Chlor-alkali industry in India – status, shortcomings and strategy

The chlor-alkali industry – producing caustic soda, chlorine, soda ash and a few other related products – is an important segment of the chemical industry, providing inputs that go into a diverse range of industrial and consumer goods. The industry does not grab headlines as the petrochemical and pharmaceutical industries do, and in times when self-reliance is all the talk, it is notable for meeting most of India's needs. The industry does operate under a threat of cheaper imports, but given inputs at competitive prices and the right policy support, it can stand up to the heat.

A recent publication brought out by the Alkali Manufacturers Association of India (AMAI), which counts all of the producing units amongst its members, highlights market trends for the industry's main products. Thorough documentation of this kind is rare in the chemical industry, though it is made easier by the fact that the chlor-alkali industry is a homogenous one, in which the issues facing an unit, are usually those of all.

Build-up of capacity

The caustic soda/chlorine segment of the industry has nearly 30-odd companies of varying sizes, and has seen significant investments over the last few years. Installed capacity for caustic soda (and concomitantly that for chlorine, which is co-produced in an unalterable ratio) has grown at a CAGR of 7.8% between FY16 and FY20 – rising from 33.7-ltpa (lakh tonnes per annum) to 45.44-ltpa. Operating rates have hovered in the low- to mid-80% range for much of the recent past, and is, more often than not, limited by the offtake of chlorine (more on this later). About 60% of the total new capacity in the last two years have been in western India, where the broader chemical industry is mostly located. Overall, Gujarat accounts for about 55% of the total installed capacity for caustic soda.

Limited exports

The industry's market focus is largely domestic, and historically only 3-5% of total production is exported (mainly as flakes). But exports have been growing in the last six years (with the exception of FY19). Much of it are to the countries of Africa, where the chemical industry is undeveloped and caustic soda flakes are needed to make basic goods such as soaps, as well as for textile processing. Smaller quantities go to some of the South East Asian countries, notably Vietnam, Indonesia and Myanmar. In FY19, export earnings of the industry were about US$105-mn.

Threat of imports & measures to combat it

The industry does, however, operate under the constant threat of cheap imports, though in the recent past these have been mitigated to some extent. Since 2015-16, when imports peaked to attain a share of nearly 17% of domestic consumption of caustic soda, there has been a steady decline both in the quantity imported and as a share of domestic requirements. In FY19, imports reached a low of about 235-kt – roughly 6.5% of the domestic requirement – but there has been a sharp uptick in FY20 to about 375-kt, representing about 10% of domestic consumption. In the current year, a COVID-related contraction in demand is expected to take a toll on the industry in the form of reduced operating rates, and the spectre of cheap imports from overseas producers desperate to sell their wares has re-emerged. Supplies are now coming in at prices of $250 per tonne, from $400 prior to the pandemic, and this will put margins under pressure for producers here.

If the imports have been curbed in the past, it was due a few initiatives taken by the industry. For one, as mentioned earlier, the industry has raised capacity over the last few years, and now has more than enough to meet domestic needs. The AMAI has also been active in combating predatory imports by seeking the imposition of anti-dumping duties (ADDs). These now exist on imports from China and South Korea, but will lapse in November, unless extended. The association is also lobbying to impose ADDs on imports from Japan, UAE, Iran and Qatar, and filed a plea this August.

Some non-tariff measures have also helped to rein in imports. For one, imports are now restricted to membrane-grade product, to the exclusion of mercury and diaphragm cell based alkali. More importantly, certification by the Bureau of Indian Standards (BIS) is needed for any importer who wishes to operate in the domestic market.

The country-wise analysis of imports has lessons for the impacts Free Trade Agreements (FTAs) can have on the domestic industry.

For the last five years, Japan has been the dominant supplier of caustic soda to India, largely due its FTA with India, which enables caustic soda to come in at concessional basic customs duty (0.7% till April 1, 2021, going down to zero thereafter, compared to 7.5% for other countries). It also helps that producers in Japan (and in South East Asia, in general), have a logistical advantage when shipping caustic soda lye to the east coast of India to meet the needs of the sizeable alumina industry there.

Fragmented consumption base

The major outlets for caustic soda in India are in textiles (21% share), alumina (12%), for making inorganic chemicals (13%), pulp & paper (8%) and soaps & detergents (7%). Aside from alumina and pulp & paper, the demand is fragmented and widely dispersed, which makes for expensive logistics to cater to it. Consequently, a sizeable portion of it is met through trade channels.

Much of the alumina capacity is located in the east coast, which does not have much of a chemical industry that can serve as a sink for chlorine. This poses a challenge for any new caustic soda capacity created in the region to meet incremental demand from the alumina sector. The best work-around to this is the setting up of a large-scale integrated polyvinyl chloride (PVC) plant at Paradeep, integrated to, or in partnership with, the refinery operated by Indian Oil Corporation (IOC) at that location. IOC has ambitious plans for its petrochemicals business and an integrated vinyls project, involving the manufacture of ethylene dichloride (EDC) and vinyl chloride (VCM), using ethylene from the refiner, should form part of the scheme for the site.

Such a project will have twin benefits: it will put the demand-supply for chlorine, at least for the region, on a more even keel; and also meet India's growing demand for PVC resin. Indian imports of the polymer were a staggering 19.16-lt in FY20, far above the domestic production of 15.14-lt, making India the world's largest importer. This is an unsustainable situation that should be corrected immediately by investments in world-scale plants for the polymer and its raw materials.

In the absence of a sizeable vinyl sink, chlorine demand in India is very different from the rest of the world. Uses such as chlorinated paraffin wax, organic & inorganic chemicals, and chloromethanes account for a large chunk of the demand. The industry is also forced to convert a significant portion – about 18% – of its chlorine to low value hydrochloric acid (HCl) by reacting it with hydrogen, which is co-produced in its plants.

The hydrogen utilisation pattern of the industry has only now has begun to receive more attention. Close to 40% of the hydrogen produced is captively used as a fuel in boilers or in the caustic soda fusion plants, and about 28% is converted to HCl. A higher 'chemical value' is obtained for only the remaining 30%, either by captive consumption (for e.g., to make hydrogen peroxide) or by sale to third party in a compressed form (for use in hydrogenation plants).

A related issue that needs deliberation is the HCl generation by consumers of chlorine. More often than not, only one atom in a molecule of chlorine (which has two) is utilised, and the other comes out as HCl. The quantum of HCl thus generated is substantial, and, at times, contaminated with impurities. The worrying fact is that there is no clear assessment of how much is generated and what is being done to it. Regulators are now insisting that companies generating HCl in their processes outline a utilisation strategy for it when seeking environmental approvals, but there is a big gap between promise and practice, and a large portion of waste HCl is unaccounted for. While this is not the chlor-alkali industry's problem per se, it will have repercussions!

Policy measures

There are some things the government can do to improve the lot of the industry. Power sector reforms are at the top of the industry's ask, as electric power is a major cost component for the industry, accounting for about 60% of manufacturing costs. Nearly 87% of the installed capacity for caustic soda is now based on captively produced power (CPP) (usually from coal-fired plants), as it is cheaper than grid power, which on average costs the industry Rs. 7.36 per kWh. But levies, cesses and other taxes add to the cost of CPP also and there is need for rationalisation of these, especially in Gujarat, home to 55% of the industry's capacity.

Fair value for all products – key to sustained competitiveness

The economics of manufacturing chlor-alkali products requires that fair value is obtained for each of the products made in the membrane cell. But, historically, the industry has focussed on the market for caustic soda and the utilisation of chlorine and hydrogen has suffered. Correcting this is key to raising overall competitiveness, and enable the industry combat the threat of imports on its own strengths, rather than depend on externalities in the form of tariff and non-tariff barriers.

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