

Background

Metal that does not contain Iron (Fe) is a Non-Ferrous Metal (NFM). Since it doesn't contain iron, most NFMs also have characteristics of being non-magnetic and resistant to corrosion (rusting). NFM industry largely comprises of base metals including aluminium, copper, zinc, lead, nickel, tin, and even precious metals like gold and silver. Rare metals such as cobalt, mercury and tungsten among others are also a part of NFM industry. This methodology mainly focuses on the four widely used base metals comprising aluminium, copper, zinc and lead.

Apart from being corrosion resistant, other distinguished characteristics including excellent thermal and electrical conductivity, high strength to weight ratio and qualities of being highly recyclable have over time increased usage of NFM. Increasing usage has resulted in a steady increase in the industry's size globally and in the domestic market. While China leads globally in terms of production and consumption, India has been progressively increasing its capacity for most metals which has not just resulted in India being self-sufficient in NFM manufacturing capacity, but for some of these metals, India has now achieved the status of net exporter as well.

Factors such as increased utilisation of NFM in automotive industry (especially in Electric Vehicle sector), growing demand in construction, advancements in coatings and treatments, and adoption of sustainable production and recycling methods are driving this market. Further, government initiatives and increasing focus on manufacturing are anticipated to drive substantial demand for NFM's domestic demand.

Although commonly referred to as base metals or NFM, these metals are quite distinct from each other having their own uniqueness when it comes to end-usage consumption. While aluminium and copper are widely used in electrical, automobiles, consumer durables and construction sectors, zinc is used for galvanising and coating, whereas lead is majorly consumed for manufacturing batteries.

Each of these metals have their own demand-supply dynamics and cost of production leading to fundamental price discovery of these metals. However, unlike the steel industry, which is averse to exchange driven pricing, non-ferrous base metals prices are derived through exchange traded mechanism. Globally, the London Metal Exchange (LME) is one of the oldest and highly traded exchange, which derives benchmark prices for most non-ferrous metals. Being globally traded and having higher standardisation as compared to steel, domestic prices of non-ferrous metals are directly linked to global prices based on landed-cost parity.

Non-ferrous metals are manufactured through two routes - primary and secondary. Secondary route means manufacturing from scrap, while primary route refers to manufacturing from ore. Indian primary non-ferrous metals industry is highly concentrated with not over three players each in aluminium and copper smelting and only one player manufacturing zinc and lead through primary route. Despite having very few players in primary market, industry continues to remain price taker owing to globally traded business.

The industry remains of high importance to the economy due to job opportunities it creates. It also makes the economy reasonably self-sufficient and can potentially control the cost of production of its end-user industries.

Methodology

CARE Ratings Limited (CARE Ratings) has a detailed methodology for rating companies belonging to the manufacturing sector. CARE Ratings' rating process begins with evaluation of the economy/industry in which the company operates, followed by assessment of business risk factors specific to the company. This is followed by an assessment of financial and project-related risk factors and quality of management. This methodology is followed while analysing industries that come under the purview of the manufacturing sector. However, considering size and diversity of the manufacturing sector, CARE Ratings has developed methodologies specific to industries within the sector. These methodologies attempt to bring out factors mentioned in the broad methodology, which is considered while analysing companies belonging to an industry.

In addition to the methodology followed for manufacturing companies, this methodology deliberates on the additional industry specific parameters impacting the credit profile of the primary NFM manufacturing companies. Such additional factors considered by CARE Ratings, along with their analytical implications, while arriving at the rating of a company engaged in the primary NFM manufacturing have been discussed below.

A. Industry risk

As NFM is a globally traded commodity, it is highly sensitive to changes in the economic cycle. The industry is equally influenced by global, rather than just domestic dynamics. CARE Ratings' analysis of the industry risk focuses on the current global economic scenario, demand-supply situation; cyclicalities associated with the industry, regulatory policies and trend in global prices for raw material and finished good products.

Non-ferrous metals find their application in households and industrial activities. Owing to the globalised industry, change in macroeconomic indicators domestically or globally directly influence demand for commodity and prices. Apart from demand-supply factors, sentiments of market also lead to significant volatility in most NFM prices. Significant volatility in commodity prices is not good for economy in the world; hence one has to also closely monitor regulatory changes/ measures adopted by government to reduce/contain the impact of volatility in commodity prices on the economy.

For analysing the industry risk of the NFM industry, CARE Ratings monitors the following parameters at the global and domestic level

- Trade activity and economic cycle
- Demand-supply scenario
- Price trend for raw material and finished goods
- Inventory position
- Regulatory changes
- Substitution risk (if any)

B. Business risk

After analysing industry risk, business risk of the entity is assessed by CARE Ratings to understand its position within the industry. Business risk is a combined factor of market position of the entity and its operating efficiencies against other players within the industry.

i. Market position

CARE Ratings considers market position to be an important factor in the analysis of primary NFM manufacturing companies. The company's position and strength as against other global NFM

manufacturing companies are considered, since the commodity is traded across boundaries. In addition, CARE Ratings also considers relative scale of operations and downstream product diversity, which would help counter competitive pressures exerted by other NFM manufacturing companies.

Size and market share

Given the huge outlay required owing to the capital intensive industry, having a widespread presence and large scale of operations is important as the scale and size determines a manufacturer's ability to distribute fixed costs over a larger base.

Significant market share ensures greater network efficiency, better utilisation of assets and scale advantages.

CARE Ratings analyses the relative position of an entity including a peer group analysis. CARE Ratings also analyses strategic initiatives undertaken by the entity to maintain/increase its market share. An entity's current market share and trend in market share in the past are important indicators of competitive strengths of the entity. A sustained dominant position leads to better revenue visibility and cash generation capability over the long term.

Geographical diversity

Generally, entities having geographical diversification are viewed favourably as it partially insulates them from regional economic cycles and demand-supply divergence. Entities having a balance of domestic and exports markets are in a better position to meet challenges arising from decline in demand in a particular country, adverse changes in duty structure, imposition of trade restrictions, political instability, localised events or economic downturns in a particular region. CARE Ratings considers geographical diversification as credit strength for NFM manufacturing entities.

Downstream product diversity

In the primary NFM manufacturing industry, product diversity majorly refers to downstream product diversity. It means manufacturing value-added products (flat products, extrusions, foils, wires, and rods among others) as required by the end-user industry as against manufacturing basic metal (ingots) which is highly commoditised. Downstream product manufacturing not only results into garnering higher net sales realization (NSR), but also ensures significant volume off-take which is very crucial as it ensures optimum capacity utilisation of the plant. Furthermore, manufacturing of value-added products not only ensures higher NSR, but also results increase in profitability. Ability to manufacture downstream products also enable such manufacturers to have a higher flexibility to adjust to changes in the demand for products. Such entities, with end-to-end control over the value chain are considered to be superior to others who manufacture merely base metals. CARE Ratings believes, companies that diversify their downstream product offerings are better positioned to withstand market fluctuations as they reduce reliance on a single segment.

ii. Operating efficiencies

Operational efficiency directly impacts profitability of entity and profitability is the key to long-term sustainability of all such entities involved in the manufacturing activity of highly commoditised products such as NFMs.

Operating efficiency and effective cost controls play as a differentiator while assessing NFM manufacturing company's credit quality. Being in price taker, cost of production and not realisation determines the level of profitability for these manufacturers. Efficient production processes, vertical integration, cost controls, and streamlined operations contribute to higher profitability. Various factors that determine cost of production for NFM manufacturing companies are as follows:

Raw material criticality

For each metal manufactured, there is a critical raw material which is required. Bauxite is required for aluminium, copper concentrate for copper, zinc ore for zinc and sulphide ore for lead. Besides basic ore, the manufacturing process also involves usage of other raw materials and energy, which form a part of critical inputs.

Any primary metal manufacturing process involves significant heating activity, which results into melting of ore and extraction of refined metal. This process consumes significant energy resource and for most metals, coal/gas or energy fuel may also form a part of the critical materials required.

Companies with assured supply of critical raw materials, either in the form of captive mines or long-term supply contracts or having linkage agreements, are considered favourably by CARE Ratings. Availability of critical raw materials in a desired quality significantly impacts the company's overall cost of production.

Energy cost

Power or energy cost accounts for a significant part (as high as 35% for aluminium) of the total cost of production for manufacturing different NFMs. Energy is virtually consumed in every stage of production, right from mining to beneficiation to transportation to refining to smelting and further to value addition. Aluminium production requires ~14,000-15,000 kWh of power to produce a tonne metal, similarly, zinc manufacturing consumes ~3,500 kWh of power. CARE Ratings views NFM manufacturers who not only have captive power plants (CPP) but also have captive energy source or linkage energy supply as superior to other manufacturers not having such CPP. CARE Ratings considers ability to keep power costs down as a critical parameter of operating efficiency.

Technology and quality of plants

Production technology does play a vital role in containing the cost of producing metal. Innovative technologies have emerged which have resulted into substantial improvement in operating efficiencies of manufacturing companies, be it reduction in energy consumption, maintenance capex, reducing wastage, waste heat recovery, and continuous process to value added products among others. This resulted into cost reduction and improvement in profitability of entities, who have adopted/upgraded to these technological changes. In addition to the above, automation at the manufacturing unit also resulted in improving productivity by achieving higher operating rates, which has resulted into reduction in overall fixed cost of production. CARE Ratings views usage of modern technology/upgradation of the plant as a rating strength. Furthermore, state of the asset or asset quality also remains a critical monitorable, as well-maintained assets aid in operating efficiently, reducing downtime and production losses, since older plants/outdated technology may incur substantial replacement/modernisation cost.

Location of the plant

Due to bulky nature of key raw materials, the logistics cost becomes an important cost head and location of the plant becomes critical. Hence, it is important to control the logistics' cost, which accounts for ~5-15% of NFM manufacturing companies' total cost of production. Higher the share of road/railway against waterways/pipelines may result into higher logistics cost.

To manufacture a tonne of aluminium, ~7-8 tonnes of raw material is required (including six tonnes of bauxite). Similar is the case for other NFMs. Bulky raw materials make it imperative that the plant's location is nearer to the raw material's source, which will help reduce the logistics cost. Companies whose plants are close to the sources of raw material are likely to have an advantage in terms of transportation cost, lower wastage, inventory holding period and therefore the working capital cycle. CARE Ratings views favourably those companies who are able to minimise their cost of transporting raw materials.

C. Promoter and management risk

Primary NFM manufacturing is a highly capital-intensive sector and needs huge investments to fund capex plans (greenfield/upgradation or modernisation/expansion). Capex activity typically has a longer gestation period of ~3-6 years, which given the global commoditised NFM industry may turn out to be highly crucial. Furthermore, such capex activity requires a lot of regulatory approvals and environmental clearances, apart from being a highly technical and complex activity. This may result in significant time and cost over runs for completion of these projects. Thus, financial flexibility of promoters and the manner in which they fund the entire capex activity and contingencies arising in is closely monitored by CARE Ratings.

The company's key management is also assessed for its role in developing and implementing long-term strategies that provides the route map for a sustainable long-term competitive advantage. The management's role in terms of new product development/value-addition, and cost reduction measures among others plays a crucial role in determining the entity's medium to long-term competitiveness.

D. Financial risk

Financial analysis considers historical and projected financial performance of the rated entity. Trend of the financial analysis over the last 3-5 years period are analysed and compared to the average industry trend. Projection period typically covers the tenure of long-term debt. CARE Ratings' analysis is largely focused on stability and sustainability of earnings and deriving cash flows from core operating activities, ensuring ability of entity to repay its entire debt obligations.

CARE Ratings also analyses the company's future cash flows under adverse situations to analyse the company's financial flexibility under different scenarios. Being highly capital intensive, the company's ability to generate sufficient internal cash flow to meet these capital requirements (opex and capex) is considered to be a key factor that influences the company's credit quality.

CARE Ratings follows the financial analysis for the NFM manufacturing companies per the criteria on Financial Ratios- Non-Financial sector.

E. Key ratios

Keeping in mind the key characteristics of the sector, certain ratios as mentioned below are analysed in greater detail.

- Total cost/metric tonne (MT)
- Power cost/MT
- Kwh/MT (for power consumption)
- PBILDT/MT
- Total Debt/ Installed Capacity (per MT)
- Total Debt/PBILDT

F. Foreign exchange fluctuations risk

In addition to the financial risk, foreign exchange fluctuation risk may cause a serious concern to NFM manufacturing companies operating in the domestic market. Being a globally traded commodity, while the cost of production is incurred in the local currency, realisations are derived based on the landed cost parity of international prices (generally LME exchange), plus the local market premium (if any). In certain metals apart from import of coal, even critical raw material like basic ore is also imported and fluctuation in forex rate may impact the cost of production of these companies as well. Furthermore, to take advantage of the lower interest cost, many of these companies' garner capex funding from international markets. CARE Ratings believes that, in the absence of active hedging mechanism, steep fluctuation in exchange rates can adversely affect earnings and cash flows of an entity and might as well result in significant increase in its foreign currency debt repayment obligations. CARE Ratings evaluates the hedging mechanism adopted by entities.

G. Analysis of Environmental, Social and Governance Risk Factors:

The base metal manufacturing sector, together with its backward integration process (mining activity for raw material) will be perhaps ranked among the top sectors when it comes to risk emanating from the Environmental and Social factors (E&S). In the last few years, CARE Ratings has been keenly examining the impact of several ESG factors on the overall sustainability of business operations and the monetary impact of this on several organisations across value chains. In addition to the impact of ESG factors, CARE Ratings has also been monitoring steps taken towards mitigating these risks in future.

There are challenges when it comes to understanding the actual impact of ESG Risk on the entity's credit assessment. Some of these challenges are lack of common disclosures, higher volume of data, dependence on self-disclosures made by the company, sector specific associations, and government agencies among others. Furthermore, especially when it comes to Social and Governance Risk, most of the factors to S&G are subjective and arriving at a common consensus in scoring this has remained a challenge.

Currently, while it's difficult to quantify or evaluate ESG risk factors and its possible impact on credit rating, CARE Ratings continues to monitor these factors to understand the possible future impact of these factors on the entity's credit profile.

Environmental risk

Mining is a key to produce base-metals and post the mining activity, the mined ore to be transformed to a base metal requires enormous utilisation of energy. Both mining and energy generation (largely through burning of fossil fuels) activity is exposed towards considerable environmental risk. Significant amount of opex and capex cost is required in terms of complying to different environmental guidelines, which also vary from location to location. As

far as energy consumption is concerned, most larger base metal manufacturing companies have already lined-up their plans of moving away from thermal coal and increasing the share of renewable energy in overall energy consumption. There has also been a re-look upon the manufacturing activity, instead of a blast furnace, there is likely to be increasing usage of Electric Arc Furnaces in future, reducing the overall energy consumption requirements among others.

Social risk

Social risk too emanates from mining and production activity when it comes to health and safety of miners and employees involved in production activities. Processes require utmost safety measures given higher categorisation of hardship required and hostile working conditions owing to activity either inside the mine or close to a furnace. While the number of accidents/casualties have reduced, destruction caused by mining activity and impact caused in nearby areas, require well strategised CSR activities addressing issues of local community.

Governance risk

As compared to the Environmental and Social risk factors, which are emanating more from external factors or the industry, governance risk may be considered more from business risk or rather being internal risk factor. Governance refers to how effectively an entity is controlled and run in a way that it is safeguarding interests of stakeholders. Governance also involves utmost transparency and independence to freely express their views across the workforce.

Some of the common ESG Factors are tabulated below:

Environmental	Social	Governance
Natural resources use	Labour - Human capital	Management
Energy consumption & climate impacts	Community	Shareholders
Renewable usage	Product responsibility	CSR activity
Air/ Water/Land quality	Human Rights	Board strategy & decision making
Waste management		Transparency
		Regulatory compliance

While there is no standard scale in terms of evaluating each ESG Risk factors, and it has been more so subjective than quantitative, CARE Ratings keep on evaluating and adopting possible risk factors of improving the ESG rating criteria.

Conclusion

The rating process is ultimately an assessment of fundamentals and probabilities of change the fundamentals. CARE Ratings analyses each of the above factors and their inter-linkages to arrive at the overall assessment of credit quality. The methodology encompasses comprehensive analysis of industry, business, management and financial parameters before arriving at the credit rating of an entity involved in manufacturing NFM's. Rating determination is a matter of experienced and holistic judgment, based on relevant quantitative and qualitative factors affecting credit quality of the issuer.

[For previous version please refer 'Rating Methodology – Non Ferrous Metals' issued in [August 2022](#)]

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