The Global Salt Market

IHS Markit, Dr. Stefan Schlag Leon Beraud, The Global Salt Market

Salt Production

Keywords: Salt Market, Supply – Demand, Trade, Consumption, Salt Uses, Forecast

The presentation will give an overview of the global salt market with base year 2017. Global production will be estimated and broken down by world regions, and type of salt, i.e. rock salt, sea salt, brines, and vacuum salt.

Abstract:
Salt markets are in most cases regional. Salt's relatively low price and its availability in most countries of the world make transportation over large distances uneconomic and unnecessary. Yet, over 10 percent of the salt produced and consumed globally is traded cross different world regions. Reasons behind this phenomenon and the global trade patterns are differences in the cost of production, geographical and climatic differences, cyclicality of demand, and an optimized transportation infrastructure. In order to allow for an understanding of the global salt market, production capacities by salt type, supply-demand, consumption breakdown by main areas of use, and the global trade pattern will be presented, along with a five year outlook for the main markets.

The Global Salt Market:
Salt is produced and consumed as dry salt or as salt in brine. Dry salt can be obtained via solar evaporation of sea water, lake brines, or underground brines. Dry salt can also be obtained from underground mining of rock salt or from open pit mining of dried salt lakes. Solar salt and rock salt can be washed to reduce the amount of impurities, depending on its final use. A very pure form of dry salt is obtained from mechanical evaporation of brines. Brines are normally obtained from solution mining of underground rock salt deposits, from underground brine deposits, from inland salt lakes, and to a minor extent as by product of potash mining. Brines are also used directly and without prior drying steps. Direct use of brines is common in the chemical industry since the largest salt consuming chemical processes use aqueous solutions of salt as feedstock. Especially for use in the chemical industry, and particularly for membrane cell chlor-alklai production, unwanted impurities are precipitated from the raw brines prior to use.

Capacities:
Global production capacities for all types of salt amount to about 400 million metric tons in 2017. The breakdown of global production capacities by world regions and type of salt is shown in the graphs below.

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email
stefan.schlagleonberaud@ihsmarkit.com

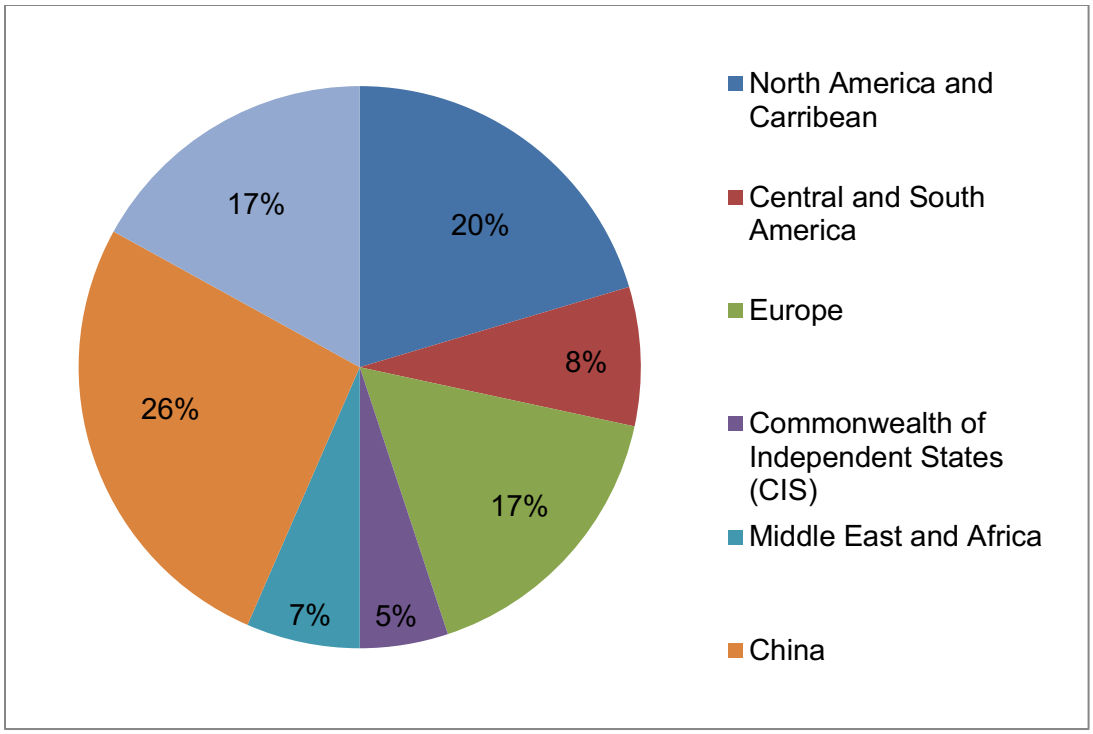

Figure 1. Regional Breakdown of Global Salt Production Capacities

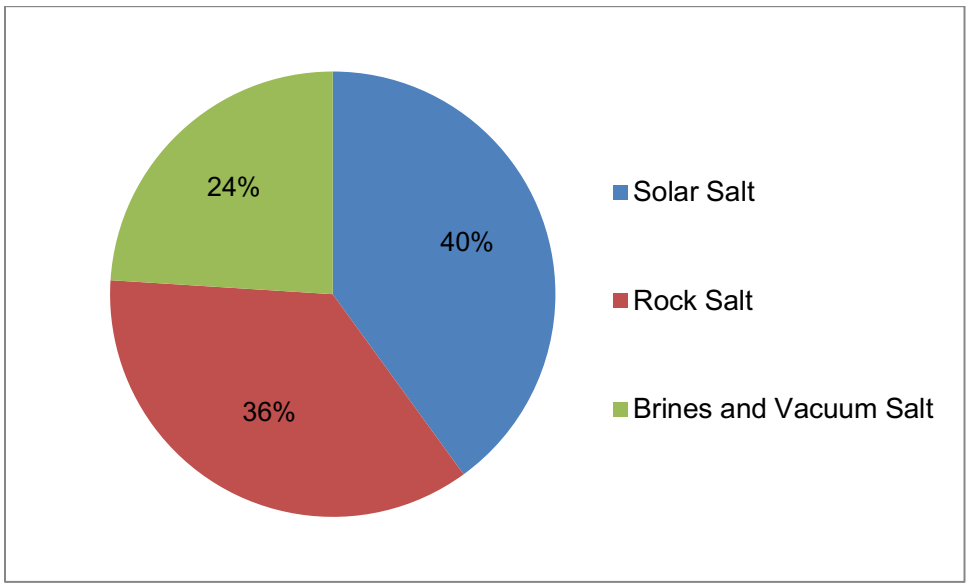

Figure 2. Breakdown of Global Salt Production Capacities by Salt Type

Supply / Demand:
In 2017, an estimated 300 million metric tons of salt were produced and consumed globally. China is the world's largest producer with about 88 million metric tons of annual production, followed by North America and Europe with about 63 and 52 million metric tons of annual

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email stefan.schlagleonberaud@ihsmarkit.com

production. 2017 world salt consumption is illustrated by main areas of end use in the chart below.

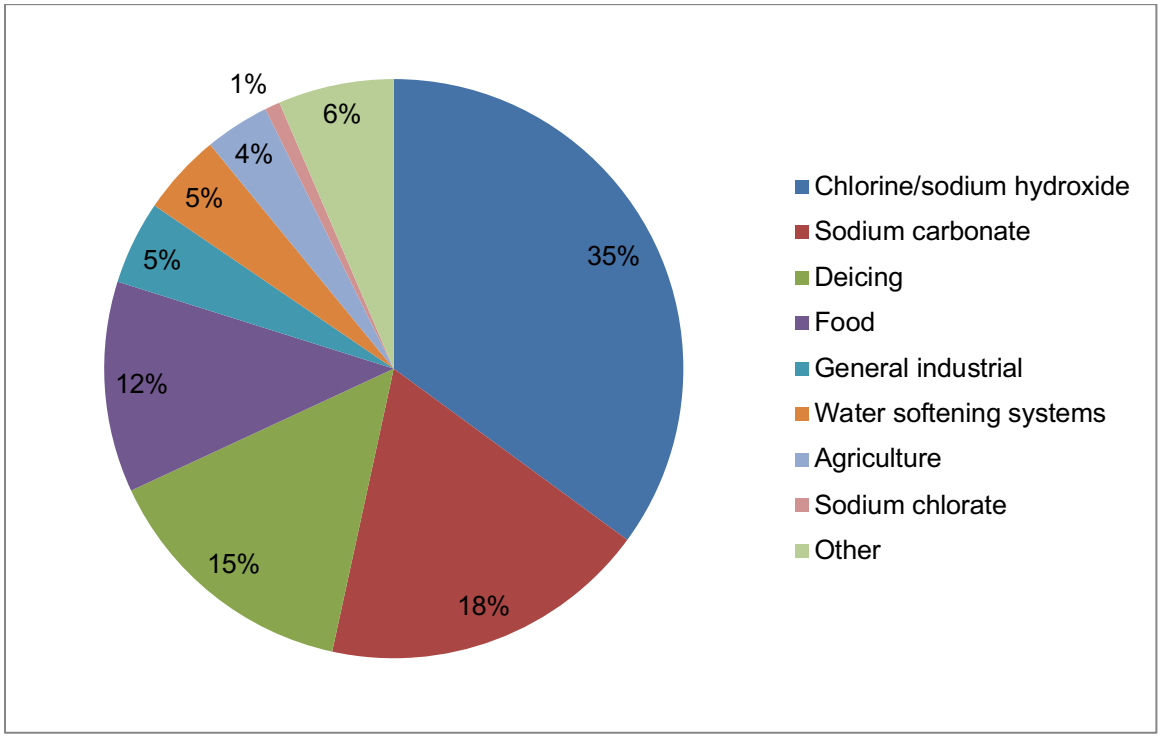

Figure 3. Breakdown of Global Salt Consumption by Main Uses

Consumption of salt in the chemical industry is the by far largest use. Altogether use of salt in the chemical industry accounts for over half of the total salt consumption. Chlorine, caustic soda, and synthetic soda ash are the main primary products made from salt. The second largest area of use is de-icing; consumption in this segment obviously fluctuates from one year to another depending on winter conditions. Salt use in food, including household salt, as well as uses in the preparation and conservation of food represents the third largest use globally. Depending on the climatic region, and extent of industrialization, consumption patterns can vary significantly for the different world regions. Overall the global consumption split by world region is illustrated in the graph below:

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email
stefan.schlagleonberaud@ihsmarkit.com

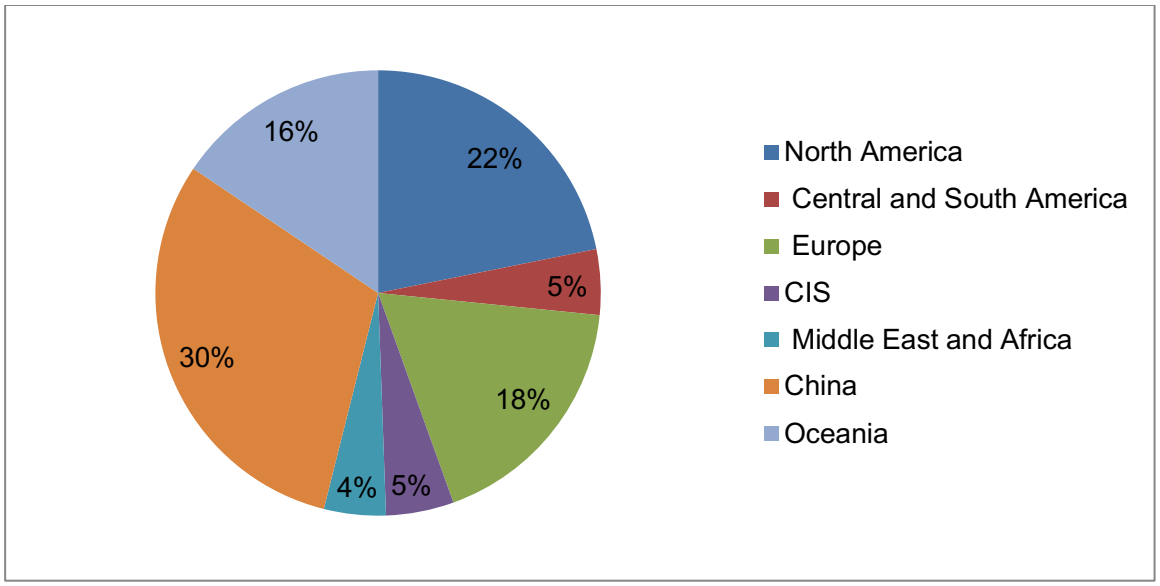

Figure 4. Breakdown of Global Consumption by World Region

Price:
The price of salt varies over a wide range. Salt in brine is the cheapest form in which salt is supplied, and if brines are produced captively by large chemical producers, transfer cost is typically below 10US$ per metric ton. The other extreme are special food grade salts for household consumption. A few hundred gram packages of these salts are sold for several dollars which is equivalent to a price of tens of thousands of dollars per ton. A typical price for edible household salt is around one dollar per kilogram or 1000 dollars per ton. Industrial grade salt, feed salt or de-icing salt is priced in the range of 20 to 300 dollars per kilogram, depending on volumes, packaging, formulation (i.e. tablets, special crystal size), and purity.

Trade and Logistics:
Keeping in mind that the larger uses of salt are in the lower price range, it is obvious that cost of transportation is significant for the overall delivered price of salt. The radius in which a producer can competitively market its product is limited. The most common scenario is the transport of salt to consumers situated relatively near to the production site, using trains, trucks and barges on inland waterways. A rail freight wagon can typically carry about 25-55 metric tons of salt, and an entire train might carry in the range of 600-1,000mt. Typically about 150mt of salt can be loaded in one hour. Transport by train is economically viable for distances larger than 200km, in the case of entire trains between supplier and end-user. For shorter distances or single wagons, transportation via train is only economical if a discharging infrastructure exists at the customer's site. For shorter distances or in the case of an absent rail and waterway infrastructure, salt is transported by truck. The cost of road transport increases both with distance and with the decreasing scale of the transportation contract. The maximum distance for water transport by barge will depend on the possible loading of the vessel, and the distance to the next potential supplier. In Europe, transport by barge with a loading of 1-2,000mt is economical for distances of up to 300-500 km.
Nevertheless, more than 10% of the annual global salt volume is being traded overseas. The map below shows the main routes of the overseas trade pattern.

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email
stefan.schlagleonberaud@ihsmarkit.com

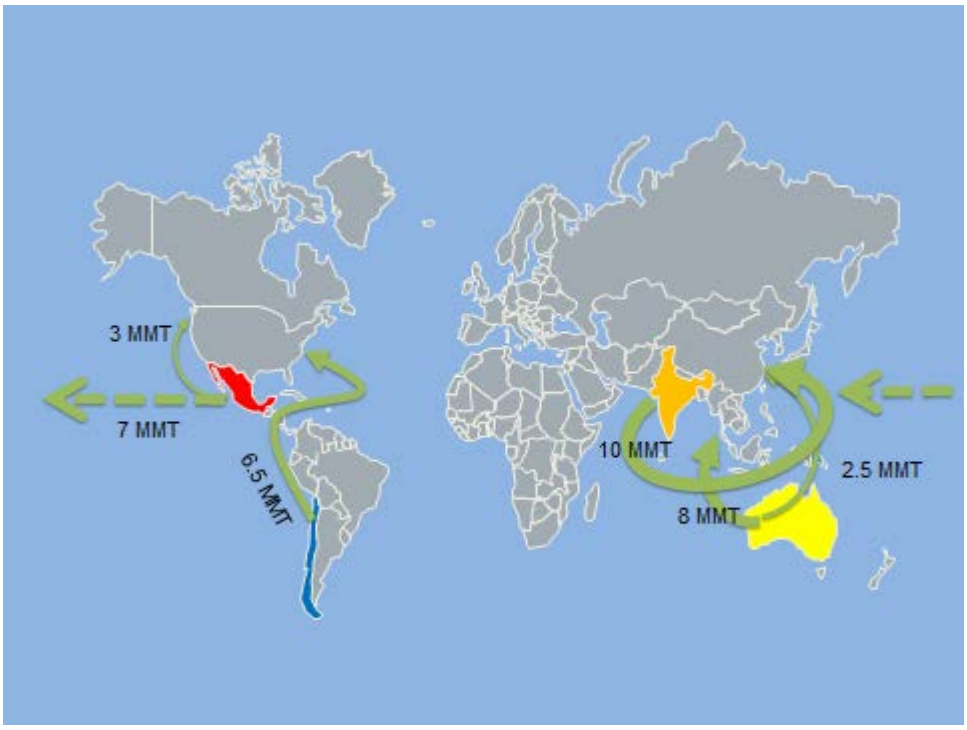

Figure 5. Global pattern of overseas salt trade

In order to be able to offer competitive salt prices in overseas export markets, salt must be produced at minimal cost. In Australia, India, and Mexico cost of production is very low, since geographical and climatic conditions at the coast allow for large scale solar evaporation plants, and in many cases more than one harvest per year. In Chile, salt can be produced very economically from the surface of a salt lake. In addition to low production cost, all producers need to manage the transport costs effectively.

Australian exporters have their own fleet of bulk carriers with a freight range of 15 to almost 100 thousand metric tons. Rio Tinto manages its seaborne cargo through its subsidiary Rio Tinto Marine, and also manages part of the harbours. Harbour infrastructure allows for the usage of large capacity carriers and fast loading rates. In Australia, salt production is located at a maximum of few kilometers distance from the harbours.

The distance of the Chilean salt deposit and its production site is 18 miles from the nearest port facilities. The harbour can accommodate bulk carriers of up to 150,000 dwt and with a loading speed of 25,000mt per day for each loading facility.

In Mexico, salt is being shipped from the East coast to destinations in the Caribbean using ships with loading capacities of 5-10,000mt. Mexican producers ship even larger quantities of salt to destinations in Asia and the USA in bulk carriers with loading capacities of 40–50,000mt. The port at Isla de Cedros on the West coast of Mexico is used exclusively for the shipping of salt. Shipping rates vary substantially over time with the availability of transport capacity and fuel costs.

On the consumer side, conditions must also be suitable to make salt trade over large distances economically viable. Consumers must be located in proximity to an overseas port in order to avoid important additional inland transportation cost. Ship loadings of tens of thousands of tons of salt are only suitable for consumers with consumption in this order of magnitude. Both conditions are met for the chemical industry at the coast of Asian countries, and for seasonal de-icing use in the coastal metropolitan areas in North America.

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email
stefan.schlagleonberaud@ihsmarkit.com

Industry Outlook:
Salt is valued for its chemical properties and as a source of its constituents, sodium and chlorine. There is no other source of either of these ions that is available at such a low cost and free availability that could conceivably be used as an alternative in the foreseeable future. Attempts to find an economically and ecologically suitable replacement product for the de-icing of roads have been unsuccessful and appear unlikely in the near future. The short term impact of global warming is unclear. On one hand, extreme weather events, in particular snow fall in densely populated areas could lead to increasing consumption of de-icing salt. On the other hand a large part of de-icing salt is used when temperatures fall in the critical range around 0°C, and even a small increase of average temperature in some regions could reduce the number of days with de-icing requirements significantly. On the longer term, average temperatures and average elevations with expected snowfall are expected to increase, and are likely to negatively impact de-icing salt consumption. By far most of the regions with expected significant growth in population, traffic infrastructure, and traffic density are in climatic zones with negligible requirements for de-icing salt, and will accordingly not generate increasing demand in this segment. Circular economy is a concept that shall lead towards a more sustainable use of raw materials and energy. In some areas, recycling of products derived from salt is already taking place, most importantly the recycling of glass where salt is one of the raw materials for synthetic soda ash production. Another potential area of recycling would be PVC, which is the largest outlet for chlorine obtained from the electrolysis of salt. Other than for glass, mechanical recycling, and feedstock recycling is still only done for a minor part of all PVC, but efforts are ongoing to improve the material recycling rates. It is not expected that increasing recycling of PVC will have a significant impact on salt consumption in this part of the chemical industry. Overall, consumption of salt is expected to grow with an expected global population growth, and growing needs for salt in food, feed, the chemical industry, water softening, and a wide range of other uses. It is expected that all four forms of salt, brines, vacuum salt, rock salt, and solar salt will be produced in larger quantities. Solar salt is certainly the least energy intensive way to produce dry salt, and large scale producers with an appropriate transportation infrastructure may be able to further increase their share in the global market. However, and for the reasons outlined above, the salt markets located at greater distance from ports will continue to be supplied by local producers.

Dr. Stefan Schlag Leon Beraud, Tel +41 44 2836345, email
stefan.schlagleonberaud@ihsmarkit.com