



Agribusiness | Fertecon

The World's Top 40 Ammonia Buyers:

Leading ammonia buyers in 2019 defined by sector
and geography

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About the Author

Peter Shaddick has been involved in the fertilizer and fertilizer raw material industry since 1974. He started work at British Sulphur Corp. as a contributor to the monthly magazine Fertilizer International, later going on to become its editor. In 1977 he helped develop the first weekly price reports for ammonia and urea, then sent out by telex, and later extended these to cover a wider range of fertilizer products. In early 1981 he moved to Singapore to work for Transammonia AG, assisting in sales of ammonia, sulphur and various fertilizers in south-east and east Asia from and including the Indian sub-continent. In 1993 he left Transammonia and formed his own company to broker and trade fertilizers in the same region. In 1999 he partnered with Fertecon to author a report on the Vietnam fertilizer market and later that year he was recruited by Fertecon on a part time basis to contribute market information on the region for all the fertilizer and fertilizer raw materials handled by Fertecon. In 2012 he authored a report for Fertecon on the Laos potash industry. He continues to live in Singapore and to work with Fertecon on a part time basis, mostly focussed on reporting the urea and ammonia markets of Asia and Oceania, east of India.

Executive Summary: Top 40 ammonia buyers

We have compiled a list of what we think are the forty biggest buyers of ammonia in 2019 and we will look at them in the context of the industries they are in, as well as geographically. The focus of our report is not the traders, trader-producers or terminal operators which fill the majority of the places in our top 10 and who are regularly covered in Fertecon's Ammonia Outlook reports, but what we would define as the "true" end-users, although this turns out to be quite a subjective exercise. If a company has a 30% or 50% share in the ownership of an ammonia plant and yet off takes the full volume is that a purchase of the full volume, or a pro-rated volume? It probably depends on individual agreements for such a shareholding but in discussing traders purchase volumes we aim to show the volume they move as well as the volume they say they buy

The biggest ammonia buyer in 2019, by quite a significant margin, is Trammo with close to 3 million t traded. We include Trammo in our first section on what we call pure traders, along with Mitsubishi (number 6 on our list) and Mitsui (8). All three of these companies have ammonia off-take agreements and Mitsubishi is a 30% owner of an ammonia plant, but we think it is more trading than producing.

In the following section on producer traders we have Yara the second biggest ammonia buyer in the world and the second biggest producer! We also cover BASF (10) and Koch Industries (13) in this grouping.

Our third grouping of trader buyers is for the terminal operators. LFC is number 9 on our list of top buyers but only uses about 20,000 t/y ammonia itself. In contrast the other big Korea importer-NCC (11) is a substantial user in its own right, although still using less than 50% of the volume it imports. Our third terminal operator is difficult to pin down. Hengrun-Gemoil (22). Hengrun has the lease on the ammonia tanks in Zhanjiang, and is a major seller of the ammonia imported, but most if not all of the buying for import into these tanks is handled by its partner Gemoil.

Sixteen of our top ammonia buyers are primarily fertilizer producers with the biggest buyers focused on ammonium phosphate fertilizer production ie OCP (3), Mosaic (4), IFFCO (5), CIL (12), Yuntianhua (26) and JPMC (38). Inevitably there is some mixing, and fertilizer producers can be industrial nitrogen producers and-as in the case of Pemex (7) - also significant ammonia traders. We should also stress that there is double counting in these numbers, eg with Trammo buying to sell to another buyer in our list. Besides Pemex, our other mixed fertilizer buyers are Toros (16), Fertiberia (24), Agropolychim (27), Bagfas (31), TFC (34) and Lovochemie (37).

After Fertilizers we look at the various industrial nitrogen sectors-non fertilizer users of ammonia. We have five of our top buyers mainly producing caprolactam: Highsun (17), Ube (19), Lanxess (23), CPDC (28) and Capro Corp. (39). It is also important to point out BASF, listed above as a producer – trader, is the second biggest caprolactam producer in the world and one of the leading producers of both MDI-TDI and Ethanolamines, products which consume ammonia and feature later in this report.

Our report has four buyers mainly producing acrylonitrile: INEOS (15), Asahi Kasei (14), Ascend (18) and Shanghai Secco (35). Both Acrylonitrile and especially caprolactam producers can and do produce

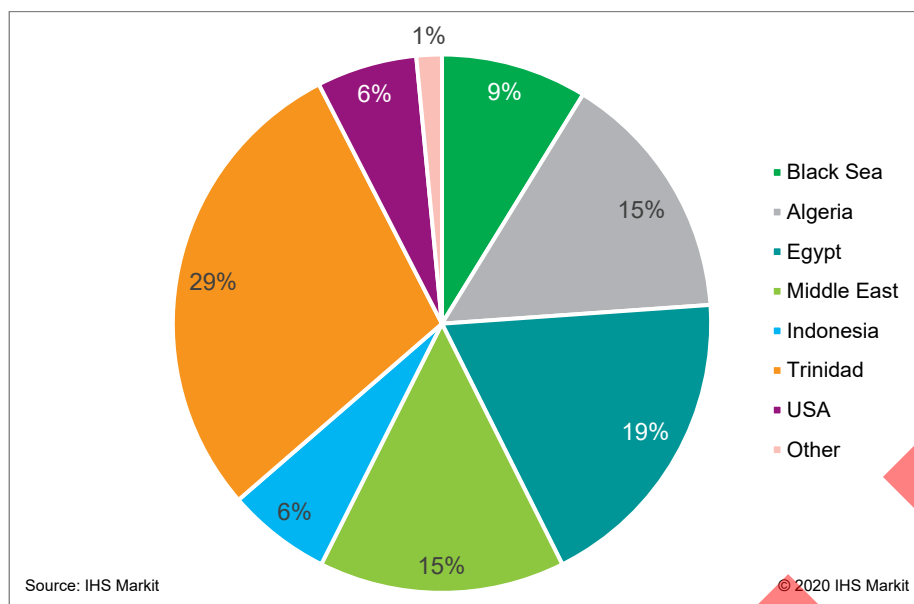
fertilizer, chiefly ammonium sulphate, in significant volumes, but we will still refer to these as non-fertilizer producers.

Three of our top companies are producers of explosive grade ammonium nitrate (EGAN): ENAEX (21), Orica (25) and CSBP (33), also a fertilizer producer. Finally, a threesome of ammonia buyers with their own distinct fields: Huchems (20) produces nitric acid, which is mostly used in the production of MDI/TDI; Evonik (30) features in our list because of its purchase of ammonia for a variety of products, including methionine. We have this buyer within a section on ammonia use in amino acids production. Our last buyer, Butachimie (40) produces ADN but is mentioned in our section on Koch, which owns Invista, a major ADN producer, and a 50% owner of Butachimie, together with BASF.

We have further tried to sub-divide these buyers on a geographical basis, so we have grouped buyers in Korea, India, Turkey and Taiwan.

List of Top 40 ammonia buyers, 2019

Rank	Company	000 t	Countries	Use
1	Trammo	3,000	Worldwide	Trading
2	Yara	1,630	Europe/Brazil	fertilizers, industrial N
3	OCP	1,570	Morocco	Phosphates, NP/NPK
4	Mosaic	1,100	USA/Brazil	Phosphates, NP/NPK
5	Iffco	830	India	Phosphates, NP/NPK
6	Mitsubishi	818	Asia	Trading
7	Pemex	777	Mexico	Fertilizer, trading
8	Mitsui	760	Asia	Trading
9	LFC	757	Korea	Trading
10	BASF	600	China, Europe	Nitric acid
11	NCC	565	Korea	fertilizers/trading
12	CIL	560	India	Phosphates, NP/NPK
13	Koch/Invista	500	USA	HCN, Nitric Acid
14	Asahi Kasei	427	Japan, Korea, Thailand	Acrylonitrile
15	INEOS	426	USA, Saudi Arabia, UK	Acrylonitrile, ethanolamines
16	Toros	400	Turkey	NP/NPK
17	Highsun/Fibrant	386	Netherlands, China	Caprolactam, AS
18	Ascend	371	USA	Acrylonitrile
19	Ube	369	Thailand, Spain	Caprolactam, AS, nitric acid
20	Huchems	350	South Korea	Nitric acid, AN
21	ENAE	347	Chile	IGAN
22	Hengrun/Gemoil	340	China	Trading
23	Lanxcess	325	Belgium	Caprolactam, AS
24	Fertiberia	320	Spain	Fertilizer
25	Orica	320	Canada/Australia	IGAN
26	Yuntianhua	311	China	Fertilizer
27	Agropolychim	295	Bulgaria	fertilizers (mostly AN)
28	CPDC	295	Taiwan	Caprolactam, Acrylonitrile, AS
29	Deepak	282	India	Fertilizers, IGAN
30	Evonik-Rohm	275	US, Europe, Singapore	methionine/MMA
31	Bagfas	247	Turkey	Fertilizer
32	GSFC	238	India	Fertilizer
33	CSBP	229	Australia	IGAN, sodium cyanide, nickel
34	TFC	211	Taiwan	Fertilizer
35	Shanghai Secco	250	China	Acrylonitrile
36	PPL	205	India	Fertilizer
37	Lovochemie	196	Czech Republic	CAN/UAN
38	JPMC	190	Jordan	Phosphates, NP/NPK
39	Capro Corp	190	Korea	Caprolactam
40	Butachimie	186	France	HCN, NA

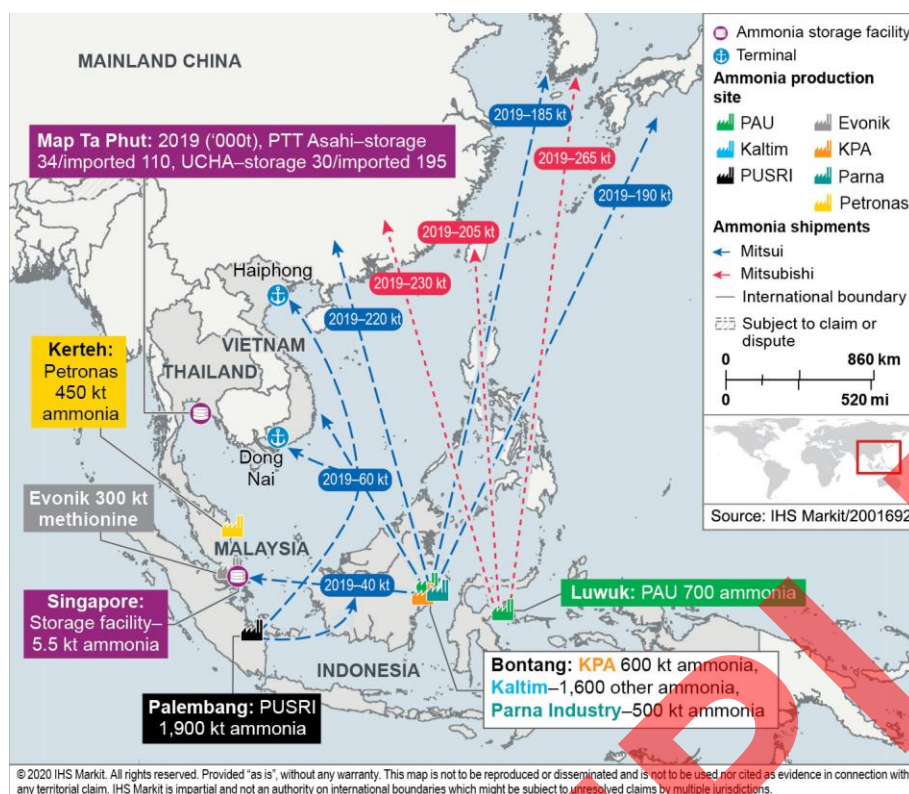
Figure 2: Origins of Trammo ammonia shipments 2019

It is difficult for us to track domestic purchases of ammonia but in international trade we estimate that in 2019 Trammo moved about 3 million t of ammonia.

The main market for Trammo appears to be India, taking around 630,000 t in 2019, with sales to various European buyers, at around 600,000 t, not far behind. We tracked about 500,000 t into Turkey, 400,000 t of ammonia into China, 370,000 t into Brazil and 350,000 t into Chile, all fairly rough estimates but enough to show the wide geographic spread of Trammo's trading.

Company	Vessel	Size '000 tons	Usual operating area
Trammo	Gas Utopia	25	Americas
	Gas Venus	25	Americas, Africa, Turkey
	Hong Jin	14.6	Asia
	Marola	25	Worldwide
	Marycam Swan	15	Black Sea-Mediterranean
	SFC Tobolsk	25	Worldwide
	Sylvie	23.5	Americas, Europe, Africa
	Tokyo	40	Worldwide
	Trammo Cornell	25	Worldwide
	Trammo Dietlin	25	Worldwide
	Trammo Paris	15	Black Sea-Mediterranean
Mitsubishi	Pazifik	40	Loading at PAU for Asia
Mitsui	BP Jacky	3.5	South- east Asia
	Gaz Millennium	15	Asia
	Leo Sunrise	23	Sub charter to Yara
	Navigator Glory	15	Sub charter to Petronas,
Yara	Coral Ivory	4	Baltic
	Desert Orchid	15	Load in Trinidad
	Leo Sunrise (from Mitsui)	23	Australia-Asia

Figure 4: East and South-East Asia



2.3. Mitsui & Co.

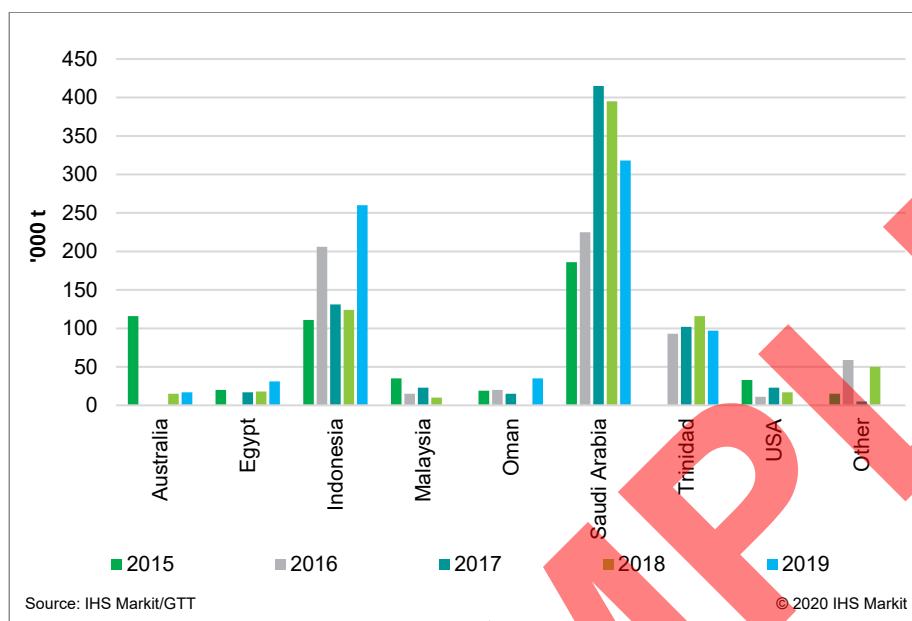
Mitsui	Rank in our Top 40 ammonia buyers: 8
Company:	Trading company in Japan
Main businesses:	Part of Global trading group active in most industrial sectors
Ammonia purchase:	760,000 t (2019)
Ports receiving ammonia:	- Caojing, China – 220,000 t (2019) - Japan – 190,000 t (2019) - Korea – 185,000 t
Main suppliers:	- KPA, Indonesia, 400,000 t in 2019 - Petronas, Malaysia, 100,000 t in 2019
Uses of purchased ammonia:	Trading of ammonia
Own ammonia production:	None
Downstream ammonia capacity:	None
Ammonia infrastructure:	Charter for own use of 15,000 t Gaz Millennium and 3,500 t BP Jacky
Outlook:	Secure supply of about 400,000 t/y from KPA guaranteed through to at least 2025

Mitsui is a Japanese group, headquartered in Tokyo and listed on the Tokyo stock exchange. Mitsui has a world-wide net work of offices with 209 overseas subsidiaries and business interests in trading, logistics and financing. Mitsui divides its business into seven segments: iron and steel products; mineral and metal resources; energy; machinery and infrastructure; lifestyle; chemicals and “innovation and corporate development. Within the chemicals segment there three units: performance materials, nutrition

In 2020 LFC agreed cfr contracts for close to 580,000 t, with 150,000 t from Maaden, 130,000 t from Mitsui, 100,000 t from Mitsubishi, 100,000 t from Trammo, 50,000 t from Sabic and about 45,000 t from Parna Raya. LFC continues to buy on a fob basis.

At the end of 2019 LFC agreed to cover the import requirements into Incheon for Hanwha. Imports into Incheon were 18,000 t in 2019 but will be higher than that in 2020.

Figure 8: LFC ammonia imports ('000 t)



4.2. Namhae Chemical Corp. (NCC)

Namhae Chemical Corp. (NCC)	
Company:	Rank in our Top-40 ammonia buyers: 11 Korean fertilizer company and ammonia terminal operator
Main businesses:	- Fertilizer production and domestic sales - Fertilizer exports – 600,000 t/y - Ammonia imports and sales
Ammonia purchase:	565,000 t (2019)
Ports receiving ammonia:	Yosu, Korea – 565,000 t (2019)
Main suppliers:	- Koch, mostly from Trinidad - Yara, mostly from Australia - Mitsubishi, mostly from Indonesia
Uses of purchased ammonia:	- Trading/distribution of ammonia in the country – 350,000 t (2019) - Feeding own fertilizer production – 220,000 t (2019)
Own ammonia production:	no production.
Downstream ammonia capacity:	1.35 million t/y complex fertilizer capacity
Ammonia infrastructure:	Yosu – 54,000 t ammonia storage
Outlook:	Difficult to see NCC being able to much expand ammonia demand

NCC is a Korean company headquartered and producing fertilizer in Yosu, also spelt Yeosu, on the southern tip of South Korea. NCC had 54,000 t of ammonia storage in Yosu which it uses to import ammonia for its own use and for resale to industrial companies in and around Yosu, the main customer being Huchems. NCC also re-exports ammonia to Japan in small coastal vessels. This trade varies from year to year depending on the economics of re-export from Korea compared with direct import into

IFFCO is a major producer of ammonia with down-stream urea spread over three sites. Kalol is located 18 km from the Gujarat capital of Gandhinagar. Commissioned in 1975 Kalol has a capacity of 363,000 t/y ammonia and 544,500 t/y urea. Phulpur is near Varanasi and 30 km from Allahabad in Uttar Pradesh state. The first Phulpur plants were commissioned in 1981, a second set of plants was added in 1997 and a debottlenecking took place in 2009. The Phulpur complex now has a capacity of 0.98 million t/y ammonia and 1.7 million t/y urea. Aonla in Uttar Pradesh is 260 km north-east of Delhi. The first Aonla plants were commissioned in 1988, a second set of plants was added in 1996 and a debottlenecking took place in 2008. The Aonla complex now has a capacity of 1.15 million t/y ammonia and 2 million t/y urea.

IFFCO imports ammonia for phosphate and NPK production at two locations. IFFCO's Kandla plant is in Kandla, Gujarat-adjacent to Kandla Port-one of India's major ports. The first complex was commissioned in 1975 with four streams based on the TVA slurry granulation process. In 1999 two more lines were added using the AZF dual pipe reactor granulation process. Currently production capacity is rated at 2.242 million t/y of DAP, 700,000 t/y of 12-32-16 and 520,000 t/y of 10-26-26, together with much smaller capacities of 15,000 t/y water soluble fertilizers (WSP) and 10,000 t/y of 18-18-18 NPK. IFFCO has 33,000 t of ammonia storage in Kandla. The Paradeep plant is in Orissa state near the deep water Paradeep port. The Oswal Chemicals and Fertilizer plant was commissioned in 2000 and acquired by IFFCO in 2005. The complex produces sulfuric acid, phosphoric acid, DAP and NP's and has in the past produced NPKs. The 1.92 million t/y DAP plant uses Jacob's technology. IFFCO has 40,000 t ammonia storage in Paradeep.

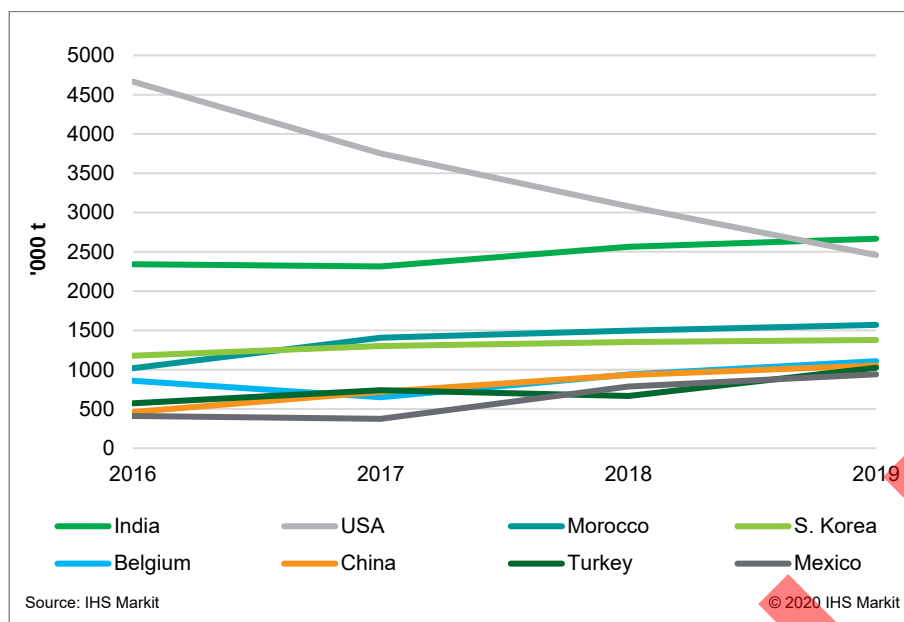
Product	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Ammonia	2.424	2.719	2.518	2.389	2.642	
Urea	4.126	4.668	4.327	4.109	4.562	4.875
DAP	1.405	1.672	1.788	1.947	1.419	
Other NP	0.421	0.592	0.579	0.430	0.599	
NPK	1.506	1.701	1.771	1.376	1.559	
DAP/NP/NPK and WSP	3.344	3.984	4.152	3.763	3.587	4.287

Source: IHS Markit/FAI/IFFCO © 2020 IHS Markit

IFFCO reported the highest ever level of production as well as record sales in financial year 2019-20. Production of compound fertilizers increased to 4.287 million t from 3.587 million t in the previous year. Details of the nutrient breakdown are not available for FY 20, but in the previous year the FAI calculates that IFFCO operated its compound fertilizer production at 81% of nitrogen and 72% of P₂O₅ in terms of nutrient capacity.

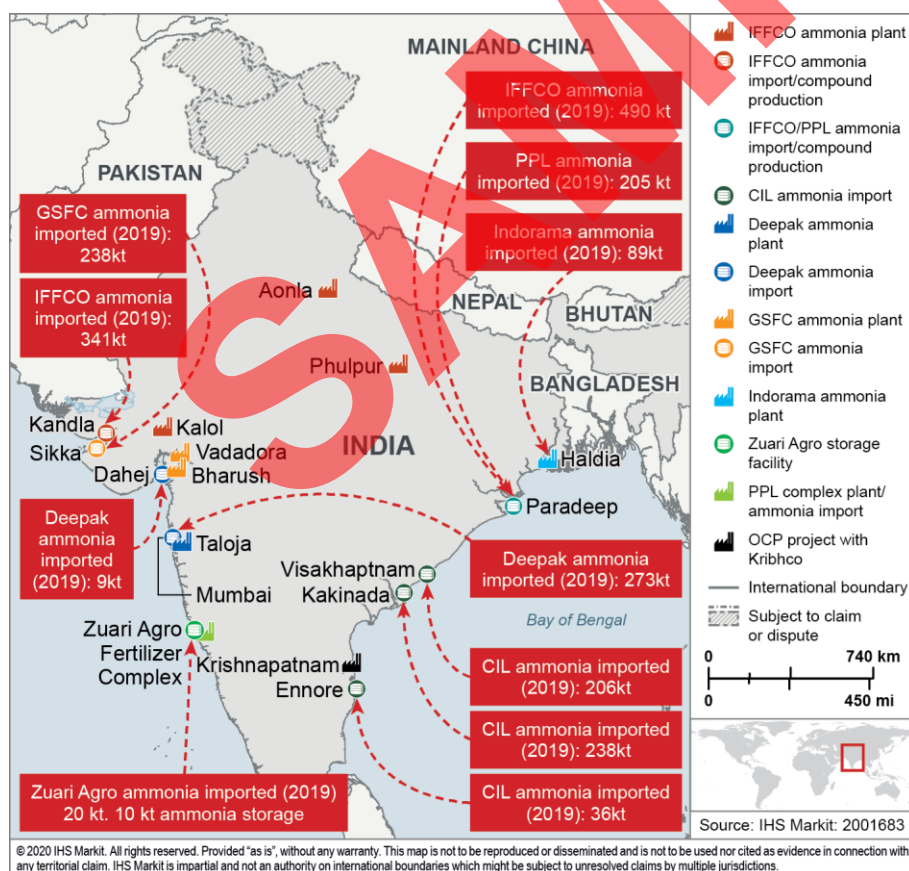
IFFCO is the only importer of ammonia into Kandla so it is relatively easy to trace ammonia movements. In 2019 IFFCO imported 341,000 t of ammonia and of this about 300,000 t was supplied by Trammo from Saudi Arabia, Egypt and Bahrain. Mitsui supplied 25,000 t from Saudi Arabia and CIFIC 15,000 t from Indonesia. We track close to another 150,000 t by Trammo into IFFCO Paradeep. IFFCO's biggest supplier to Paradeep is Ameropa, shipping on behalf of TOAZ, out of Russia, 240,000 t in 2019. The balance of roughly 100,000 t to IFFCO in Paradeep is made up of about 75,000 t from Indonesia, through CIFIC, and some smallish lots from the UAE and Qatar.

Figure 14: World's top ammonia importing countries ('000 t)



Total ammonia consumption in India during 2019 was 16.5 million t, so imports only accounted for about 16% of this. Domestic ammonia demand is predominantly for the production of urea whereas imported ammonia is primarily for ammonium phosphate production, although our next buyer is an exception.

Figure 15: India



Pemex and Fertimex and sales of ammonia expanded to reach 269,000 t in 1980 to 359,000 t in 1986, mostly for direct application of anhydrous ammonia as a fertilizer. Fertimex was privatised in 1991-1992 but the ammonia plants remained with Pemex, who to this day hold most of the ammonia distribution infrastructure.

Pemex has four ammonia plants in Cosoleacaque, (plant numbers, 4-7), which Pemex regards as still potentially productive with a total nameplate capacity of 2.18 million t/y ammonia. In addition, there is a 132,000 t/y ammonia plant in Camargo, Chihuahua. In 2014 Pemex acquired Agro Nitrogenados (now called Pro-Agro), which has a urea plant in Pajaritos, Vera Cruz. This plant was originally designed to produce UAN and later, solid ammonium nitrate, and it is possible one or other of these could still be produced there. In 2015 Pemex acquired Grupo Fertinal, which has a fertilizer complex on the west coast in Lázaro Cárdenas, Michoacan, producing TSP, MAP, DAP nitrate and ammonium sulphate fertilizers, together with a phosphate mine in Baja California Sur. Both purchases are mired in controversy because of the prices paid and the state of the assets and legal cases linked with these acquisitions continue till today. Pemex as a group has struggled with high debt and a shortage of gas and in past years the fertilizer operations appear to have been very low down the pecking order in Pemex business plans.

Pemex has historically had a low capacity utilisation rate for its ammonia plants due to high gas costs and insufficient gas supply. Production of ammonia was around 0.9 million t/y from 2010-2014, fell to 500,000 t in 2017, was down to 152,000 t in 2018 and stopped altogether in 2019. Despite investment to rehabilitate one of the ammonia lines output still suffers. Pemex signed an agreement with CF Energia for the supply of gas to Cosoleacaque and production at this unit started in February 2020. In the four months to May just over 50,000 tons was produced. However, production stopped in June and nothing was produced before production resumed in October 2020.

In its current business plan, there is the intention to rehabilitate two more ammonia plants at Cosoleacaque in 2020-2021, with work on the fourth depending on the availability of funds.

The ammonia plant in Camargo was closed in 2002 and, despite plans to revive it in 2013, it has remained idled. However, in June 2019 the Mexican President- President Andrés Manuel López Obrador declared that this unit would also be brought back into production, along with its associated urea plant, as part of the revival of Mexico's fertilizer industry.

The Pro-Agro plant in Pajaritos, with a nominal capacity of 600,000 t/y urea and 325,000 t/y ammonium nitrate, was not operating when it was acquired by Pemex in 2014. A substantial rehabilitation has taken place which was completed in the second quarter of 2018, but production could not start because of the shortage of ammonia and carbon dioxide from Cosoleacaque. It is hoped with revived ammonia and carbon dioxide supply the plant can be restarted before the end of 2020, with the aim of producing 360,000 t/y urea. In May 2020 a tender was issued by Pemex for the rehabilitation of 20,000 tons ammonia storage at the site as well as on the ammonia pipeline connecting Pajaritos with Pemex's ammonia plant in Cosoleacaque. In the absence of its own production it maybe that Pemex will import ammonia for this plant. In October, Fertinal bought 20,000 t ammonia from Koch to go into Coatzacoalcos. In early November Pemex Procurement International issued a tender for 500,000 t for shipment through 2021 into both Coatzacoalcos and Topolobampo. This looks to be well above what we reckon went into these ports in 2019, so may suggest further supplies to go into fertilizer production. Pemex also chartered the SFC Tobolsk, which at the time of writing was positioned in Salina Cruz and is understood to be there to load ammonia supplied by pipeline from the Cosoleacaque plant, for onward shipment to Topolobampo.

Agropolychim AD	Rank in our Top-40 ammonia buyers: 27
Uses of purchased ammonia:	AN, UAN and NP/NPK production
Own ammonia production:	Devnya plant (198,000 t)
Downstream ammonia capacity:	- AN – 400,000 t - UAN – up to 800,000 t - MAP/DAP/NP/NPK – 300,000 t
Ammonia infrastructure:	10,000 t storage tank in Varna West Terminal
Outlook:	Agropolychim has increased recently the imports of ammonia reducing the production at own plant

Agropolychim AD was founded in 1974 as a state-owned enterprise but in 1999 the government sold 69% of the capital of the company. Today Agropolychim is a completely private owned company, belonging to Acid and Fertilizers LLC of the USA, a joint venture formed by Davenport Industries (99%) and Umico MED (1%).

Agropolychim is located near to the town of Devnya, in Northeast Bulgaria-next to the Varna West terminal, the most modern and best equipped port in Bulgaria.

Agropolychim produces nitrogen and phosphate fertilizers as well as industrial phosphates. There is a 198,000 t/y ammonia plant on site feeding 400,000 t/y ammonium nitrate production and up to 800,000 t/y UAN. There is also the capacity to produce 300,000 t/y of DAP, MAP, NP or NPK fertilizers-or up to 330,000 t/y of TSP. Phosphoric acid production capacity is 200,000 t/y. In 2016 the company completed a 10,000-t ammonia storage tank in Varna and an expansion to 23,000 tons was scheduled to be completed within 2020. With a bigger ammonia tank Agropolychim plans to import more ammonia to expand AN/UAN production and to allow the distribution of ammonia within Serbia and Romania.

Agropolychim is able to import ammonia at a lower cost than I can produce it, because of the relatively high cost of gas in Bulgaria, close to US\$ 7 per MMBtu. Agropolychim is extremely flexible as to its product mix of nitrates, phosphates and compounds, adjusting to seasonal and market differences, so it is very difficult to pin down what their ammonia consumption is in any one year. We assume Agropolychim does not operate its ammonia plant but even so, based on our calculations of production of phosphates and nitrates Agropolychim did not use enough ammonia in its production to justify the import volume seen in 2019. We assume Agropolychim is selling significant volumes of both ammonia and aqua ammonia within Bulgaria-and to a more limited extent to neighbouring countries

The first ammonia imports by sea arrived in November 2016 from Algeria, sold by Trammo to Agropolychim using their new ammonia terminal located at their plant-next to Varna West. Trammo supplied again in 2017, 2018 and early 2019 from Algeria, Egypt, Turkey and Ukraine. In May 2019 TOAZ shipped from Yuzhny to Agropolychim and in the second half of 2019 and so far in 2020 all shipments to Agropolychim have come from TOAZ.

Table 7: Bulgaria ammonia imports '000 tons					
	2016	2017	2018	2019	Jan-June 2020
Algeria	8.1	0.0	23.5	9.5	0.0
Egypt	0.0	15.4	25.9	0.0	0.0
Turkey	0.0	0.0	66.4	10.0	0.0
Black Sea (Yuzhnyy)	0.1	0.4	8.1	274.5	168.4
Other	0.2	0.8	5.9	1.5	0.0
Total	8.3	16.6	129.8	295.5	168.4

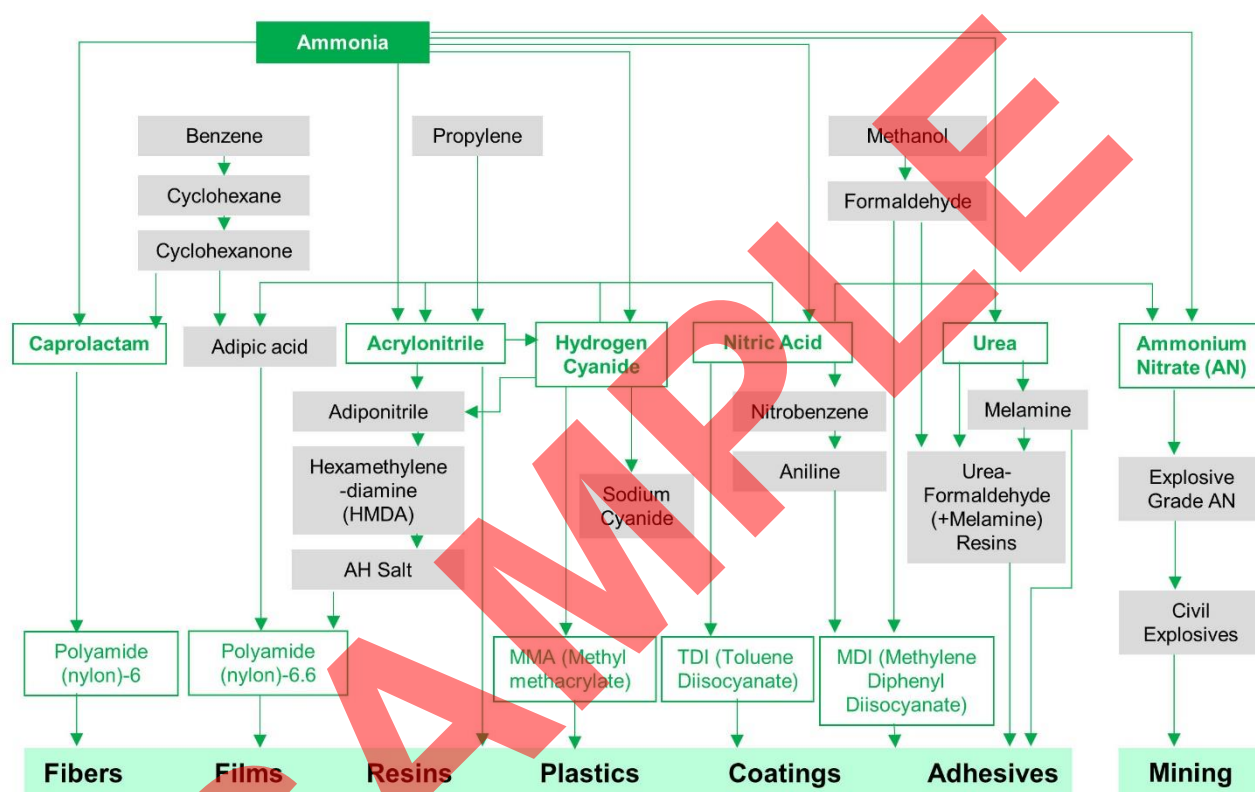
Source: IHS Markit /GTT

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7. Industrial use of ammonia

Ammonia is used as feedstock for the production of several important petrochemical products: caprolactam, acrylonitrile, hydrogen cyanide, nitric acid, urea for industrial use.

Figure 22: Ammonia: Main downstream industrial products



Source: IHS Markit

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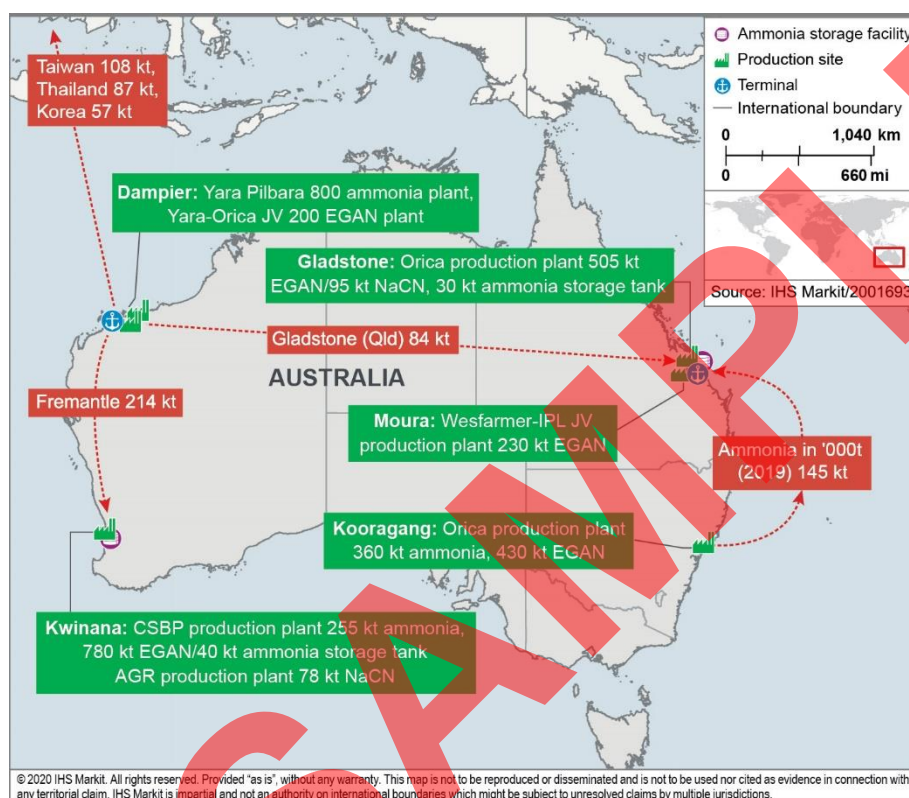
Nylon is the generic term used to refer to the chemical grouping of polyamides. There are many different types, and these are characterised by the number of carbon atoms in the monomers from which they are derived. The great majority of commercial demand, however, comprises two product groups:

Nylon 6, which is produced by the polymerisation of caprolactam.

Nylon 6,6 which is produced by the polymerisation of hexamethylene diamine (HMDA) and adipic acid. Ammonia is used in the production of all three nylon intermediates, namely caprolactam, HMDA and adipic acid.

about 145,000 t of ammonia was supplied to Gladstone in this way. Supply was more abundant than in the previous year, mainly because of reduced fertilizer sales due to drought. This supply was supplemented by purchases of ammonia from Yara's Burrup plant-which totaled 84,000 t in 2019, together with the import 23,300 t from Indonesia. The JV plant in Burrup produced only a small quantity of EGAN in 2019, supplied by the adjacent Yara ammonia plant, and we calculate Orica's share of ammonia as 8,000 t making a total of about 115,000 t purchased ammonia for Australia. In Canada Orica has a 500,000 t/y ammonium nitrate plant in Carseland, which is supplied with ammonia by the adjacent CF Industries ammonia plant. Assuming operations close to capacity in 2019 the purchased ammonia would have been a bit under 200,000 t in 2019. Taken together with Orica's 10% share in the Bontang plant Orica probably purchased about 320,000 t ammonia in 2019 for all operations.

Figure 32: Australia



10.3. Wesfarmers-CSBP

CSBP	Rank in our Top-40 ammonia buyers: 33
Company:	Australian company, part of Wesfarmers Group, specialising in production of fertilizers and explosives
Main businesses:	- Production of explosives - Production of fertilizers
Ammonia purchase:	229,000 t (2019)
Ports receiving ammonia:	Kwinana, Fremantle, Western Australia
Main suppliers:	Yara, mostly from Australia
Uses of purchased ammonia:	- Feeding own EGAN and sodium cyanide capacity - Sale of ammonia to nickel refineries – 85,000 t (2019)
Own ammonia production:	Kwinana, Western Australia, 255,000 t/y

12. Amino acid producers

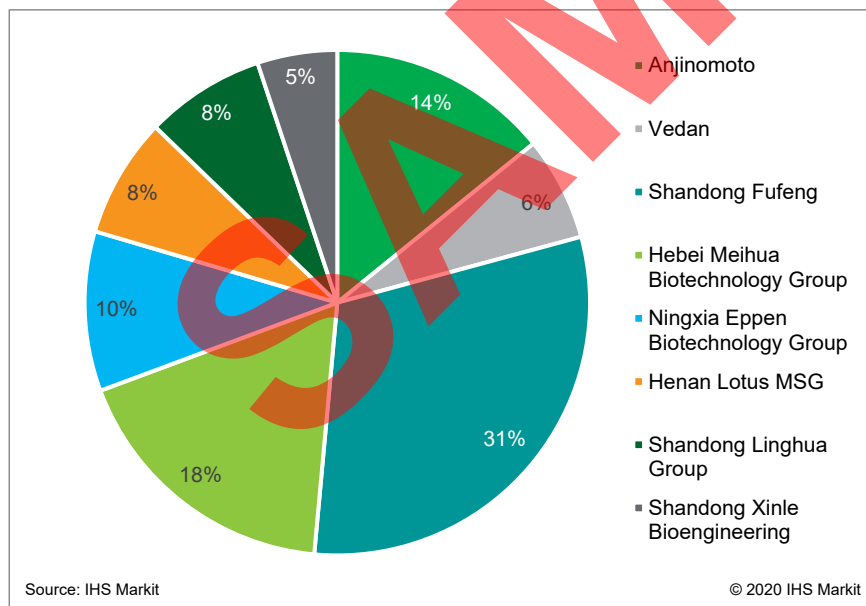
12.1. MSG

Monosodium L-glutamate (MSG) is a naturally occurring amino acid. It was first synthesised in 1909 in Japan by Kikunae Ikeda who named it MSG and Ajinomoto began operations to commercialise his invention. MSG is widely used as a flavour enhancer and is almost all used in food production and preparation.

In 2018 IHS Markit estimated MSG consumption worldwide at 3.1 million t and is therefore the largest volume amino acid produced. Modern production is based on the fermentation process using a starch or sugar e.g. from corn, tapioca, and sugarcane/beets, and a nitrogen source, typically ammonia. As a rough approximation the production using ammonia uses about one third a ton of ammonia for every ton of MSG, so worldwide MSG production could account for as much as one million t/y of ammonia.

World MSG capacity is close to five million t/y, with 3.6 million t/y of this in China, and only about 300,000 t/y outside of Asia. Ajinomoto has 554,000 t/y production capacity plants in several countries. Assuming one third of production volume as an ammonia requirement its total volume of ammonia purchase would bring it close to our list of top 40 buyers, but only if it operated at full capacity, and this seems very unlikely given that world demand is only about 60% of world capacity.

Figure 34: MSG capacity as % of world, for main companies



Shandong Fufen Group in China has 1.2 million t/y of capacity and even if it operated at 60% it could make our list of top buyers, were it not for its own ammonia capacity and its in-house production process, used in all but one plant, which Fufeng says greatly reduces the requirement of ammonia. The second largest producer-Meihua group, is also the second largest producer of lysine in China and, like Fufen, it also has its own ammonia capacity so is unlikely to be one of our top ammonia buyers.