

Supply and Demand Data Methodology

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GLOSSARY

Regions

Africa: Algeria, Angola, Cameroon, Chad, Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Libya, Mauretania, Morocco, Niger, Nigeria, South Africa, Senegal, Sierra Leone, Somalia, Sudan, Togo, Tunisia, Zambia.

Asia and the Pacific: Australia, Bangladesh, Brunei, India, Indonesia, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam.

Europe: Albania, Austria, Belgium, Bosnia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Greenland, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK.

Former USSR: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

South & Central America: Argentina, Aruba, Bolivia, Bonaire, Brazil, Chile, Colombia, Costa Rica, Cuba, Curacao, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Martinique, Nicaragua, Puerto Rico, Paraguay, Peru, Suriname, Trinidad, Uruguay, Venezuela, Virgin Islands.

Middle East: Abu Dhabi, Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Yemen.

North America: Canada, Mexico, USA.

Northeast Asia: China, Hong Kong, Japan, North Korea, South Korea, Taiwan.

Terms used in the Charts

Production: the quantity of product produced at operating unit in the region. This may also include recycled material e.g. for plastics.

Consumption: the quantity of product consumed in the region. This may not be the same as demand in the region due to export and import volumes

Capacity: the officially specified capacity of the operating unit at the time of construction, updated with any public announcements. If a manufacturing plant is on 'standby' the volumes are not included, nor are those deemed 'speculative' by our ICIS Consulting team.

Utilisation Rate: the ratio indicating the % use of the available capacity in the region (= Production/Capacity). It does not include recycle volumes included in the Production total.

Export: Quantity of material, which is moved out of a region.

Import: Quantity of material, which is moved into a region.

Net Trade: the volume of exports out of a region minus the volume of imports into a region.

Data is expressed in thousands of metric tonnes i.e. kilotonnes (kt)

Kilotonnes: thousands of metric tonnes (1 tonne x 1000 = 1 kt)

MMt: millions of metric tonnes (1 tonne x 1000000 = 1 m tonne)

MMlbs: millions of US or imperial pounds – see below (1 m lb)

The pound (lb) is a unit of mass used in the imperial, United States customary and other systems of measurement. It is exactly 0.45359237 kilograms.

One kilogram = 2.204623 pounds (lbs)

Global Supply and Demand

The methodology is based on the 'ICIS global supply and demand service': a single, highly searchable source of detailed historical and forecast data on petrochemical, energy and refining markets around the globe. It features information from four ICIS databases, all accessed via one online interface.

The database enables you to search upstream, midstream and downstream data spanning 160 countries and 100 markets. You can interrogate historical data as far back as 1978 and query and model forecast data up until 2030. It allows you to refine, sort, slice and export data, or create graphs and charts to illustrate findings more easily.

A complete picture of supply and demand

- Includes feedstocks and derivatives
- Country production data back to 1978
- Import and export figures
- Forecasts until 2030

Trading history and projected trade flows

- Global trade flows
- Search by country and region
- Compare by volume, value or value-per-unit
- Define by origin and destination country

Production capacity – past, present and future

- Current and planned production
- Capacity levels from 1978
- Capacity forecasts until 2030
- Updated monthly

Company ownership and equity shares

- Annual equity share of holding companies and affiliates
- Current and previous company ownership structures

The database is consolidated at the global level on a product by product basis and includes the following groups:

- Energy & Refining
- Petrochemical feedstocks
- Olefins
- Aromatics
- Polymers

Projections

Projections are developed for demand of downstream products (for which no supply demand statistics of derivatives are held in the database) at the country level. Global and regional demand is the sum of country demand. The distribution of production, capacity and resulting trade flows amongst countries and regions is elaborated by consultants on the basis of feedstock availability, local demand and competitiveness.

Feedstock availability (in terms of volume and value) is determined from expected developments in the gas processing and refinery sectors. Demand projections are made for energy requirements, transportation fuels, chemicals and miscellaneous (those outside the aforementioned sectors). Judgement on the sourcing of gas and refinery feeds is made from:

- Knowledge about exploration and discovery of hydrocarbon deposits
- Expected investments in processing equipment to valorize hydrocarbon deposits
- Analysis and optimisation of alternative conversion equipment to meet country and regional balances
- Knowledge of developments, advances and investment in biofuels

Petrochemicals

Demand projections are made only for petrochemical products that do not have derivatives contained in the ATEC database. These fall into three categories:

- Polymers, Elastomers & Fibres
- Derivative-consuming sectors that do not have supply statistics contained in the ATEC database
- Consumption for solvents

For production and trade projections, total production at the global level is set equal to demand which forces global net trade to zero. Production at the country level is fixed from a consideration of local capacity and net trade. Net trade is then summed at the regional level and compared with historical trends in net regional trade. Once the regional net trade flow is set, it is broken down by component countries. Individual country net trade is set in line with historical trends unless there is a change in capacity, in which case the delta change for the region is broken down on a weighted average basis.

Polymers, Elastomers & Fibres

The principal parameters to determine projected demand are economic growth and population intensity. GDP data reported by the World Bank as a year on year percentage growth is converted into an absolute common currency, US\$ and subsequently into US\$ per capita based on the World Bank's actual and projected population statistics. GDP per capita at the country level is used to determine the weighted average values at the regional and global level. For each product a correlation is maintained between demand per capita and GDP per capita at the global level.

Non-database-held Derivatives

Demand projections are calculated from derivative production capacity obtained from local sourcing, including future new investment and/or closures.

Solvents

Estimates for projected demand are primarily based on recent historical trends in each country.

Energy

Energy demand projections are correlated with GDP growth at the country level. Reference is made to historical trends and projections provided by IEA and national statistical offices. Energy demand is split between sources based on historical and current infrastructure, and expected investments.

Transportation Fuels

Transportation fuel demand is divided into components including the domestic car pool, industrial road transportation, rail and sea freight, and jet fuel. Demand for the domestic car pool is based on historical trends, the rate of vehicle replacement and GDP growth, and is split between gasoline, diesel, electrical vehicles and LPG based on actual registrations and expected developments. Industrial road transportation,

rail and sea freight, and jet fuel is estimated from historical trends, expected infrastructure investment and GDP growth.

Projections of production and trade for petroleum products are based on judging the sourcing of gas and refinery feeds from:

- Knowledge about exploration and discovery of hydrocarbon deposits
- Expected investments in processing equipment to valorize hydrocarbon deposits
- Analysis and optimization of alternative conversion equipment to meet country and regional balances
- Knowledge of developments, advances and investment in biofuels

Chemicals

Demand for the chemical sector is integrated with the ATEC Petrochemical database. For chemicals not included in the database, demand is estimated from historical trends, GDP growth and new capacity investments.

Miscellaneous

Miscellaneous demand projections are made at the country level based on historical trends and consultant knowledge of future developments.