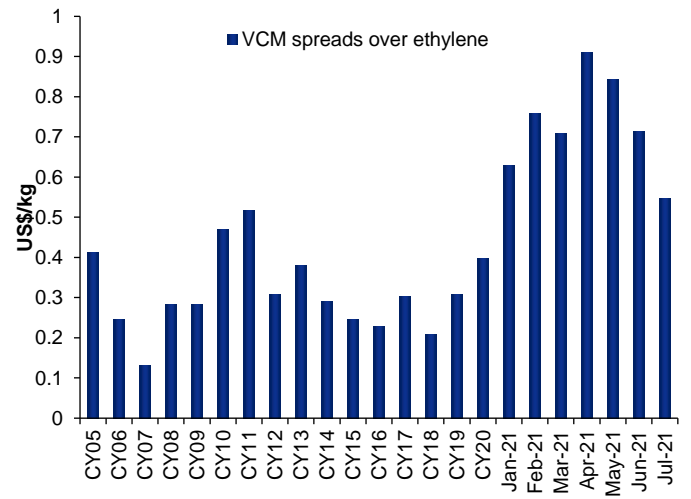
SOURCES: COMPANY REPORTS, INCRED RESEARCH

Figure 12: Indian VCM (vinyl chloride monomer) imports have been rising consistently



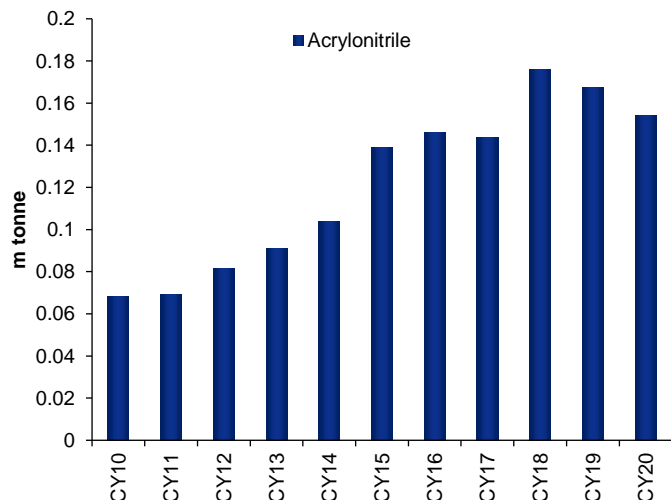
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 13: VCM spreads over ethylene have been below 30 cents/kg in the recent past, which justifies new investment



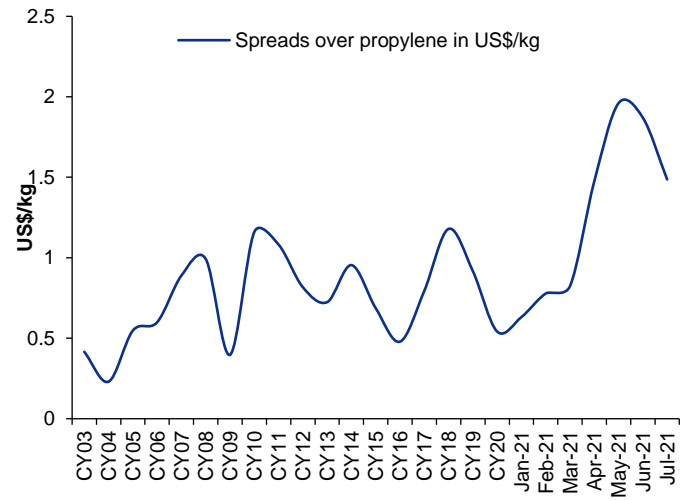
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 14: Indian acrylonitrile imports have risen at a 10% CAGR over CY10-CY19



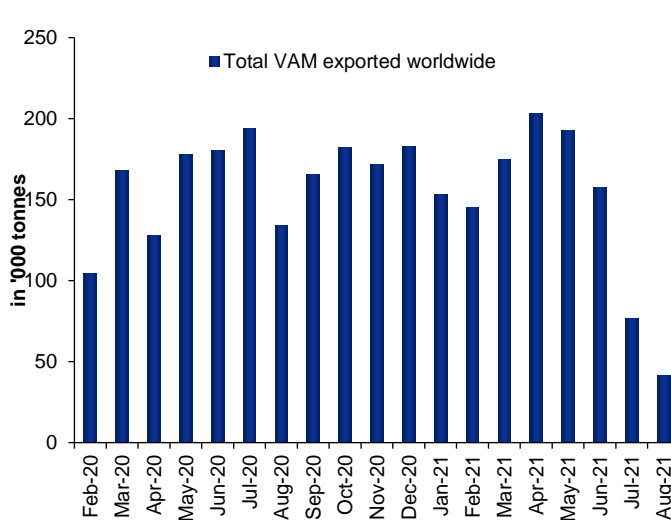
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 15: Acrylonitrile spreads over propylene are stable, which justifies investment in this chemical



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 16: There has been a dramatic fall in international exports of VAM



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 17: However, as container congestion eases at ports, VAM prices will come down; easing of congestion is shown by falling container freight rates



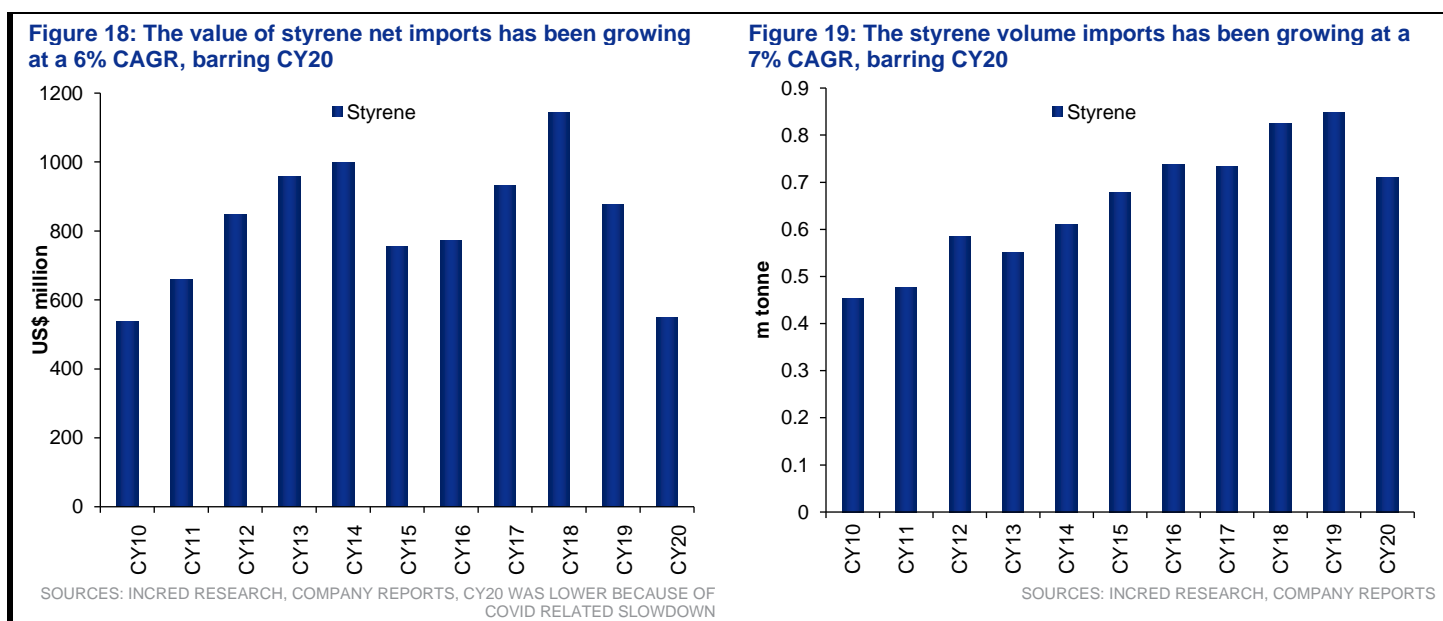
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Chemicals - Import substitution opportunities

We have identified key organic chemicals where import substitution opportunities are bigger than at least US\$200m and growing in high single digits. Our analysis indicates that styrene, vinyl chloride, acetic acid, toluene, saturated acyclic hydrocarbons, esters of acrylic acid, ethylene dichloride, acrylonitrile and penicillins are some of these opportunities.

Styrene has the largest single import substitution potential

Indian imports of styrene have been growing at a 6% CAGR over CY10-19 ➤



Apart from IOCL, no company is planning to put up styrene capacity but that's not enough

 ➤

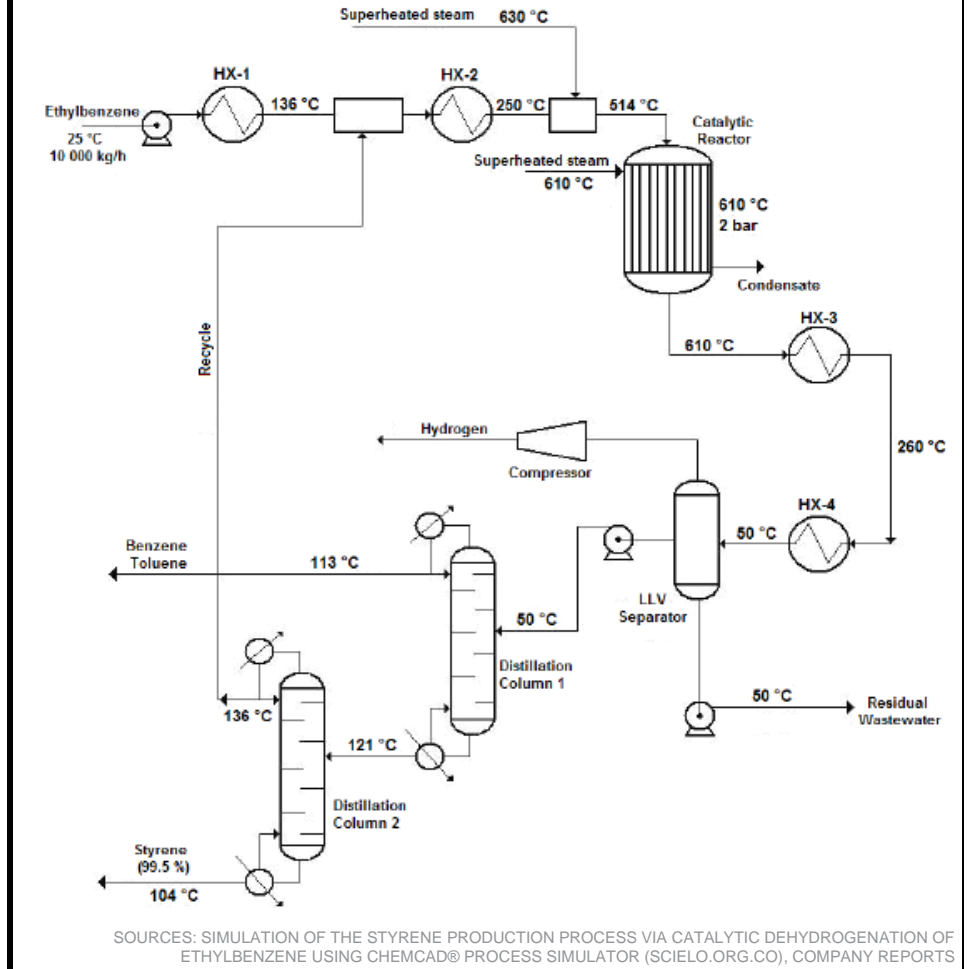
Indian Oil Corporation Ltd or IOCL will invest US\$6bn to establish its 387mtpa facility at its Panipat Refinery & Petrochemical Complex in Haryana. The project is a part of IOCL's Panipat Refinery Expansion Project, which also includes the construction of a new 2.5mtpa Fluidized Catalytic Cracking Unit. This capacity is likely to meet only 26% of the styrene demand in FY28F and hence, India needs additional styrene capacity.

Is technology a constraint for establishing new styrene capacity? It appears so, at least on an industrial scale

 ➤

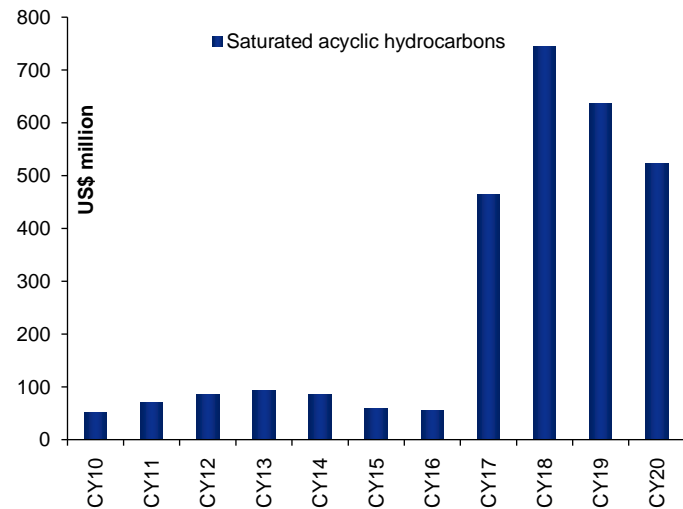
Styrene demand is touching 1mtpa and capital is not a constraint for many big refiners like Reliance Industries Ltd (RIL) in India. This raises the question as to why capacities are not being put up? It appears technology is a constraint for a few players.

Figure 20: While styrene manufacturing technology is in academic papers as well, it appears that sustaining it on an industrial scale is a challenge, and at least Indian refiners don't seem to have access to the same



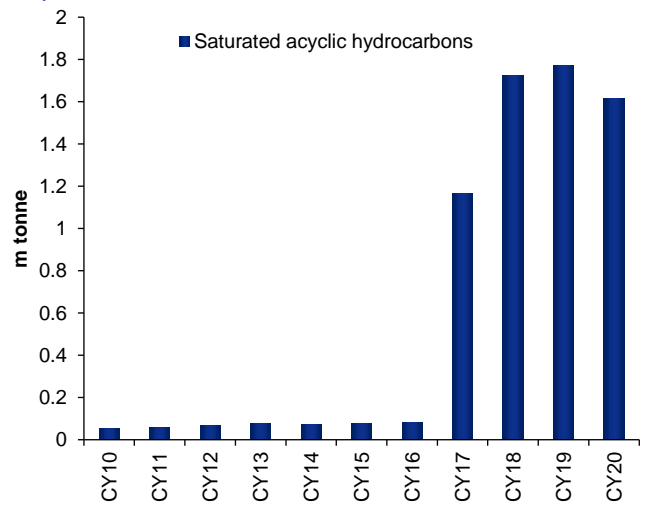
Saturated acyclic hydrocarbons net imports in India are growing at a 32% CAGR

Figure 21: In value terms, imports rose at a 32% CAGR over CY10-CY19



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 22: Indian acyclic hydrocarbon net imports (volume terms) rose at a 47% CAGR



SOURCES: INCRED RESEARCH, COMPANY REPORTS

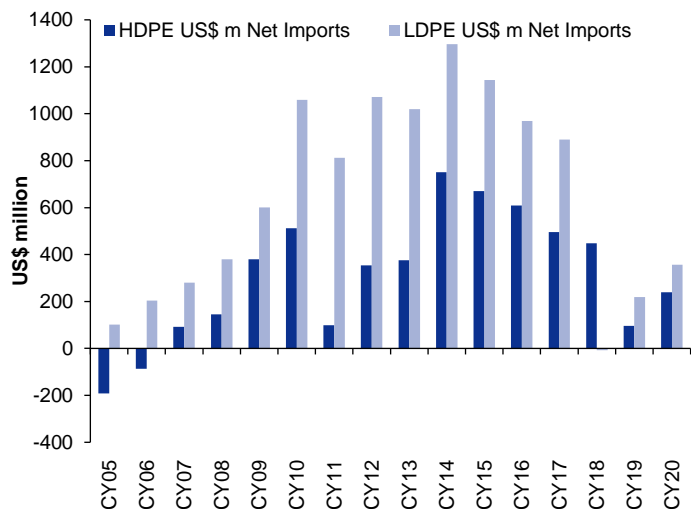
What are saturated acyclic hydrocarbons? ➤

Saturated hydrocarbons are the simplest of the hydrocarbon species. They are composed entirely of single bonds and are saturated with hydrogen. The formula for acyclic saturated hydrocarbons (i.e., alkanes) is C_nH_{2n+2} . These are the simplest compounds occurring in nature for example - methane, ethane, octane, butane etc.

Acyclic hydrocarbons are made from refined petroleum or natural gas, primarily used to make polyethylene ➤

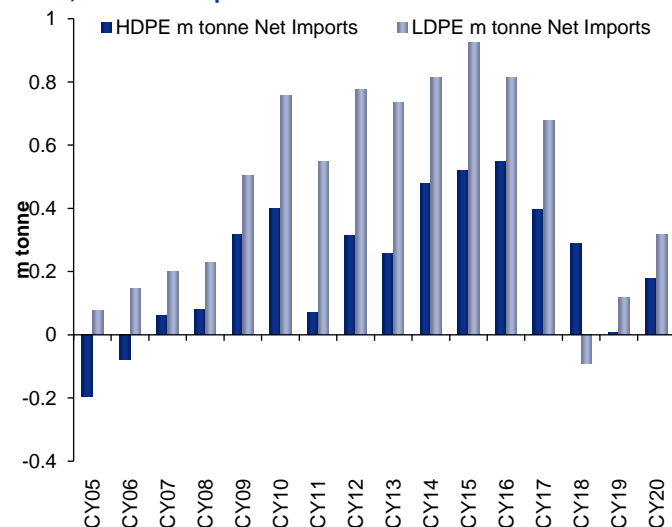
These hydrocarbons are made from refined petroleum or natural gas. Saturated acyclic hydrocarbons are commonly found in lubricants, as a solvent, and in the production of polyethylene. India is a voracious consumer of polyethylene.

Figure 23: India has been an importer of HDPE and LDPE for long, but after GAIL commissioning its capacity imports have come down



SOURCES: INCRED RESEARCH, COMPANY REPORTS

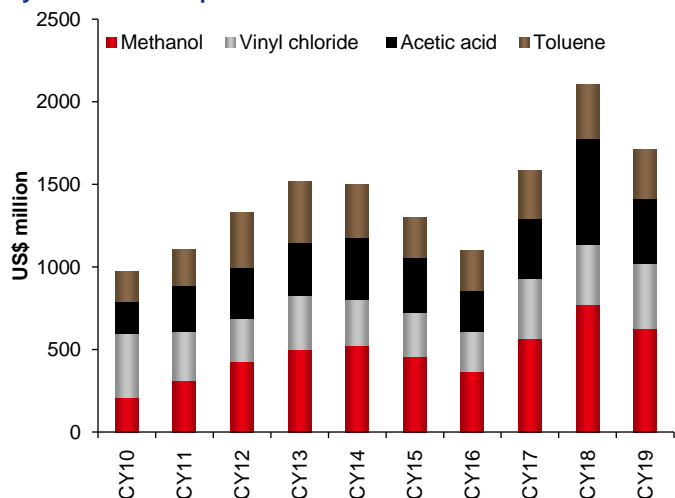
Figure 24: Despite having a capacity of 2.9mt of HDPE and LDPE, India still imports ~0.5mt HDPE+LDPE



SOURCES: INCRED RESEARCH, COMPANY REPORTS

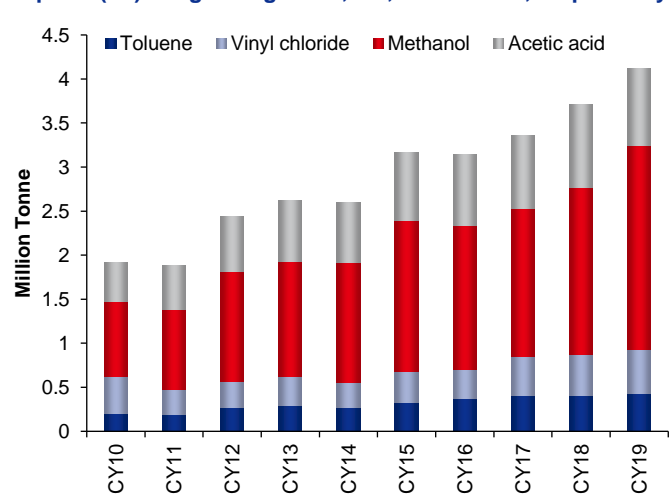
India has been a net importer of methanol, acetic acid, vinyl chloride and toluene for long

Figure 25: The value imports have been volatile, driven mainly by base crude oil prices



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 26: Toluene, methanol, acetic acid and vinyl chloride imports (mt) are growing at 9%, 2%, 8% and 12%, respectively



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Methanol has a wide usage and simple manufacturing process and there can be enough new methanol capacity in India >

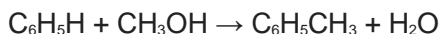
Methanol is primarily used as an industrial solvent to help create inks, resins, adhesives, and dyes. It is also used as a solvent in the manufacture of important pharmaceutical ingredients and products such as cholesterol, streptomycin, vitamins and hormones. It is also a chemical building block for hundreds of everyday products, including plastics, paints, car parts and construction materials. Methanol is also a clean energy resource used to fuel cars, trucks, buses, ships, fuel cells, boilers and cook stoves.

Natural gas is primarily used to produce methanol on an industrial scale >

On an industrial scale, methanol is predominantly produced from natural gas by reforming the gas with steam and then converting and distilling the resulting synthesized gas mixture to create pure methanol. The result is a clear, liquid, organic chemical that is water soluble and readily biodegradable.

Toluene can be produced by multiple routes >

1. Toluene is produced during petroleum refining operations, directly as a by-product of styrene manufacture and indirectly as a by-product of coke-oven operations. It is produced from petroleum as an aromatic mixture with benzene and xylene, primarily by catalytic reforming and pyrolytic cracking.
2. It is also a by-product of the production of coke from coal. Final separation and purification is done by any of the distillation or solvent extraction processes used for BTX aromatics (benzene, toluene, and xylene isomers).
3. Toluene can be prepared by a variety of methods. For example, benzene reacts with methanol in the presence of a solid acid to give toluene



Multiple uses of toluene in daily usage >

1. Toluene can be used as an octane booster in gasoline fuels for internal combustion engines as well as jet fuel.
2. Toluene is a common solvent, e.g. for paints, paint thinners, silicone sealants, rubber, printing ink, adhesives (glues), lacquers, leather tanners and disinfectants.

Vinyl chloride monomer (VCM) is produced by ethylene and chlorine >

VCM is produced by the catalytic reaction of ethylene and chlorine to produce EDC (ethylene dichloride), which is reacted for VCM. VCM is imported in India and is used to make PVC (poly vinyl chloride). PVC is further converted into CPVC (chlorinated poly vinyl chloride) to be used to manufacture water-carrying pipes and various other uses. Paste PVC is another important usage of PVC.

New VCM facilities are being planned in India by various companies, but most of them are still on the drawing board >

India will be the third-largest country within the Asian region in terms of capacity addition with a capacity increase from 0.97mt in 2019 to 2.55mt in 2024F. Adani Enterprises is also planning to install a 2mt VCM plant, which will be based on coal as a primary raw material. The company plans to source coal from Australia for the same. There are media reports about RIL's new VCM capacity. However, we don't know the stage in which these planned expansions are currently.

Acetic acid is manufactured from carbonylation of methanol ►

Most of the acetic acid is produced by methanol carbonylation. In this process, methanol and carbon monoxide react to produce acetic acid according to the equation:



The process involves iodomethane as an intermediate and occurs in three steps. A catalyst, metal carbonyl, is needed for the carbonylation (step 2).

1. $\text{CH}_3\text{OH} + \text{HI} \rightarrow \text{CH}_3\text{I} + \text{H}_2\text{O}$
2. $\text{CH}_3\text{I} + \text{CO} \rightarrow \text{CH}_3\text{COI}$
3. $\text{CH}_3\text{COI} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{HI}$

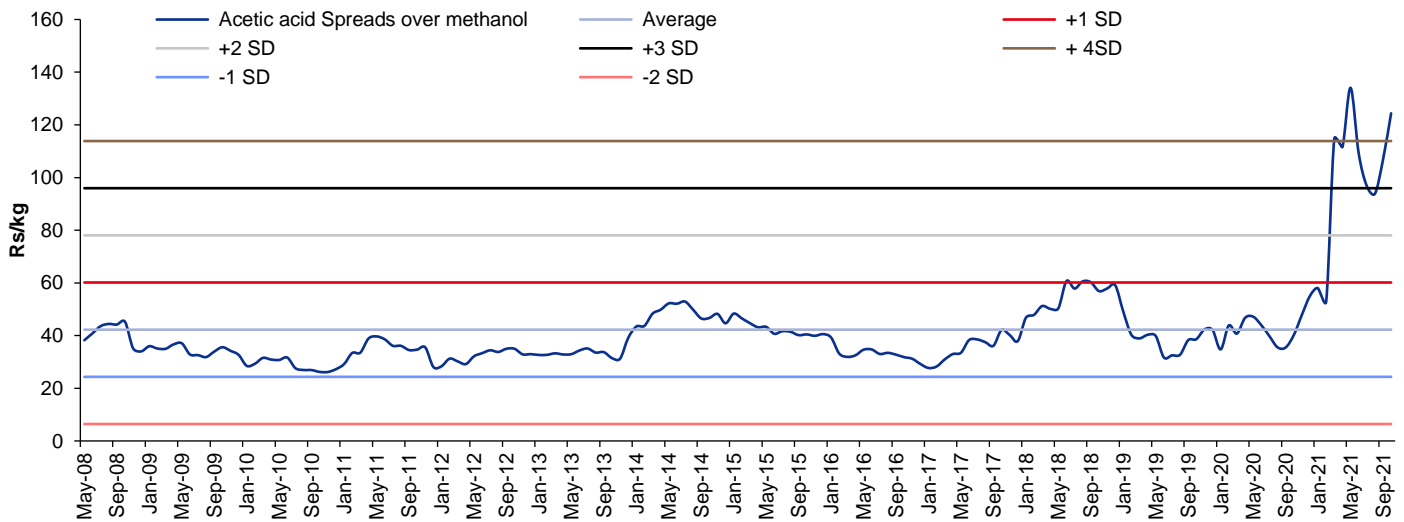
Two related processes for the carbonylation of methanol are the rhodium-catalysed Monsanto process, and the iridium-catalysed Cativa process. The latter process is greener and more efficient and has largely supplanted the former process, often in the same production plants. Catalytic amounts of water are used in both processes, but the Cativa process requires less, so the water-gas shift reaction is suppressed, and fewer by-products are formed. By altering the process conditions, acetic anhydride may also be produced on the same plant using the rhodium catalysts.

Acetic acid is used in multiple products and chemicals ►

1. The primary use of acetic acid is the production of vinyl acetate monomer (VAM). In 2008, this application was estimated to consume a third of the world's production of acetic acid. The reaction consists of ethylene and acetic acid with oxygen over a palladium catalyst, conducted in the gas phase.
2. The major esters of acetic acid are commonly used as solvents for inks, paints and coatings. The esters include ethyl acetate, *n*-butyl acetate, isobutyl acetate, and propyl acetate. They are typically produced by catalysed reaction from acetic acid and the corresponding alcohol.
3. The product of the condensation of two molecules of acetic acid is acetic anhydride. The worldwide production of acetic anhydride is a major application, and uses approximately 25% to 30% of global production of acetic acid. The main process involves dehydration of acetic acid to give ketene at 700–750 °C. Ketene is thereafter reacted with acetic acid to obtain the anhydride.
4. Glacial acetic acid is an excellent polar protic solvent, as noted above. It is frequently used as a solvent for recrystallization to purify organic compounds. Acetic acid is used as a solvent in the production of terephthalic acid (TPA), the raw material for polyethylene terephthalate (PET).
5. Acetic acid injection into a tumour has been used to treat cancer since the 1800s. Acetic acid is used as part of cervical cancer screening in many areas in the developing world. The acid is applied to the cervix and if an area of white appears after about a minute, the test is positive.
6. Acetic acid is an effective antiseptic when used as a 1% solution, with a broad spectrum of activity against streptococci, staphylococci, pseudomonas, enterococci, and others. It may be used to treat skin infections caused by pseudomonas strains resistant to typical antibiotics.

While, as of now, acetic acid making even via imported methanol makes sense, we don't know the sustainability of current spreads ➤

Figure 27: Acetic acid spreads over methanol have increased only in the recent past; sustainability of the same is a big question and hence, companies may not rush to put acetic acid plants so soon

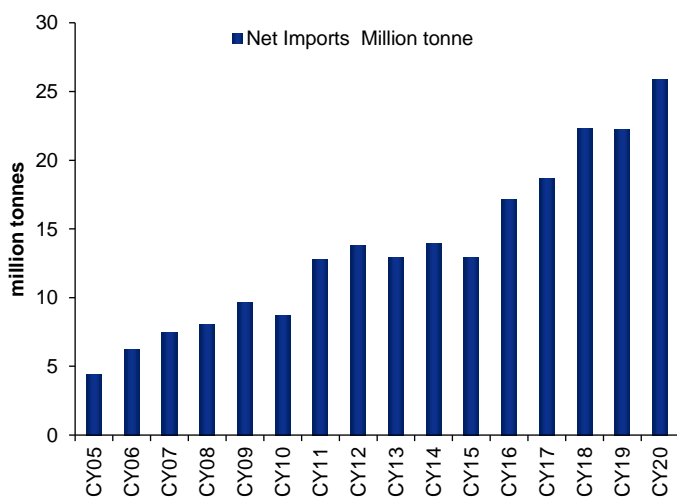


SOURCES: INCRED RESEARCH, COMPANY REPORTS

To set up acetic acid plants, one needs domestic methanol which is unavailable for Indian companies ➤

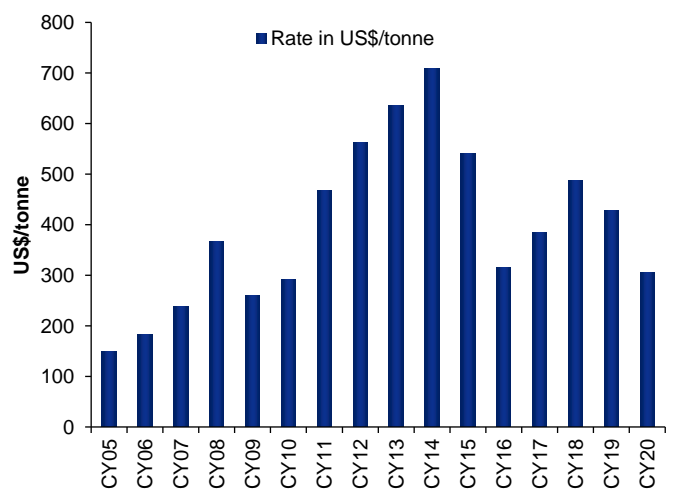
Ethanol manufacturing is normally done using natural gas, which is not easily available in India. India imports around 25mt of natural gas whose prices are quite volatile and hence, using that as a feedstock to make methanol doesn't appear to be economical.

Figure 28: Indian liquified natural gas (LNG) imports have risen exponentially



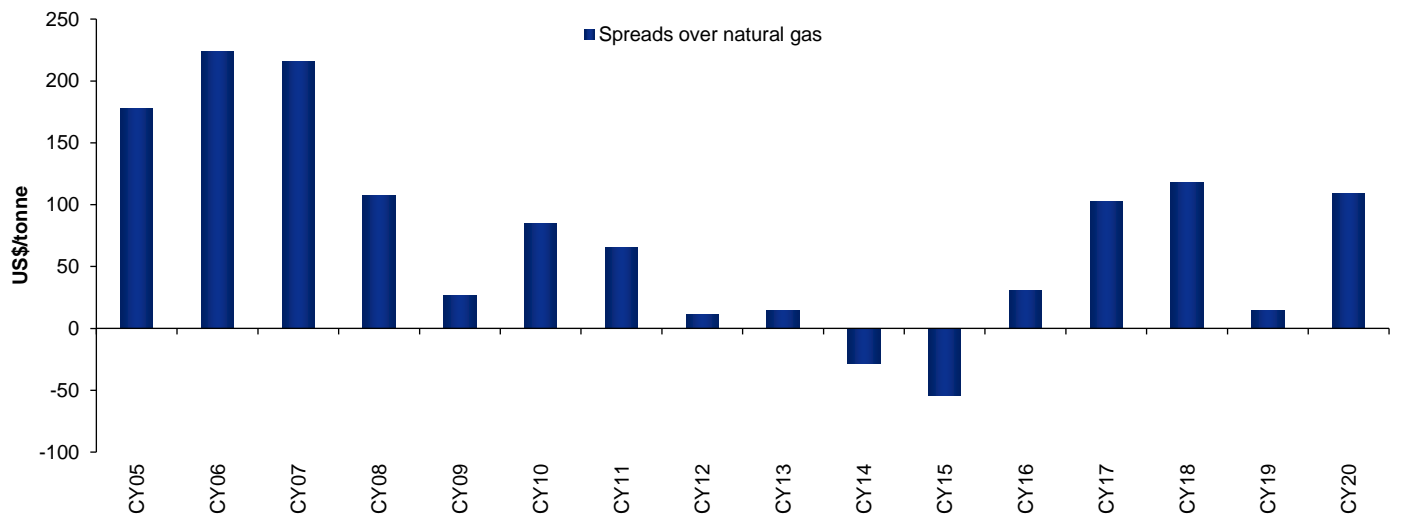
SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 29: However, high volatility in prices makes long-term investment risky, where margins are based on LNG spreads



SOURCES: INCRED RESEARCH, COMPANY REPORTS

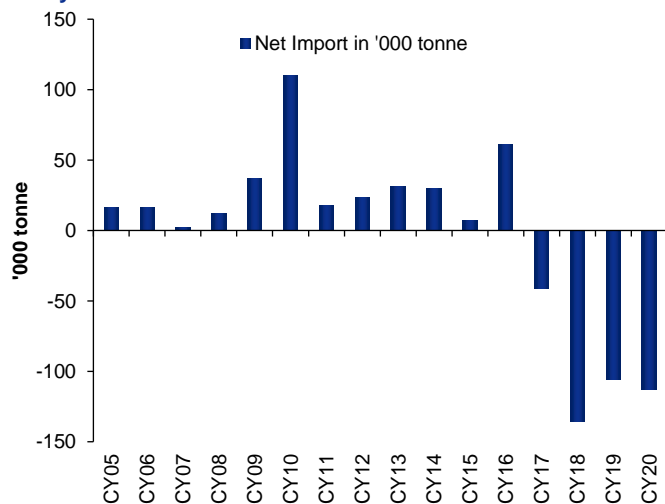
Figure 30: Indian companies cannot use imported natural gas to make methanol as the economics doesn't work out well



SOURCES: COMPANY REPORTS, INCRED RESEARCH

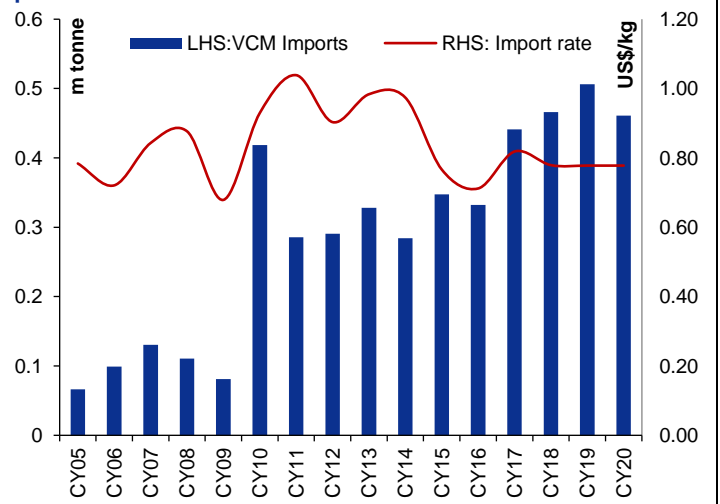
Even VCM facilities can face challenges as ethylene is not available in a sufficient quantity locally ➤

Figure 31: India has been an exporter of ethylene since last four years



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 32: VCM imports have been only increasing in the recent past



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Some listed PVC makers like Chemplast Sanmar are totally dependent on imported VCM or EDC ➤

It is indeed surprising that despite the easy availability of ethylene and declared EDC capacity, companies like Chemplast Sanmar keep importing the latter for its captive consumption. The import of EDC becomes even more surprising when it becomes clear that importing EDC is not profitable when one can make the same using ethylene and chlorine.

Figure 33: Despite the 84KT EDC capacity, Chemplast Sanmar has been importing the same since last five years

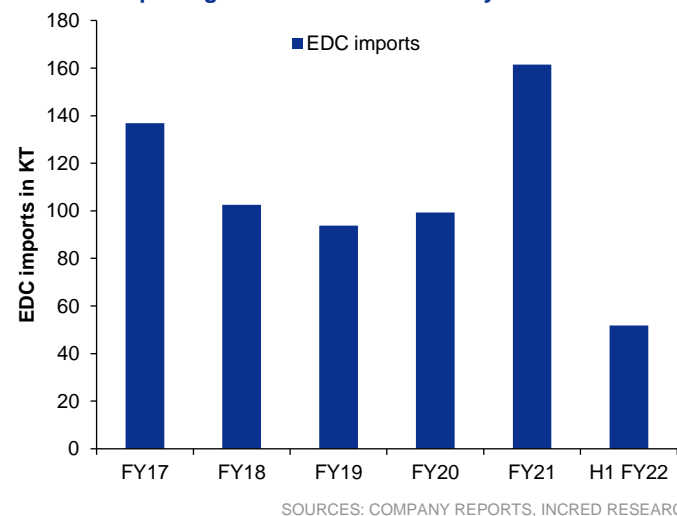
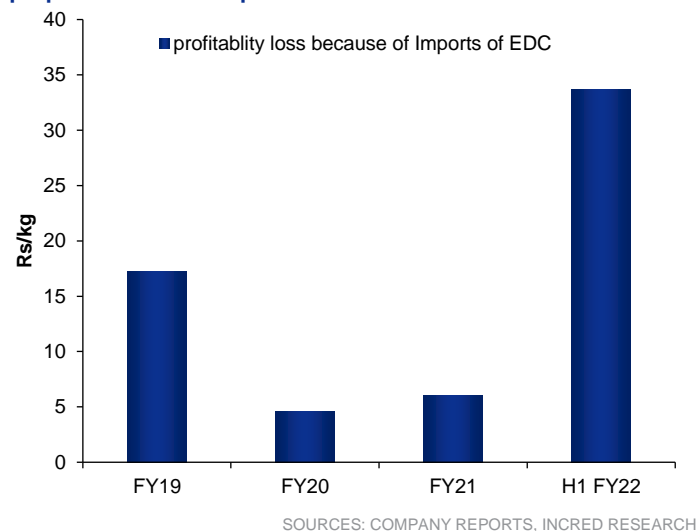


Figure 34: It's clear that importing EDC is a lose-lose proposition for Chemplast Sanmar



Given India is a big importer of VCM and EDC, building capacity is a requirement ➤

India has several PVC producers as well as ethylene suppliers and hence, its quite natural to put EDC and VCM capacities in the country. A number of companies are showing interest in this regard.

Esters of acrylic acid, IPA, acrylonitrile, pencillins and vinyl acetate are important import items

Figure 35: IPA, acrylic acid esters, acrylonitrile, VAM (vinyl acetate monomer) and pencillins are other important import items

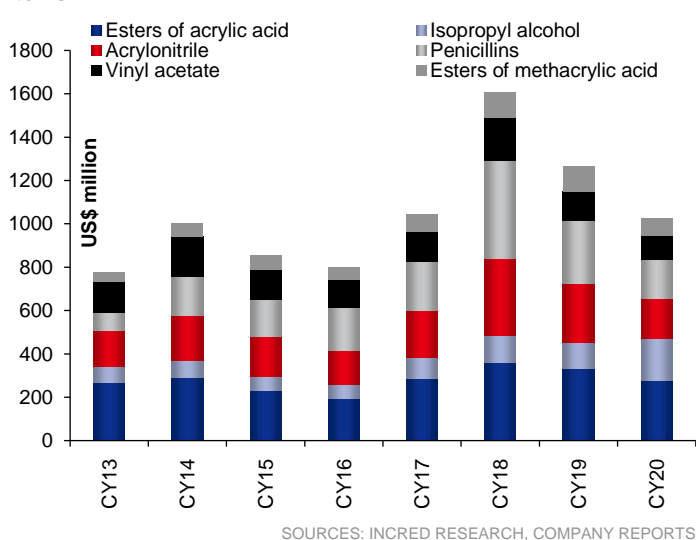
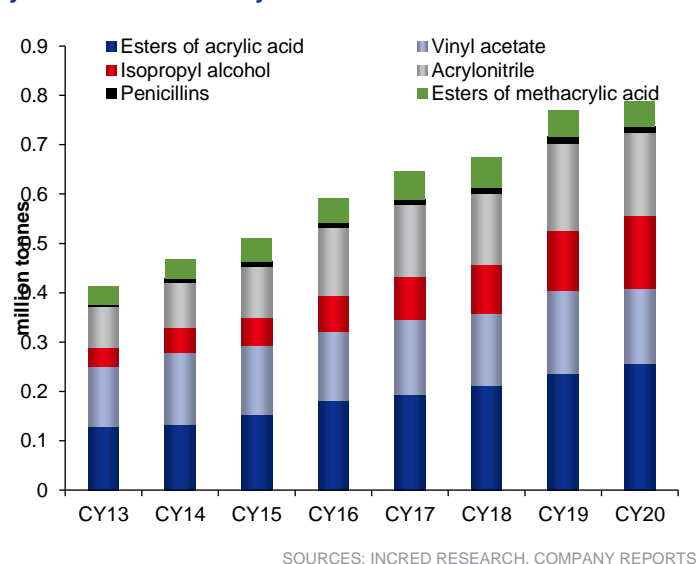


Figure 36: The net imported quantity (in mt) is increasing every year for the last seven years



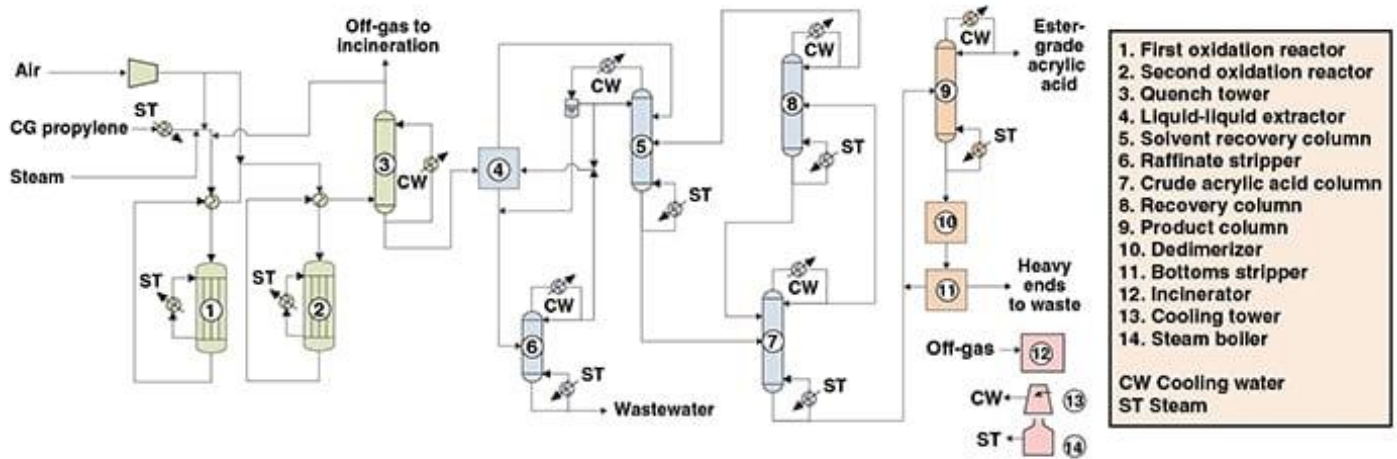
Ester of acrylic acid or acrylates/methacrylates have varied usage ➤

Acrylates are industrially prepared by treating acrylic acid with the corresponding alcohol in the presence of a catalyst. The reaction with lower alcohols (methanol, ethanol) takes place at 100–120°C with acidic heterogeneous catalysts (cation exchanger). The reaction of higher alcohols (*n*-butanol, 2-ethylhexanol) is catalysed with sulfuric acid in a homogeneous phase. Acrylates of even higher alcohols are obtainable by transesterification of lower esters catalysed by titanium alcoholates or organic tin compounds (e.g. dibutyltin dilaurate).

Acrylates have found application in the manufacture of co-polymers for coatings and paints, sealants, adhesives, textile fibres, and printing inks. It is a highly superabsorbent polymer and thus used in diapers. Thermoplastic acrylate co-polymers are used in biomedicine and a variety of other advanced application areas.

Acrylic acid is manufactured by double oxidation of propylene, with technology available from Lurgi/ Nippon Kayaku ▶

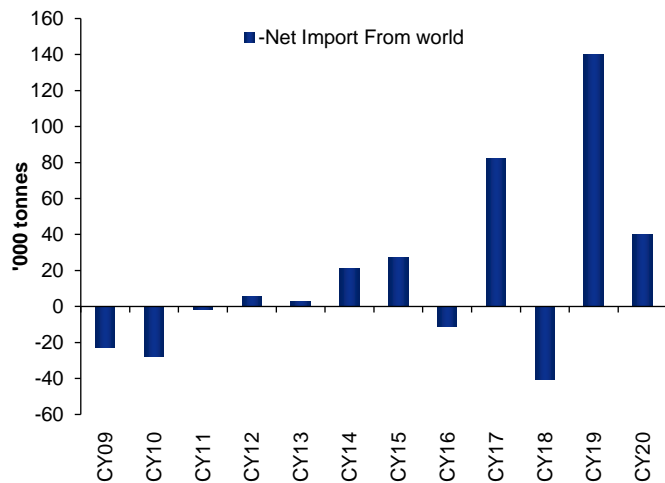
Figure 37: Acrylic acid is manufactured from double oxidation of propylene



SOURCES: INCRED RESEARCH, COMPANY REPORTS

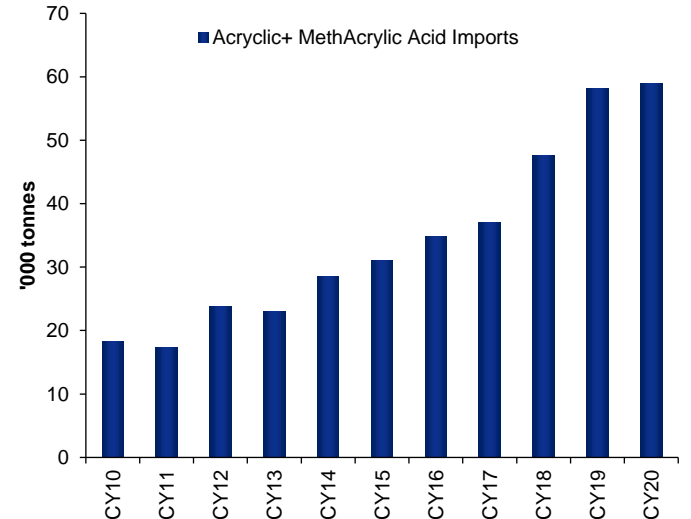
India appears to have a balanced market for propylene, but imports acrylic and methacrylic acid ▶

Figure 38: Indian exports and imports are balanced barring some odd years



SOURCES: INCRED RESEARCH, COMPANY REPORTS

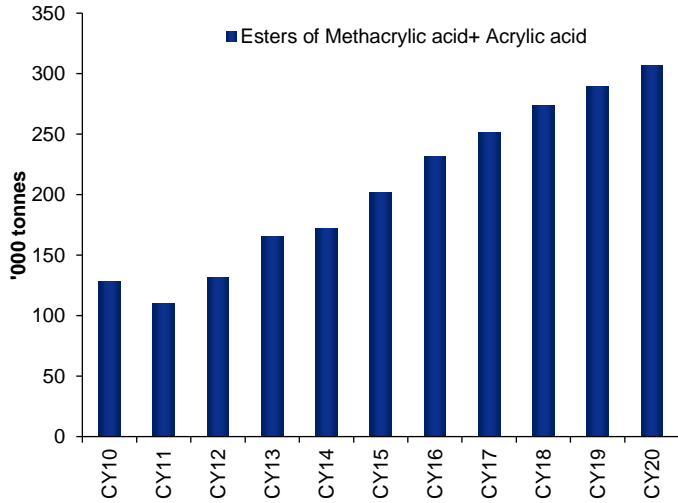
Figure 39: However, Indian acrylic and methacrylic acid imports have risen year after year



SOURCES: INCRED RESEARCH, COMPANY REPORTS

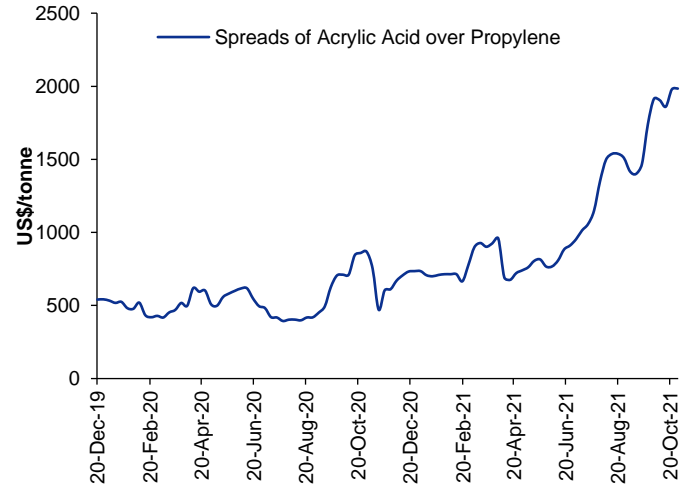
Apart from these, India imports ester of acrylic and methacrylic acid ➤

Figure 40: Indian net imports of acrylates and methacrylate exceeded 300KT in CY20



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 41: Making acrylic acid from propylene is highly profitable now

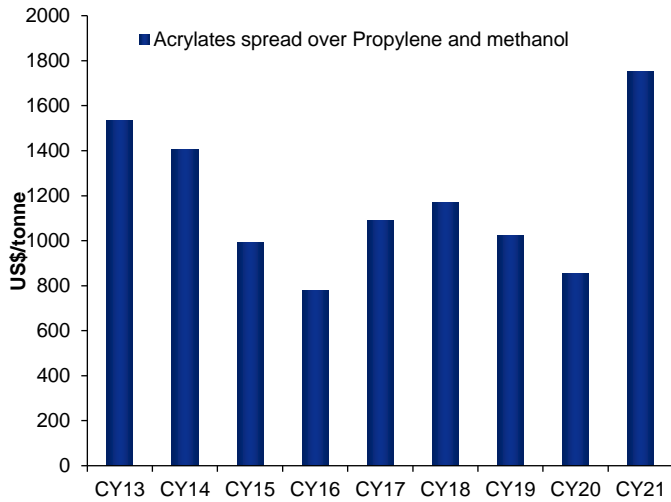


SOURCES: INCRED RESEARCH, COMPANY REPORTS

A combined propylene and acrylates plant will make more money now than any other time during the past decade ➤

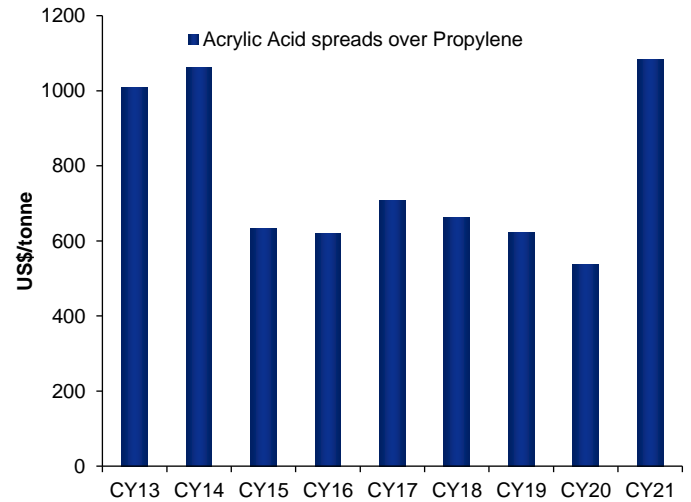
Assuming propylene is transferred to the acrylate plant on an arm's length basis, current spreads on simple methyl acrylate are higher than ever since the last 12 years.

Figure 42: Acrylates spreads over propylene and methanol are at the highest level since the last decade



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 43: Acrylates are merely following acrylic acid spreads over propylene

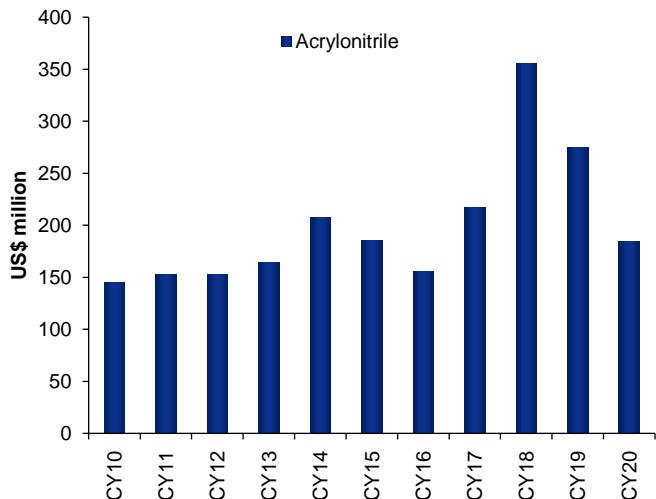


SOURCES: INCRED RESEARCH, COMPANY REPORTS

Acrylonitrile is another important commodity for Indian companies >

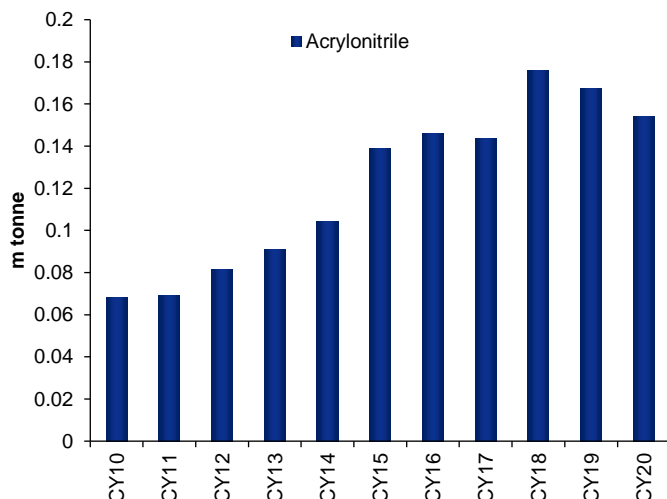
Multiple companies like Vinati Organics are big consumers of acrylonitrile. Almost all of them import this commodity from international markets.

Figure 44: The value growth in imports has been at a 6% CAGR over the last decade



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Figure 45: Indian acrylonitrile imports have risen at a 10% CAGR over CY10-CY19



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Propylene is the main raw material for acrylonitrile >

Acrylonitrile is produced by catalytic ammoxidation of propylene, also known as the SOHIO process. Acetonitrile and hydrogen cyanide are significant by-products that are recovered for sale. In fact, the 2008–2009 acetonitrile shortage was caused by a decrease in demand for acrylonitrile.

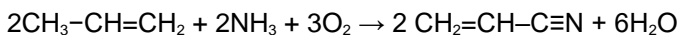
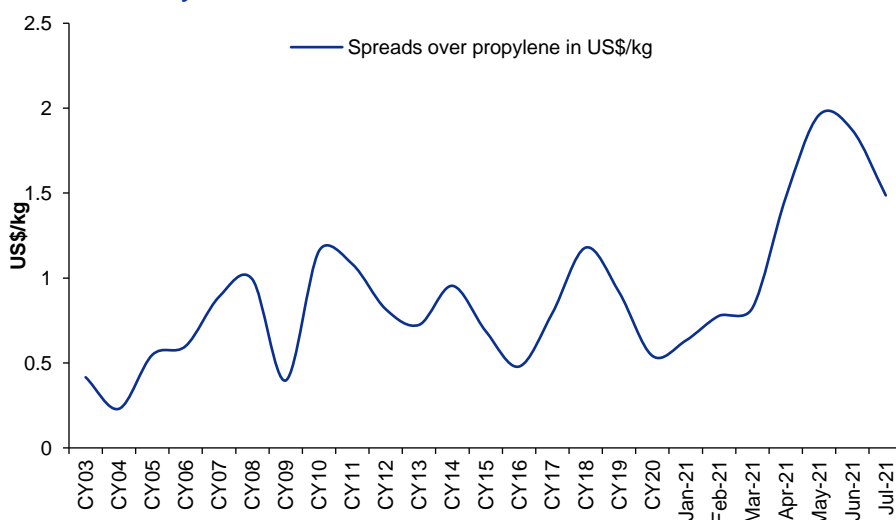


Figure 46: During May 2021, acrylonitrile spreads over propylene were the highest since the last 20 years



SOURCES: INCRED RESEARCH, COMPANY REPORTS

Propylene is available in India easily and hence, its surprising that there is no significant acrylonitrile capacity in the country >

India has significant propylene capacity and at the same time ammonia availability is also not a constraint and hence, it is surprising that there is no significant acrylonitrile capacity in the country. Given approximately 200KT imports, there is a need for a dedicated acrylonitrile capacity in the country.

Deepak Nitrite is already doing expansion of its IPA capacity ➤

While Deepak Nitrite is already expanding its IPA capacity by 30KT, there is a need for more IPA capacity. Imports are still around 150KT, which means Deepak Nitrite’s IPA plant will be able to meet only 25% of the import demand.

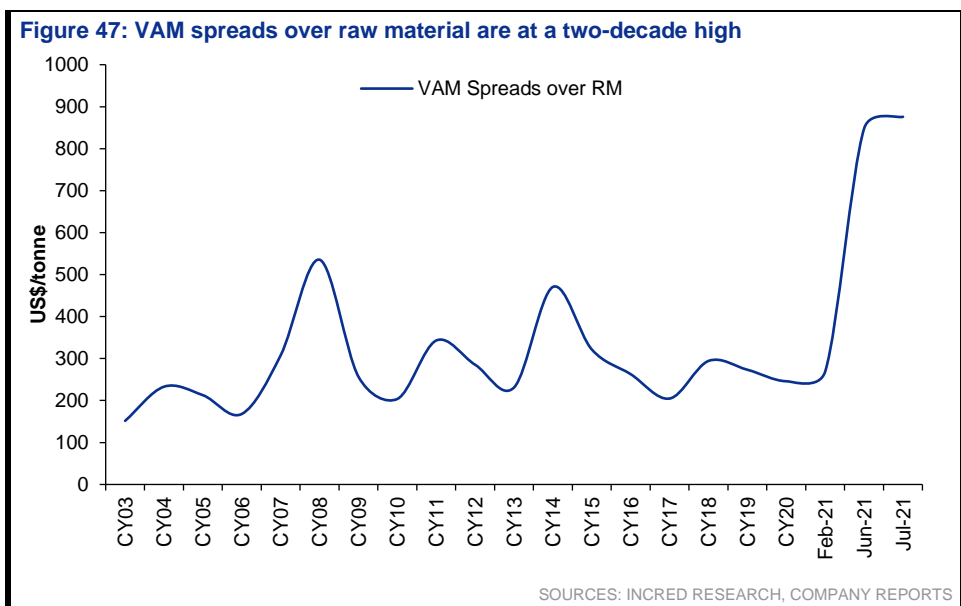
Vinyl acetate monomer is the principal component for adhesives ➤

Vinyl acetate monomer (VAM) is a key intermediate used in the making of a number of polymers and resins for adhesives, coatings, paints, films, textiles and other end-products. The largest derivative is polyvinyl acetate (PVA) which is mainly used in adhesives as it has good adhesion properties to a number of substrates including paper, wood, plastic films and metals. Other uses for PVA include paper coatings, paints and industrial coatings.

Vinyl acetate is produced by a catalytic reaction of acetic acid oxygen and ethylene ➤

VAM manufacturing is very lucrative now, but plants will have issues in acetic acid as well as ethylene availability. Mostly, they will have to depend on imports which may not be an ideal scenario as of now. Moreover, mastering the complex catalytic process may not be easy for companies.

VAM spreads over raw material at a two-decade high may not sustain for long ➤



Container congestion at ports is fuelling price rise of VAM, but as container congestion eases prices will come down ➔

Figure 48: There has been a dramatic fall in international exports of VAM

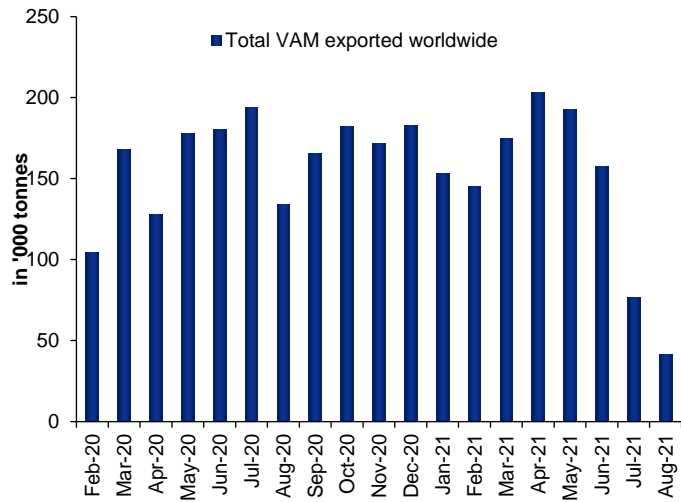


Figure 49: However, as container congestion eases, VAM prices will come down; easing of congestion is shown by falling container freight rates



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The survey result is as of the date appearing in the Corporate Governance Report of Thai Listed Companies. As a result, the survey result may be changed after that date. CGS-CIMB Thailand does not confirm nor certify the accuracy of such survey result.

Score Range:	90 - 100	80 – 89	70 - 79	Below 70	No Survey Result
Description:	Excellent	Very Good	Good	N/A	N/A

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Corporate Governance Report of Thai Listed Companies (CGR). CG Rating by the Thai Institute of Directors Association (Thai IOD) in 2020, Anti-Corruption 2020

ADVANC – Excellent, Certified, **AMATA** – Excellent, Certified, **ANAN** – Excellent, n/a, **AOT** – Excellent, n/a, **AP** – Excellent, Certified, **ASP** – Excellent, n/a, **AU** – Good, n/a, **BAM** – Very Good, Certified, **BAY** – Excellent, Certified, **BBL** – Very Good, Certified, **BCH** – Good, Certified, **BCP** - Excellent, Certified, **BCPG** – Excellent, Certified, **BDMS** – Excellent, n/a, **BEAUTY** – Good, n/a, **BH** - Good, n/a, **BJC** – Very Good, n/a, **BLA** – Excellent, Certified, **BTS** - Excellent, Certified, **CBG** – Very Good, n/a, **CCET** – n/a, n/a, **CENTEL** – Excellent, Certified, **CHAYO** – Very Good, n/a, **CHG** – Very Good, n/a, **CK** – Excellent, n/a, **COM7** – Very Good, Certified, **CPALL** – Excellent, Certified, **CPF** – Excellent, Certified, **CPN** - Excellent, Certified, **CPNREIT** – n/a, n/a, **CRC** – Very Good, n/a, **DELTA** - Excellent, Certified, **DDD** – Very Good, n/a, **DIF** – n/a, n/a, **DOHOME** – Very Good, n/a, **DREIT** – n/a, n/a, **DTAC** – Excellent, Certified, **ECL** – Excellent, Certified, **EGCO** - Excellent, Certified, **EPG** – Excellent, Certified, **ERW** – Very Good, Certified, **GFPT** - Excellent, Certified, **GGC** – Excellent, Certified, **GLOBAL** – Very Good, n/a, **HANA** - Excellent, Certified, **HMPRO** - Excellent, Certified, **HUMAN** – Good, n/a, **ICHI** – Excellent, Certified, **III** – Excellent, n/a, **INTUCH** - Excellent, Certified, **IRPC** – Excellent, Certified, **ITD** – Very Good, n/a, **IVL** - Excellent, Certified, **JASIF** – n/a, n/a, **JKN** – Excellent, Declared, **JMT** – Very Good, Declared, **KBANK** - Excellent, Certified, **KCE** - Excellent, Certified, **KEX** – n/a, n/a, **KKP** – Excellent, Certified, **KSL** – Excellent, Certified, **KTB** - Excellent, Certified, **KTC** – Excellent, Certified, **LH** - Excellent, n/a, **LPN** – Excellent, Certified, **M** – Very Good, Certified, **MAKRO** – Excellent, Certified, **MC** – Excellent, Certified, **MEGA** – Very Good, n/a, **MINT** - Excellent, Certified, **MTC** – Excellent, Certified, **NETBAY** – Very Good, n/a, **NRF** – n/a, n/a, **OR** – n/a, n/a, **ORI** – Excellent, Certified, **OSP** – Very Good, n/a, **PLANB** – Excellent, Certified, **PRINC** – Very Good, Certified, **PR9** – Excellent, n/a, **PSH** – Excellent, Certified, **PTT** - Excellent, Certified, **PTTEP** - Excellent, Certified, **PTTGC** - Excellent, Certified, **QH** – Excellent, Certified, **RBF** – Good, n/a, **RS** – Excellent, n/a, **RSP** – Good, n/a, **S** – Excellent, n/a, **SAK** – n/a, n/a, **SAPPE** – Very Good, Certified, **SAWAD** – Very Good, n/a, **SCB** - Excellent, Certified, **SCC** – Excellent, Certified, **SCGP** – n/a, n/a, **SHR** – Very Good, n/a, **SIRI** – Excellent, Certified, **SPA** – Very Good, n/a, **SPALI** - Excellent, Declared, **SPRC** – Excellent, Certified, **SSP** - Good, Declared, **STEC** – n/a, n/a, **SVI** – Excellent, Certified, **SYNEX** – Very Good, n/a, **TCAP** – Excellent, Certified, **THANI** – Excellent, Certified, **TIDLOR** – n/a, n/a, **TISCO** - Excellent, Certified, **TKN** – Very Good, n/a, **TMB** - Excellent, Certified, **TOP** - Excellent, Certified, **TRUE** – Excellent, Certified, **TU** – Excellent, Certified, **TVO** – Excellent, Certified, **VGI** – Excellent, Certified, **WHA** – Excellent, Certified, **WHART** – n/a, n/a, **WICE** – Excellent, Certified, **WORK** – Good, n/a.

- CG Score 2020 from Thai Institute of Directors Association (IOD)

- Companies participating in Thailand's Private Sector Collective Action Coalition Against Corruption programme (Thai CAC) under Thai Institute of Directors (as of January 30, 2021) are categorised into: companies that have declared their intention to join CAC, and companies certified by CAC.

Recommendation Framework

Stock Ratings

Definition:

Add	The stock's total return is expected to exceed 10% over the next 12 months.
Hold	The stock's total return is expected to be between 0% and positive 10% over the next 12 months.
Reduce	The stock's total return is expected to fall below 0% or more over the next 12 months.

The total expected return of a stock is defined as the sum of the: (i) percentage difference between the target price and the current price and (ii) the forward net dividend yields of the stock. Stock price targets have an investment horizon of 12 months.

Sector Ratings

Definition:

Overweight	An Overweight rating means stocks in the sector have, on a market cap-weighted basis, a positive absolute recommendation.
Neutral	A Neutral rating means stocks in the sector have, on a market cap-weighted basis, a neutral absolute recommendation.
Underweight	An Underweight rating means stocks in the sector have, on a market cap-weighted basis, a negative absolute recommendation.

Country Ratings

Definition:

Overweight	An Overweight rating means investors should be positioned with an above-market weight in this country relative to benchmark.
Neutral	A Neutral rating means investors should be positioned with a neutral weight in this country relative to benchmark.
Underweight	An Underweight rating means investors should be positioned with a below-market weight in this country relative to benchmark.