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Georgian National Investment Agency

Chemical Sector Research
Other basic organic chemicals

April 2015

DISCLAIMER

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Our work was carried out solely based on the publicly available research data.

We have indicated within our Report the sources of the information presented and have satisfied ourselves, so far as possible, that the information presented in our Report is consistent with other information which was made available to us in the course of our work in accordance with the terms of the Contract. We have not, however, sought to establish the reliability of the sources by reference to other evidence.

All recommendations, provided to you with/in this Report that refer to the future have some limitations in the sense that they are based on the assumptions valid on the issuance date. These assumptions could change with time, after the date of this Report issuance, and so could lose their value.

References to 'KPMG Analysis' in this Report indicate only that we have (where specified) undertaken certain analytical activities on the underlying data to arrive at the information presented; we do not accept responsibility for the underlying data.

This report was commissioned by the LEPL "Georgian National Investment Agency" www.investingeorgia.org

General overview

Organic chemicals represent more than 95% of all compounds known to exist and form the basis of the chemical industry

Organic chemicals represent more than 95% of all compounds known to exist and form the basis of the chemical industry. Most organic compounds are derived from oil, natural gas, or natural gas liquids. There are three basic stages in converting crude oil or natural gas into final products:

- Manufacture base chemicals, or building blocks (e.g., ethylene, propylene, or benzene).
- Convert base chemicals into intermediate products (e.g., ethylene glycol or styrene).
- Process or convert intermediates into finished products.

Organic chemicals consists of acyclic hydrocarbons and cyclic hydrocarbons. In their terms, acyclic hydrocarbons (acyclic hydrocarbons contain only hydrogen and carbon atoms) can be saturated hydrocarbons and unsaturated hydrocarbons, while the cyclic hydrocarbons are classified as hydrocarbons, aromatic hydrocarbons and heterocyclics.

The fundamental difference between cyclic and acyclic hydrocarbons is the arrangement of the carbon atoms in a cyclic structure. Saturated hydrocarbons are typically used as a fuel (or as a feedstock to create unsaturated compounds).

The report includes research on hydrocarbons as a whole and research of alcohols and acids, which are oxygenated hydrocarbons, as well as, research on aromatics, which are cyclic hydrocarbons.

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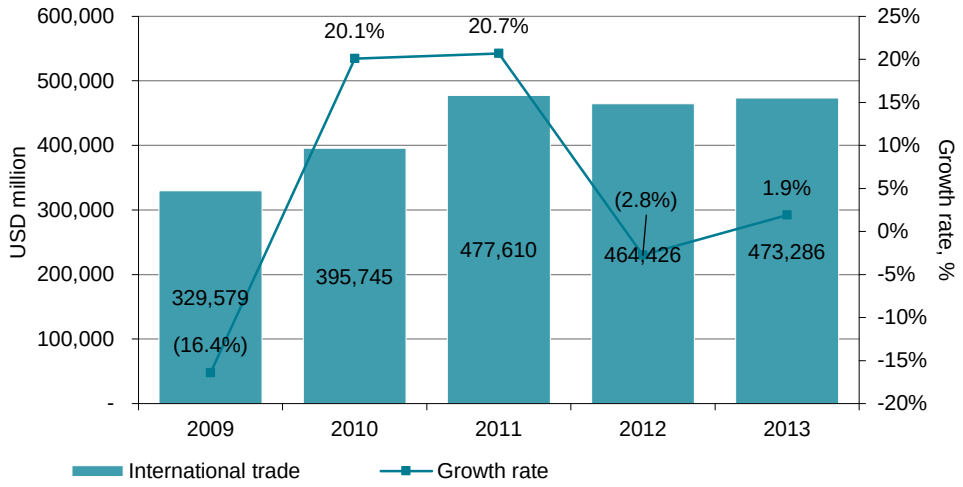
In 2013 the world trade of organic chemicals was equal to USD 473 billion

International trade of organic chemicals, 2009-2013



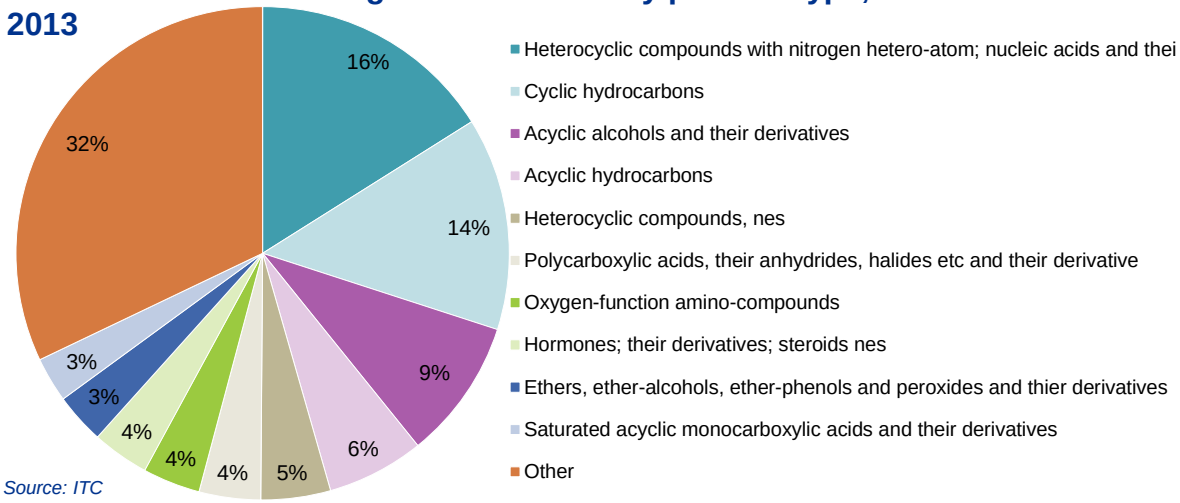
Source: ITC

The world trade of organic chemicals have been steadily increasing for the period of 2009-2011 and had only 2.8% decrease in 2012 which was followed by the increase. The compound annual growth rate of the organic chemicals trade was equal to 9.4%.

In the period of 2009-2013 The world trade of organic chemicals reached its peak in 2011 equaling USD 477,610 million.

In 2013 cyclic and acyclic hydrocarbons accounted for 18% of the world trade of the organic chemicals, while the acyclic alcohols accounted for 9%.

International trade of organic chemicals by product type, 2013



Source: ITC

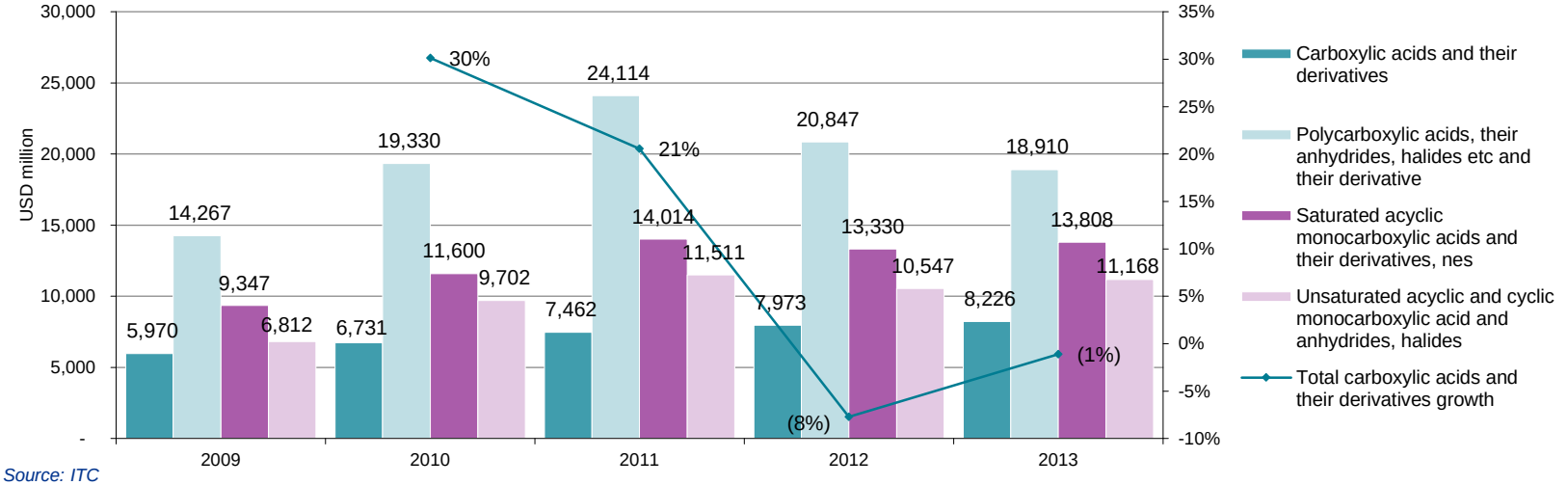
Heterocyclic compounds with nitrogen hetero-atoms accounted for the biggest share in the world trade of organic chemicals equaling to 16%

Market overview

In 2013 the world trade of acids, hydrocarbons and alcohols was equal to USD 52,112 million, USD 105,823 million and USD 45,437 million respectively

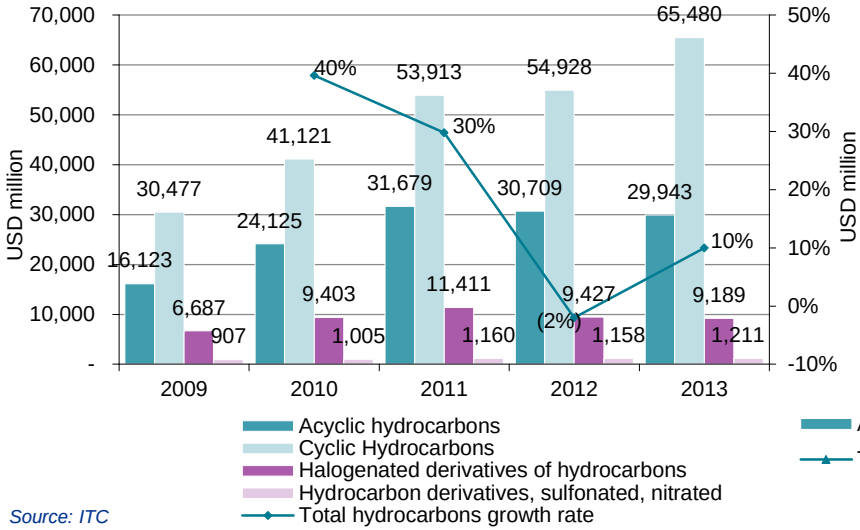
In 2013 the world trade of aromatics comprised approximately 38% of world trade of hydrocarbons

International trade of acids and their derivatives, 2009-2013



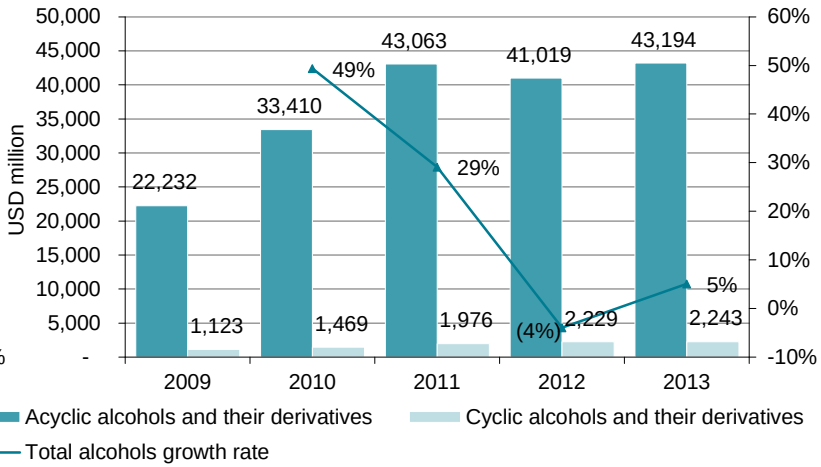
Source: ITC

International trade of hydrocarbons, 2009-2013



Source: ITC

International trade of alcohols, 2009-2013

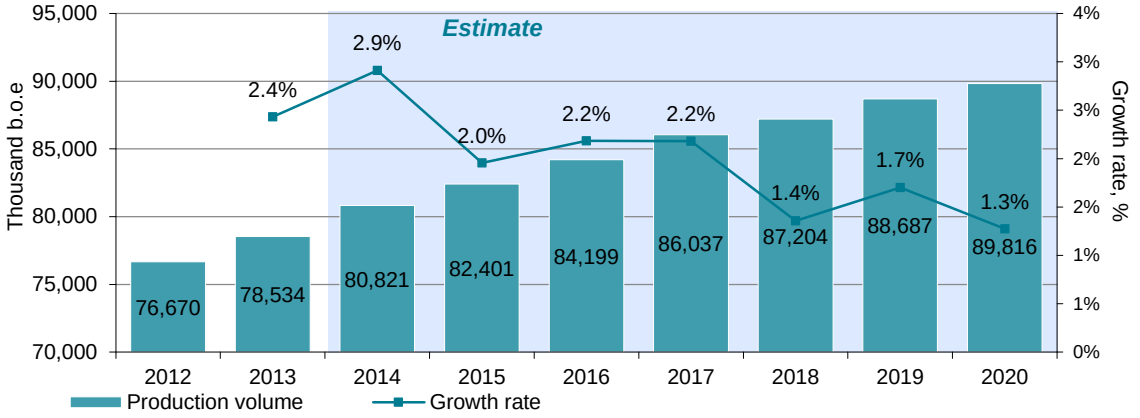


Source: ITC

Hydrocarbons – production and consumption

In 2013 the world production volume of hydrocarbons was equal to 78,534 thousand b.o.e, while the consumption was equal to 99,441 thousand b.o.e

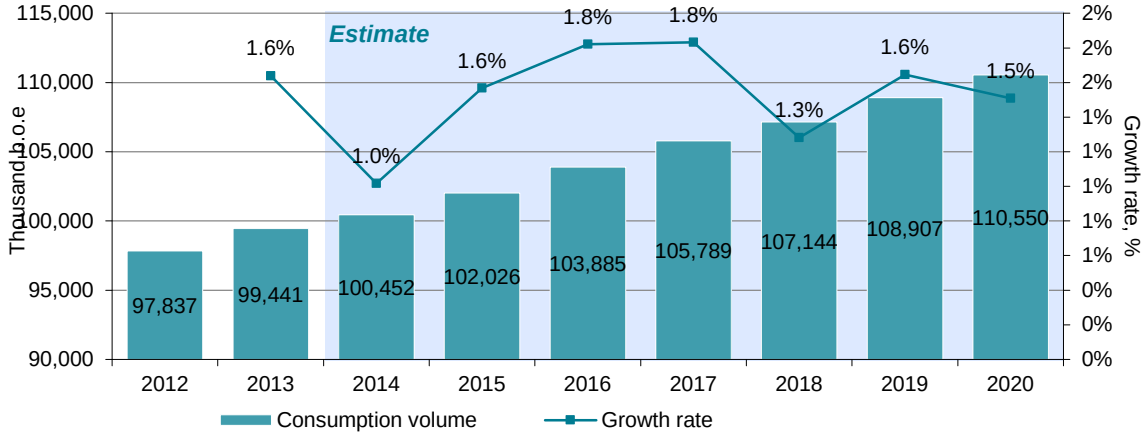
Hydrocarbon production volume of top exporter countries, 2012-2020



Source: Business Monitor International

In 2013 the main producing countries of the hydrocarbons were United States, Russia and Saudi Arabia with the production volumes equal to 24,189 thousand b.o.e, 22,053 thousand b.o.e and 13,552 thousand b.o.e. respectively

Hydrocarbon consumption volume of top exporter countries, 2012-2020



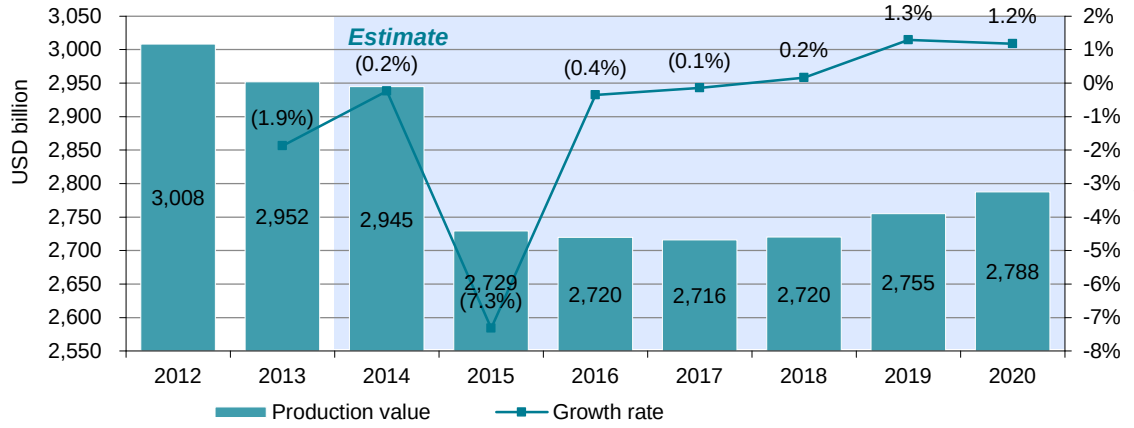
Source: Business Monitor International

In 2013 the main consuming countries of the hydrocarbons were United States, China and Russia with the consumption volumes equal to 31,664 thousand b.o.e, 13,591 thousand b.o.e and 11,916 thousand b.o.e. respectively

Hydrocarbons – production and consumption

In 2013 the the world production value of hydrocarbons was equal to USD 2,952 billion, while the consumption was equal to USD 3,962 billion

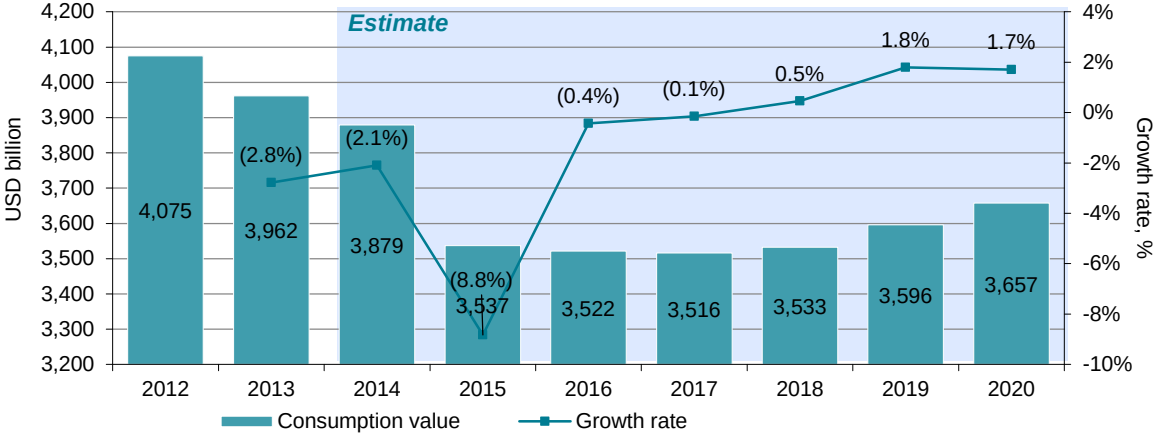
Hydrocarbon production value of top exporter countries, 2012-2020



Source: Business Monitor International

In 2013 the main producing countries of the hydrocarbons were United States, Russia and Saudi Arabia with the production values equal to USD 893 billion, USD 774 billion and USD 513 billion respectively.

Hydrocarbon consumption value of top exporter countries, 2012-2020



Source: Business Monitor International

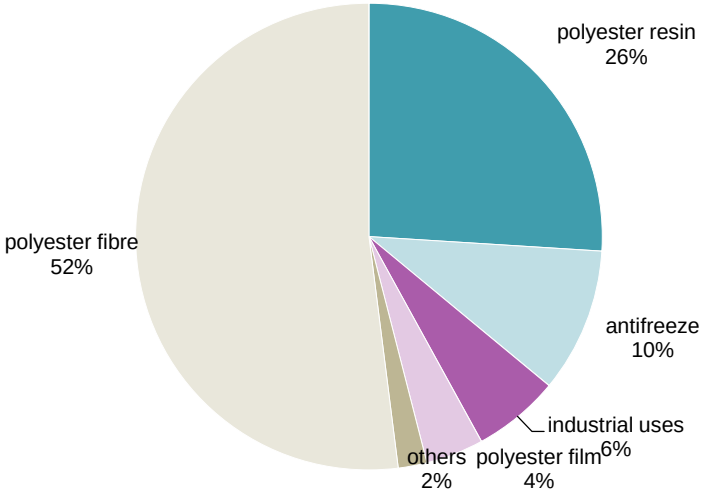
In 2013 the main consuming countries of the hydrocarbons were United States, China and Russia with the consumption values equal to USD 1,264 billion, USD 581 billion and USD 410 billion respectively

Alcohols – Market Overview

The cumulative world trade of ethylene glycol (ethanedio) and methanol (methyl alcohol) accounts for 60.1% of the world trade of alcohol

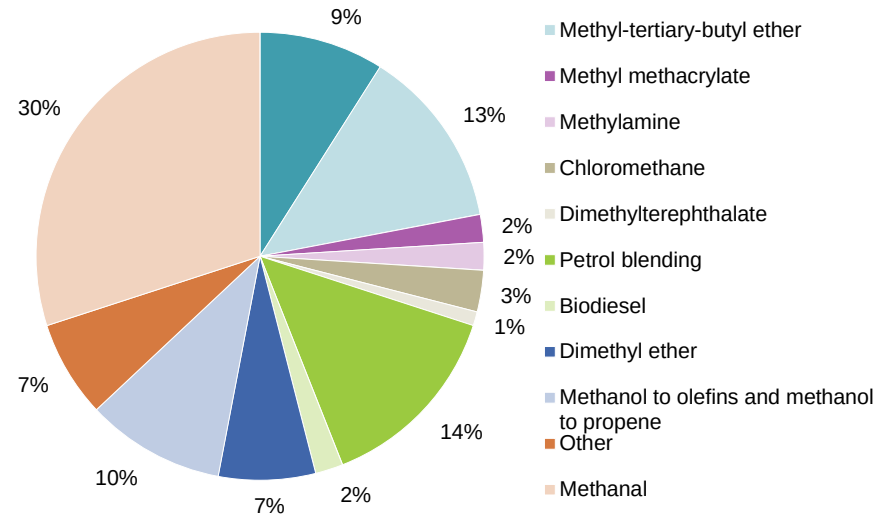
The alcohols are divided into two subgroups cyclic alcohols and acyclic alcohols and each of the groups includes large variety of alcohol types. The world trade of two main alcohols - Ethylene glycol (ethanediol) and Methanol (methyl alcohol) accounts for approximately 60.1% of the world trade of alcohols. The analysis of the alcohol sector will be based on the analyses of these two main alcohols.

Uses of ethylene glycol (ethanediol)



Source: Essential Chemical industry

Uses of Methanol



Source: Essential Chemical industry

ITC subgroups included in the analysis

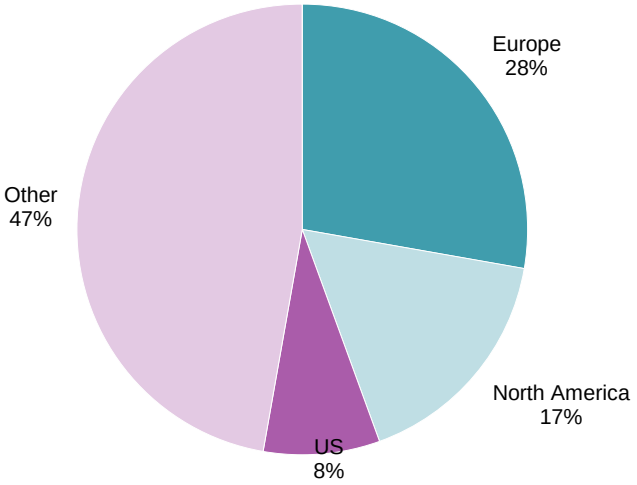
ITC code	Name	World trade, 2013
2905	Acyclic alcohols and their derivatives	USD 43,193,548 thousand
2906	Cyclic alcohols and their derivatives	USD 2,242,603 thousand

Source: ITC, KPMG research

Alcohols – production and consumption

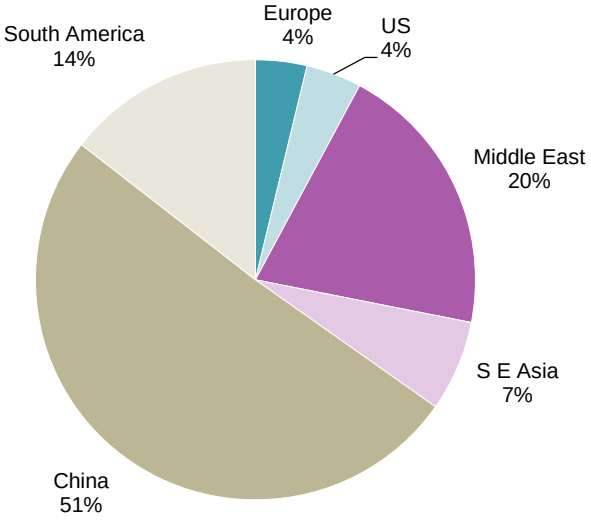
The annual world production volumes of ethylene glycol (ethanediol) and methanol are equal to 18 million tones and 69 million tones respectively

Annual production of ethylene glycol (ethanediol)



Source: Essential Chemical industry

Annual production of methanol



Source: Methanol Market Services Asia, 2014

The annual world production volume of ethylene glycol (ethanediol) is equal to 18 million tones, from which Europe accounts for 5 million tones, North America accounts for 3 million tones, while US accounts only for 1.5 million tones. China is among the world biggest producers of ethylene glycol (ethanediol).

The annual world production volume of methanol is equal to 69 million tones, from which China accounts for 35 million tones, South America accounts for 10 million tones, Middle East accounts for 14 million tones, SE Asia accounts for 4.8 million tones, US accounts for 2.8 million and Europe accounts for only 2.6 million tones.

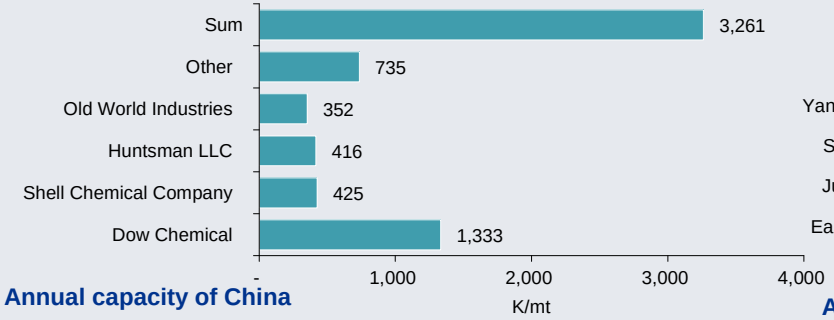
According to the KPMG estimation the annual world consumption volumes of the ethylene glycol (ethanediol) and methanol are approximately equal to the production volumes*.

Source: The average annual production and consumption are calculated based on the data for the period of 2010-2013

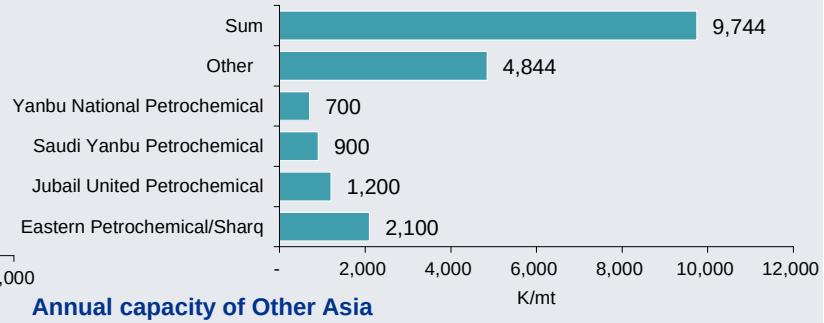
Alcohols – capacity

Annual capacity of ethylene glycol producers

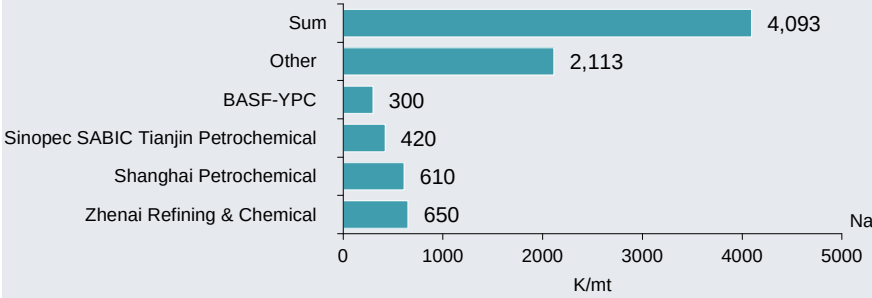
Annual capacity of US world producers



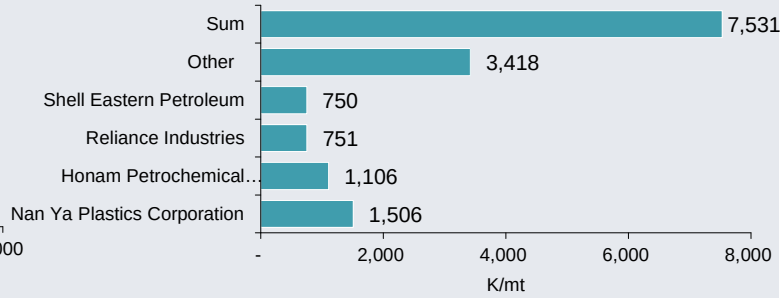
Annual capacity of Europe/Middle East



Annual capacity of China

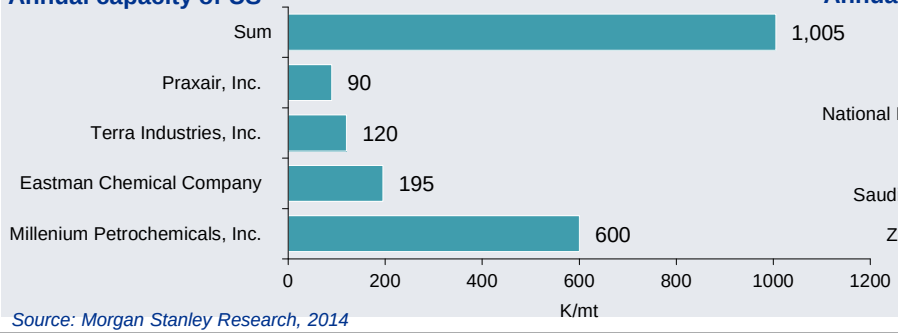


Annual capacity of Other Asia

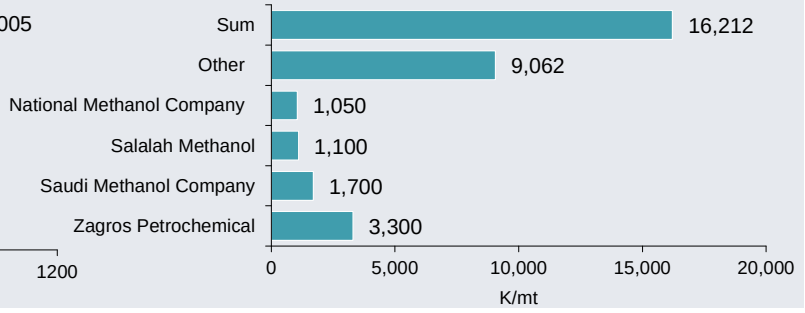


Annual capacity of methanol producers

Annual capacity of US



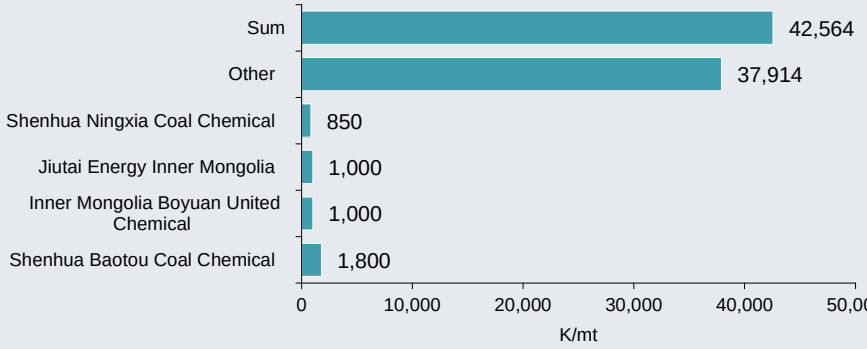
Annual capacity of Middle East



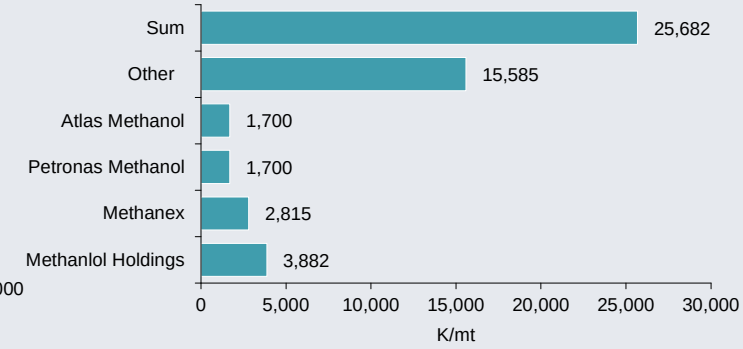
Source: Morgan Stanley Research, 2014

Alcohols – capacity

Annual capacity of China



Annual capacity of the rest of the world



Source: Morgan Stanley Research, 2014

Acids – Market overview

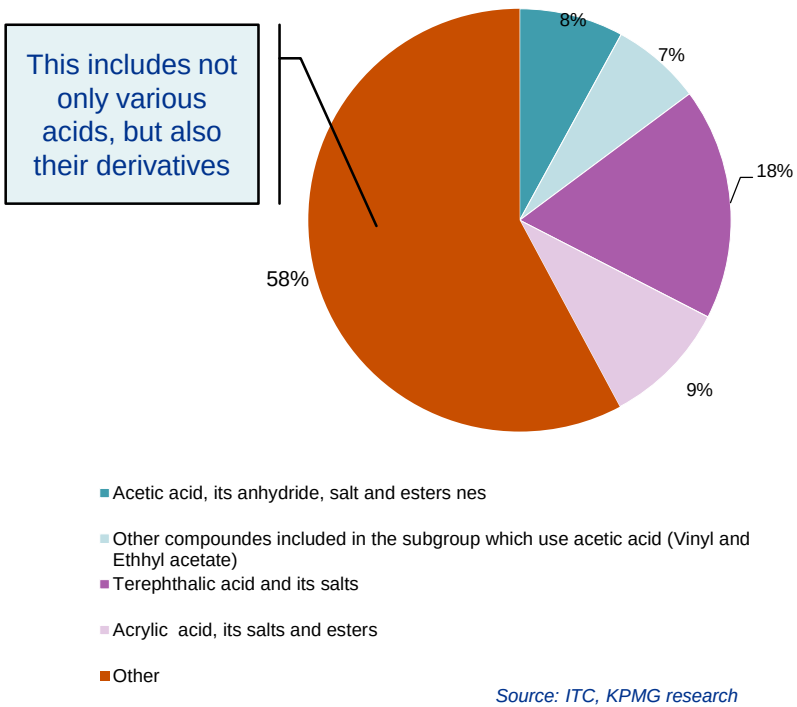
There are various types of acids and while being included in one big group each separate acid has its own characteristics, specifications in production methods and most importantly application in various industries.

There are various types of acids and while being included in one big group each separate acid has its own characteristics, specifications in production methods and most importantly application in various industries. Thus using the international trade statistics (world import) we conducted analysis to identify the most used acids and separately analyze them. For the total import of acids we take the total import of four groups presented in the table below as all those subgroups included various acids, their salts, esters and derivatives.

As per ITC data acetic acid (including its anhydride, salt and esters) accounts for around 8% of total import of carboxylic acids and their derivatives. Other chemical compounds (acids, acetates) that consume the acetic acid and are included in the sub groups accounted for another 7%. Having the all above information we considered the acetic acid as one of the most used and chose to analyze this acid separately.

We also chose to separately analyze the acrylic acid as it accounts for another 10% (together with its salts and ester) and Terephthalic acid which including its salts accounts for 18% of selected group.

Acids global import structure



Source: ITC, KPMG research

ITC subgroups included in the analysis

ITC code	Name	World trade, 2013
2915	Saturated acyclic monocarboxylic acids & their derivatives (including acetic acid)	USD 13,801 million
2916	Unsaturated acyclic & cyclic monocarboxylic acid & anhydrides, halides (including acrylic acid)	USD 11,168 million
2917	Polycarboxylic acids, their anhydrides, halides etc & their derivative (including terephtalic acid)	USD 18,910 million
2918	Carboxylic acids & their derivatives	USD 8,225 million

Source: ITC, KPMG research

Acids – acetic acid consumption, production and capacity

Acetic acid is one of the most common organic chemicals. Chemical compounds derived from acetic acid are key compound for various industries including production of coating, ink, paper, resin, textile, etc.

Acetic acid is one of the most common organic chemicals. Acetic acid market revenue is expected to reach USD 12,191.2 million by 2020, growing at an estimated CAGR of 9.2% from 2014 to 2020.

According to the Grand View Research the global demand for acetic acid was 10.4 million metric tons in 2013 and is expected to grow at a CAGR of 5.1% from 2014 to 2020 with increasing demand from China.

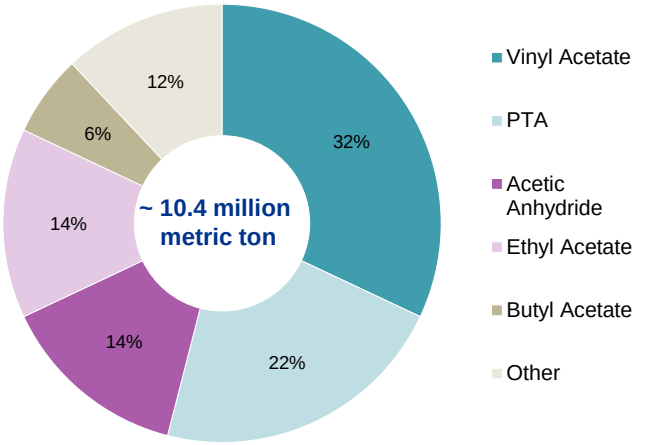
Globally vinyl acetate accounted for the 32% of acetic acid being the largest derivative. Vinyl acetate is used to produce polyvinyl acetate which used in adhesives, coatings, paper, and textiles. In 2013 for production of vinyl acetate USD 1,990.2 million of acetic acid was used.

The second largest consumer of acetic acid is the production of terephthalic acid (PTA) which accounts for 22% of the global consumption.

From the perspective of geography the biggest consumer country of the acetic acid is China. United States is also one of the largest consumers. According to MarketsandMarkets in 2012 Asia Pacific consumed around 61.77% of the total global acetic acid.

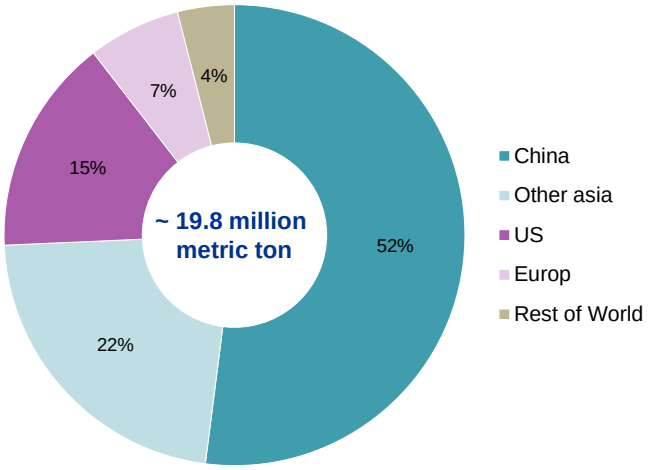
The global supply of acetic acid was estimated to be around 14.7 million metric ton while the production capacity is around 19.8 million metric ton which lead to utilization rate of around 74.4%.

Acetic acid end market consumption



Source: Company data, Morgan Stanley Research, KPMG research

Acetic acid global production capacity



Source: Company data, Morgan Stanley Research, KPMG research

Acids – acetic acid production and cost structure

The largest producer of acetic acid is Celanese Corporation (USA)

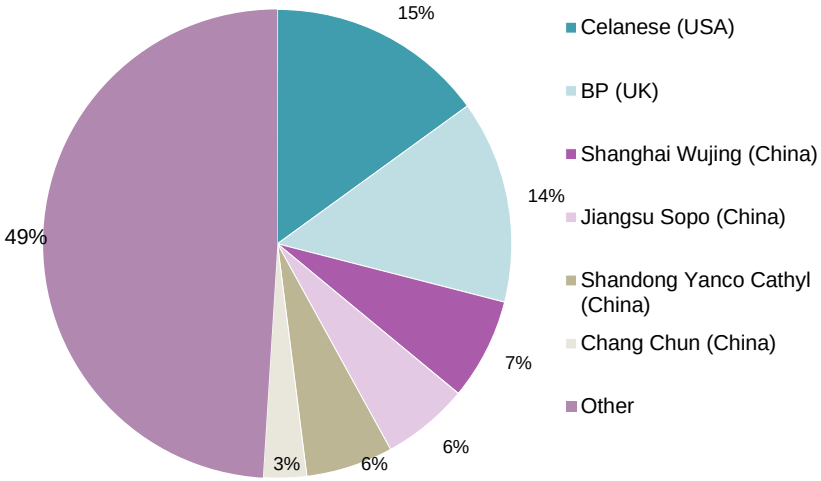
The largest producer of acetic acid is Celanese Corporation.

Nowadays acetic acid is produced by carbonylation of methanol (around 95%). This method was originally developed by Monsanto.

When preparing acetic acid using carbonylation method the process conversion effectiveness is around 98-99%. For producing one ton of acetic acid using the above mentioned method around 0.54 tons of methanol and 0.5 ton of CO (carbon monoxide) is required.

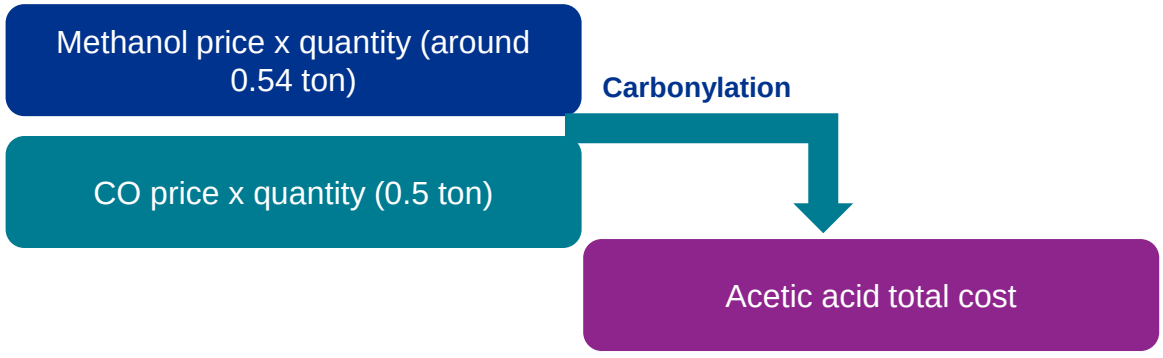
Acetic acid is also produced in many other chemical reactions where it appears as a by-product of the reaction and it can be recovered and used. According to the estimates (Morgan Stanley) recovered acid accounts for around 17% of total world supply of acetic acid.

Main acetic acid producer companies market share



Source: Company data, Morgan Stanley Research, KPMG research

Acetic acids raw materials cost modeling



Source: Company data, Morgan Stanley Research, KPMG research

Acids – acrylic acid consumption, production and capacity

Acrylic acid is used primarily in architectural paints and coatings. Also acrylic acid is used for automotive coatings and radiation curable coatings.

One of the major factors driving the demand for acid at the global level is the industrial application of acids. Number of industries including production consumer goods, cosmetics, polymers, pharmaceuticals, solvents, paints, food and beverage, etc. use acids.

Acrylic acids are widely used in the form of different esters (e.g. n-butyl acrylate). The end market consumption of acrylic acids and its derivatives include surface coatings, textiles, adhesives, and plastics.
According to the MarketsandMarkets press releases, In 2014 the acrylic acid consumption was around is 5,570 KT (thousand metric ton) and is expected to grow up to 6,974 KT by 2019 with CAGR of 4.60% during the period.

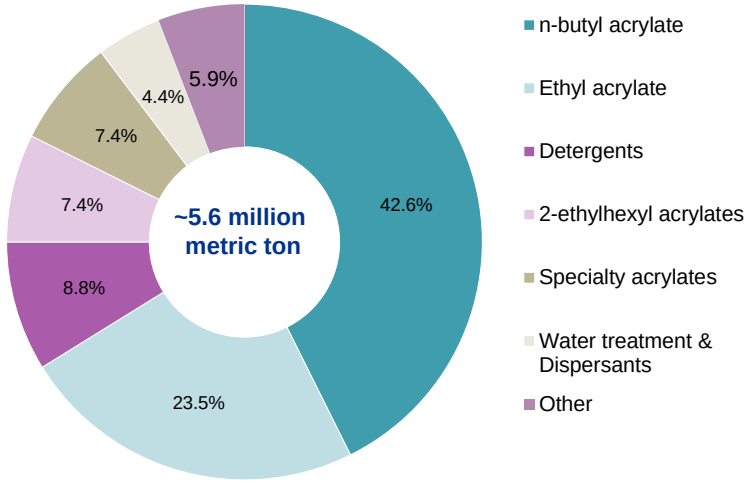
The global capacity of acrylic acid was estimated to be around 6.4 million metric ton. China accounts for about 23.2% of global production capacity of acrylic acid and USA accounted of 20.4%.

Having the world demand of around 5.6 metric ton the current production capacity should have been utilized at around 87% utilization rate to meet the global demand.

Taking the projections of the MarketsandMarkets and assuming the utilization rate stay at the current rate we estimated that by 2019 around 1.6 million metric ton of additional production capacity would be required to meet the increased global demand of acrylic acids.

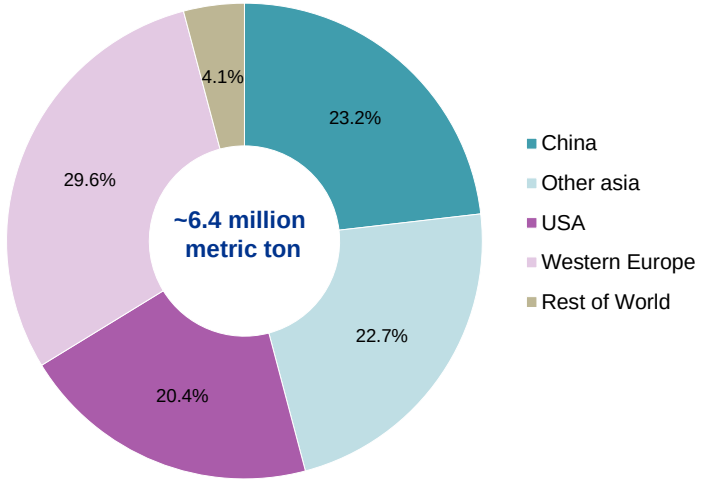
Again Asia Pacific, specifically China was the largest market for acrylic acid and its derivatives in 2013.

Acrylic acid end market consumption



Source: Company data, Morgan Stanley Research, KPMG research

Acrylic acid global production capacity



Source: Company data, Morgan Stanley Research, KPMG research

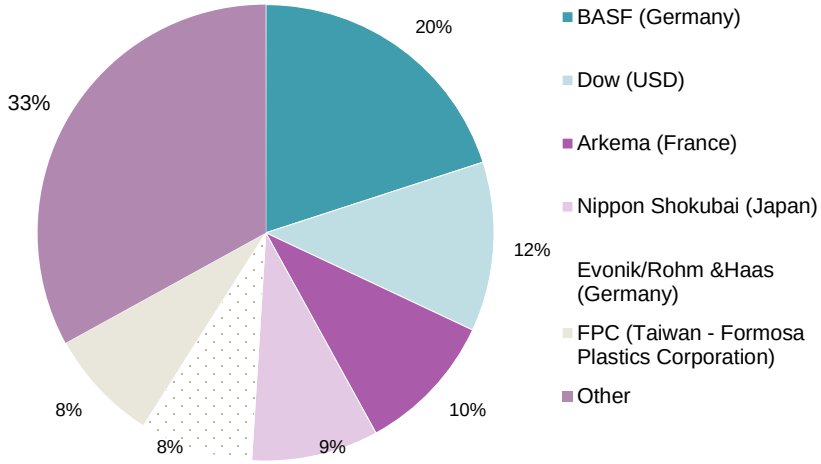
Acids – acrylic acid production and cost structure

BASF is the world's largest producer of acrylic acid and acrylic esters.

BASF has operating production sites all over the world.

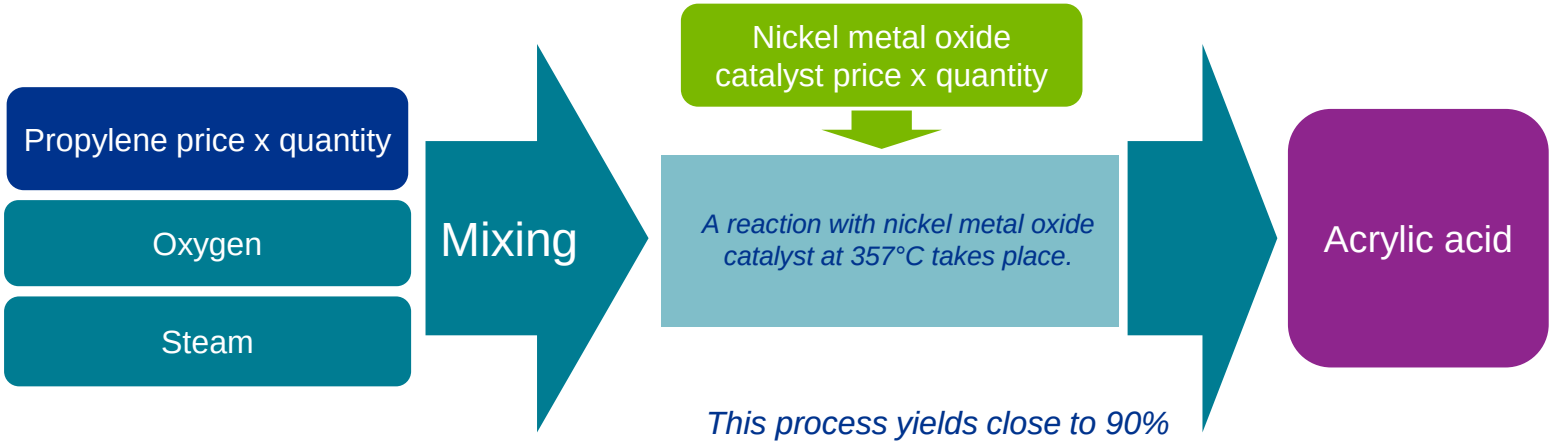
The largest producer of acrylic acid is BASF accounting for 20% of the market followed by USA Dow (12% market share).
Several production processes for acrylic acid exists. According to the Morgan Stanley reports currently the propylene oxidation is the most commercially viable production method. The Propylene oxidation process is described in the below chart.
Acrylic acids are highly volatile and explosive liquids. The transportation of acrylic acid is not easy so the demand tends to be met by local suppliers.

Main acrylic acid producer companies market share



Source: Company data, Morgan Stanley Research, KPMG research

Propylene oxidation process (raw materials cost modeling)



Source: Company data, Morgan Stanley Research, KPMG research

Acids – Terephthalic acid consumption and production capacity

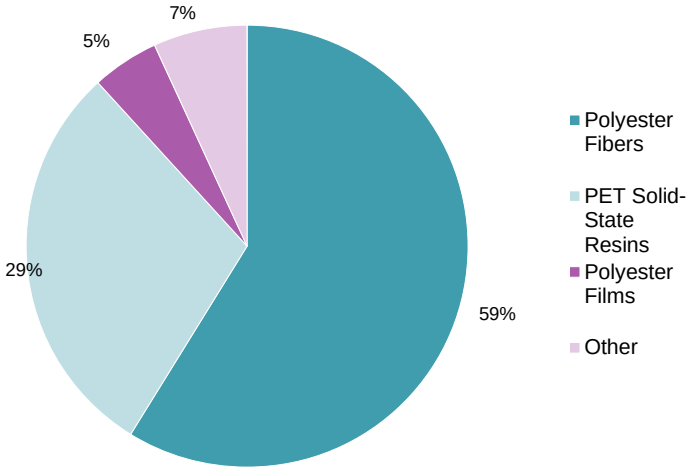
PTA is the major feedstock for polyester chain. Most of it is used for fiber but proportion is also used in resin. It can also be used in paint as a carrier and raw material for certain drugs

Terephthalic acid which also known as Purified Terephthalic acid (PTA). PTA is used primarily in the manufacture of polyester (either resin called PET or fiber).

According to equity research (Asia Petrochemicals Sector) the world demand of PTA in 2013 was around 52 million metric ton per year and is expected to grow with 6.9% (was estimated based on 4.1x over world GDP growth during 2004-13).

According to the USB research the global capacity is estimated to be around 54.5 million metric ton. Having all above data we estimated the global production capacity of PTA to operate at a utilization rate of 95% to meet the global demand in 2013. The production capacity is expected to increase in upcoming years and the most additions are expected from Asia (more specifically China and India).

PTA end market consumption



Source: Deutsche Bank and CMAI, KPMG research

Note: Based on 2011 data

PTA global production capacity by top producers

Regions	Capacity (000 metric ton)	Share
World Total	54,500	100%
BP	7,223	13%
Mitsubishi Chemical	4,210	8%
FCFC	2,800	5%
Invista	2,480	5%
Mitsui Chemicals	2,340	4%
Reliance	2,000	4%
Samsung Petrochemical	1,800	3%
Xianglu Petrochemical	1,500	3%
Yisheng Petrochemica	1,500	3%
Eastman	1,025	2%
Others	27,357	51%

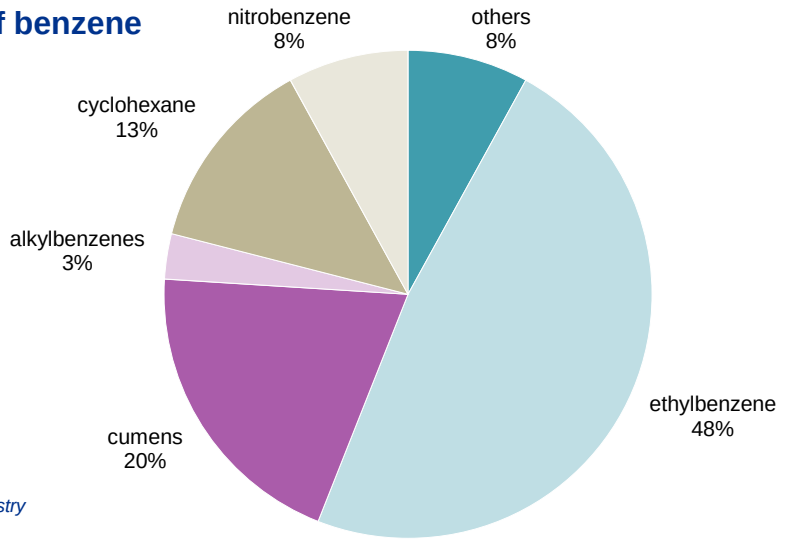
Source: ICIS, CMAI, Company data, UBS, KPMG research

Aromatics – Market overview

48% of benzene is used for producing ethylbenzene

All aromatics are cyclic hydrocarbons. The analysis will include the three widely used aromatics – Benzene, Toluene (Methylbenzene) and Xylenes (Dimethylbenzenes) (o-Xylene, p-Xylene, m-Xylene and mixed isomers)

Uses of benzene



Source: Essential Chemical industry

ITC subgroups included in the analysis

ITC code	Name	World trade, 2013
290220	Benzene	USD 10,484,895 thousand
290230	Toluene	USD 3,868,010 thousand
290241	O-Xylene	USD 1,651,926 thousand
290242	M-Xylene	USD 163,546 thousand
290243	P-Xylene	USD 22,643,813 thousand
290244	Mixed Xylene isomers	USD 1,262,318 thousand

Source: ITC, KPMG research

Aromatics – capacity

The cumulative annual world production volume of most traded aromatics is equal to 75 million tones

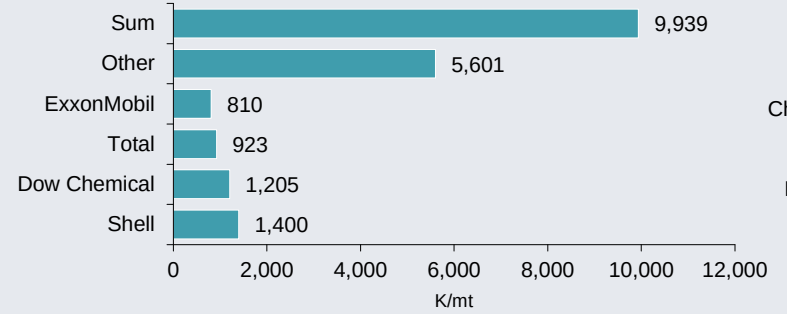
The annual world production volume of benzene and Toluene is equal to 42 million tones, from which Europe accounts for 7.2 million tones, US accounts only for 5.8 million tones, while Russia accounts for only 1 million tones.

The annual world production volume of Xylenes is equal to 33 million tones, from which US accounts for only 5.8 million tones.

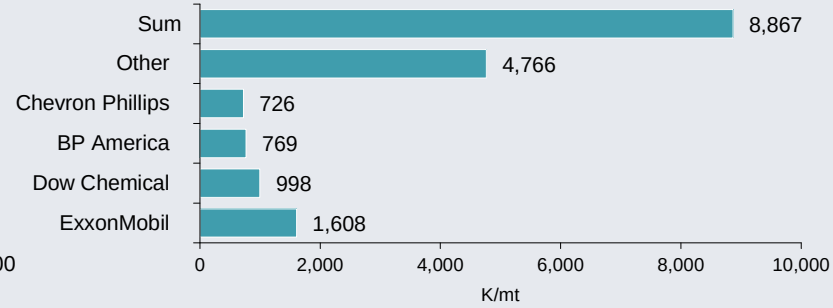
According to the KPMG calculation the annual world consumption volumes of aromatics are approximately equal to the production volumes.

Annual capacity of benzene producers

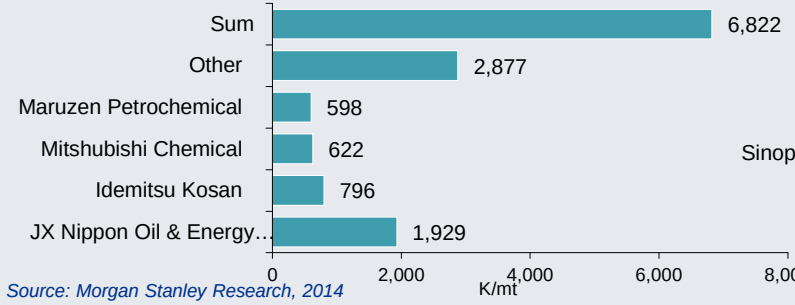
Annual capacity of Western Europe producers



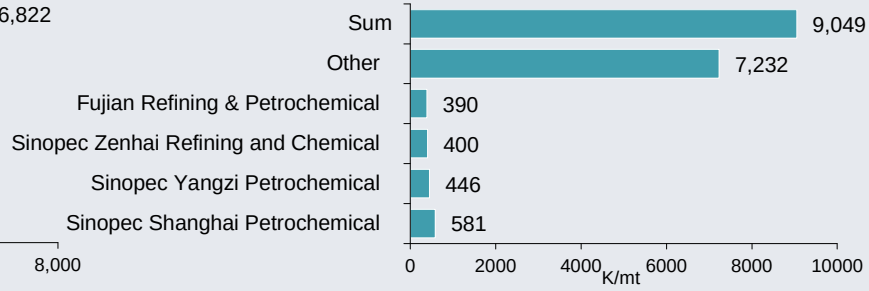
Annual capacity of US



Annual capacity of Japan



Annual capacity of China



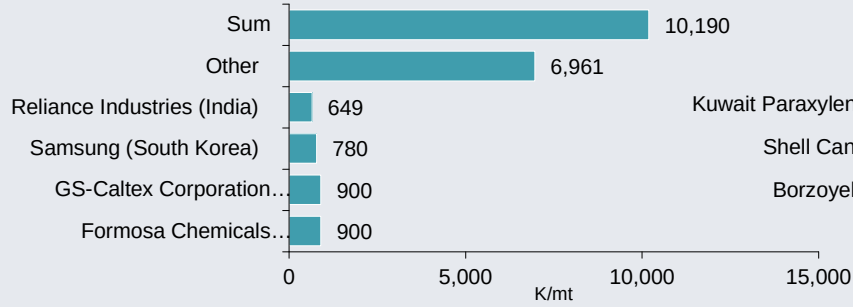
Source: Morgan Stanley Research, 2014

Source: The average annual production and consumption are calculated based on the data for the period of 2010-2013

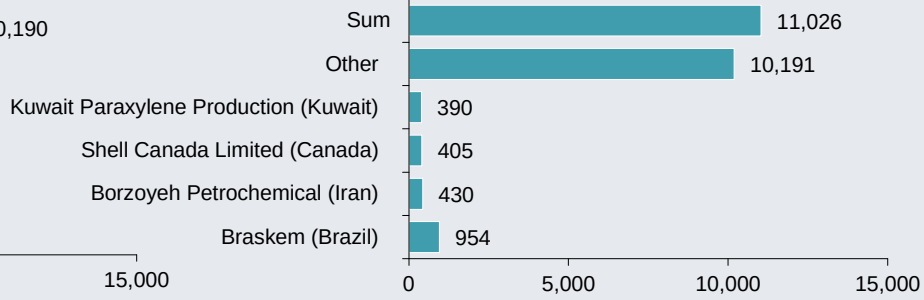
Aromatics – production, consumption and capacity

Annual capacity of benzene producers

Annual capacity of other Asia

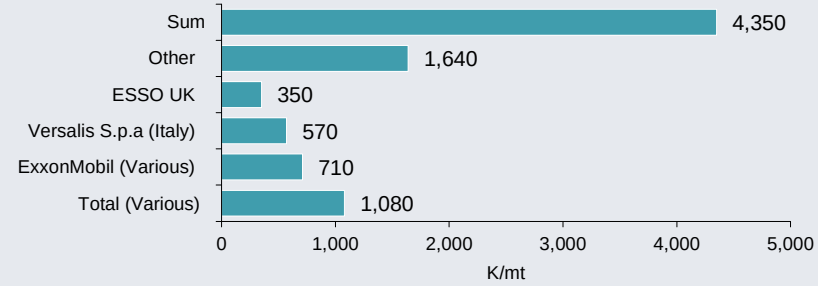


Annual capacity of the rest of the world producers

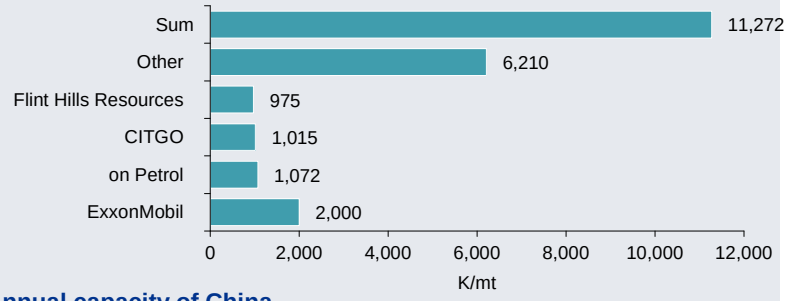


Annual capacity of toluene and xylenes producers

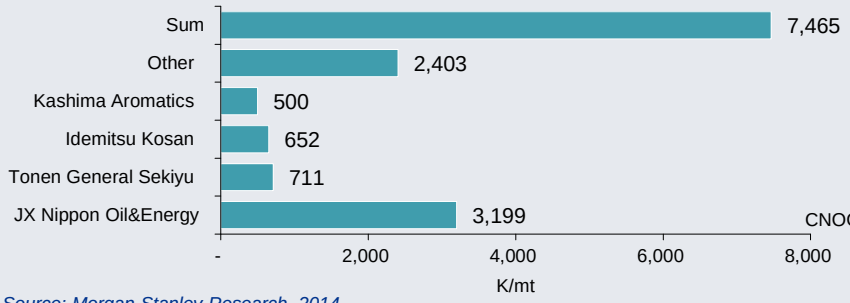
Annual capacity of Western Europe



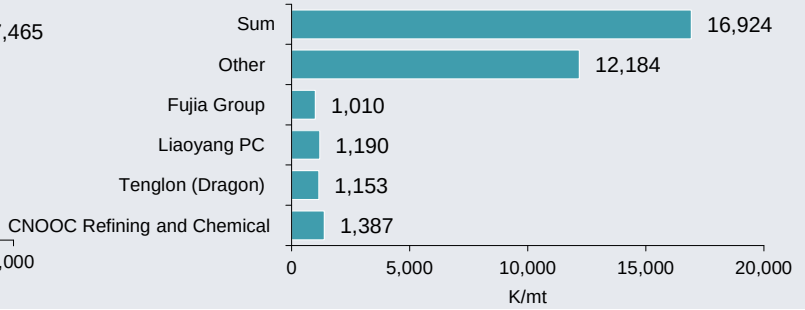
Annual capacity of US



Annual capacity of Japan



Annual capacity of China

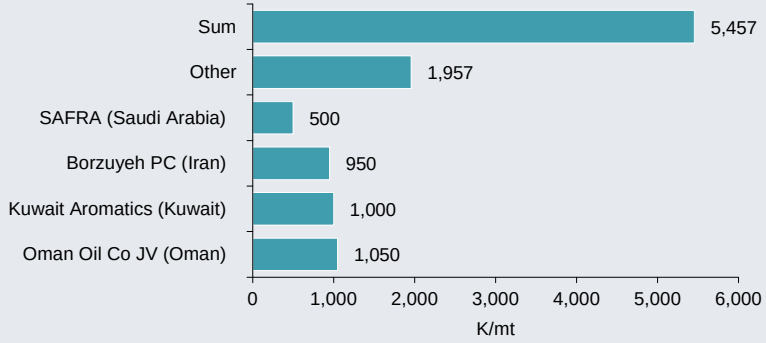


Source: Morgan Stanley Research, 2014

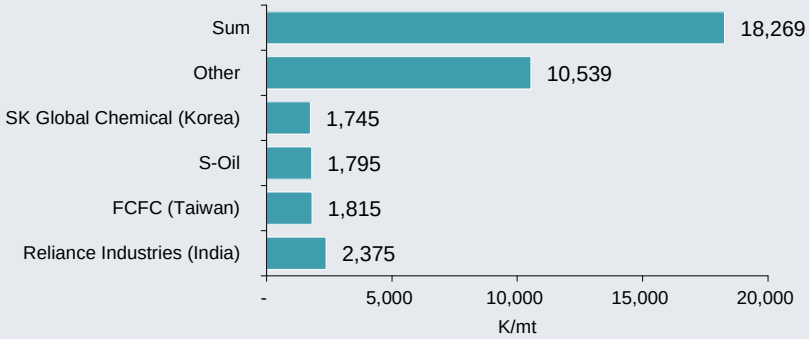
Aromatics – production, consumption and capacity

Annual capacity of toluene and xylenes producers

Annual capacity of Middle East



Annual capacity of the rest of world



Source: Morgan Stanley Research, 2014

Other basic organic chemicals
Price analysis

The main price drivers are:

- ***Cost of raw materials (mainly natural oil)***
- ***Energy***
- ***Capital costs***
- ***Labor costs***
- ***Economies of Scale***

Prices, per unit of organic chemicals, 2013

USD/ton	Georgia	Central Asia	EU	Average price in the remaining countries under research
Hydrocarbons				
Cyclic hydrocarbons	3,882	2,520	1,525	1,414
Acyclic hydrocarbons	9,500	600	1,397	8,436
Halogenated derivatives of hydrocarbons	3,352	3,187	1,435	1,817
Hydrocarbon derivatives, sulfonated, nitrated	N/A	2,394	1,761	1,264
Acids				
Saturated acyclic monocarboxylic acids and their derivatives	1,769	1,444	1,116	1,143
Unsaturated acyclic and cyclic monocarboxylic acid and anhydrides, halides	4,300	3,076	2,570	3,508
Polycarboxylic acids, their anhydrides, halides etc and their derivative	2,290	1,884	1,646	1,717
Carboxylic acids and their derivatives	2,168	2,176	3,305	1,851
Alcohols				
Acyclic alcohols and their derivatives	2,337	988	876	1,247
Cyclic alcohols and their derivatives	20,000	7,806	10,199	18,001
Aromatics				
Benzene	N/A	1,332	1,332	3,125
Toluene	4,000	7,846	1,192	1,233
O-xylene	3,000	1,129	1,362	2,179
M-xylene	N/A	N/A	1,482	N/A
P-xylene	N/A	N/A	1,397	1,578
Mixed xylene isomers	5,500	4,396	1,226	1,330

Source: ITC
Note: The unit importing value is presented as a price

Project pipeline

Kazakhstan is set to construct a major petrochemicals complex in the Atyrau region that is designed to produce up to 800,000 metric tons of polypropylene per year starting in 2016. The 4.5 billion euro ($6.2 billion) project was ordered by the Kazakh government to increase the productive use of associated petroleum gas, much of it currently flared off. The completion of those two stages is due 2016.

A third complex stage, planned for 2016, is set to produce butadiene using feedstock from two other major Kazakh oil fields, Karachaganak in the country's north west and Kashagan field in the Caspian Sea. The completion of the stages is due 2018.

the South Korean petrochemical firm LG Chem is planning to build an ethylene production plant in Atyrau. The company will construct it along with two Kazakh firms and production is also due to begin in 2016.

Raw materials in the selected Region/Countries - Natural gas

Among the selected countries Turkmenistan and Kazakhstan have the largest reserves of natural gas

Natural gas is a raw material for a number of chemical industries including production of fertilizers, industrial gases and organic chemicals.

According to CIA World Factbook the EU 28 total reserves of natural gas is estimated to be 1,994 billion cubic meters which is approximately 1% of world estimated reserves (194,900 billion cubic meters, 2013 estimates).

According to the 2013 estimates Turkmenistan has the largest reserve of natural gas among the Central Asian countries (17,500 billion cubic meters).

According to BP statistical review among the selected counties the largest producers of natural gas in 2013 were Netherlands, Turkmenistan and Uzbekistan.

Production of Natural Gas (billion cubic meters)

	2008	2009	2010	2011	2012	2013
Netherlands	66.6	62.7	70.5	64.2	63.9	68.7
Turkmenistan	66.1	36.4	42.4	59.5	62.3	62.3
Uzbekistan	62.2	60	59.6	57	56.9	55.2
United Kingdom	69.6	59.7	57.1	45.2	38.9	36.5
Ukraine	19	19.3	18.5	18.7	18.6	19.3
Kazakhstan	16.9	16.4	15.9	17.5	18.4	18.5
Azerbaijan	14.8	14.8	15.1	14.8	15.6	16.2
Romania	11.4	11.3	10.9	10.9	10.9	11
Germany	13	12.2	10.6	10	9	8.2
Italy	8.5	7.3	7.7	7.7	7.9	7.1
Denmark	10.1	8.4	8.2	6.6	5.8	4.8
Poland	4.1	4.1	4.1	4.3	4.3	4.2

Source: BP Statistical Review of World Energy June 2014

Proved Natural Gas Reserves

Country	Reserves (million cubic meters)
EU 28	
Netherlands	1,230,000
United Kingdom	246,000
Germany	125,000
Romania	105,500
Total EU 28	1,993,563
Central Asia	
Turkmenistan	17,500,000
Kazakhstan	2,407,000
Uzbekistan	1,841,000
Kyrgyzstan	5,663
Tajikistan	5,663
Total Central Asia	21,759,326
Other countries	
Georgia	8,495
Turkey	6,173
Ukraine	1,104,000

Source: CIA World Factbook

Raw materials in the selected Region/Countries - Natural gas

The largest exporters of Natural Gas in gaseous state among the selected countries in 2013 were Netherlands and Germany

The largest importers of Natural Gas in gaseous state among the selected countries in 2013 were Germany and Italy

Natural gas in (gaseous state) export and import, export and import unit value

	Value exported in 2013 (USD thousand)	Trade balance in 2013 (USD thousand)	Quantity exported in 2013	Quantity Unit	Unit value (USD/unit)
World	225,627,704		453,849,591	Tons	497
Netherlands	23,271,137	13,358,049	38,043,214	Tons	612
Germany	14,059,268	-36,169,784	28,705,184	Tons	490
Belgium	10,063,419	-7,075,332	20,174,584	Tons	499
United Kingdom	3,373,790	-5,912,391	6,554,196	Tons	515
France	2,202,720	-16,171,627	4,415,890	Tons	499
Other EU	2,676,986	-40,762,913	4,352,180	Tons	n/a
Turkmenistan	9,000,705	9,000,705	18,711,500	Tons	481
Kazakhstan	1,956,818	1,466,640	16,550,235	Tons	118
Uzbekistan	1,166,014	1,166,014	3,762,509	Tons	310
Azerbaijan	701,980	701,978	2,187,892	Tons	321
Armenia	10,340	-561,426	40,223	Tons	257

	Value imported in 2013 (USD thousand)	Trade balance in 2013 (USD thousand)	Quantity imported in 2013	Quantity Unit	Unit value (USD/unit)
World	229,527,999		412,705,190	Tons	556
Germany	50,229,052	-36,169,784	98,087,015	Tons	512
Italy	24,837,440	-24,706,141	40,625,550	Tons	611
France	18,374,347	-16,171,627	30,481,122	Tons	603
Belgium	17,138,751	-7,075,332	28,431,398	Tons	603
Other EU	52,993,664	-23,803,050	83,544,964	Tons	n/a
Ukraine	11,538,192	-11,538,192	18,909,096	Tons	610
Armenia	571,766	-561,426	1,718,171	Tons	333
Kazakhstan	490,178	1,466,640	3,915,784	Tons	125
Georgia	288,392	-288,392	1,447,920	Tons	199
Kyrgyzstan	64,158	-64,158	106,432	Tons	603

Source: ITC

Other basic organic chemicals

Raw materials in the selected Region/Countries - Crude oil

In 2013 the world import of crude petroleum oil equaled to USD 1,618 billion, while the world export equaled to USD 1,501 billion

Import of crude oil

Importers	Value imported in 2013 (USD thousand)	Quantity imported in 2013 (Tons)	Import price (USD)
World	**1,618,467,151**	**2,075,646,000**	**780**
Germany	74,284,138	91,388,708	813
Netherlands	52,163,977	63,201,586	825
Italy	46,462,095	57,467,112	808
France	45,627,941	55,587,971	821
Spain	45,308,060	58,583,900	773
United Kingdom	40,091,970	49,032,430	818
Belgium	28,484,159	36,137,415	788
Poland	18,048,934	23,134,843	780
Greece	16,052,194	19,193,103	836
Sweden	12,706,028	15,915,994	798
Other EU	**63,581,773**	**78,668,902**	**N/A**
Kazakhstan	2,839,859	7,497,985	379
Ukraine	630,280	761,058	828
Uzbekistan	250,368	299,435	836
Tajikistan	115,054	137,629	836
Kyrgyzstan	641	1,032	621
Georgia	2	-	-
Turkmenistan	1	-	-

Source: ITC

Export of crude oil

Exporters	Value exported in 2013 (USD thousand)	Quantity exported in 2013 (Tons)	Export price (USD)
World	**1,501,630,777**	**1,699,516,077**	**N/A**
United Kingdom	29,793,875	36,112,960	825
Netherlands	7,042,431	8,886,727	792
Denmark	4,915,203	6,000,228	819
Belgium	2,119,677	2,342,062	905
Italy	426,958	573,665	744
Poland	334,011	402,667	829
Greece	176,267	-	N/A
Other EU	**362,834**	**486,348**	**N/A**
Kazakhstan	55,221,442	68,158,350	810
Azerbaijan	20,244,053	24,855,868	814
Turkmenistan	72,552	86,701	837
Kyrgyzstan	1,036	2,423	428
Turkey	1	-	-

Source: ITC

Crude oil prices, 2013

Dubai USD/bbl	105.47
Brent USD/bbl	108.66
Nigerian Forcados USD/bbl	111.95
West Texas Intermediate USD/bbl	97.99

Source: BP Statistical Review of World Energy, June 2014

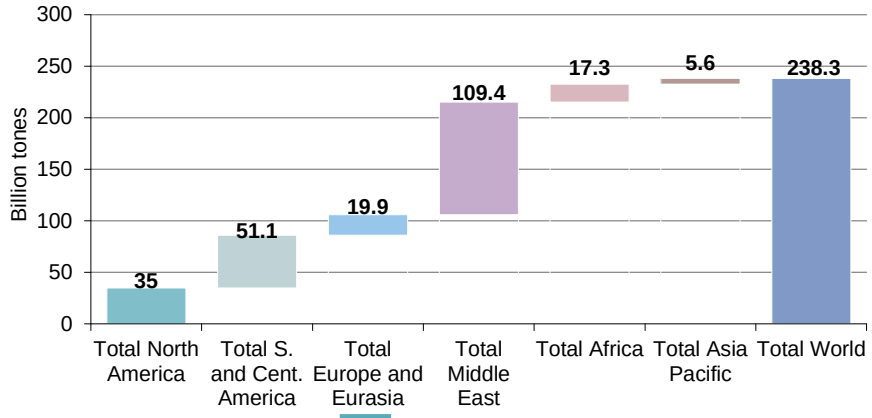
According to the BP "Statistical Review of World Energy Report", in 2013 the price of crude oil for the period of 2009-2013 presented by Dubai, Brent, Nigerian Forcados and West Texas Intermediate increased by the CAGR equal to 14.5%, 15.2%, 15.3% and 12.2% respectively.

Raw materials in the selected Region/Countries - Crude oil

In 2013 the value of total world proved oil reserves was equal to 238.3 billion tones, while the value of the total world refinery capacity was equal to 94,928 thousand barrels daily

In 2013 Venezuela had the biggest share in the total world proved oil reserves equal to 19.6% (46.6 billion tones), while US had the biggest share in the total world refinery capacity equal to 18.8% (17,818 thousand barrels daily)

World proved reserves of crude oil*



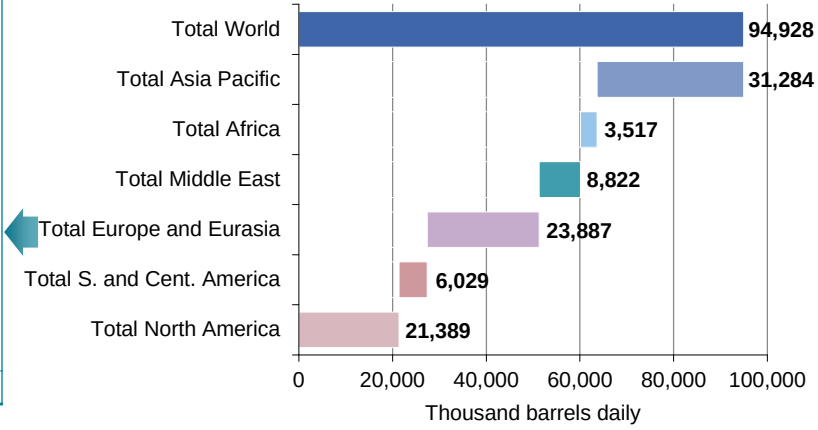
Europe and Eurasia proved reserves of crude oil*	
Billion tones	
Total EU 28	**0.8**
Denmark	0.1
Romania	0.1
Italy	0.2
United Kingdom	0.4
Total Central Asial	**4.1**
Turkmenistan	0.1
Uzbekistan	0.1
Kazakhstan	3.9
Total Other countries	**15.0**
Azerbaijan	1.0
Other Europe and Eurasia	14.0
Total Europe and Eurasia	**19.9**

Europe and Eurasia refinery capacities**	
Thousand barrels	
Total EU 28	**12,335.0**
Belgium	810
France	1,520
Germany	2,061
Greece	498
Netherlands	1,274
Spain	1,537
Sweden	434
Turkey	613
Italy	2,062
United Kingdom	1,526
Total Other countries	**11,551**
Other Europe and Eurasia	11,551
Total Europe and Eurasia	**23,886**

According to the "OPEC Annual Statistical Bulletin" in 2013 Ukraine had crude oil reserves equal to 395 million barrels. According to the same bulletin in 2013 Ukraine, Kazakhstan and Azerbaijan had refinery capacities equal to 879.8 thousand barrels per calendar day, 345.1 thousand barrels per calendar day and 399 thousand barrels per calendar day respectively.

According to the BP "Statistical Review of World Energy Report", in 2013 the oil reserves of Russian Federation comprised 63.8% (6,027 thousand barrels daily) of the total oil reserves of Europe and Eurasia proved oil reserves while the refinery capacities of Russian Federation comprised 63.8% (12.7 billion tones) of the total refinery capacities of Europe and Eurasia refinery capacities.

World refinery capacity**



Source: BP Statistical Review of World Energy, June 2014

*Note: * Proved reserves of crude oil - Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.*

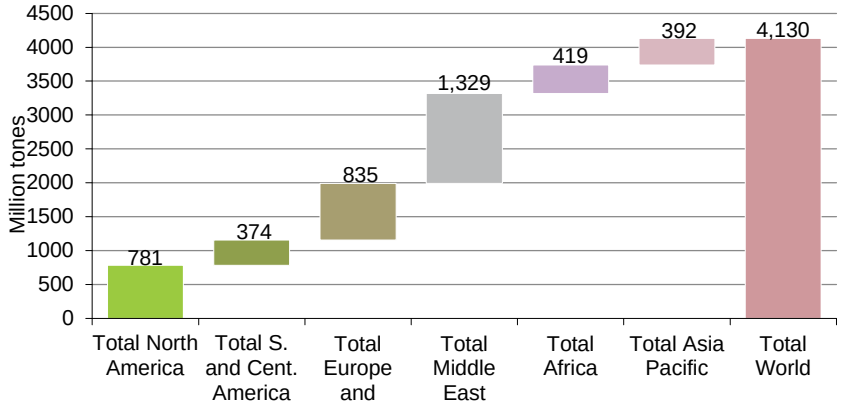
*** Atmospheric distillation capacity on a calendar-day basis.*

Raw materials in the selected Region/Countries - Crude oil

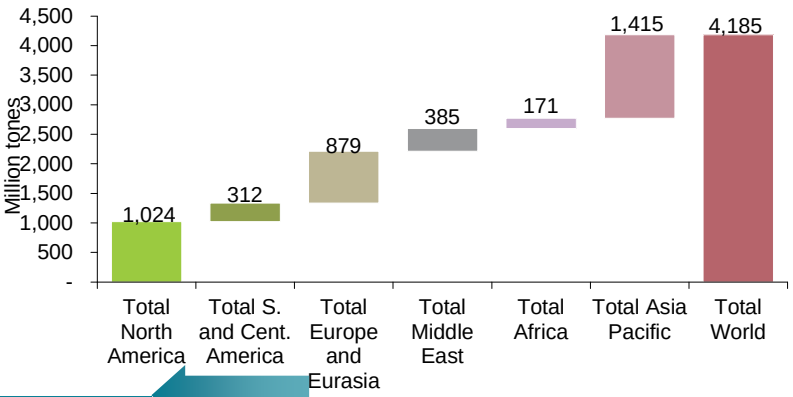
In 2013 the value of total world production of crude oil was equal to 4,130 million tones, while the value of the total world consumption was equal to 4,185 million tones

In 2013 Saudi Arabia had the biggest share in the total world production of crude oil equal to 13.1% (542.3 million tones), while US had the biggest share in the total world consumption equal to 19.9% (831 million tones)

World production of crude oil*



World consumption of crude oil**



Europe and Eurasia production of crude oil*	
Million tones	
Total EU 28	**59**
Denmark	9
Italy	6
Romania	4
United Kingdom	41
Total Central Asial	**98**
Kazakhstan	84
Turkmenistan	11
Uzbekistan	3
Total Other countries	**678**
Azerbaijan	43
Other Europe and Eurasia	634
Total Europe and Eurasia	**835**

Europe and Eurasia consumption of crude oil**			
Million tones			
Total EU 28	**589**	Portugal	11
Austria	13	Romania	9
Belgium	31	Slovakia	4
Bulgaria	4	Spain	59
Czech Republic	9	Sweden	14
Denmark	8	United Kingdom	70
Finland	9	**Total Central Asial**	**23**
France	80	Kazakhstan	14
Germany	112	Turkmenistan	6
Greece	14	Uzbekistan	3
Hungary	6	**Total Other countries**	**267**
Republic of Ireland	7	Azerbaijan	5
Italy	62	Ukraine	12
Lithuania	3	Turkey	33
Netherlands	41	Other Europe and Eurasia	217
Poland	24	**Total Europe and Eurasia**	**879**

According to the "OPEC Annual Statistical Bulletin" in 2013 Ukraine's, France's, Germany's, Netherland's and Turkey's production values of crude oil were equal to 43.7 thousand barrels daily, 16 thousand barrels daily, 51.8 thousand barrels daily, 21.6 thousand barrels daily and 46.2 thousand barrels daily respectively.

According to the BP "Statistical Review of World Energy Report", in 2013 the oil production of Russian Federation comprised 63.7% (531.4 million tones) of the total oil production of Europe and Eurasia oil production, while the consumption of Russian Federation comprised 17.4% (153.1 million tones) of the total consumption of Europe and Eurasia consumption.

Source: BP Statistical Review of World Energy, June 2014
*Note: * Includes crude oil, tight oil, oil sands and NGLs (the liquid content of natural gas where this is recovered separately). Excludes liquid fuels from other sources such as biomass and derivatives of coal and natural gas.*
*** Inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of bio gasoline (such as ethanol), biodiesel and derivatives of coal and natural gas are also included.*

cutting through complexity