
Balaji Amines

— -Vishnu Ch (@vishnu570) —

DISCLAIMER

This presentation is prepared solely to provide information about this company and take feedback from the readers. This presentation is NOT meant for equity investment. It should NOT be construed as an investment advice for buy/sell/hold or any other form of recommendation. This presentation does not recommend any price or price target for the company discussed. Investment in equity shares has its own risks. The information contained herein is based on my study and upon sources that I consider reliable. I, however, do not vouch for the accuracy or the completeness thereof. This material is for personal information and not intended for any investment decisions. I am not responsible for any profit or loss incurred based upon it & take no responsibility whatsoever for any financial profits or loss which may arise from the discussion thread above/anywhere in communication. It is safe to assume that I, my family have vested interest in any of the companies/stocks discussed/presented here. Please do your due diligence and take the help of a qualified advisor before you take any financial decision. NOT a SEBI Registered Investment Advisor/Analyst.

Topics to be covered

- Aliphatic Amines Industry Overview
- Balaji Amines v/s Alkyl Amines
- Balaji Amines Capacities
- Triggers/Catalysts
 - Mancozeb (EDA) – Immediate/Short Term (Q4 FY19)
 - MIPA – Medium Term (H2 FY20)
 - 6-PPD (MIBK) – Long Term (FY21-22)
 - DMA HCL (Metformin) – Long Term (FY22 and beyond)
- RM Supply: Low Cost Methanol ?? (Circular Economy)
- Risks

Nature of Industry

Domestic aliphatic-amines is an INR 1,200 cr industry with an oligopoly structure created by high barriers to entry due to limited technological know-how. The industry's growth potential is driven by its major end-user sectors pharmaceuticals and agro-chemicals. Over the past few years, the industry participants have also started exports to the European nations as well as other developing markets.

Opportunity Size

High quality and cost competitiveness has stretched opportunity size beyond the domestic amines industry. Expansion into specialty chemicals with import substitution potential and globally growing demand has open the industry participants to a much larger market.

Capital Allocation

Brownfield capex of INR 60 crore has been completed by the company in FY18 with internal accruals. BAL has also announced an investment of INR 66 crore into Balaji Specialty Chemicals limited for 51% stake in the firm.

Predictability

Regulatory hindrances and limited information from secondary markets may impact predictability

Sustainability

Very difficult to dislodge clients due to high switching cost; Scope to expand globally will ensure sustainability

Disproportionate Future

The shift from core methylamines to higher derivatives and specialty chemicals will ensure that the future performance in terms of return ratios will be better than the past as asset turnover and margins will steadily improve

Business Strategy & Planned Initiatives

Current focus is towards ramping up existing capacities and simultaneously looking out for expansion opportunities

Near Term Visibility

Strong visibility for 31% CAGR bottom line growth along with 230 bps improvement in operating margins from FY17-FY19E

Long Term Visibility

To remain one of the largest aliphatic amines capacity players with increasing regulated market presence

Methylamines
Monomethylamine

Caffeine (stimulant, diuretic)
Sevin/carbaryl (insecticide)
Various other insecticides
Various other herbicides
Various other pesticides
Water gel explosives
Photographic developers
Analgesics (Demerol)
Antispasmodics

Dimethylamine

Fungicides
Dimethyl Formamide (solvent)
Rubber accelerators, processing agents
Propellants
anithistamatic (Benadryl)
Catalysts (Urethane)
Surfactants
Water Treatment
Detergents
Germicides
Herbicides

Trimethylamine

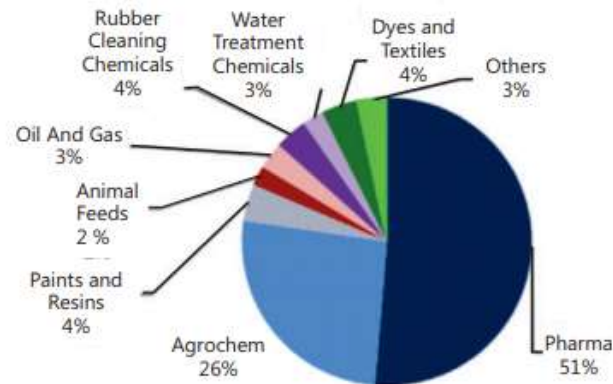
Epoxy Resin Accelerators
Acid Scavenger (Nylon, Benzyl Esters)
Choline Chloride
Ion Exchange Resins (with crosslinked polystyrene)
Gelling Inhibitor (Polyester)

Methylamine End User Industries

Source:

<https://www.methanolmsa.com/methanol/>

Industry Wise Revenue Break Up In FY17



Source: Balaji Amines AR FY18

BAL/AACL position in the Value Chain

- Alkylamines are organic compounds produced through reaction of an alcohol with ammonia
- Difficult to substitute and to replicate
- Small portion of customers' overall costs. Contracts are typically on Cost-Pass-Through model with 1 month lag.
- Low cost model through heat and steam recycling (optimizing energy efficiency)
- Manufacturing flexibility to shift production among derivatives
- Large Pharma and Agro-Chem customer base
- Neutral supplier to customers by not competing in certain downstream end markets

Alkylamines are the Highest Valued Amines

Alkylamines

Industry Characteristics

- ~20% EBITDA margins
- Highest valued amine
- Non-cyclical end-markets
- Niche industry

Significant Players



Ethanol Amines

Industry Characteristics

- Mid-teens EBITDA margins (10-15% estimated)
- Very fragmented market
- Focused on cyclical growth markets
- Global overcapacity with several regional expansions planned

Significant Players



Ethylene Amines

Industry Characteristics



















- High-teens EBITDA margins (15-20% estimated)
- Focused on developing markets
- Current significant players expected to cede market share in the mid-term (due to weak position in emerging markets)

Significant Players



Global Amines Scoresheet

- Alkylamines and their derivatives is a noticeably more defensive industry than either Ethanol or Ethylene Amines and their derivatives

	Alkylamines	Ethanol Amines	Ethylene Amines	Comments
Niche Industry				<ul style="list-style-type: none"> Taminco is clear global leader in alkylamines and derivatives with few players Other amines experiencing an increased number of low-cost competitors (e.g. in Asia)
Not Able to Be Transported Easily				<ul style="list-style-type: none"> Ethanol Amines and Ethylene Amines are relatively more thermally stable molecules making them conducive to transport
Player Vertical Integration				<ul style="list-style-type: none"> All key players of each sector are vertically integrated into several derivatives although many derivatives are also produced by 3rd parties in Ethanol and Ethylene Amines space Taminco and BASF offer very broad array of derivatives produced on same sites as alkylamines
End Market Diversity				<ul style="list-style-type: none"> Ethanol Amines offers lowest end market diversity with key focus on commodity surfactants and gas/metal working
High Rates of Customer Loyalty and High Switching Costs				<ul style="list-style-type: none"> Taminco and BASF have cost advantages from vertical integration
Secular Growth				<ul style="list-style-type: none"> Taminco and BASF less focused on industrial end-markets

... leading to an oligopolistic market structure

Region	Key players	
Europe	BASF	Arkema
US	Eastman	Huntsman
Japan	Mitsubishi Gas	Koep Chemical
China	Feicheng Acid	Shandong Huala Hengsheng
India	Balaji (BAL)	Alkyl Amines (AACL)

While Indian players like AACL and RCF have procured the amines technology from Leonard Process Technology, BAL claims to have developed it indigenously.

<http://www.acid-amine.com/profile.htm>

Focus Charts – Story in a nutshell

Highest capacity in methylamines and derivatives with rapid expansion plan within the duopolistic domestic industry



* all numbers in metric tonnes per annum (MTPA)

Higher capacity utilization with import substitution and exports to fuel revenue growth



Contribution of profit margins to ROE consistently rising



Consistent capex towards high-value derivatives and specialty chemicals.....



....materialized into higher margins



Product Profile



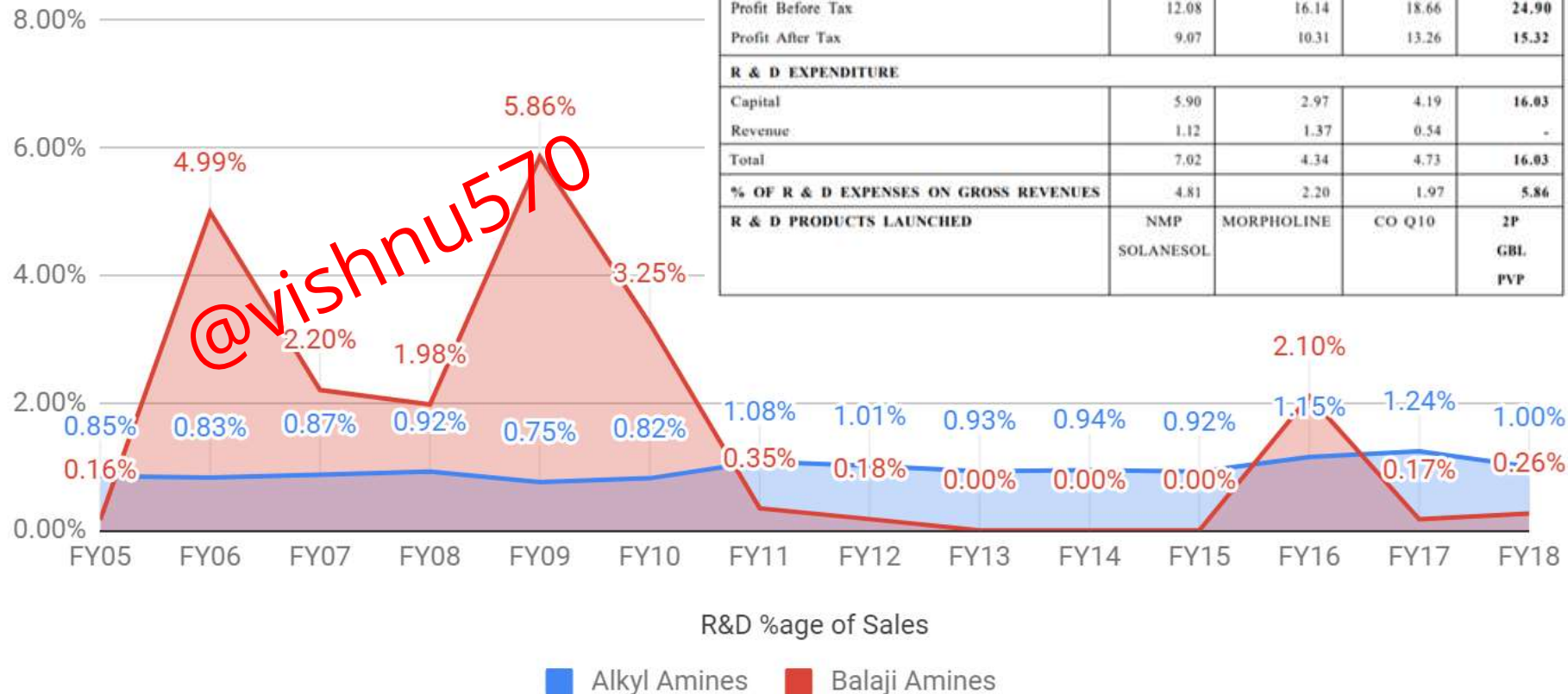
Alkyl Amines Chemicals Limited

MethylAmines	Capacity: 48,000TPA Utilization: 100% Captive consumption: 75%	Capacity: 30,000TPA Utilization: 70% Captive consumption: 50%
	Market size=60,000TPA. More than half is used for captive consumption. Rest to meet domestic requirement Methyl Amine Prices= Rs 80/Kg. EBITDA margin= 25%	
EthylAmines	Capacity: 6,000TPA Utilization: 95%	Capacity: 15,000TPA + 15,000 TPA(patalganga)
	Margins are better in Ethylamines than in Methylamines.	
DMF(Dimethyl Formaldehyde)	Capacity: 30,000TPA Utilization: 33%	Capacity: 0TPA
	Pricing pressure. Balaji Amines applied for ADD but it was not granted	
DMA HCL(Dimethylamine Hydrochloride)	Capacity: 22,000TPA + 7500TPA(Waiting for NOC) Utilization: 95%	Capacity: 13,000 TPA Utilization: 100%
	Used to manufacture Metformin. A Common medication to treat diabetes. Increasing demand for this product.	
DMAC(Dimethyl acetamide)	Capacity: 6000TPA Utilization: 70%	Anti Dumping duty imposed on the imports in May 2018.
	Capacity: 10,000TPA Company waiting to get the NOC to start production	Capacity: 10,000TPA Utilization: 90% 50% market share Given the pricing pressure, the company has put the planned expansion on hold
Acetonitrile	Market size=15000TPA. Additional capacity meant for export. Current prices= 120/kg Acetonitrile is being manufactured from Acetic acid and not acrylonitrile.	
Morpholine	Capacity: 4000TPA+6000TPA(Waiting for NOC) Used to make antibiotics, analgesics, additives for corrosion protection etc	

Source:

<https://myinvestmentdiary.com/company-analysis/balaji-amines-and-alkyl-amines>

R&D as %age of Sales



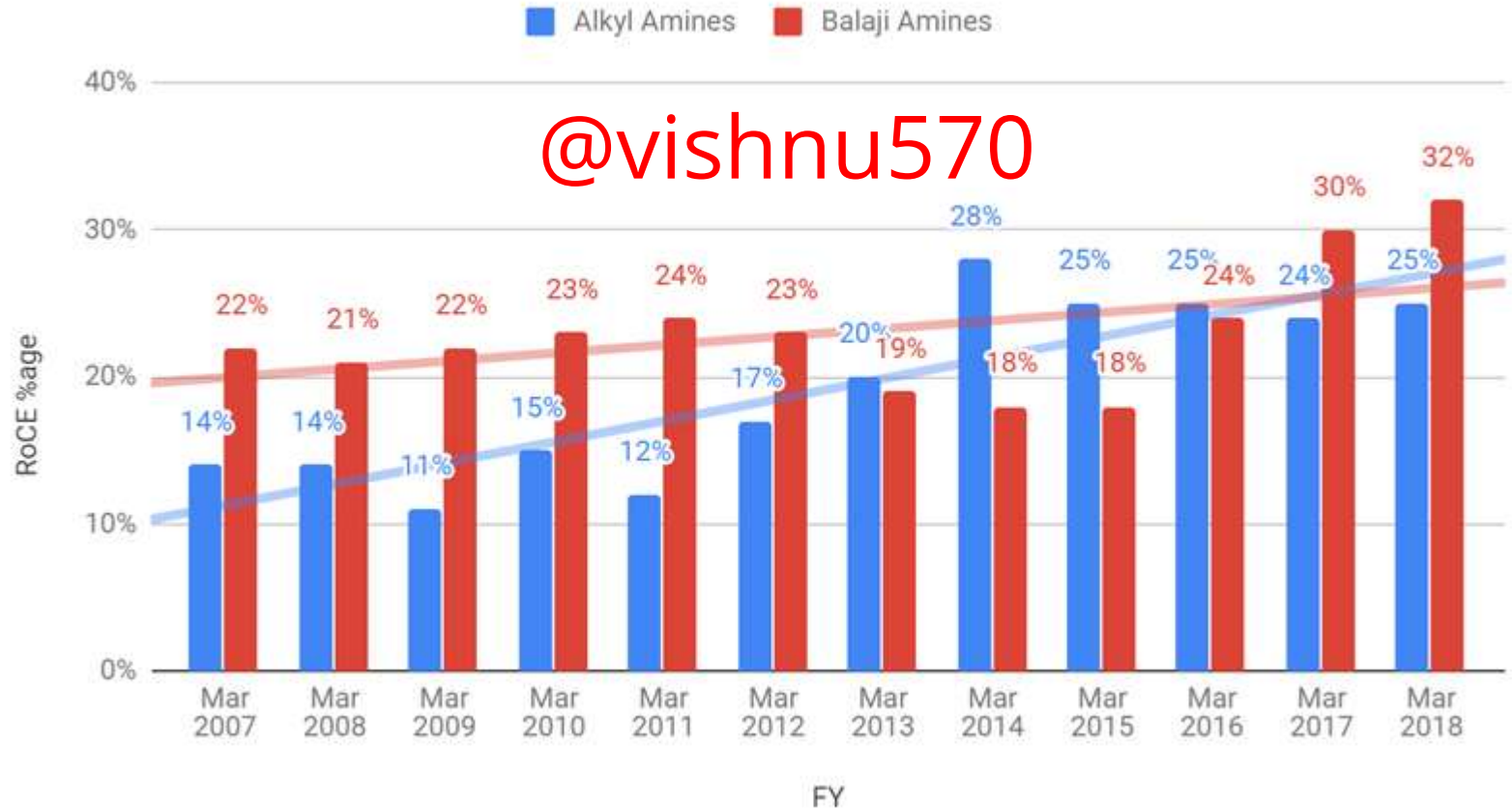
PARTICULARS	2005-2006	2006-2007	2007-2008	2008-2009
Gross Sales	145.89	197.29	239.67	273.58
Net Sales	128.61	175.50	217.82	252.20
Profit Before Tax	12.08	16.14	18.66	24.90
Profit After Tax	9.07	10.31	13.26	15.32
R & D EXPENDITURE				
Capital	5.90	2.97	4.19	16.03
Revenue	1.12	1.37	0.54	-
Total	7.02	4.34	4.73	16.03
% OF R & D EXPENSES ON GROSS REVENUES	4.81	2.20	1.97	5.86
R & D PRODUCTS LAUNCHED	NMP SOLANESOL	MORPHOLINE	CO Q10	2P GBL PVP

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
PARTICULARS (in LAKHS)	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
	ALKYL AMINES														
R&D Expenditure															
Capital		1.71	13.77	0	15.24	92.59	89.83	70.31	82.71	3.43	24.09	16.41	112.69	29.27	20
Revenue		90.95	86.29	120.68	140.86	64.46	96.84	202.3	208.12	336.06	397.08	423.04	443.01	516.02	472
Total		92.66	100.06	120.68	156.1	157.05	186.67	272.61	290.83	339.49	421.17	439.45	555.7	545.29	492
R&D %age of Sales		0.85%	0.83%	0.87%	0.92%	0.75%	0.82%	1.08%	1.01%	0.93%	0.94%	0.92%	1.15%	1.24%	1.00%
	BALAJI AMINES														
R&D Expenditure															
Capital	0	0	590	297.17	419.18	1603	622.07	133	85.35	0	0	0	1268	60	179
Revenue	6.62	14.28	112	137.39	54.28	0	277.7	0	0	0	0	0	33	56	50
Total	6.62	14.28	702	434.56	473.46	1603	899.77	133	85.35	0	0	0	1301	116	229
R&D %age of Sales		0.16%	4.99%	2.20%	1.98%	5.86%	3.25%	0.35%	0.8%	0.00%	0.00%	0.00%	2.10%	0.17%	0.26%
PARTICULARS (in LAKHS)	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	12 Year CAGR
	BALAJI AMINES														
Exports	1262	2046	3129	4653	5331	6127	7018	11862	12081	14575	14109	11855	12573	16134	21.66%
%age	14.38%	14.55%	15.86%	19.41%	19.49%	22.11%	18.23%	24.41%	21.72%	21.84%	23.78%	19.12%	18.70%	18.59%	
	ALKYL AMINES														
Exports	1829	1807	2499	3649	3896	4073	4678	6361	7725	9315	8497	8882	9004	10908	14.72%
%age	16.78%	14.97%	18.10%	21.54%	18.71%	17.81%	18.53%	22.10%	21.11%	20.88%	17.84%	18.37%	20.48%	22.10%	

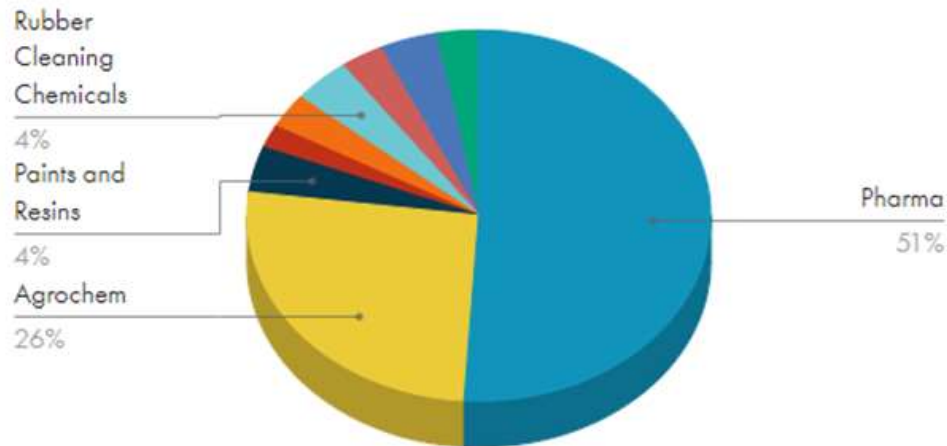
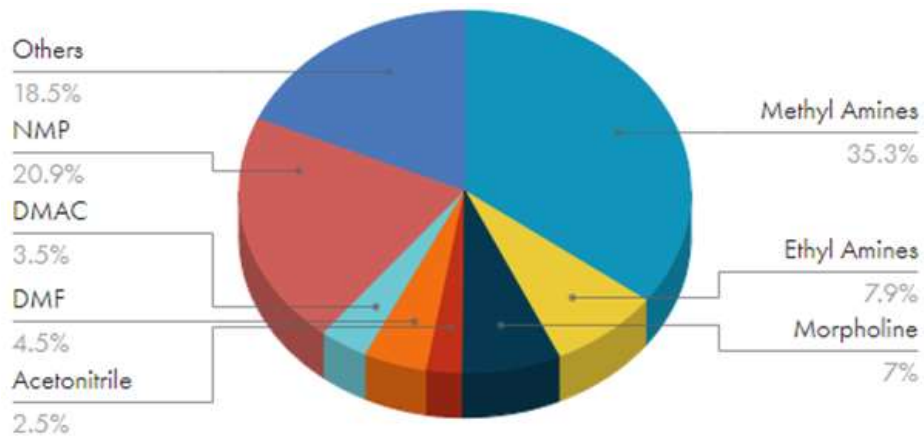
ix. Commodity price risk or foreign exchange risk and hedging activities

The Company imports its major raw material and hence there is a commodity price risk and also foreign exchange risk. The company imports in bulk quantities against annual contracts with the suppliers where the company gets the price advantage on the bulk / contract purchase. Since the company is also having exports the exchange risk is partly covered by natural hedge (by way of exports). The company also carries hedging activities basing on the market conditions on case to case bases.

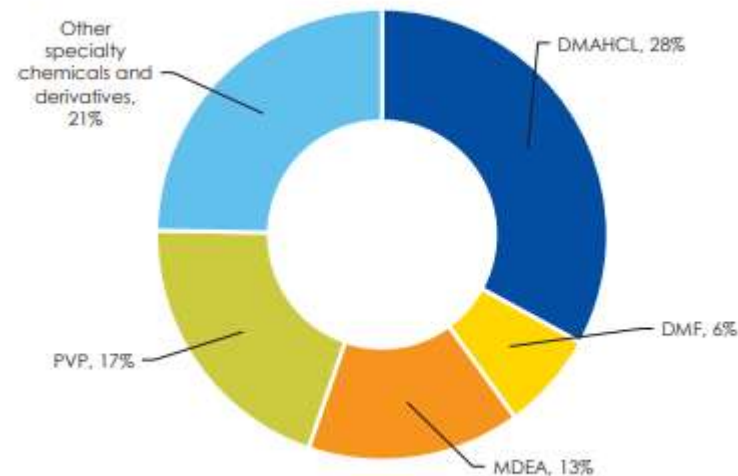
Alkyl Amines v/s Balaji Amines



All figures (in INR Crores)	BAL	AACL
Cumulative CFO	690	545
Cumulative PAT	472	347
Cumulative Taxes Paid	46.8	106
Cumulative Capex	507	420
Cumulative Interest Paid	196	123
Cumulative Dividends Paid	46	71
Cumulative FCF	182	128
Cumulative R&D Spend (FY05-FY18)	59.91	41.7
12 Yr CAGR of CFO	47.14%	26.51%
12 Yr CAGR of PAT	24.66%	21.15%



60% from methylamines and derivatives



Source: Company, Edelweiss Investment Research

Source:

<https://tijorifinance.com/company/balaji-amines-limited#marketshare>

Products (Broad Categories)	<u>Existing capacity</u>	<u>End-market utilisation</u>	<u>Expansion</u>	<u>Comments</u>
Methylamines	48k	18% (total utilisation 70%)	-	Expect higher captive utilisation into derivatives
Methylamine derivatives				
DMA HCl	22k	90%	7.5k	Excess demand with limited capacity
Di Methyl Formamide (DMF)	33k	15%	-	Import substitution due to plant shutdowns in China
Di Methyl Acetamide (DMAc)	7.5k	80%	-	Strong product with steady growth
GBL, 2-P and linked products				
N-Methyl-2-Pyrrolidone (NMP)	22k	50%	-	High-value specialty chemicals with consistent growth potential
N-Ethyl Pyrrolidone (NEP)	11k	50%	-	
Ethylamines and derivatives	6k	80%	-	Limited capacity with low focus
Morpholine	3k	80%	7k	High growth focus due to import substitution tendency
Acetonitrile	0	0	10k	Major product of AACL; steady domestic and export demand expected from existing clients

MATERAIL BALANCE OF EDA PLANT							
SR.NO	NAME OF THE R.M	INPUT QTY IN MT/YEAR	RECYCLE QTY IN MT/YEAR	LIQUID EFFLUENT IN MT/YEAR	DISS COLUMN RESIDUE IN MT/YR	AIR EMISSIONS	OUT PUT IN MT/YEAR
1	MONO ETHANOL AMINE	58430	5000				
2	AMMONIA	13340	1000				
3	ETHELENE DIAMINE(PRODUCT)		1625				37350
4	DEAT(PRODUCT)		220				3150
5	PIP(PRODUCT)		165				4050
6	AEP/HEP/AEEA(PRODUCT)		110				450
7	MIXTURE OF HIGHER AMINES						330
8	DISTILLATION COLOMN RESIDUE				104		
9	WATER	2376	2376	18216			
10	HYDROGEN	4				4	
	TOTAL	74150	10496	18216	104	4	45330

Source:
<http://environmentclearance.nic.in/writereaddata/EIA/1909201686W3W/PDGEIA.pdf>

No	Product/ By-product Name	Quantity (TPD)	Uses
1.	Mono Iso Propyl Amine (MIPA)	50	<ul style="list-style-type: none"> As regulating agent for plastics, an additive in the petroleum industry, intermediate in organic synthesis.
2.	MIBK	100	<ul style="list-style-type: none"> High-solids coatings, automotive and textile coatings, Acrylic & vinyl-acrylic resins for adhesives, Extraction solvent for antibiotics & other pharmaceuticals, Nitrocellulose lacquers
3.	Di Phynel Amine (DPA)	35	<ul style="list-style-type: none"> Plant growth regulator
4.	N Butyl Thiophosphoric Triamide NBPT	10	<ul style="list-style-type: none"> Agricultural chemicals (non-pesticidal), A urease inhibitor
5.	Iso Propyl Alcohol (IPA)	165.6	<ul style="list-style-type: none"> Used as a solvent, usually as a cleaner
6.	Di-isopropyl ether	6.6	<ul style="list-style-type: none"> Food Additives: Extraction Solvent Fuel additive
7.	Propane	32.2	<ul style="list-style-type: none"> Heating, Home Appliances
8.	Di Methyl Carbonate (DMC)	55.2	<ul style="list-style-type: none"> Used as reactive intermediate, in paints and coatings, fuel additive.
9.	Propylene Carbonate	14.4	Used as a polar, aprotic solvent
10.	Propylene Glycol	55.2	<ul style="list-style-type: none"> Food, Medicine
11.	Methyl Amines	120	<ul style="list-style-type: none"> Industry use- Intermediates
12.	Choline Chloride 75 %	70	<ul style="list-style-type: none"> Nutritional additive in chicken feed,
13.	Choline Chloride 60%	50	<ul style="list-style-type: none"> Dog and Cat Food Human nutritional supplements
14.	Choline Chloride 98%	10	
15.	Ethyl Amines	100	<ul style="list-style-type: none"> Food additives -> Flavoring Agents Dyes, Pharmaceuticals, Surfactants, Herbicides, Rubber vulcanization accelerator and Ion exchange resins

Capital cost of the Project (as proposed to be approved by the funding agency / financial Institutions : **Rs.400 Crores** (Rs. Four hundred Crores Only)

- XIX Expenditure on Environmental Measures :
 A Capital cost of the Project (as proposed to be approved by the funding agency / financial Institutions : **Rs.400 Crores** (Rs. Four hundred Crores Only)
 B Cost of Environmental protection measures : (Rs. Lakhs)

Sr. No.	Description	Cost Component (Rs. Lakhs)	
		Capital	O & M/Year
1	Capital cost of ETP comprising of RO, MEE, Guard tank for standby storage of effluent, Solvent Recovery System and allied Infrastructure	2680	400
2	Cost towards APC equipment, MDC followed by Bag Filters, Stacks, Scrubbers	1840	200
3	Cost towards Noise Level Management	80	--
4	Green Belt Development	120	40
5	Environmental Monitoring & Management	--	60
6	Occupational Health & Safety	100	40
Total		4820	740

Source:
http://environmentclearance.nic.in/writereaddata/EIA/29092018XQEUC1GP_EIA.pdf

DMF

- Nearly 50% of production and over 70% of consumption by China
- There is global oversupply with no scope to increase capacity; Nearly 75% of domestic demand is met through imports
- **CASE POINT** – Multiple plant shutdowns in China due to environmental concerns has increased import prices and subsequently brought domestic suppliers into the field. BAL has increased production from 300 MT/month to 1,000 MT/month from Aug-Sept 2017 onwards

DMA HCL

- Widely used as an intermediate in a few of the most common pharma drugs such as metformin and ranitidine; consistent volume growth in each of these drugs
- BAL is the largest manufacturer in the world with leading Indian pharma companies as customers
- **CASE POINT** – Extant capacity of 22,000 MT/annum is already optimally utilised; BAL is confident of strong demand for the additional 7,500 MT/annum being set up

Morpholine

- Only three major players globally ex China: Huntsman, BASF Germany and Balaji
- India's consumption is 7,000 MT/month while Balaji is providing 45%, the remainder is imported from China and Saudi Arabia
- BAL's prices are highly competitive versus imports; this makes its product highly preferred over imports
- Current capacity is nearly optimally utilised; hence tendency for high import substitution exists
- **CASE POINT** – Going forward, BAL expects to meet ~80% of domestic demand in the medium term. Additionally, it has received the REACH certificate for the product and can start exporting

Acetonitrile

- Substantially used in pharma with an annual estimated demand of 15,000 MT/annum
- AACL is the largest player in this product with 10,000 MT/annum capacity, operating at near optimal levels and has plans to expand to 30,000 MT/annum over the next 3-5 years
- BAL has got the EC for 20,000 MT/annum but will start with a 10,000 MT/annum set up
- **CASE POINT** – BAL has already secured some export demand from its existing clients and is confident of achieving ~60% utilisation level by end-FY19 through both domestic and exports exposure

Mancozeb (BAL EDA = 37,350 MTPA)

Mancozeb is used to protect many fruit, vegetable, nut and field crops against a wide spectrum of fungal diseases, including potato blight, leaf spot, scab (on apples and pears), and rust (on roses). It is also used for seed treatment of cotton, potatoes, corn, safflower, sorghum, peanuts, tomatoes, flax, and cereal grains.

Market and key manufacturers

Sales of mancozeb rose by 8.8% to record high of \$ 620 million in 2011. As of the end of 2011, the global mancozeb capacity is about 205,000 tons (off 80% a.i.), of which, 150,000 tons are produced by international producers and 51, 000 tons are produced by domestic producers. The global output reached 140,000 tonnes against the sales volume of 135,000 tonnes.

China produced 45,000 tonnes mancozeb against sales volume of 44,000 tonnes , among which 35,000 tonnes for export in 2011. Markets for export include Europe, Africa, Asia and North America.

Key manufactures include the largest producer, UPL, Sabero, Indofil and domestic producers, Linmin Chemical, Hebei Shuangji Chemical, Dow(China), Nantong Baoye and Xi'an MPC Stock.

Company	Capacity(ton)
UPL (India)	90,000
Sabero (India)	30,000
Indofil (India)	30,000
Limin Chemical	20,000
HebeiShuangji Chemical	15,000
Dow (China)	8,000
Nantong Baoye Chemical	3,000
Xi'an MPC Stock	5,000



Price tendency

Mancozeb price remained some Yuan 22,000 /ton in 2012.

Events

Registered formulation

Mancozeb is available as dusts, liquids, water dispersible granules, as wettable powders, and as ready-to-use formulations.

---From 2012 China mancozeb product report
issued by CCPA

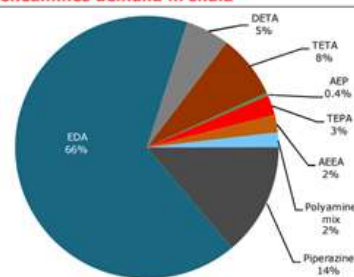
- It is a combination of two other dithiocarbamates: maneb and zineb.
- At present, the top five companies account for more than 80% of global market share in mancozeb field.
- At present, India is the leading mancozeb consumption markets, accounting for over 28% of the global market.
- The global price of mancozeb is slightly floating in the past five years, and the global price is mainly depending on the leading company which has high production and high price. It is from 3752 in 2011 to 3686 USD/MT in 2015, and it is expected to decrease in future.

Source:

<http://www.agrochemex.org/wp-content/uploads/2013/05/April-issue.pdf>

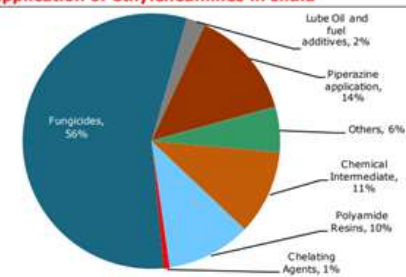
Product / Segment	Piperazine*	Non-piperazine ethyleneamines**
Revenue contribution (FY11)	75%	25%
Revenue contribution (FY12)	77%	23%
Product / service offering	Piperazine-Anhydrous (PIP-A), one of the saleable forms of piperazine.	Ethylenediamine (EDA) and higher ethyleneamines derivatives that mainly include: <ul style="list-style-type: none"> Diethylenetetramine (DETA) Triethylenetetramine (TETA) Aminoethylpiperazine (AEP)
Geographic presence	Domestic consumption: 96% Exports: 4% <ul style="list-style-type: none"> Only domestic player to produce PIP-A Has 40% share of the domestic piperazine market. 	Domestic consumption: 93% Exports: 7% <ul style="list-style-type: none"> One of the few global players to own ethyleneamines manufacturing process technology. Only domestic player to produce ethyleneamines; has 8% share of the largely import-dependent domestic market.
Market position		
Industry growth expectations	<ul style="list-style-type: none"> High demand from various end-applications. Constraints in current manufacturing process are limiting growth in global piperazine production. 	<ul style="list-style-type: none"> Ethyleneamines demand is expected to grow at around 8% CAGR in the next few years. Current demand is 29,200 tonnes, which is expected to increase to 38,000 tonnes by 2014
Sales growth (FY09-FY11 – 2-yr CAGR)	68%	31%
Sales forecast (FY11-FY13 – 2-yr CAGR)	7%	42%
Demand drivers	<ul style="list-style-type: none"> PIP-A mainly used by the pharma industry in anti-infective, anti-histamine, anti-filarial, anthelmintics (dewormer for parasites in veterinary applications). In India, it is largely used to manufacture Ciprofloxacin, an anti-bacterial drug. Other applications include use in polyamide agents, chelates. 	<ul style="list-style-type: none"> Diverse end-product applications such as chelates, polyamide resins, lube and fuel oil, fungicides, and chemical intermediates Dethiocarbamate-based fungicides are the main demand drivers. Available under fungicides such as Maneb, Mancozeb and Zineb.
Key competitors	Domestic: None Global (importers): BASF, Tosoh, Delamine	Domestic: None Global (importers): Dow Chemicals, BASF, Tosoh, Huntsmen, Akzo Nobel
Key risks	<ul style="list-style-type: none"> Supply side risk arising from over-dependence on Dow Chemicals for raw materials. Operating margin highly susceptible to fluctuations in PIP-A prices. Increasing raw material prices. 	<ul style="list-style-type: none"> Macroeconomic slowdown could impact demand from end-product manufacturers. Delay in ramp up of debottlenecking exercise. Increases in raw material prices.

Figure 6: EDA constitutes the largest share of ethyleneamines demand in India



Source: Company, CRISIL Research

Figure 7: Fungicides represent the largest application of ethyleneamines in India



Source: Company, CRISIL Research

Table 2: End-use applications of ethyleneamines derivatives

End usage	EDA* Ethylene Diamine	DETA* Diethylene Triamine	TETA* Triethylene Tetramine	TEPA* Tetraethylene pentamine	AEEA*	AEP* Aminoethyl piperazine	PIP* Piperazine	POLYAMINES MIX*
Fungicides*								
Polyamide/Epoxy*								
Chelants*								
Additive for Lube oils/fuels*								
Paper Resins*								
Bleach								
Urethanes*								
Surfactants*								
Fabric Softners								
Pharma intermediate								
Chemical Intermediate								

Source:

<http://www.dacl.co.in/investors/Crisil%20Report.pdf>

Since company's core business is Ethylene amines, any negative Development or upheavals taking place in the market place may affect the performance of the company. Fluctuating prices of certain key raw materials also has potential to impact the performance in short term.

Company also has to compete with competitors who are either forward or backward integrated & has the advantage of scale of economies & thus can swamp the markets with excess & lower priced or even duty free products.

Your company recognizes & understands these challenges very well and always braces itself to compete effectively by providing superior, reliable and timely customer support to the end users.

OUTLOOK:

For the year 2018, the Company's focus will continue on sustaining and maintaining the market share in certain industry segment where company enjoys market leadership position. This will be achieved by forging stronger relationship with customers and by negotiating and entering in to beneficial contracts with the suppliers of raw materials.

26

Diamines And Chemicals Limited

CIN NO:L24110GJ1976PLC002905



The Ethylene amines business is going through demand-supply imbalance on global level and excess supply is expected to be a reality in the year 2018-19 also. Your company is well aware of the challenging scenario lying ahead and taking necessary steps by planning activities properly at operational stages.

34. Consumption of Imported/Indigenous Materials:

Particulars	For the Year ended March 31, 2017		For the Year ended March 31, 2016	
	Percentage		Percentage	
Raw Materials				
Imported	97.58%	147,739,178	98.33%	185,145,651
Indigenous	2.42%	3,666,163	1.67%	3,142,746
TOTAL	100.00%	151,405,341	100.00%	188,288,397

The company manufactures ethyleneamines through two processes:

CPA process: The company processes the polyamine mixture to manufacture piperazine and other higher ethyleneamine derivatives. This is an energy intensive process that requires distillation and purification of end products.

EDA process: This is one of the two conventional routes (EDA and MEA) of manufacturing ethyleneamines globally. The main end products are ethylenediamine (EDA) and higher ethyleneamines such as DETA, TETA, AEP, piperazine, and others.

a. Capacity production :

		As at March 31, 2011		As at March 31, 2010	
		Installed*	Actual Production**	Installed*	Actual Production**
Ethylene diamines / amines and derivatives *					
Through EDC Plant	MT	2600 **	584.036	2600 **	68.225
Through CPA Plant		2900	1970.176	2900	1901.727
			2554.212		1969.952

* As certified by the management

** Presently EDC Plant has commenced its commercial production in September, 2009. However, at any given point of time, either EDC or CPA route can be operated.

** Includes production of NIL (Previous Year 182.390 MT) on account of tolling arrangement entered with third party

EDA – Domestic Demand Side Analysis

Through this subsidiary, the company gets an exposure to specialty chemicals like ethylene diamine (22,000 tonne). Key application for ethylene diamine is in the field of fungicide like Mancozeb. It is noteworthy that India imports about 29,000 tonne ethylene diamine (EDA) every year. Among the domestic likely clients for EDA are Coromandel, UPL and Indofil. Coromandel has recently added a 10,000 tonne capacity in the Mancozeb segment taking the total installed capacity to 45,000 tonne.

<https://www.moneycontrol.com/news/business/moneycontrol-research/balaji-amines-q3fy19-review-input-price-volatility-hits-volumes-accumulate-on-staggered-basis-3504831.html>

On the manufacturing side: Mancozeb facility at Dahej has been commissioned. With this, we have added further 10,000 tons of Mancozeb bringing our overall capacity to 45,000 MT. We are further adding capacities in our plant for new products which are likely to come up in Q4.

https://coromandel.biz/pdf/2018-2019/FinancialResult/Q3TranscriptFY2019_2.pdf

With the earlier capacity of 35,000 metric tonne running at 85% capacity utilization,

<https://economictimes.indiatimes.com/articleshow/68020904.cms>

The Company had also commissioned the construction of its state-of-the-art Greenfield Mancozeb (under Agro Business Division) ... at GIDC Bharuch, Gujarat. Construction of both these facilities was completed towards the end of Financial Year 2017-18 and are **expected to start Commercial Production by Q2 of Financial Year 2018-19.**

With Mancozeb production capacity of 35,000 TPA, this plant would be Indofil's biggest manufacturing facility. This state of the art infrastructure would contribute in a large way to Indofil's growth aspirations in the coming years. With this, the Company's annual production capacity now stood at 66,000 TPA The Company did face some challenges on the operational front. The demand and supply side was stressed, resulting in the reduction in margins. Growth in international business has been almost stagnant due to slow growth from Brazil and other developing markets due to channel inventories. **Prices of major raw material such as Ethylenediamine (EDA) and Carbon-di-Sulphide (CS2) have significantly increased during the year.** As a result of these factors, our margins have witnessed a downfall compared to the earlier years.

http://indofilcc.com/wp-content/uploads/2016/06/AGM_FY2017_18_Print.pdf

Revenue contribution from Mancozeb was around 57% and group's export were at 44% in fiscal 2018. The total planned project cost is Rs.462 crore, to be funded by debt to the extent of Rs.369 crore and balance from internal accruals.

<http://www.careratings.com/upload/CompanyFiles/PR/Indofil%20Industries%20Limited-01-25-2018.pdf>

B. Pesticide Intermediate 5(b) Total Quantity			67000	
Intermediate Chemicals 5(f) - EC Required as per EIA Notification 2006				
17	Ethylenediamine (EDA) (1,2-Diaminoethane)	107-15-3	30000	5(f) Intermediate Chemical

Page 3 of 134



EIA/EMP Report for Capacity Expansion of Manufacturing Capacity of Existing Products and Manufacturing of New Pesticides, Intermediate Chemicals (Unit # 1), Plot No.- 117/118, Notified Industrial Estate, GIDC, Ankleshwar (Gujarat)

III. MASS BALANCE – MANCOZEB :

The Mass Balance for MANCOZEB is given below:

INPUT	Quantity (Kgs/ton)	MANCOZEB 1000 kg	OUTPUT	Quantity (Kgs/ton)
Ethylene Diamine (100%)	203.93		Product	
CS ₂	567.5		Mancozeb	1000
NaOH (48%)	567		By – Product/	
MnSO ₄ (29.5%)	1820.8		Mn(OH) ₂ Sludge	15
			Sodium Sulphate	500
			NaSH Solution	5
			Recycle	
Water	3417		CS ₂	52.5
ZnSO ₄ (13%)	176.9		Water	4431
SLS	30.12		To Air	
HMTA	18.8		Water Vapour	845
DADAMOL (40%)	15.1		Powder	0.039
Filter aids	4		CS ₂ to scrubber vent	0.03
			Hazardous waste to Incineration	
NaOH (48%) (MEE)	28		Filter aids	1
TOTAL	6849		TOTAL	6849

S. No.	By product	Capacity (MTPA)
1.	Piperazine (PIP)	9510
2.	Diethylenetriamine (DETA) - (95-99%)	3300
3.	Amino Ethyl Piperazine (AEP) - (95-99%)	1650
4.	Amino Ethyl Ethanol Amine (AEEA) - (95-99%)	990
5.	Hydroxy Ethyl Piperazine (HEP) - 98%	660

<http://environmentclearance.nic.in/writereaddata/Form-1A/Minutes/261120180Q1S6AUOFinal42EACMeeting.pdf>

203.93 kgs of EDA is required to make 1000 kgs of Mancozeb.

$1000/203.93 = 4.9$ is the conversion factor

**List of Raw Material
(For proposed New Unit)**

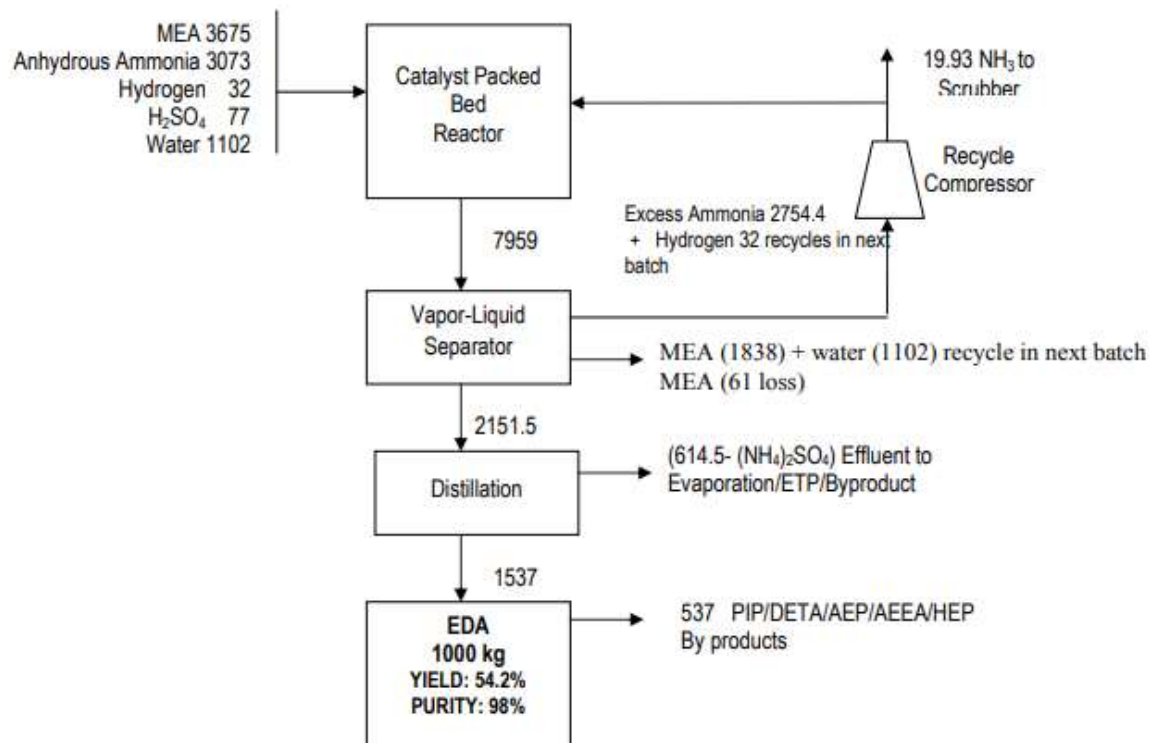
Sr. No.	Product Name	Capacity TPA	Capacity TPM	Raw material	Consumption after Recycle		
					kg/kg	kg/MT	MT/Month

Project:	Proposed new manufacturing of Agrochemicals, intermediates and speciality chemicals
Proponent:	M/s. UPL Ltd.
Project site:	Plot No. D-3/6, Dahej – III - Industrial estate (within PCPIR region) Village: Kadodara, Taluka - Vagra, Dist. Bharuch, State - Gujarat, India
Documents:	List of Raw Material

				Steam	1.08	1080	180
				4% Copper(I) oxide / Aluminium oxide	0.001	1.1	0.18
	Total				2.82	2821.1	470.19
17	Ethylenediamine (EDA)	30000	2500	Monoethanol Amine	1.837	1837	4592.5
				Ammonia	0.319	318.55	796.38
				Sulfuric acid	0.077	77	192.5
	Total				2.23	2232.55	5581.38

Project:	Proposed new manufacturing of Agrochemicals, intermediates and speciality chemicals
Proponent:	M/s. UPL Ltd.(formerly known as M/s.United Phosphorus Limited)
Project site:	Plot No. D-3/6, Dahej – III - Industrial estate (within PCPIR region) Village: Kadodara, Taluka - Vagra, Dist. Bharuch, State - Gujarat, India
Documents:	Manufacturing Process

Flow Sheet:

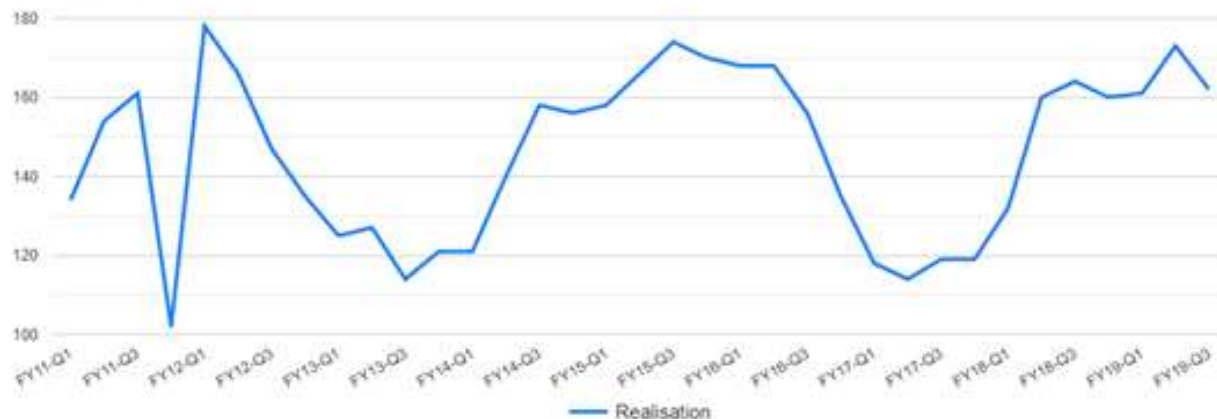


Source:

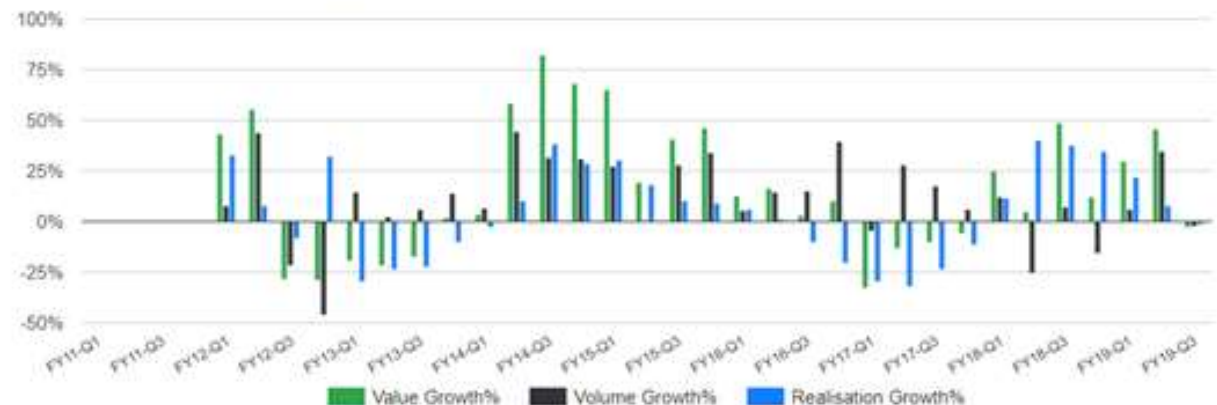
<http://environmentclearance.nic.in/writereaddata/online/E C/09052018JSMU3I9VEDSr eply-f.pdf>

	Mancozeb (MTPM/MTPA)		EDA (MTPM)	EDA (MTPA)	Conversion Factor
UPL - 1	15443 MTPA	Mancozeb	265.11	3181.32	
		Maneb	273	3276	
		Zineb	290.55	3486.6	
UPL	4400 MTPM		907.22	10887	
India Pesticides	2400 MTPM	Mancozeb			
Crystal Crop Protection	400 MTPA	Mancozeb		82.4	4.85
Coromandel - Total	45000 MTPA	Mancozeb		9264	
	25000	Mancozeb	416	4992	5.01
	500	Maneb	8.32	99.84	
Indofil - Dahej	5000	Zineb	75.2	902.4	
Indofil - Total	66000 MTPA			13179	
Agrow Allied Ventures P	150 MTPM	Mancozeb	29.7	356.4	5.05
Dhanuka Agritech	300 MTPM	Mancozeb	59.4	712.8	5.05
NANDOLIA ORGANIC C	1500 MTPM	Mancozeb	342	4104	
				5173	Others
				22443	Indofil + Coromandel
				30000	UPL
			Total EDA	57616	

Realisation Trend by Quarter



Growth Trend by Quarter



FY ▼	Value	Quantity KGS	Realisation	Value Growth %	Volume Growth %	Realisation Growth %
FY19	₹536 Cr	32,239,460	₹166	-9%	-15%	8%
FY18	₹586 Cr	37,945,830	₹154	22%	-7%	31%
FY17	₹481 Cr	40,754,240	₹118	-16%	12%	-24%
FY16	₹571 Cr	36,525,860	₹156	11%	18%	-7%
FY15	₹516 Cr	30,930,580	₹167	41%	21%	17%
FY14	₹367 Cr	25,597,920	₹143	49%	27%	16%
FY13	₹247 Cr	20,109,990	₹123	-16%	9%	-23%
FY12	₹295 Cr	18,447,300	₹160	5%	-11%	19%
FY11	₹281 Cr	20,744,070	₹135	0%	0%	0%

@phreakonomics

Source:

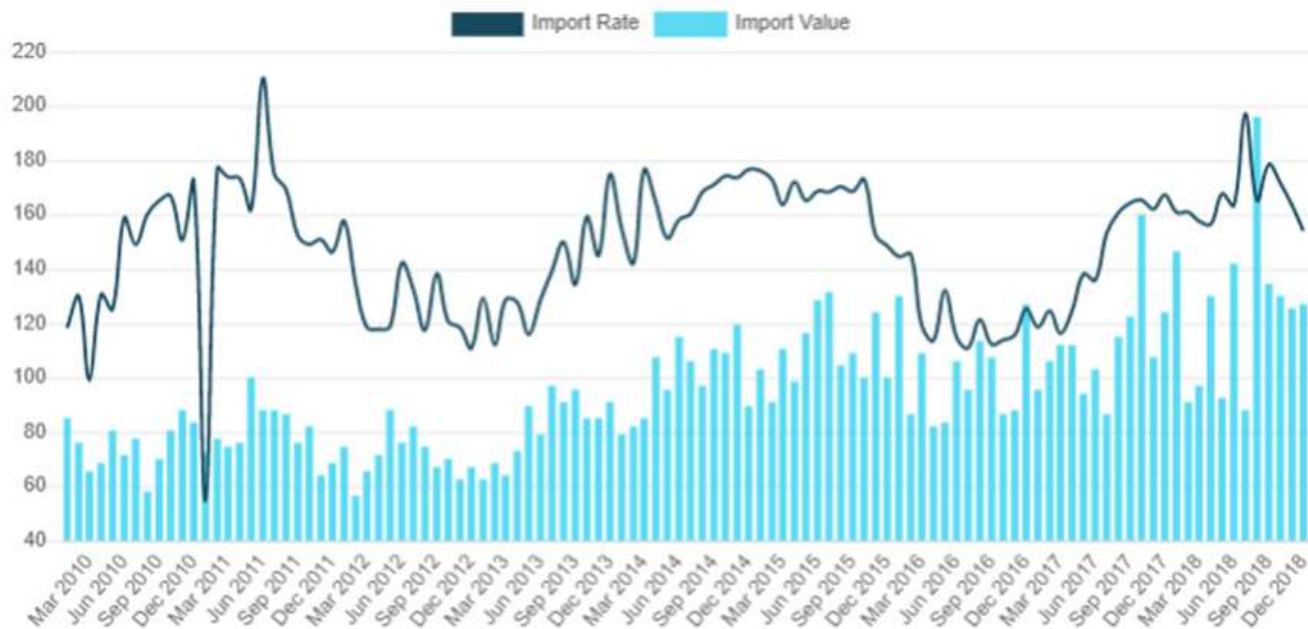
https://phreakonomics.in/export-import/micro-individual?type=imports&hscode_co_mmodity=1794&startDate=2000-04-01&endDate=2019-03-01¤cy=INR&consolidation=quarter

ETHYLENEDIAMINE AND ITS SALTS: HS Code - 29212100

Rates in Rs. / KGS

SHOW EXPORT

6m 1Yr 3Yr 5Yr Max



Methyl Isobutyl Ketone (MIBK)

100 TPD => 25,000 MTPA

The current Indian demand for MIBK is around 20000 MT per annum and the entire requirement of the country is being imported. The demand for MIBK in India is expected to reach 35000 MT per annum in 2015. As there is no manufacturer in India / South East Asia, Cetex will be in an advantageous position to market entire requirement of this region. With FTA (Free Trade Agreement) between ASEAN countries, those countries will prefer supplies from India to take advantage of duty benefits.

MIBK is primarily used in solvent applications in the following areas:

- Paints & Coatings-Primarily in nitrocellulose lacquers and solvent-borne Coatings
- High-solid coatings-which require stronger solvents
- Replacement for ester- based solvents-to reduce volatile organic Compound (VOC) levels and achieve lower solvent levels
- Pesticide solvent
- Extraction operations-to refine mining distillates, dewax mineral oils, purify fatty acids, and manufacture penicillin and other antibiotics
- Other solvent application- as purge solvent in the cleanup of paint equipment in automotive plants in the formulation of inks and adhesives
- Rubber additive- for rubber anti-ozonants
- Acetylenic surfactants

The ratings also take note of the virtually nil progress in the Methyl Isobutyl Ketone (MIBK) project in the past three years.

MIBK project: CPL had planned to undertake a debt-funded capex to set up a manufacturing unit with an installed capacity of **30,000 MTPA** to manufacture MIBK. The project was proposed to be funded by bank debt amounting to Rs.65 crore and equity infusion of Rs.94.50 crore.

The company decided to go slow on the project as the dynamics had changed in the industry with a fall in prices of MIBK and increase in prices of acetone (feedstock) in the global market

Source:<http://www.careratings.com/upload/CompanyFiles/PR/Cetex%20Petrochemicals%20Limited-10-08-2018.pdf>

MANAGEMENT DISCUSSION AND ANALYSIS

INDUSTRY STRUCTURE AND DEVELOPMENT

Cetex Petrochemicals Limited has been the only manufacturer of Methyl Ethyl Ketone (MEK) and Secondary Butyl Alcohol (SBA) in India, with the Capacity of 20,000 tones per annum. This accounts for 40% total consumption in India.

OUTLOOK

The Company is in the process of implementing MIBK Project and the project is expected to be completed by June of 2017.

OPPORTUNITIES

During the year 2014-15, the company has manufactured 3,479.237 tones of MEK & 12,715.884 tones of SBA and which register 20.64% growth in production of MEK & 43% growth in production of SBA.

The revenue from operations for the financial year 2014-15 at Rs.180.61/- crores, was higher by 26.63% over last year (Rs.142.63/- crores in 2013-14). Once the expansion of the MIBK project is completed the company is expected to achieve the revenue from operations of Rs.700/- crores.

The Company is focusing to market its products in overseas to increase its revenue. As a result, the company has earned 18% revenue by selling the products in the overseas market during the year.

Source: https://www.cetexpetro.com/Cetex_Annual_Report_Final_10-12-2015.pdf

Western and northern India lead the consumption of MIBK, accounting for nearly the entire domestic consumption of the country. MIBK is used primarily in the paint and coatings industry which fuel a major share of the growth of MIBK in the country.

RIL was the only company producing MIBK in the country, but discontinued production in its 7,000 tons per annum Thane plant in 2006. **Since the termination of production of MIBK in the country in 2006-2007, the entire domestic demand is met through imports.** Even though lack of production facilities deters growth, MIBK has recorded steady increase in production since 2001, progressing solely on the basis of imports. Particularly in the last 6 years, demand for MIBK has grown substantially recording an annual compounded growth rate of over 10%. The current environment is conducive for demand to grow exponentially in the next few years.

Source: <https://indianpetrochem.com/report/mibkreport>

FY ▼	Value	Quantity KGS	Realisation	Value Growth %	Volume Growth %	Realisation Growth %
FY19	₹239 Cr	26,483,740	₹90	-23%	-24%	0%
FY18	₹312 Cr	34,684,070	₹90	80%	54%	17%
FY17	₹173 Cr	22,487,100	₹77	-22%	-18%	-4%
FY16	₹221 Cr	27,575,870	₹80	-17%	19%	-30%
FY15	₹266 Cr	23,242,730	₹114	21%	27%	-5%
FY14	₹219 Cr	18,318,190	₹120	9%	4%	5%
FY13	₹201 Cr	17,668,160	₹114	18%	-8%	28%
FY12	₹171 Cr	19,208,940	₹89	39%	17%	19%
FY11	₹123 Cr	16,398,540	₹75	0%	0%	0%

1.2 Project Details

Sr. No.	Name of Product	Existing Capacity (MT/Month)	Additional Capacity (MT/Month)	Total after Proposed Expansion (MT/Month)
A. Rubber Chemical & Rubber Chemicals Intermediates				
1	4 Amino Diphenyl Amine (4 ADPA)	1700	800	2500
2	Sodium Mercapto Benzothiazole (NaMBT)	350	650	1000
3	2 Mercapto Benzothiazole (MBT)	100	100	200
B. Finished Products				
1	N-1,3 Dimethylbutyl-N-Phenyl-P-Phenylenediamines Pilflex-13 & Similar Derivatives	1000	2000	3000

B. Finished Products		
1. N-1,3 Dimethylbutyl-N-Phenyl-P-Phenylenediamines Pilflex-13 & Similar Derivatives		
1.	Methyl Iso Butylketone	0.43
2.	4ADPA	0.713
3.	Hydrogen	100 Nm3/MT
4.	Catalyst	0.0015
5.	Co-Catalyst	0.0035

NOCIL: Pilflex-13

3000 MT/month

≈ 36000 MTPA

MIBK Required

= $0.43 * 36000$

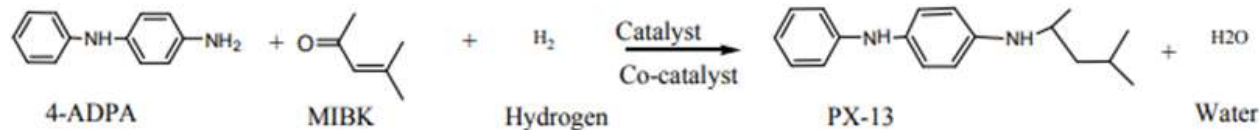
= 15480 MTPA

Planned Capacity of BAL =

100 TPD = 25000 MTPA

Source:

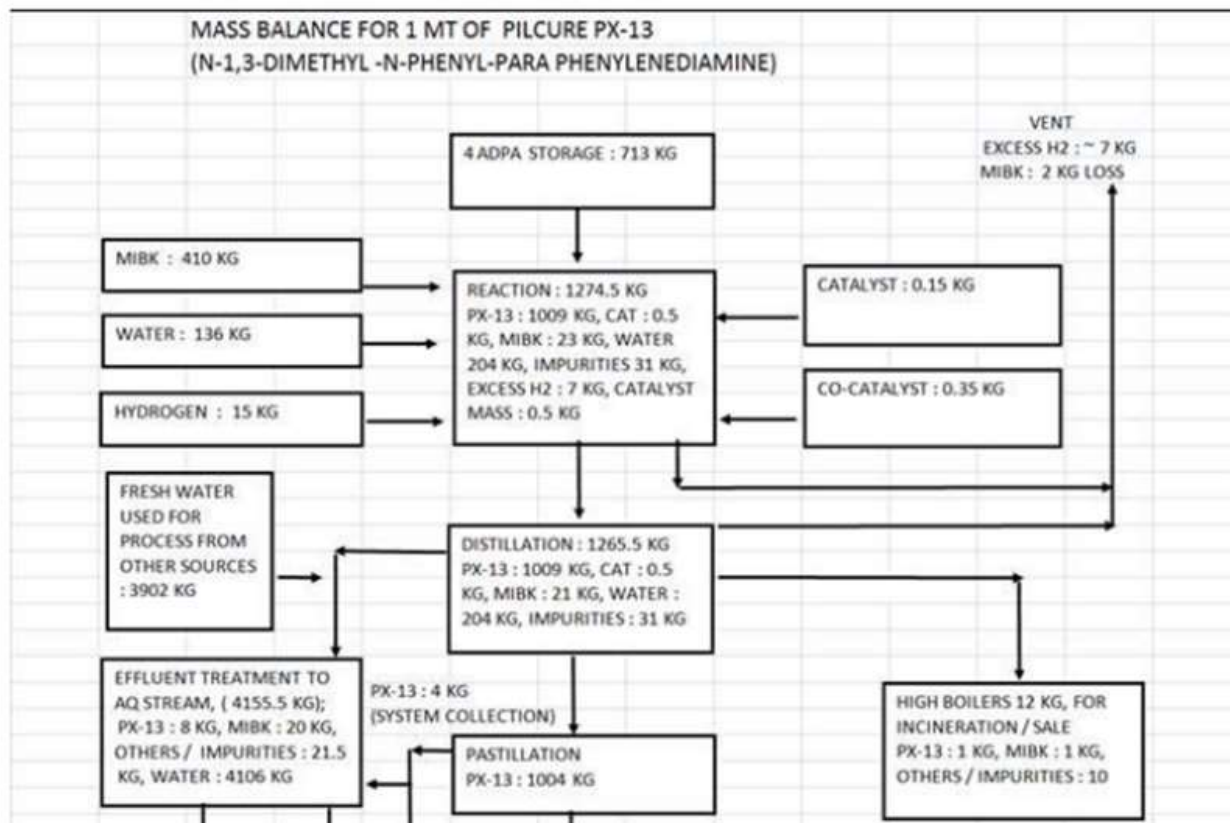
http://environmentclearance.nic.in/writereaddata/FormB/TOR/PFR/23_Jan_2016_142201187NEGOMZ54Annexure-DocumentsofProjectFeasibilityReport.pdf



Mass Balance Equation

Source:

http://environmentclearance.nic.in/writer_eaddata/FormB/EC/EIA_EMP/26052017_UH4MORFVAnnexure-EIAEMP.PDF



Date	Product	Producer	Grade	Category	Trading Mode	Market/Port	Price	Unit	Change	Trend
23/02/19	MIBK			Retail	Imported Intact	Kolkata	88.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Imported Repack	Mumbai	70.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Domestic Repack	Delhi	70.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Domestic Repack	Mumbai	70.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Imported Intact	Mumbai	88.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Imported Repack	Ahmedabad	78.00	Rs/KG	0	View
23/02/19	MIBK			Retail	Imported Intact	Chennai	90.00	Rs/KG	0	View
23/02/19	MIBK			Bulk	Imported Tanker Load	Kandla	62.00	Rs/KG	0	View

Date from 01-Feb-2014 To 28-Feb-2019



**MIBK –
Imported
Intact
(Mumbai)
Price History**

6.Tetramethylthiuramdisulphide (TMTD) Pilcure TMT		
1	Dimethyl amine	0.383
2	Carbon disulphide	0.679
3	Additives	0.02
4	Oil	0.01

Capacity of Pilcure TMT
= 200 MT/month => 2400 MTPA

DMA Required
= 0.383 * 2400 = 919.2 MTPA

Source:

http://environmentclearance.nic.in/writereaddata/FormB/EC/EIA_EMP/26052017UH4MORFVAnnexure-EIAEMP.PDF

DMA HCL (Metformin Intermediate)
BAL Capacity of 30,000 MTPA

2.2.1 Demand Supply Gap

Amine Hydrochloride It is mainly used in Metformin which is growing @ of 10% per annum. Although the current combined capacities (AACL + Bal+ Shraibs) are meeting the demand but from the growth rate it is evident that the demand will overshoot the capacities in coming years.

DMAC majorly used as solvent in pharma. It also used in textile industry as spandex (fiber). There is no growth in demand but the current capacity in India (4500 MTPA). Considering 7000 MT demand of India there is a gap of 2500 MTPA which is currently fulfilled by imports from other countries.

2.2.2 Import vs. Indigenous production

Currently there is no import of Aminehydrochloride and our indigenous capacity is 17000 MTPA.

At present 3500 MTPA of DMAC is being imported in India from countries like China, Turkey, Japan, and Belgium.

AACL additionally has a modern state of the art R &D centre at Pune, which is approved by DSIR. Similarly it also has a pilot plant at Kurkumbh which is also approved by DSIR. It is a highly technology oriented company and believes in self-reliance in technology. The R & D centre and the technology development group consists of 25 scientists and 10 chemical engineers and has developed and commercialized more than 50 out of the current 55 products which it has in its portfolio of offerings .

1.2.3 Global Market

Globally the Aminehydrochloride market is around 40,000 MTPA. It is a combined requirement of India, Spain, Iran, Taiwan, Bangladesh etc.

Globally the Dmac market is around 17000 MTPA. It is a combined requirement of India, Oman, China Vietnam, Turkey etc.

Table 2-7: Use of Products

S. No.	Product	Uses
1	Monomethylamines	<ol style="list-style-type: none"> 1. Agrochemicals (Insecticides) and Agro-intermediate 2. Dyestuff Intermediates 3. Explosives and explosives (boosters) 4. Pharmaceutical products such as Antidepressants, Antihistamine, Antiulser, N-Methyl Piprazine, Stimulant, Dimethyl Urea 5. Raw material for Refinery chemicals 6. Speciality Chemicals 7. Water Treatment & IO 8. Rubber Chemicals (Stabilizing Agent & Preservative) 9. Solvent 10. Photographic Chemicals
2	Dimethylamines	<ol style="list-style-type: none"> 1. Agrochemical (Herbicide) 2. Dyes Textile 3. Ethoxalates 4. Rayon Industry (Textile Strength) 5. Pharmaceutical products such as Anti Diabetic, Anti Biotic, Anti-Depressant, Anesthetics, Antihistamines 6. Rubber Chemicals (Accelerators) 7. Solvent 8. Textile Neutralizing Agent 9. Water Treatment 10. Propellant 11. Miscellaneous Emulsifying Agent 12. Surfactant
3	Trimethylamine	<ol style="list-style-type: none"> 1. Animal Feed 2. Agrochemical 3. Water Treatment 4. Pharmaceutical 5. ION Exchange 6. Surface Active Agents

4	Dimethylaminopropylamine	<ol style="list-style-type: none"> 1. Surfactants 2. Dyes 3. Adhesives & Coating 4. Fuel Additives 5. Lube Additives 6. Flocculants
5	N-Methylpyrrolidone	<ol style="list-style-type: none"> 1. Solvent in Petrochemical and Plastic Industry. 2. Pharmaceutical industry, <i>N</i>-methyl-2-pyrrolidone is used in the formulation for drugs by both oral and transdermal delivery routes
6	N-Ethylpyrrolidone	<ol style="list-style-type: none"> 1. Solvent in Petrochemical/Coating /Pharma industry
7	Acetonitrile	<ol style="list-style-type: none"> 1. Pharmaceuticals 2. Extraction of Fatty Acids, Oils and Unsaturated Hydrocarbons such as butadiene 3. Chemical Intermediate and solvent for perfumes, pharmaceuticals and agrochemicals and agro chemicals 4. High pressure liquid chromatographic analysis 5. Catalyst and component of transition-metal complex catalysts 6. Solvent or chemical intermediate in Biochemistry (for synthesis of Vitamin A, Vitamin B1 and Amino Acids) 7. Solvent for spinning, casting & extractive distillation based on its selective miscibility with organic compound

Source:

http://environmentclearance.nic.in/writereaddata/FormB/EC/EIA_EMP/12012019MSMW6M3KEIARreport.pdf

11.2.1 Production details:

S. No.	Products	Quantity MT/ Annum			
		Existing (EC & CTE Received for)	CTO Received For	Proposed	Total (Existing + Proposed)
1	Methylamines (Mono, Di & Tri)	49500	49500	-	49500
2	Dimethylaminopropylamine (DMAPA)	4950	-	-	4950
3	Tertiaryamine	4950	-	-	4950
4	N-Methyl Pyrrolidone (NMP)	9900	-	-9900	9900
	N- Ethyl Pyrrolidone (NEP)	9900	-		
5	Acetonitrile	16500	-	-	16500
6	Sodium acetate	6105	-	-	6105
Proposed					
7	Dimethylacetamide (DMAC)	-	-	8250	8250
8	Amine Hydrochloride	-	-	57750	57750
	Total	101805	49500	56100	157905

EXPANSION OF AMINES, AMINE DERIVATIVES
AND ACETONITRILE PLANTS AT GIDC DAHEJ,
PHASE II

ALKYL AMINE CHEMICALS LTD.

PROJECT DESCRIPTION

S. No.	Product	Uses
		8. Rubber Chemicals
8	Sodium acetate	1. Textile industry
9	Dimethylacetamide (DMAC)	1. Textile industry 2. Pharma Industry
10	Amine Hydrochloride	1. Starting material in pharma industry

Methanol: 33% RM Cost of BAL

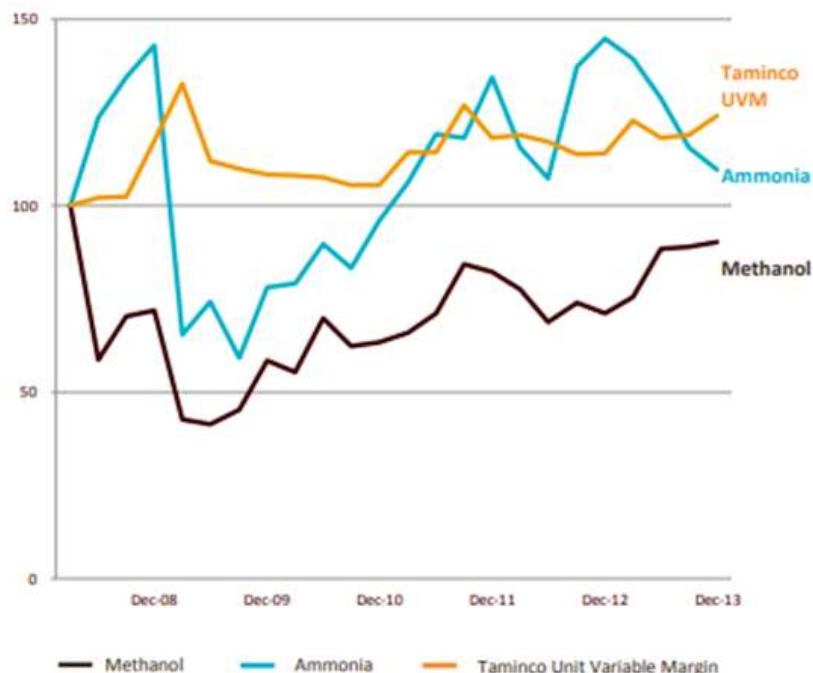
Margin Stability Supported by Pass Through of Raw Materials

Contracts

Tamirco is relatively insulated from raw material volatility through:

- Cost-Pass-Through ("CPT") contracts account for 50% of volume
- Market based sale contracts renegotiated quarterly
- Tamirco's products typically represent a small percentage of customers' total costs
- Top 4 raw materials account for 40% of cost of sales
- All main raw materials are readily available commodity chemicals
- Key raw materials are purchased from a limited number of suppliers providing security of supply through contracts

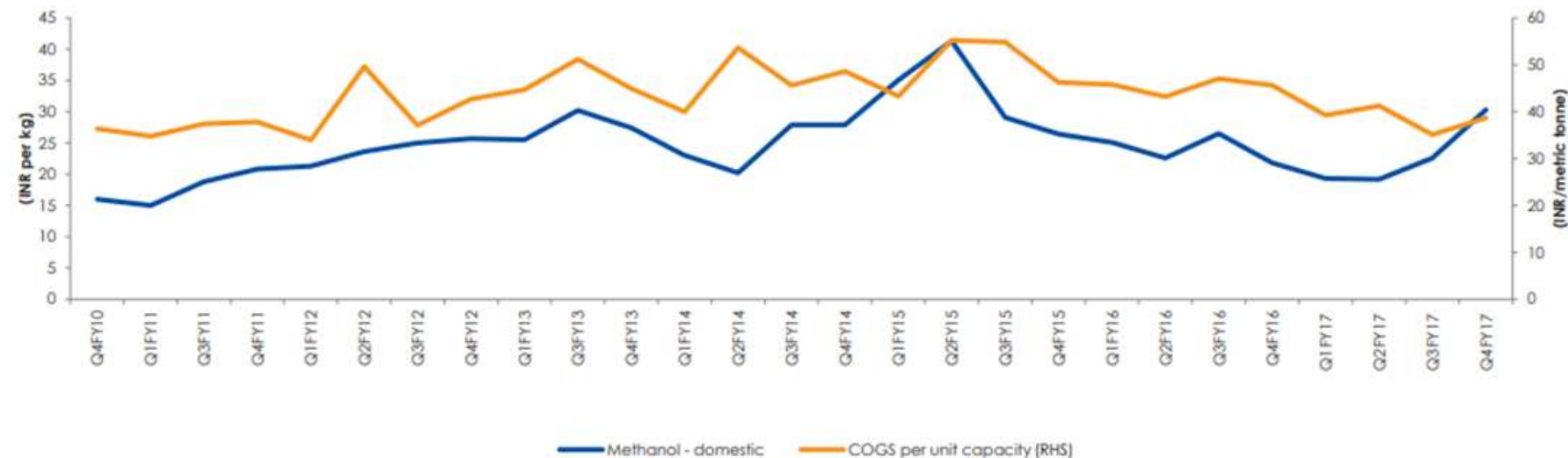
Raw Materials Pricing Evolution Versus Unit Variable Margin⁽¹⁾



b. Gross margins consistent owing to price-linked contracts

BAL relies on methanol and ammonia as its key raw material, with methanol accounting for more than 50% of its raw material costs. With over 70% of its revenues arising from methylamines and its derivatives, BAL is closely impacted by any volatility in methanol prices. Hence, the company has entered into multiple price-linked contracts in order to safeguard its margins.

However, only about 64% of the cost of goods sold (COGS) per unit production is explained by domestic methanol prices.



Source: Company, Edelweiss Investment Research

Changing product mix towards higher value-added products explains for the remaining volatility in COGS and consequent gross margins. The upward revision in gross margins discussed in section IV is concluded from this phenomenon.

Methanol: Broad Feedstocks and Markets

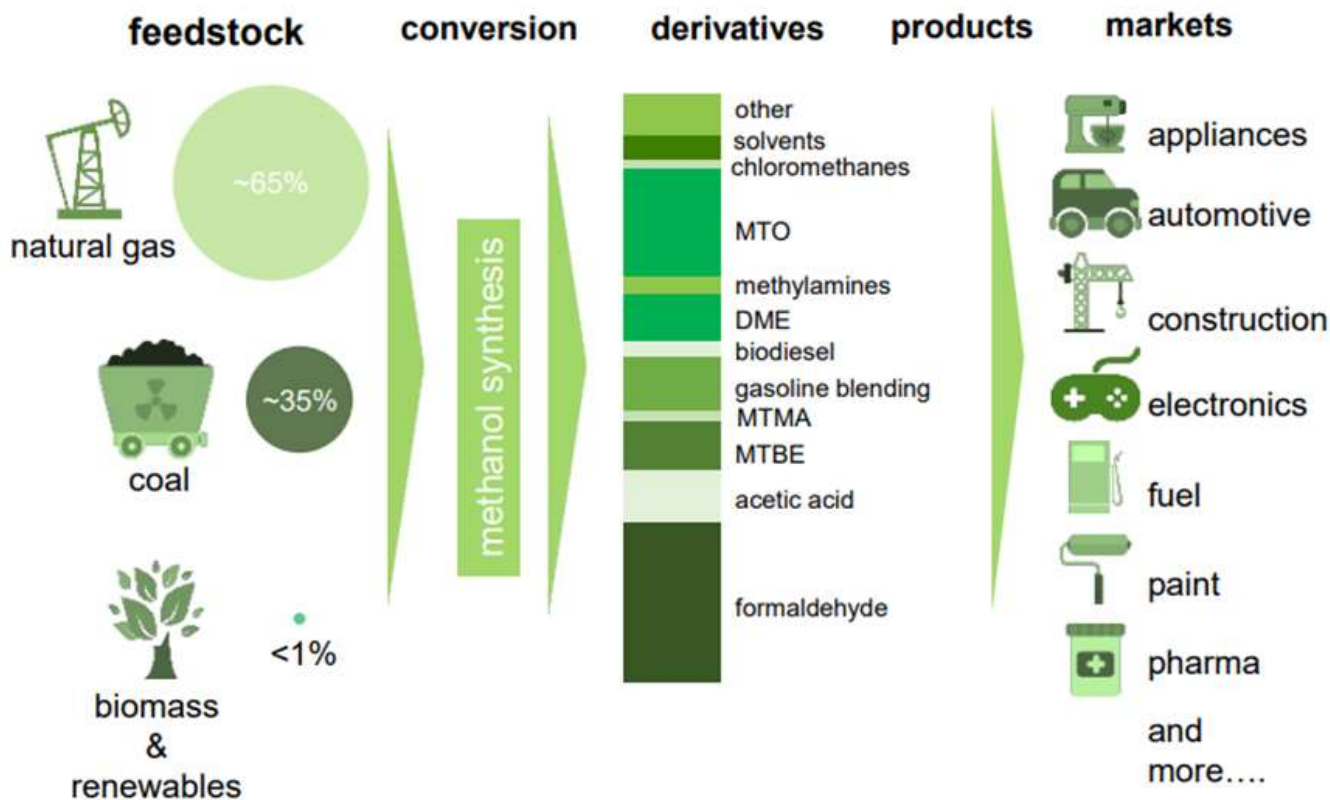
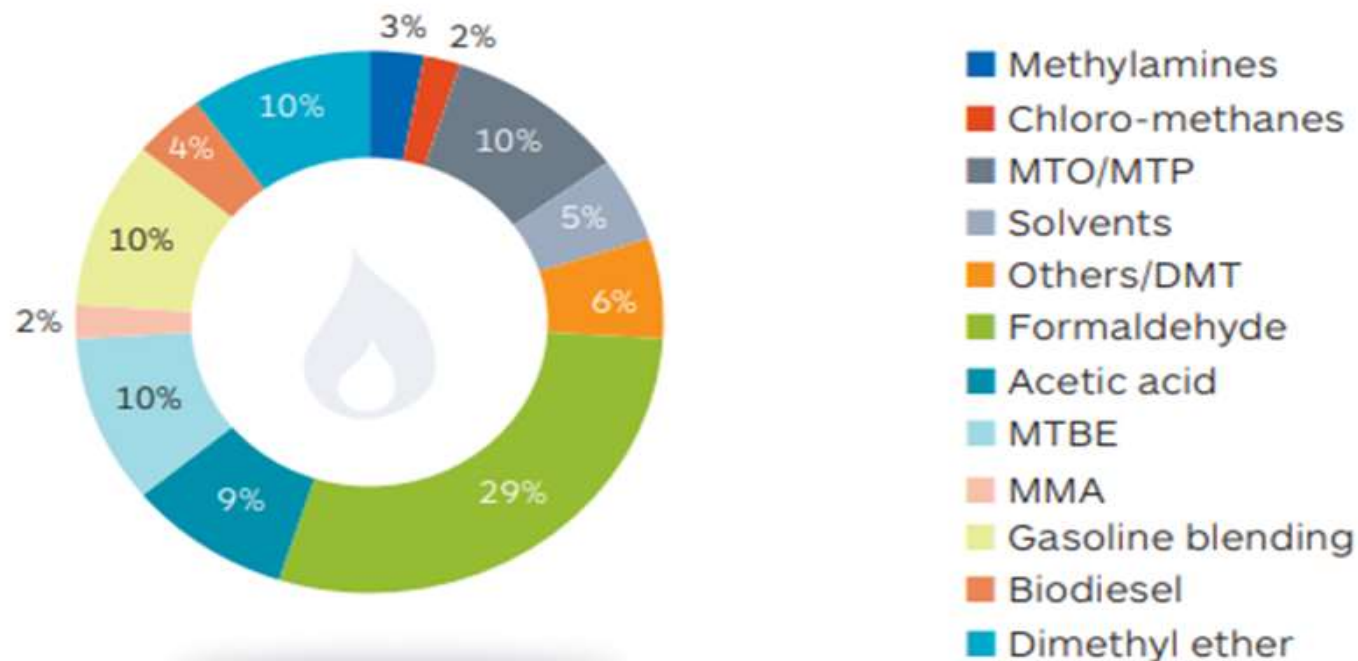


Chart 2: World 2015 methanol demand by end use



Source: IHS Chemical

© 2016 IHS

Methanol has lower fire risk than gasoline



Methanol



evaporates slowly



needs lots of vapour to burn



confined fire zone;
fires less likely



Gasoline



evaporates fast



needs little vapour to burn



broad fire zone;
fires more likely

Emissions Reductions

Methanol is among the lowest emission fuels for marine engines



Source: Stena Lines — Emission reductions when compared to alternative fuels currently available (fuel oil)

Safer for the environment

LC50, LC = LETHAL CONCENTRATION

Concentration in water, at which half the population died within specified test duration

Methanol^[1]
15,400 (mg/l)

Safer than Diesel by a
factor of 240 times

Methane^[5]
49,9 (mg/l)

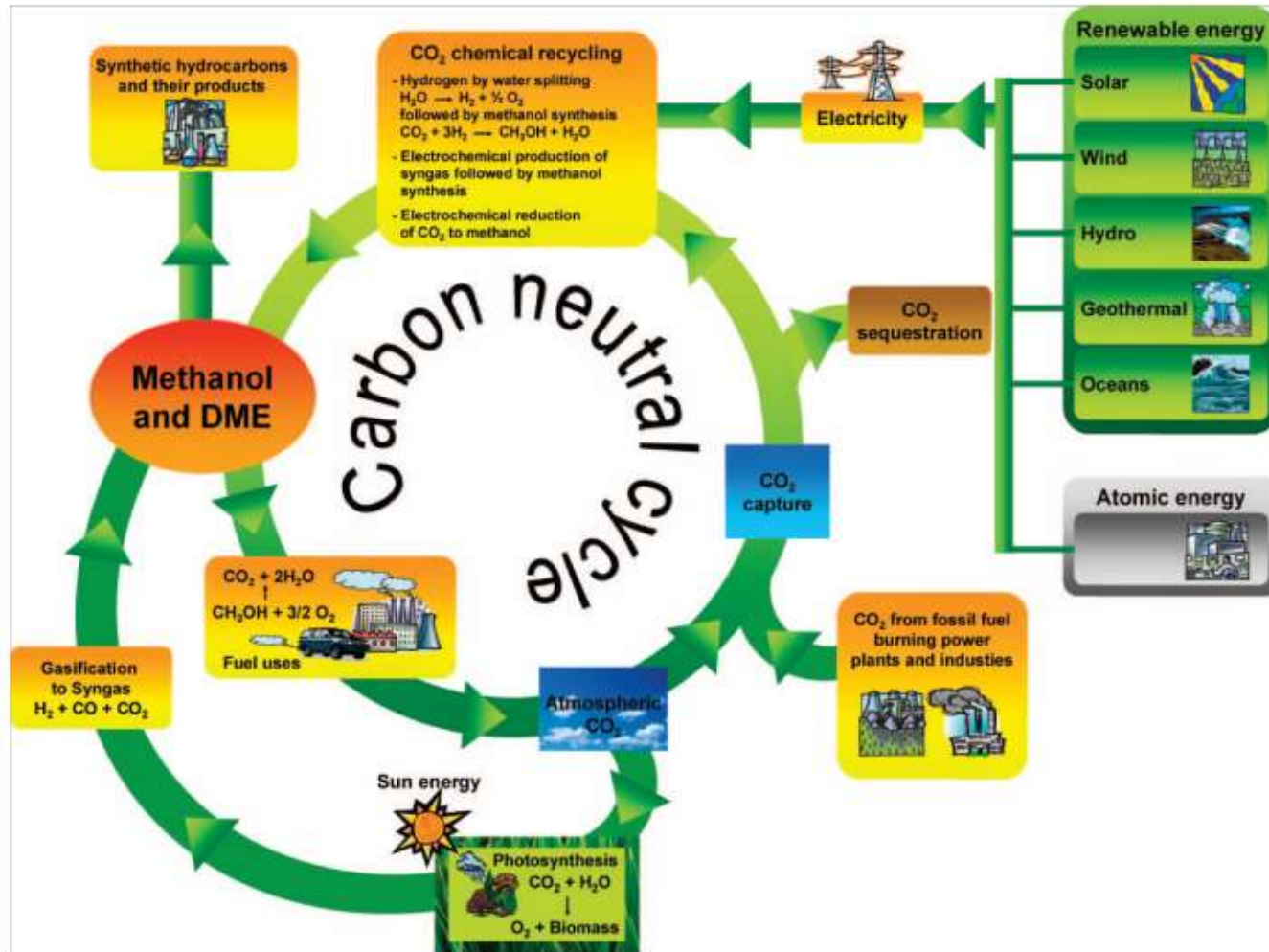
Heavy Fuel Oil^[3]
79 (mg/l)

Diesel^[4]
65 (mg/l)

Gasoline^[2]
8,2 (mg/l)

Safer than Gasoline by
a factor of 1900 times

- [1] ECHA, European Chemicals Agency, registration dossier Methanol
- [2] Petrobras/Statoil ASA, Safety Data Sheet, ECHA registration dossier Gasoline
- [3] GKG/ A/S Dansk Shell, Safety Data Sheet
- [4] ECHA, European Chemicals Agency, registration dossier Diesel
- [5] ECHA, European Chemicals Agency, registration dossier Methane

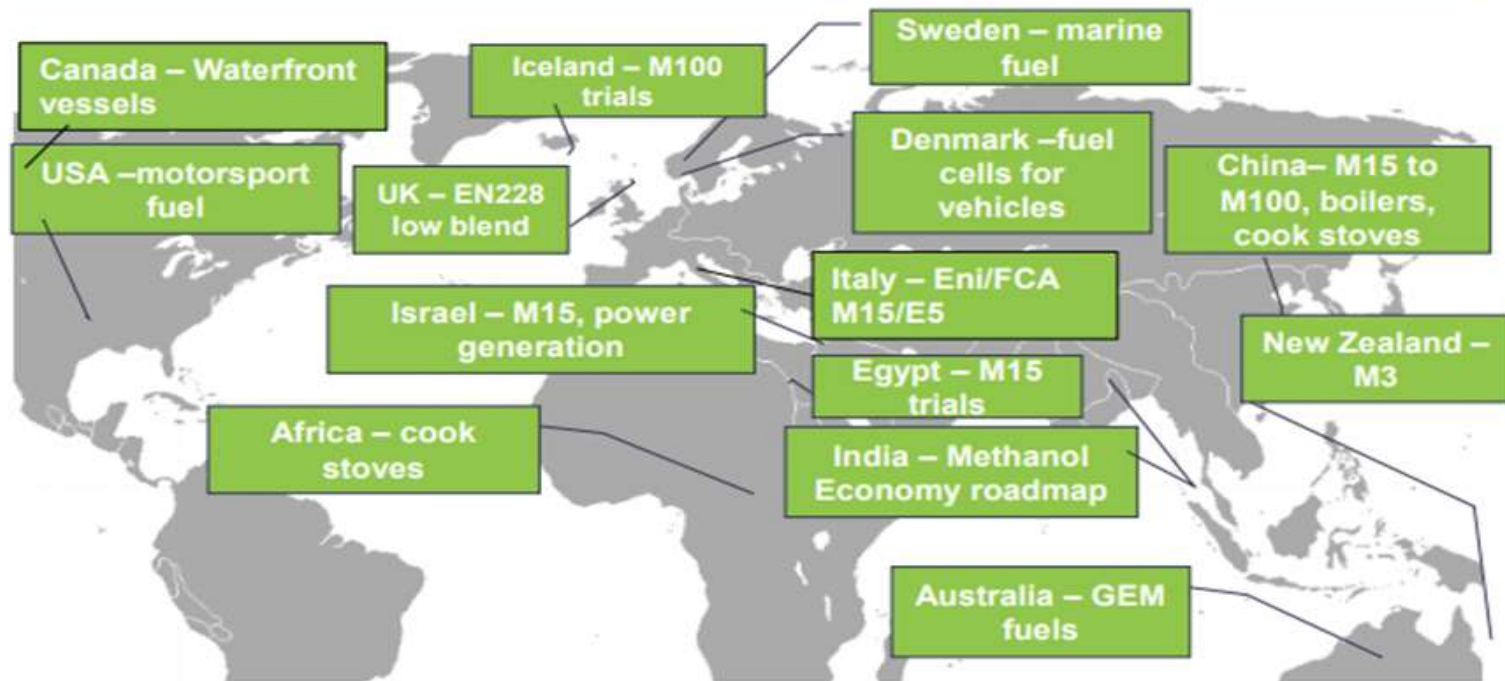


Beyond Oil and Gas:
The Methanol
Economy - George
Olah

Source:

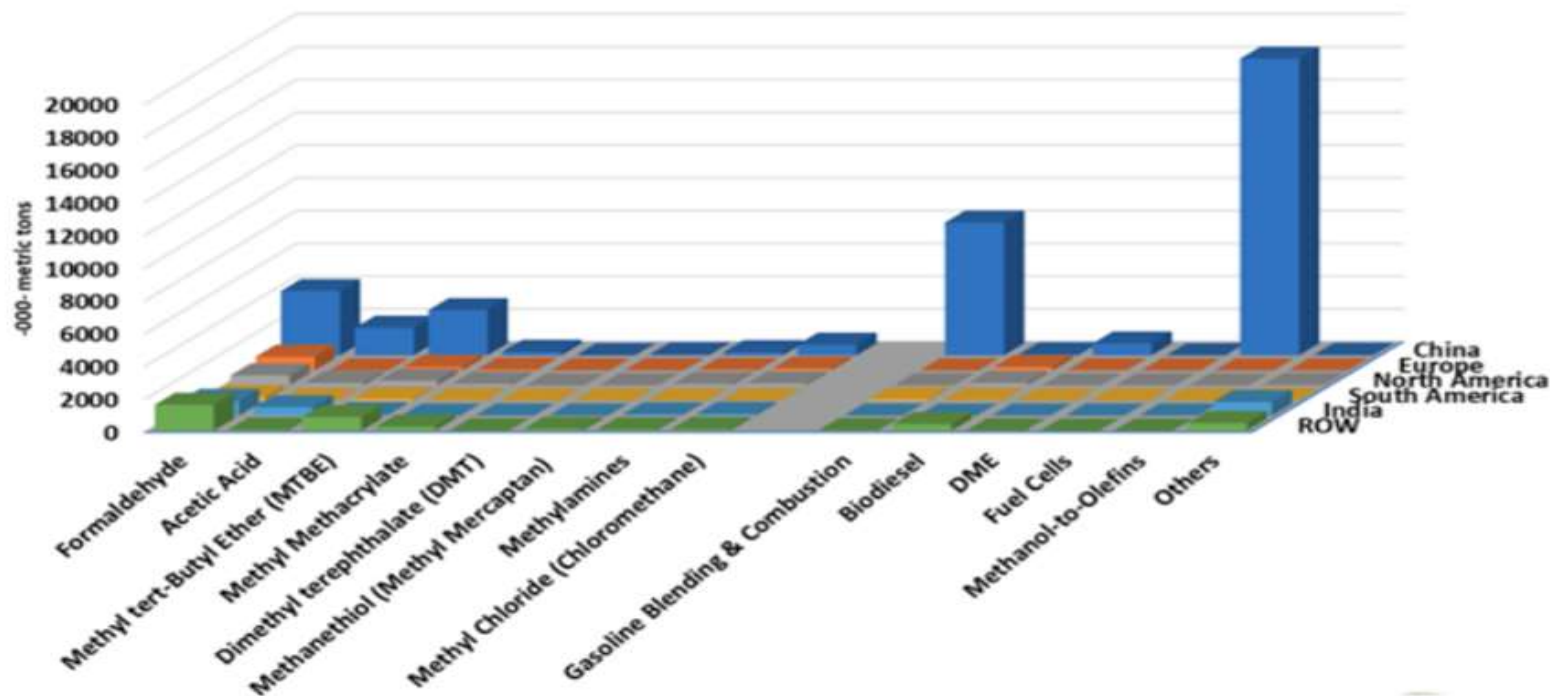
http://www.f.u-tokyo.ac.jp/~kanai/seminar/pdf/Lit_T_Matsumoto_B4.pdf

Global Methanol Fuel Examples

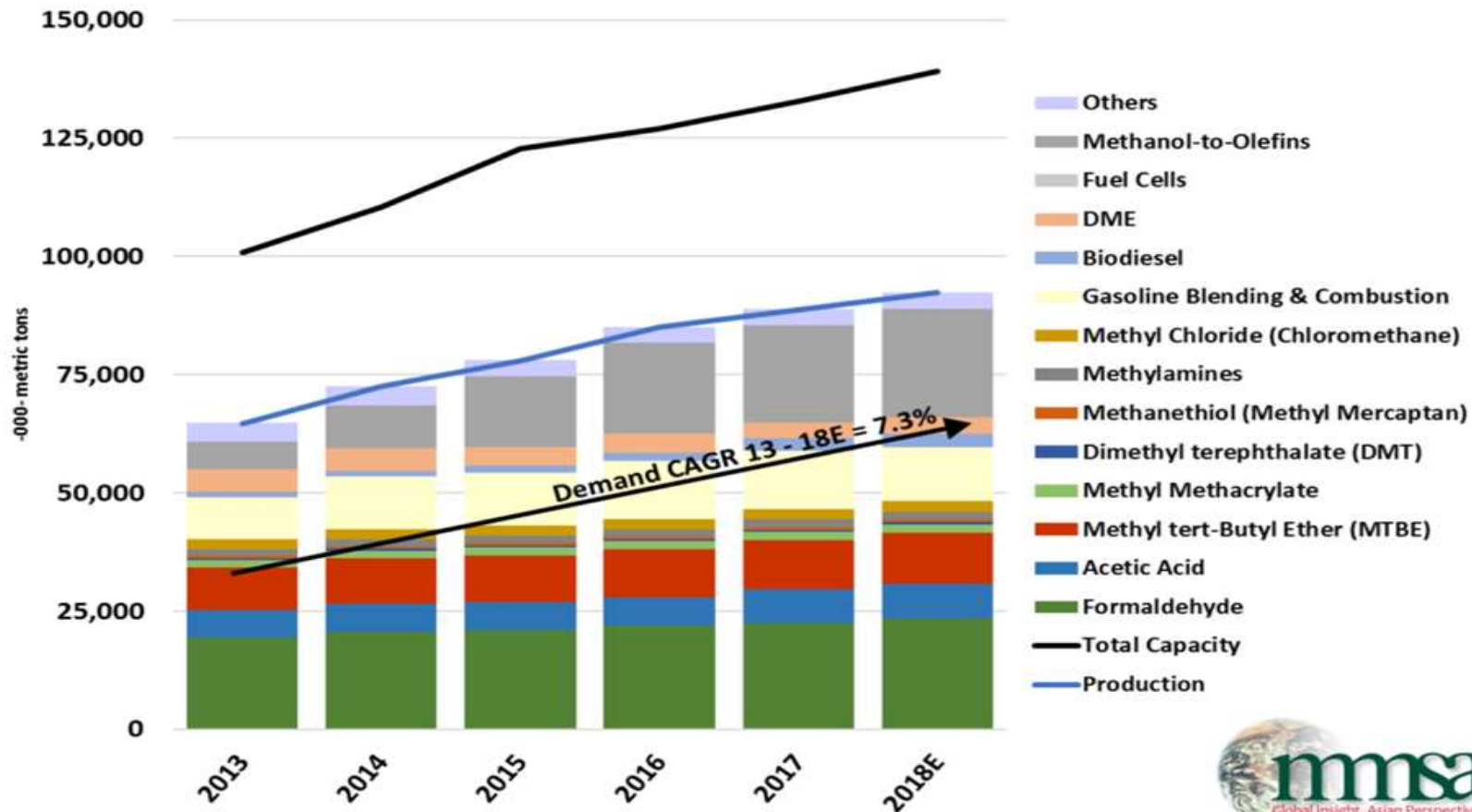


CHINA METHANOL DEMAND DRIVES WORLD MARKETS

Projected Methanol Demand Growth, by Product & Region
2017– 2027E



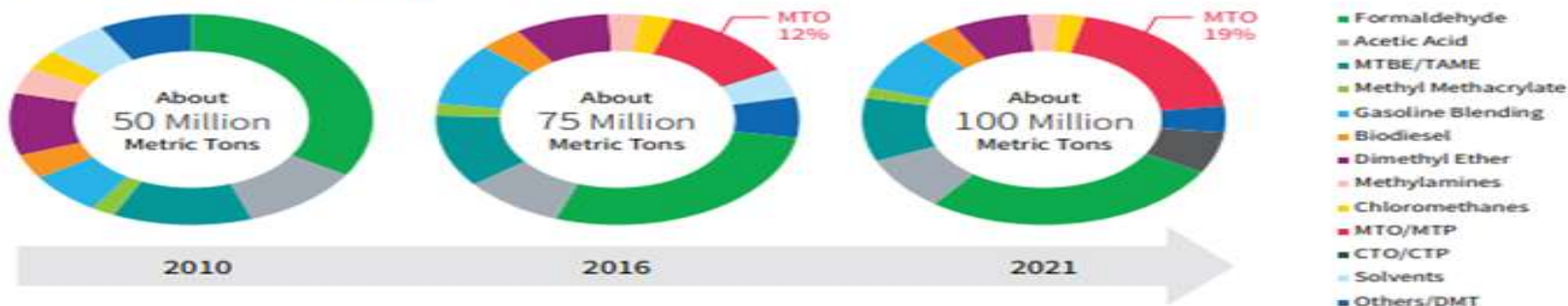
MMSA Global Methanol Supply and Demand Balance 2013 - 2018E



	2013	2014	2015	2016	2017	2018E	CAGR 13-18E
Supply							
Nameplate Capacity	100,868	110,471	122,727	127,048	132,777	139,177	6.7
Adjustments	-	-	-	-	-	-	-
Total Capacity	100,868	110,471	122,727	127,048	132,777	139,177	6.7
Macro Operating Rate	64.1%	65.7%	63.4%	66.9%	66.8%	66.4%	0.7
Production	64,682	72,607	77,870	85,027	88,711	92,354	7.4
Imports	24,425	24,194	24,195	26,680	26,568	26,874	1.9
Total Supply	64,682	72,607	77,870	85,027	88,711	92,354	7.4
Demand							
Formaldehyde	19,387	20,488	21,017	21,832	22,546	23,487	3.9
Acetic Acid	5,714	6,020	5,994	6,096	6,981	7,246	4.9
Methyl tert-Butyl Ether (MTBE)	9,108	9,641	9,748	10,111	10,469	10,798	3.5
Methyl Methacrylate	1,549	1,634	1,648	1,687	1,733	1,822	3.3
Dimethyl terephthalate (DMT)	468	472	467	473	478	476	0.3
Methanethiol (Methyl Mercaptan)	478	493	503	513	528	545	2.7
Methylamines	1,441	1,482	1,522	1,558	1,600	1,649	2.7
Methyl Chloride (Chloromethane)	1,985	2,107	2,099	2,165	2,243	2,285	2.9
Alternative Fuels							
Gasoline Blending & Combustion	8,926	11,093	11,323	12,266	12,192	11,417	5.0
Biodiesel	1,175	1,173	1,383	1,831	2,844	2,860	19.5
DME	4,734	4,853	3,844	3,935	3,292	3,374	-6.5
Fuel Cells	7	7	8	8	9	9	6.6
Methanol-to-Olefins	5,767	9,108	15,150	19,218	20,533	22,917	31.8
Others	4,067	4,027	3,465	3,330	3,431	3,470	-3.1
Total	64,803	72,597	78,171	85,023	88,882	92,354	7.3
Exports	24,425	24,194	24,195	26,680	26,568	26,874	1.9
Total Country Demand	64,803	72,597	78,171	85,023	88,882	92,354	7.3
Net	(121)	10	(301)	5	(171)	-	-

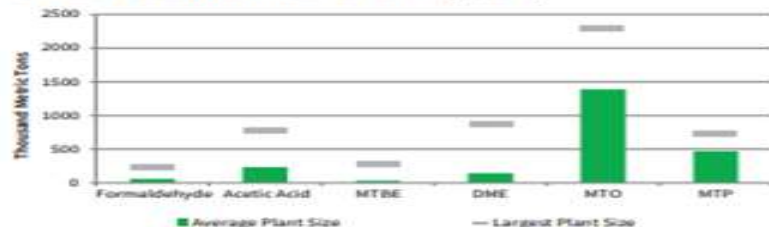
Olefins represents 15-20% of methanol demand

GLOBAL METHANOL DEMAND BY END-USE



The methanol industry entered into a new dimension with much larger MTO plants

CAPACITY TO CONSUME METHANOL BY KEY DERIVATIVE IN CHINA (2017)



Methanol and Olefins Price Setting Mechanisms Link at High Operating Rates

OLEFINS

- Methanol may be an olefins price setter as marginal supply
- Methanol is important to marginal supply
 - Indicator of olefins supply/demand tightness
 - MTO is low capex supply in regions with advantaged methanol

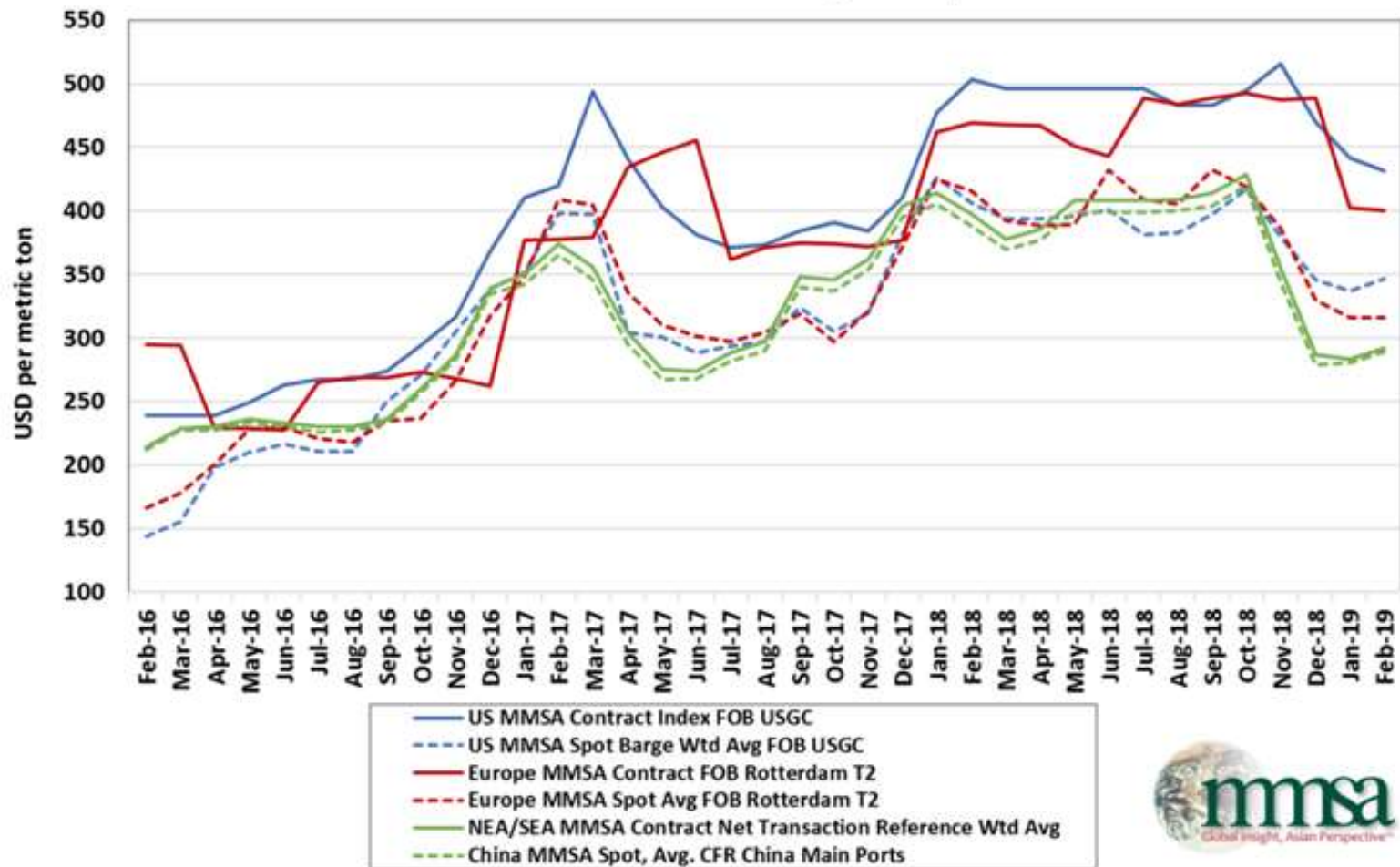
METHANOL

- MTO/CTO cost structure is complex due to feedstock sourcing and derivatives
- MTO affects the methanol market
 - At 15-20% of demand, drives methanol operating rates
 - MTO affordability acts as ceiling to methanol prices

It is critically important to understand both markets.

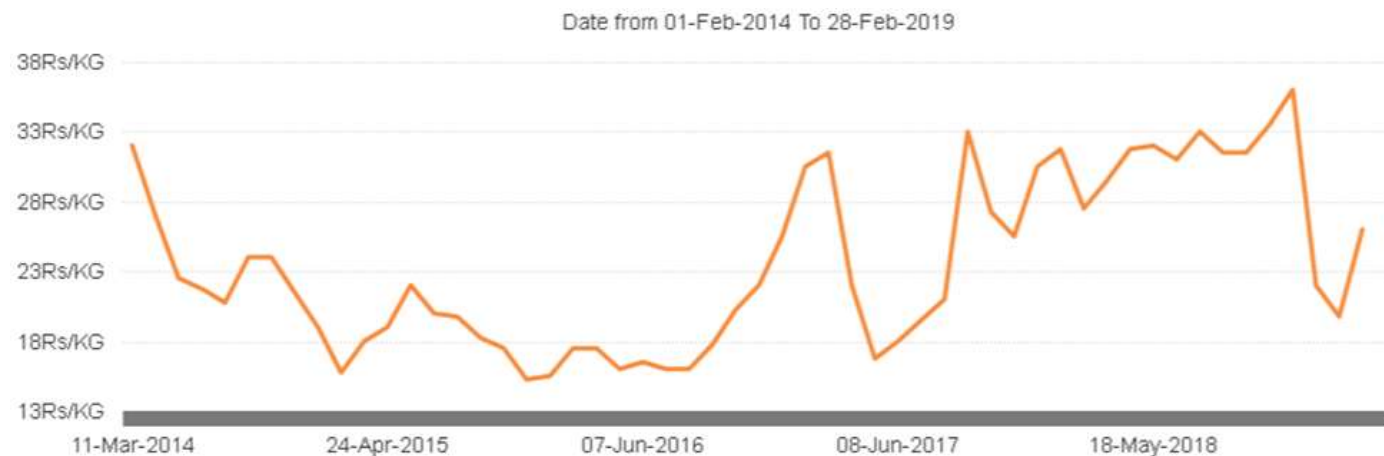
The methanol and olefins markets are not independent from each other. IHS Markit experts analyze in-depth both markets and their correlation.

Global Methanol Pricing Comparison



China Methanol Prices in Recent 5 Years		
Years	Price (CNY/mt)	Price Change Spread
2013	2,500-4,000	1,500
2014	1,800-3,100	1,300
2015	1,700-2,600	1,100
2016	1,700-3,300	1,600
2017	2,200-3,800	1,600
H1 2018	2,100-3,700	1,600

Date	Product	Producer	Grade	Category	Trading Mode	Market/Port	Price	Unit	Change	Trend
23/02/19	Methanol			Retail	Domestic Repack	Kolkata	38.00	Rs/Litre	0	View
23/02/19	Methanol			Bulk	Imported Tanker Load	Mumbai	23.00	Rs/KG	-1	View
23/02/19	Methanol			Retail	Domestic Repack	Delhi	37.00	Rs/KG	0	View
23/02/19	Methanol			Retail	Imported Repack	Delhi	36.00	Rs/Litre	0	View
23/02/19	Methanol			Retail	Imported Intact	Mumbai	35.50	Rs/KG	0	View
23/02/19	Methanol			Retail	Imported Repack	Mumbai	32.00	Rs/Litre	0	View
23/02/19	Methanol			Retail	Domestic Repack	Ahmedabad	39.50	Rs/Litre	0	View
23/02/19	Methanol			Bulk	Imported Tanker Load	Kandla	24.00	Rs/KG	0	View



Methanol –
Imported
Tanker Load
(Mumbai) Price
History

China Methanol Fuel Status

2009

China adopted national standards for M85 and M100

2012

MIT "high proportion" methanol demonstration to serve as the basis for M85 vehicle standards in Shanxi, Shaanxi, and Shanghai, and has expanded to other provinces and cities.

2014

7 million tons (2.3 billion gallons/8.7 billion liters) of methanol blended with gasoline, against total gasoline consumption of 2.25 million barrels per day or 34.5 billion gallons/130 billion liters

180,000

Vehicles converted to methanol fuel, mostly taxis.

Geely M100 Vehicles

- China's Geely Automotive Holdings is global leader in the commercialization of M100 vehicles
- Geely has two methanol engine and five methanol vehicle manufacturing bases, with an annual methanol vehicle production capacity of 300,000 - 500,000 cars
- Now introduced M100 bus, long-haul truck and medium-duty truck



India's Leapfrog to Methanol Economy

- Under Indian Methanol Economy program 5 methanol plants based on high ash coal, 5 DME plants and 1 natural gas based methanol production plant with a total production of 20 MMT/ annum in joint venture with Israel, are planned to be set up. 3 boats and 7 cargo vessels are being built by Cochin Shipyard Limited for IWAI to use Methanol as a marine fuel for inland waterways program.
- Thermax Ltd. has successfully developed a 5 KW methanol based reformer on a Direct Methanol Fuel Cell (DMFC). This module is being tested to replace DG sets in mobile towers. For direct electricity generation, Kirloskar Oil Engines Ltd. has converted a 5 KW generator set to run on 100% methanol and demonstrated successfully. Kirloskar is working towards converting generator sets of 150 - 300 KVA/KW capacity in collaboration with Dor Chemicals, Israel.
- As a part of R & D program, work is in progress to set up coal to methanol plants in the country using the indigenous technology which are currently being demonstrated at BHEL (Hyderabad), Thermax, BHEL (Trichy) and IIT Delhi. Thermax with IIT Delhi is working on 1 TPD demonstration plant while BHEL (Hyderabad) & BHEL (Trichy) are working on 1 TPD & 40 TPD demonstration plants respectively.
- R & D project have been sanctioned by Department of Biotechnology for production of Methanol from biomass to IISc Bengaluru and Praj Industries Pune. Phase I of the demonstration of production of syngas from biomass will be demonstrated in January 2019

Methanol Economy is the “Bridge” to the dream of a complete “Hydrogen based fuel systems”.

Methanol can be produced from Natural Gas , Indian High Ash Coal , Bio-mass, MSW , stranded and flared gases and India can achieve (through right technology adaptation} to produce Methanol @ Rs.19 a litre from Indian coal and all other feedstock. The best part world is already moving towards renewable methanol from CO₂ and the perpetual recycling of CO₂ into Methanol, say CO₂ emitted from Steel plants, Geothermal energy or any other source of CO₂, effectively “Air to Methanol”

India has an installed Methanol Production capacity of 2 MMT per annum. As per the plan prepared by NITI Aayog, using Indian High Ash coal, Stranded gas, and Biomass can produce 20 MMT of methanol annually by 2025. *India, with 125 Billion Tonnes of proven Coal reserves and 500 million tones of Biomass generated every year & the huge quantities of Stranded & Flared gases has a huge potential for ensuring energy security based on alternate feedstock and fuels.*

Methanol in Railways

Indian Railways consumes about 3 billion litres a year and the annual diesel bill is in excess of Rs. 15000 Crores. A Methanol locomotive prototype is being implemented by Indian Railways under a grant by Department of Science & Technology and once all **6000 diesel engines are converted to methanol (at very minimal cost of less than 1 crore a engine), the annual diesel bill can be reduced by 50%. Methanol conversion program** in railways is complementary to the goals of electrification in Railways.

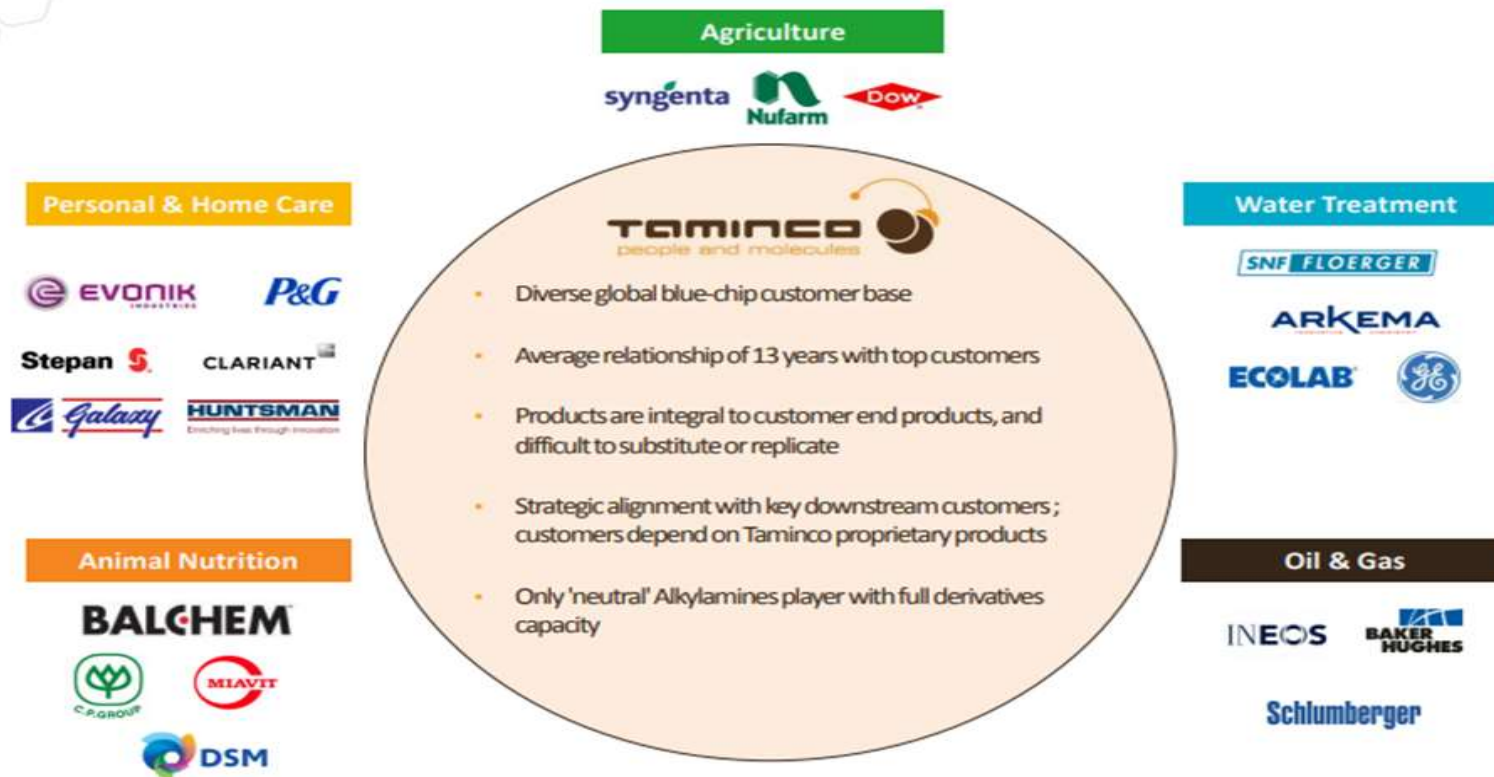


Characteristics	
Business Model	Niche Industry
	Leading Market Positions
	End-Markets with Strong Underlying Fundamentals
	Growing Fast in the "Right" Regions
	Partnerships with Blue-Chip Customers
Financial Profile	Attractive Financial Profile
	Economic Resiliency
	Positive Short and Long-Term Outlook

Taminco's Attributes
<ul style="list-style-type: none">• Specialized player with large capital investments• Highly valued / integral element of final product
<ul style="list-style-type: none">• #1 or #2 market positions in vast majority of chemicals produced• Robust product development
<ul style="list-style-type: none">• GDP+ growth (e.g. 2x GDP)• Long-term sustainable growth trajectory
<ul style="list-style-type: none">• Footprint located to serve around the world• Exposure to high growth regions
<ul style="list-style-type: none">• Long tenure with top customers• Track-record of partnerships with customers
<ul style="list-style-type: none">• Strong Adjusted EBITDA margins (i.e. > 20%)• High free cash flow conversion
<ul style="list-style-type: none">• Non-discretionary demand for products• End markets driven by positive "Mega Trends"
<ul style="list-style-type: none">• Strong momentum across entire business portfolio• Pipeline of growth opportunities

Possible Future for BAL/AACL

Integral Supplier to Blue-Chip Customer Base



Risks

- Management Quality
 - Di-(worse)-fication in the past. However, they have quickly exited upon failure of businesses.
 - Non-technical background of BAL Management compared to AACL.
 - More aggressive compared to AACL in terms of capacity expansion.
 - Based on LinkedIn profiles and Ambit report, AACL seem to have better R&D employee base compared to BAL.
- Lower number of products (25) compared to AACL (125)
- Potential ban on herbicides such as Glyphosate/Atrazine (which can impact MIPA offtake since it is a key intermediate) if not offset by other end user industries.

Risks (2)

- There is a potential for serious adverse events being reported against Metformin in future, though probability of it is low (since it has been prescribed since 1950s)
- Forex risk: Cost of RM imports > Export Revenues
- Dependency on Anti-Dumping Duty (Govt Regulation)
- Paradigm shift away from Iatrogenic pharma and Intensive Monocrop farming towards “Via Negativa” wellness and Regenerative Agriculture (Silvopasture or Allan Savory’s holistic management)
- Capability to innovate and find new derivatives which can continue to play the “import substitution” theme.
- Quasi Promoter Holding of approx. 15% (Nalla Family - KPR Group & Yannam

References

<https://www.methanol.org/wp-content/uploads/2019/01/Dolan-TT-Methanol-Fuel-Blending-Workshop-24-Jan-2018.pdf>

<https://www.methanol.org/wp-content/uploads/2018/10/MI-Asian-Sulphur-Cap-2020-Final.pdf>

<https://www.methanol.org/wp-content/uploads/2019/03/Dolan-IMPCA-Miami-8-Feb-2019.pdf>

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=179785>

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=174919>

http://www.niti.gov.in/writereaddata/files/document_publication/Article%20on%20Methanol%20Economy_Website.pdf

<http://niti.gov.in/content/methanol-economy>

<https://portbulletin.com/2019/02/20/mancozeb-market-capacity-production-status-and-outlook-and-future-predictions/>

<http://www.jefferies.com/CMSFiles/Jefferies.com/files/Conferences/081114/PDF%20Presentations/Taminco%20V2.pdf>

<https://www.methanol.org/news/china-methanol-market-analysis-h1-2018/>

<https://www.methanol.org/methanol-price-supply-demand/>

<https://www.methanol.org/news/analysis-on-main-products-of-methanol-industry-chain-in-may/>

Appendix: Excerpts from Taminco 10-K

Alkylamine derivatives production tends to be regional to minimize shipping costs. As a result of these factors, production in the industry is generally regional.

Over the past decade, producers in the alkylamine industry that compete in our geographies have consolidated significantly. Key consolidation events include Air Products UK closure of a 50 kt production line in 2004, Chinook Canada's closure of a 68 kt production line in 2004 and sale of contracts to DuPont, our purchase of Air Products North American and Latin American amines business in 2006, Akzo Nobel's Netherlands closure of a 22 kt production line in 2006 and sale of contracts to us and Balchem's purchase of Akzo Nobel's 18 kt Italian operations in 2007.

The largest alkylamine building block product by volume is methylamines, followed by higher alkylamines. Methylamines are manufactured by reacting methanol with ammonia in a catalytic reactor. Three different methylamines are produced: mono methylamine ("MMA"), dimethylamine ("DMA") and trimethylamine ("TMA").

The reaction circumstances (pressure, temperature, catalysts, etc.) and reactant ratios determine the ratio of the three products. **If an excess of any of these three methylamines is produced, the product can be returned back to the catalytic reactor and recycled.**

- The term higher alkylamines refers to the C2-C6 alkylamines, that is, ethyl, n butyl, n propyl, isopropyl and cyclohexylamines. The manufacturing process for higher alkylamines is similar to that for methylamines, as ammonia is combined with various alcohols in catalytic reactors and subsequently distilled. The use of different alcohols results in the creation of different higher alkylamines.
- According to research provided by consultants, consumption of methylamines accounted for slightly less than three quarters of global consumption of alkylamines by volume. Higher alkylamines made up the remainder of global consumption, with ethyl amines accounting for 7%, isopropyl amines, which include MIPA, for approximately 13% and butylamines for approximately 2% of total global consumption by volume.
- Methylamines are expensive to transport in gaseous form due to their volatile nature and logistical complexity. As such, supply and demand for methylamines is typically matched on a regional basis. Competition in higher alkylamines production is generally regional. With few exceptions, producers tend to focus on producing a small number of higher alkylamines, which results in a limited number of producers of each type of higher alkylamine in each region. Methylamines and higher alkylamines are the principal building blocks that can, following reaction with various other chemical compounds, be used for the manufacture of a wide range of specialty alkylamine derivatives.
- As we engage in Cost Pass Through (“CPT”) Contracts for approximately 50% of revenues for the year ended December 31, 2013, we can largely pass raw material price increase through to customers.

- **The average timeline for product development from conception to execution is three to five years.**
- Amines and their derivatives account for approximately:
 - Agriculture (36% of Volume): 15% of the end product cost structure
 - Water Treatment(17% of Vol): 15% of the end product cost structure for water treatment products on average
 - Personal & Home Care(18% of Vol): 10% of the end product cost structure for products in the personal & home care end-market on average
 - Animal Nutrition(12% of Vol): less than 1% of the end product cost structure for animal nutrition products.
 - Oil & Gas (8% of Volume): 4% of the end product cost structure for these oil & gas products

Methanol vs Ethanol: Last Alt. Fuel Standing?

Growing sugar cane, even more water hungry than[rice] paddy, in water-scarce Maharashtra is equally contraindicated- especially since the country happens to be surplus in sugar most of the time, and exporting sugar amounts to exporting water. It takes 2100 litres of water to produce one kilogram of sugar in Maharashtra.

<https://swarajyamag.com/economy/ipl-will-use-zero-percent-of-the-water-that-sugarcane-does>

<https://www.freepressjournal.in/editorspick/ethanol-is-a-bad-choice-to-run-cars-in-india-bharat-jhunjhunwala/1360577>

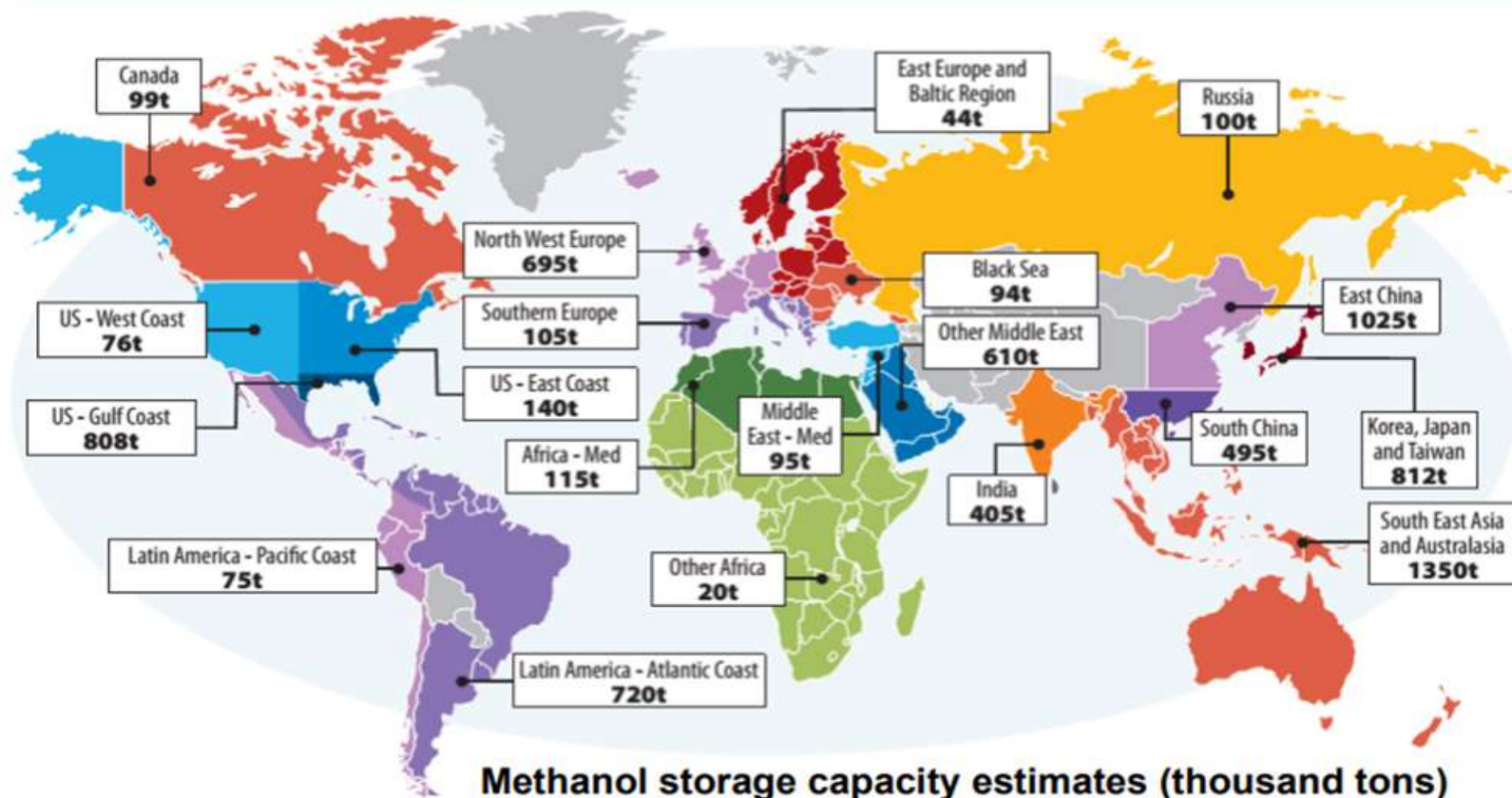
<https://www.livemint.com/Industry/RfNU5ZFXDRTfUkl9INMaL/Why-ethanol-blending-in-petrol-might-not-work-for-India.html>

<https://energy.economictimes.indiatimes.com/energy-speak/why-methanol-is-a-viable-alternative-fuel-for-india/2533>

<http://pib.nic.in/newsite/PrintRelease.aspx?relid=174919>

<http://www.thealternative.in/society/the-hidden-story-of-indias-virtual-water-deficit/>

Available in many ports around the world



Unintended Consequences of Human Intervention

What makes a soil fertile? Is it the pesticides or the microbes and the ecosystem of diverse flora and fauna? Would Nature/Evolution select for increased yields?

Monocrop farming + intensive use of Agrochemicals leading to Soil Depletion of Nutrients and Microbes.

Deforestation (for factory) and Desertification (of farmlands):

<https://www.engagemedia.org/Members/VisualEntity/videos/rooted-truth-a-short-documentary-on-sai-sanctuary/view> (Thanks to Raj Sharma for sharing!)

<https://www.rewildingbritain.org.uk/rewilding/rewilding-projects/knepp-estate>