

Caustic-Chlorine industry in India – Preparing for a sustainable rebound

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The caustic-chlorine industry in India witnessed a cyclical downturn after H1FY20 which was further exacerbated during FY21 owing to the Covid-19 pandemic-related contraction in demand from major end-use industries. The electro chemical unit (ECU) realizations which represent weighted average realization of caustic soda, chlorine and hydrogen (wherein chlorine and hydrogen are co-products of caustic soda) fell close to their decadal low of around Rs.23,000/MT during FY21 (having previously dipped to around Rs.21,000/MT in FY11) vis-à-vis the highs of around Rs.38,000/MT in FY19 and around Rs.30,000/MT in FY20. It significantly impacted the profitability margins of the industry players in FY21. However, from March 2021 onwards, there are early signs of recovery for the sector with revival in demand from end-use industries which is also reflected in the improved ECU realization of around Rs.27,000/MT during Q1FY22. CARE Ratings expects ECU realizations to remain firm and further improve from this level in the balance part of FY22 in case there is no third wave of the pandemic or major disruptions caused by it. Although any significant improvement in ECU realizations beyond Rs.30,000/MT would be restricted on the back of large capacities scheduled to come onstream in FY22 and FY23, they are expected to largely sustain at such higher levels on the back of few structural changes in the industry which is expected to make it more resilient.

What is expected to drive overall competitiveness of Indian Caustic-Chlorine industry?



Technology shift

Caustic soda can be manufactured through diaphragm cell, mercury cell or membrane cell technologies. Manufacturing it using diaphragm cell technology has become obsolete and is no longer in use in India. Furthermore, due to environmental concerns associated with the mercury cell technology, the sector has gradually transitioned from mercury cell to membrane cell technology, which is eco-friendly and consumes 25% lesser energy. India had been using mercury cell technology for a long time which made Indian caustic soda costlier on the back of higher pollution control and power cost involved in manufacturing through this technology. India faced threat of heavy dumping from other countries wherein cost of production was much lower due to their early shift to membrane cell technology. However, mostly all the caustic soda plants in India are now based on membrane cell technology, making India at par with other countries in terms of technology. The share of import of caustic soda as a percentage of total domestic consumption reduced to less than 10% during FY21 as against 17%-18% witnessed around five to six years ago, while exports have seen a rising trend in the last five years ended FY21.

Declining power cost

Caustic soda is produced by way of electrolysis of salt which is an energy intensive process; power cost is a major input cost comprising around 60% of the total cost of manufacturing it in India. Total cost of power was very high earlier mainly due to usage of mercury cell technology which entailed power consumption of 3,150-3,300 kWh/tonne of caustic soda manufactured and secondly due to total reliance on conventional sources of thermal power which has now proved to be costlier compared with renewable energy sources. However, with transition to membrane cell technology, the industry's average power consumption has reduced by 25% to 2,300-2,450 kWh/tonne of caustic soda production. Hence, in terms of consumption of units of power, India is now at par with other caustic soda-producing countries. This coupled with the gradual rise in the relatively cheaper renewable power capacity has resulted in a declining spree in the per unit cost of power consumed which would make the cost of power consumed for producing caustic soda in India largely at par with other countries in the medium term.

Growing applications of co-products of caustic soda

Chlorine and hydrogen are co-products of caustic soda, i.e., generation of one automatically leads to generation of another. With the production of 1 MT of caustic soda, 0.89 MT of chlorine and 25 kg of hydrogen gas is produced.

Chlorine

There is a marked difference in the dynamics of chlorine in India compared with the global scenario. Globally, 38% of the chlorine produced is used by the vinyl industry, whereas it is only 8% in India in the absence of bulk demand from Vinyls. Consequently, the caustic-chlorine industry in India is mainly caustic driven unlike the rest of the world, where it is chlorine driven. In India, chlorine fetched negative realization at times due to its associated disposal costs which put pressure on the ECU realizations thereby making Indian caustic soda less competitive. During FY20, India produced 15.14 lakh MTPA of poly-vinyl chloride (PVC), while imports of the polymer were staggering at 19.16 lakh MT which was far above the domestic production thus making India the world's largest importer. However, the scenario is expected to change now as India has announced the second-highest capacity addition of PVC at 17.4 lakh MTPA by 2025 after China. Hence, the challenge and costs associated with disposal of chlorine is expected to gradually subside going forward. From past three years, the realizations of chlorine have turned positive for domestic players and the trend is expected to continue even going forward which should support the ECU realization of the sector.

Hydrogen

In India, around 40% of the hydrogen produced is captively consumed either as a fuel in boilers or for manufacturing of other downstream products, while around 30% of hydrogen is converted into low-value additive Hydrochloric acid (HCL) by reacting it with chlorine. Higher value is obtained from the balance around 30% of hydrogen only as it is either sold to third party in a compressed form (for use in hydrogenation plants) or consumed to make other products like hydrogen peroxide. Hydrogen gas is presently used in varied industries such as chemicals, petrochemical refining, metallurgical, glass and electronic industries. Hydrogen burns as a clean fuel, producing water as a by-product that makes it an efficient energy carrier and a clean and ecologically balanced fuel. During the Union budget speech in February 2021, the Honourable Finance Minister announced the launch of the Hydrogen Energy Mission to produce hydrogen from renewable sources. In April 2021, the Indian Hydrogen Alliance was formed for commercialising hydrogen technology and developing green and blue hydrogen in the country. Hydrogen is rapidly emerging as an alternative fuel choice to combat climate change and achieve de-carbonisation across industries. Thus, with India's focus towards transition to cleaner energy, the usage and significance of hydrogen is bound to increase leading to its improved realisation.

All these structural changes (some of which are already underway) are expected to result in a more sustainable rebound in profitability of the Indian caustic chlorine industry.

Potential upside going forward

Imposition of anti-dumping duty: In December 2020, the Commerce Ministry's investigation arm, the Directorate General of Trade Remedies (DGTR), had issued a notification regarding initiation of anti-dumping probe on the caustic soda imports from Japan, Iran, Qatar and Oman (which constituted around 75%-80% of India's total imports of caustic soda). Accordingly, anti-dumping duty, if imposed, could result in further improvement in ECU realizations for the domestic industry players.

Potential downside going forward

Probable third wave of Covid-19 pandemic coinciding with planned capacity addition in the medium term: Projects with capacity of around 7 lakh MTPA of caustic soda (which comprises around 15% of existing installed capacity in India) are under implementation by various industry players whereby projects with capacity of around 4 lakh MTPA are expected to come onstream in FY22, while the remaining projects are expected to come onstream in FY23. Accordingly, despite good rebound in ECU realizations expected from the lows of FY21, the improvement would be limited to an extent till FY23 considering these planned capacity additions. Additionally, any potential third wave of Covid pandemic could limit the growth in demand from end-use industries (which majorly includes textiles, pulp and paper, aluminium, detergents, soaps, rayon, plastics, pharmaceuticals, agricultural chemicals, etc.), thereby putting pressure on ECU realizations for the domestic players.

Contact:

Padmanabh Bhagavath
Ranjan Sharma
Hardik Shah
Komal Israni
Mradul Mishra

Senior Director
Director
Associate Director
Lead Analyst
Media Relations

ps.bhagavath@careratings.com
ranjan.sharma@careratings.com
hardik.shah@careratings.com
komal.israni@careratings.com
mradul.mishra@careratings.com

+91-22-6754 3407
+91-79-4026 5617
+91-79-4026 5620
+91-79-4026 5694
+91-22-6754 3573

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CARE Ratings Limited

Corporate Office: 4th Floor, Godrej Coliseum, Somaiya Hospital Road, Off Eastern Express Highway, Sion (East), Mumbai - 400 022
Tel.: +91-22-6754 3456 | CIN: L67190MH1993PLC071691

Connect:

