

India

Overweight (no change)

Highlighted Companies

Hindalco Industries

ADD, Rs493 close

We expect Hindalco's wholly-owned subsidiary Novelis' profitability to grow steadily in future as it has invested in captive scrap collection centres, which will reduce the costs in the coming quarters. Hence, despite a challenging macroeconomic environment, EBITDA/t of Novelis can rise from the current level.

National Aluminium Co

ADD, Rs97 close

Nalco is not investing in scrap usage, and it doesn't have rolled products in its portfolio. Rolled products are the future of aluminum because their usage will increase in the automobile sector. Nevertheless, lower energy cost remains its advantage and hence, the stock remains a tactical BUY for us.

Summary Valuation Metrics

P/E (x)	Mar22-A	Mar23-A	Mar24-F
Hindalco Industries	7.7	15.66	17.19
National Aluminium Co	6.14	8.35	9.49
P/BV (x)	Mar22-A	Mar23-A	Mar24-F
Hindalco Industries	1.4	1.3	1.22
National Aluminium Co	1.44	1.76	1.64
Dividend Yield	Mar22-A	Mar23-A	Mar24-F
Hindalco Industries	0.81%	0.81%	0.81%
National Aluminium Co	6.38%	6.38%	6.38%

Non Ferrous

Scrap will keep aluminium price under check

- Recycling aluminium scrap needs only 5% energy of the primary metal and at the current price (US\$2,350/t), recycling EBITDA/t is more than US\$600.
- Aluminium available for scrapping is ~1.3bn tonne. Multiple companies are in the fray to leverage this profitability, that means aluminium prices may not rally.
- In our coverage universe, Hindalco has taken multiple steps to leverage on aluminium scrap (particularly, in Novelis) but Nalco is lagging far behind.

Scrap is a natural counter-balancing factor for aluminium prices

Aluminium scrap has two sources: 1) used metal pool, and 2) process scrap. Aluminium doesn't degrade even after years of usage and hence, the used metal pool (aluminium that has been used to make various products since aluminium discovery in 1888) becomes an easy source of raw material. The scrapping rate of the used metal pool varies between 1.5-7% and is normally driven by near-term price changes. Zorba (one of the multiple aluminium scrap grade and has 95% aluminium metal content) trades at 60% of the price of pure aluminium. Please note that companies that use Zorba scrap to make the pure metal can produce aluminium at ~US\$1,750/t (at current aluminum prices of US\$2,350/t) and hence, their profitability is more than that of many primary smelters who use coal/natural gas-based power and alumina (made from bauxite) to produce primary aluminium.

Scrap availability is outpacing metal demand by 0.5% since 2005

Scrap availability is a function of the used metal pool available for scrappers and recyclers. In the past 18 years, this pool has grown at a 5.14% CAGR while the overall aluminium demand (primary+ secondary) rose by a 4.64% CAGR. Hence, while we all kept arguing for higher metal prices based on primary metal demand-supply, the market always remained adequately supplied. That's why aluminium prices have done nothing great since 2005 (despite fixed-cost inflation, mining trouble in bauxite, higher coal cost, etc.). We firmly believe that the primary metal demand-supply equation is useless if scrap is not considered.

The future belongs to companies having captive scrap collection

As scrap usage rises, naturally its price, as a percentage of aluminium price, will increase. As of now, a lion's share of the money is being made by scrap dealers who collect scrap from various sources and have their own scrap yard. Hence, the future belongs to companies that have set up their own scrap collection centres at various places and can form a seamless scrap supply chain. Depending on traders like Trafigura will lead to a decline in the EBITDA (over the next several quarters) made on converting scrap to primary metal. Aluminium users and producers who have invested in aluminium scrap supply chain can make outsized returns on their capital employed for a long time. In this regard, Hindalco, which has multiple scrap collection centres across the globe and is investing in its supply chain, remains our top stock pick.

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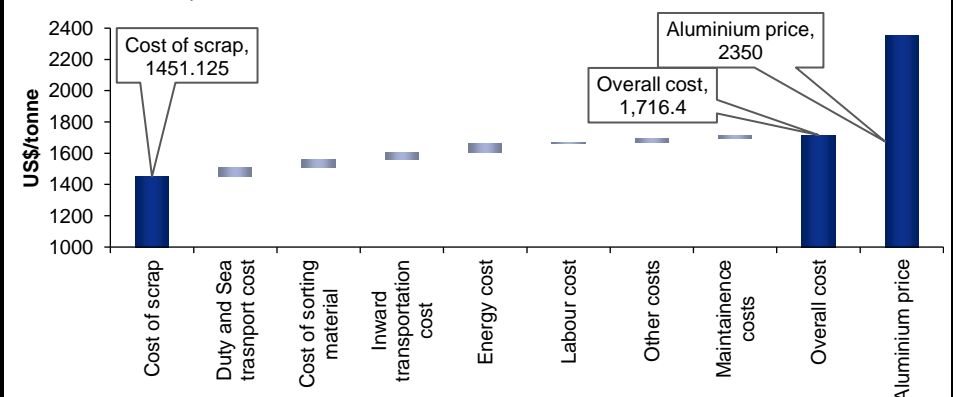
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Figure 1: As of now, EBITDA for recyclers who produce aluminium using Zorba scrap is more than US\$600/t



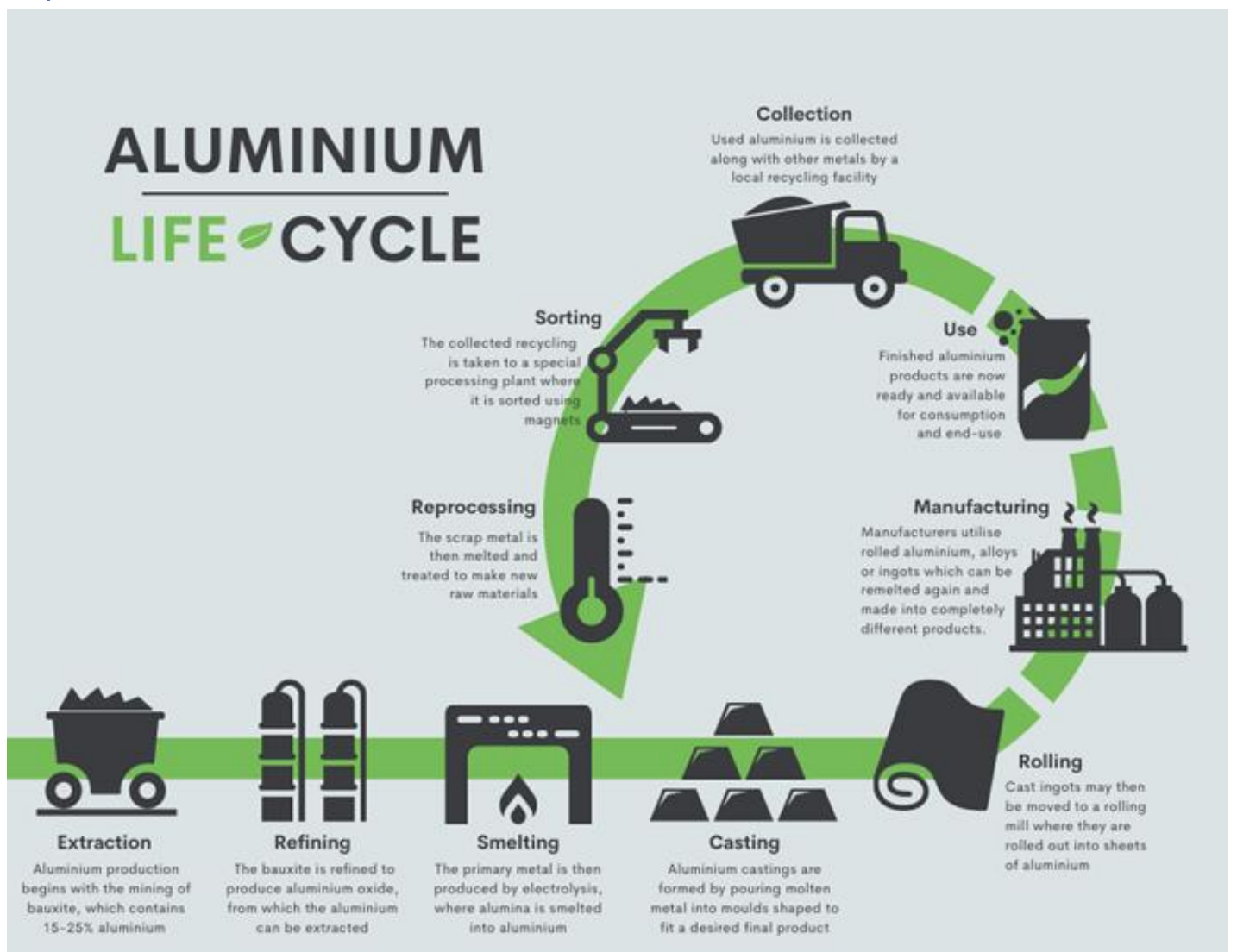
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Scrap will keep aluminium price under check

A lot of arguments have been made recently on the lack of global smelting capacity and thus the belief that aluminium prices will rise, but all these arguments have missed a critical component - the impact of scrap on metal demand. We believe scrap is likely to become the primary source of incremental metal supply and hence, energy price inflation is not likely to propel aluminium prices upwards. We feel aluminium users and producers who have invested in making the aluminium scrap available can make outsized returns on their capital employed and they can last for a long time.

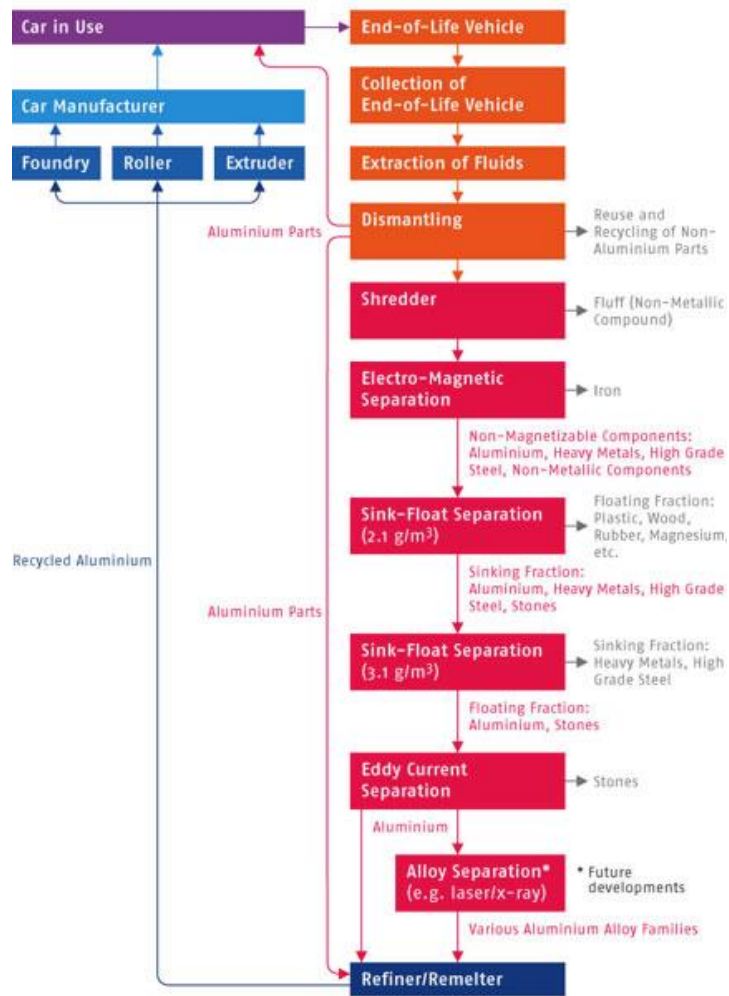
Aluminium scrap supply chain

Figure 2: Aluminium recycling process is shown in the picture below; until a few years ago, this industry was dominated by small companies



SOURCE: INCRED RESEARCH, ALUMINIUM RECYCLING: AN AGEING INNOVATION DRIVING THE CIRCULAR ECONOMY - ANTHONY TROPEANO, PRESIDENT OF TT CONSULTING INC. AND AN ADVISORY BOARD MEMBER OF ALCIRCLE | ALCIRCLE E-MAGAZINE ON INNOVATORS AND TRENDSETTERS OF THE ALUMINIUM INDUSTRY

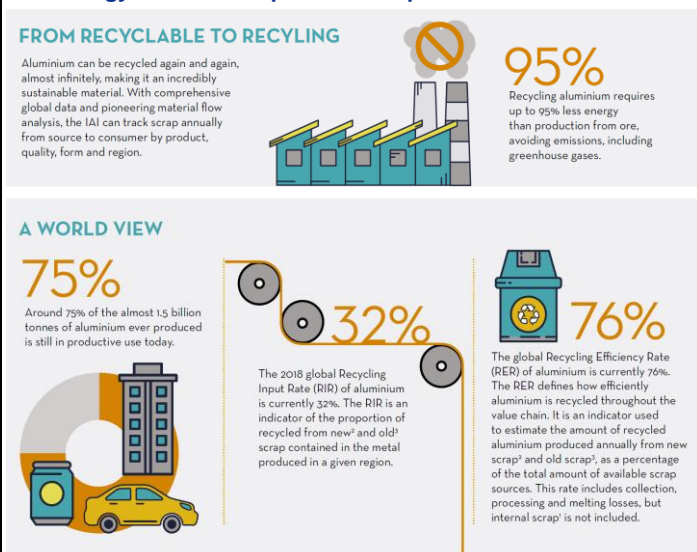
Figure 3: The vehicle recycling process illustrates the above scenario in a much better manner



SOURCE: INCRED RESEARCH, [HTTPS://RECYCLING.WORLD-ALUMINIUM.ORG/REVIEW/QUALITY-VALUE/](https://recycling.world-aluminium.org/review/quality-value/)

Why scrap usage is in vogue?▶

Figure 4: Aluminium scrap is more easily available and much less energy-intensive to produce the pure metal



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 5: China is the leader in using scrap aluminium

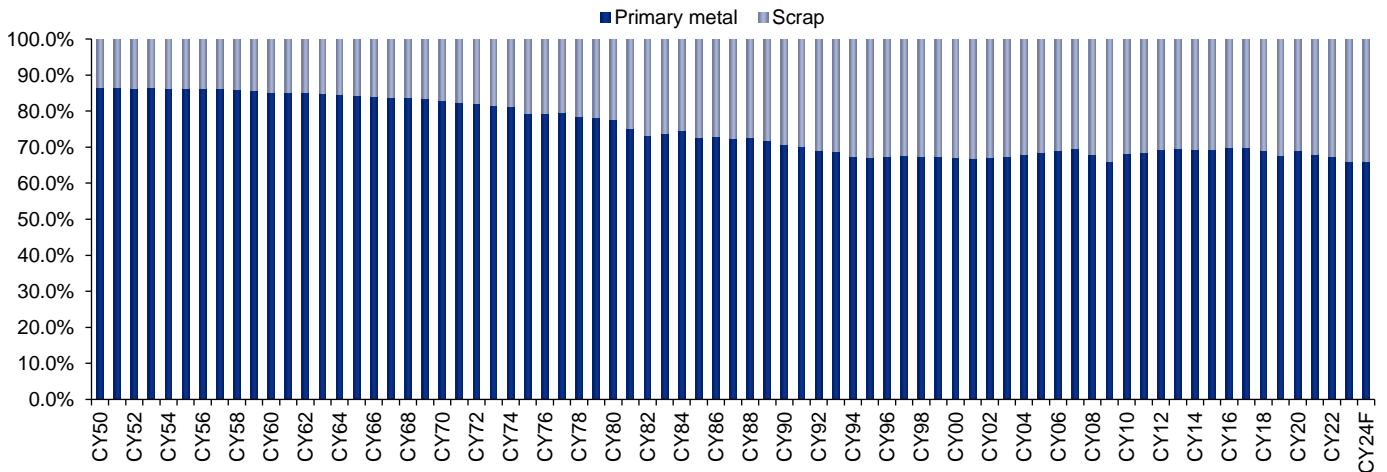


SOURCE: INCRED RESEARCH, COMPANY REPORTS

Scrap is important for aluminium demand-supply analysis ▶

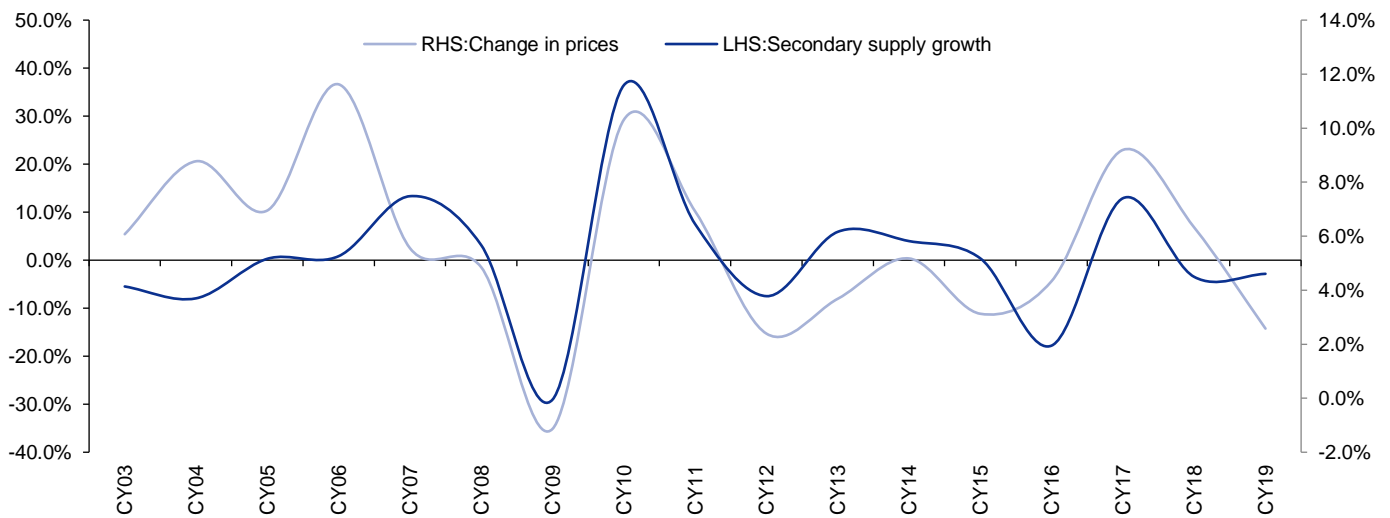
We all have neglected scrap in the overall demand-supply analysis of aluminium, as getting the exact supply of aluminium scrap is impossible. It will always be a statistical model-based production estimate where aluminium prices become an important input. In a sense, a classic 'circular error' kind of Excel sheet scenario where the input is dependent on output and vice versa.

Figure 6: Scrap metal formed only 14% of overall metal supply, but increased to more than 30% of supply by the end of CY20



SOURCES: INCRED RESEARCH, COMPANY REPORTS

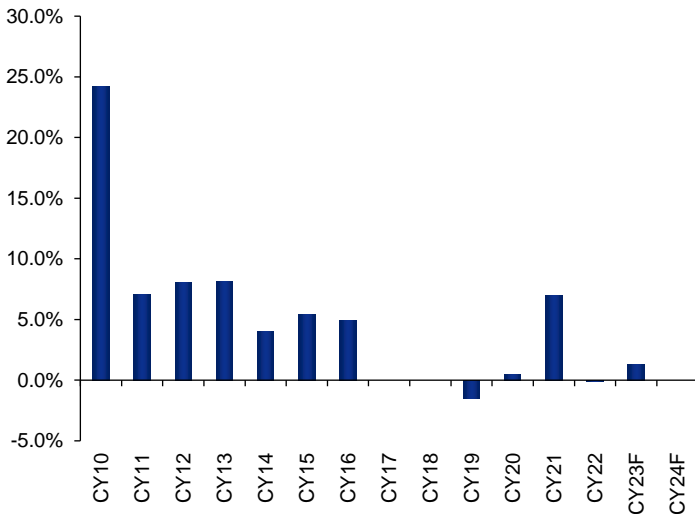
Figure 7: Secondary aluminium (scrap aluminium) supply growth is primarily dependent on the price; as scrap now has become a significant part of the overall metal supply, its prices control the metal price as well



SOURCE: INCRED RESEARCH, COMPANY REPORTS

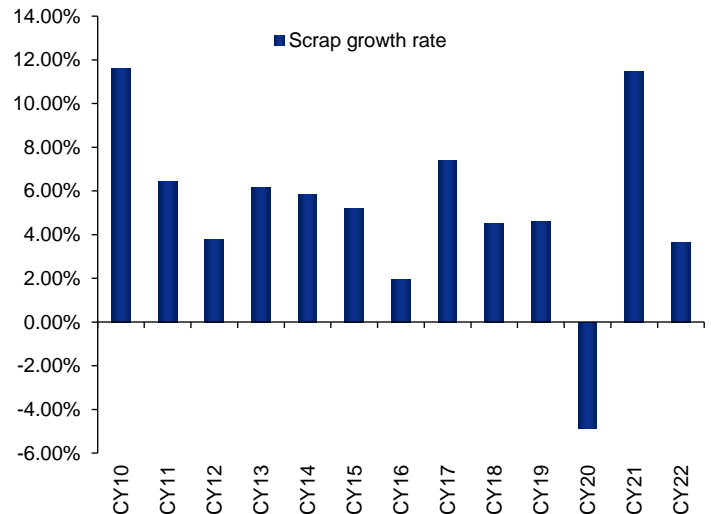
Primary metal and scrap consumption growth rates have been divergent over the last few years ➤

Figure 8: Primary metal production growth rate has been anaemic over the last few years



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 9: The consumption growth rate of aluminium scrap has been much stronger

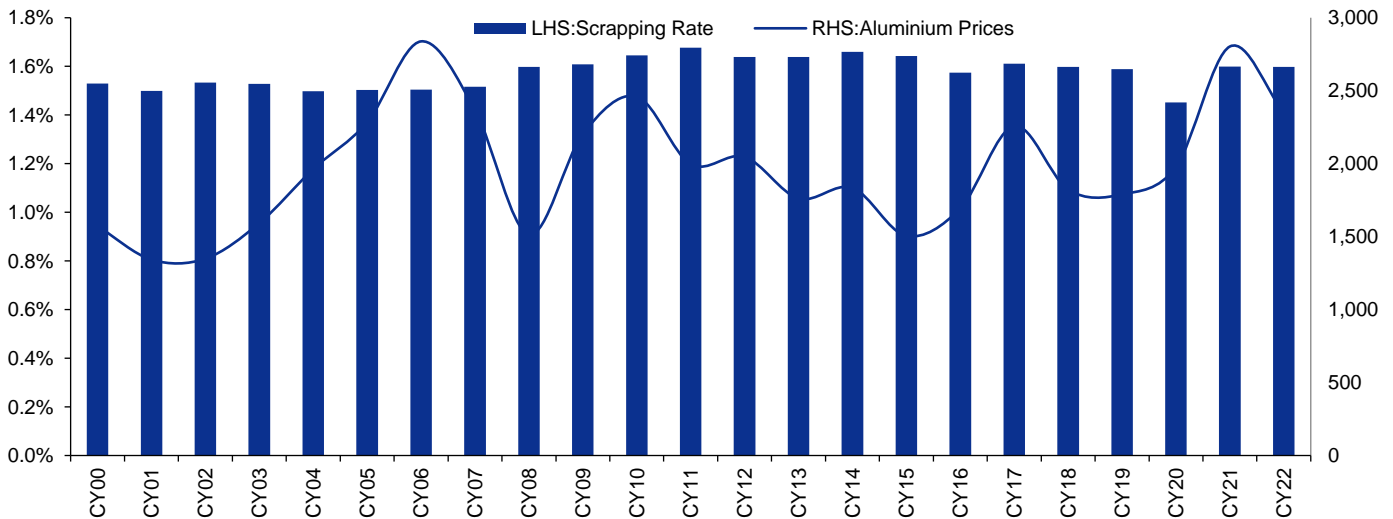


SOURCE: INCRED RESEARCH, COMPANY REPORTS

Scrap has two sources: 1) used metal pool 2) process scrap ➤

Aluminium doesn't degrade even after years of usage and hence, the used metal pool (aluminium that has been used to make various products) becomes an easy source of raw material. The scrapping rate of the used metal pool varies between 1.5-7% and is normally driven by near-term price changes.

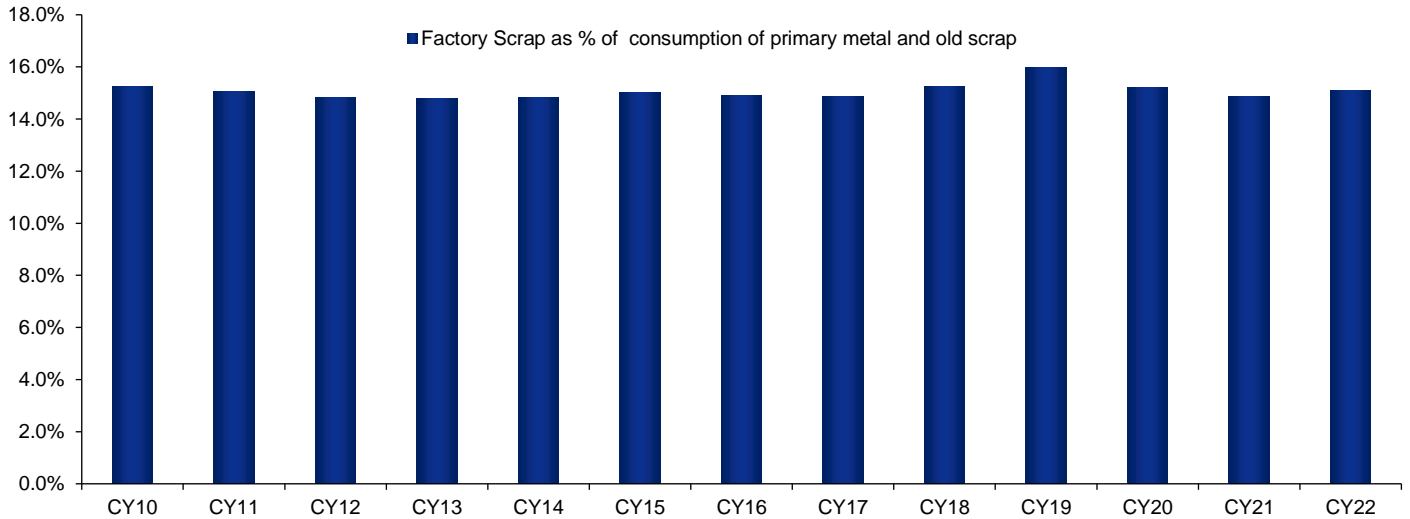
Figure 10: Used metal pool scrapping rate is normally determined by near-term price changes



SOURCE: INCRED RESEARCH, COMPANY REPORTS

However, process scrap generation is only a function of the overall metal usage and hence, its generation, as a percentage of the primary metal+ old metal scrap, remains constant around 15%.

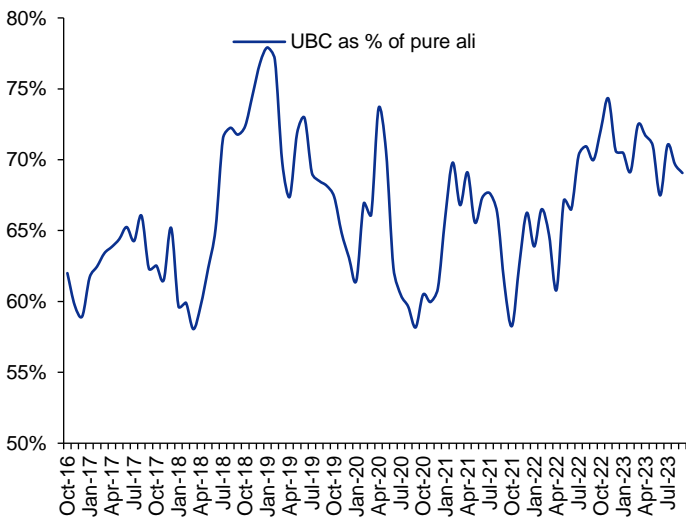
Figure 11: Factory scrap consumption, as a percentage of primary metal + old scrap usage, normally remains in the 15% range



SOURCES: INCRED RESEARCH, COMPANY REPORTS

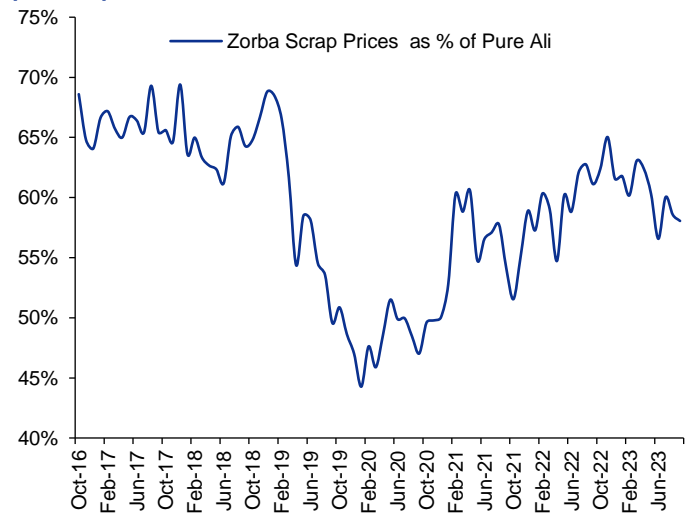
Traded metal scrap still offers an arbitrage opportunity over the primary metal price ➤

Figure 12: UBC trades around 70% of the price of pure metal



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 13: Zorba scrap has been trading at around 60% of the price of pure metal

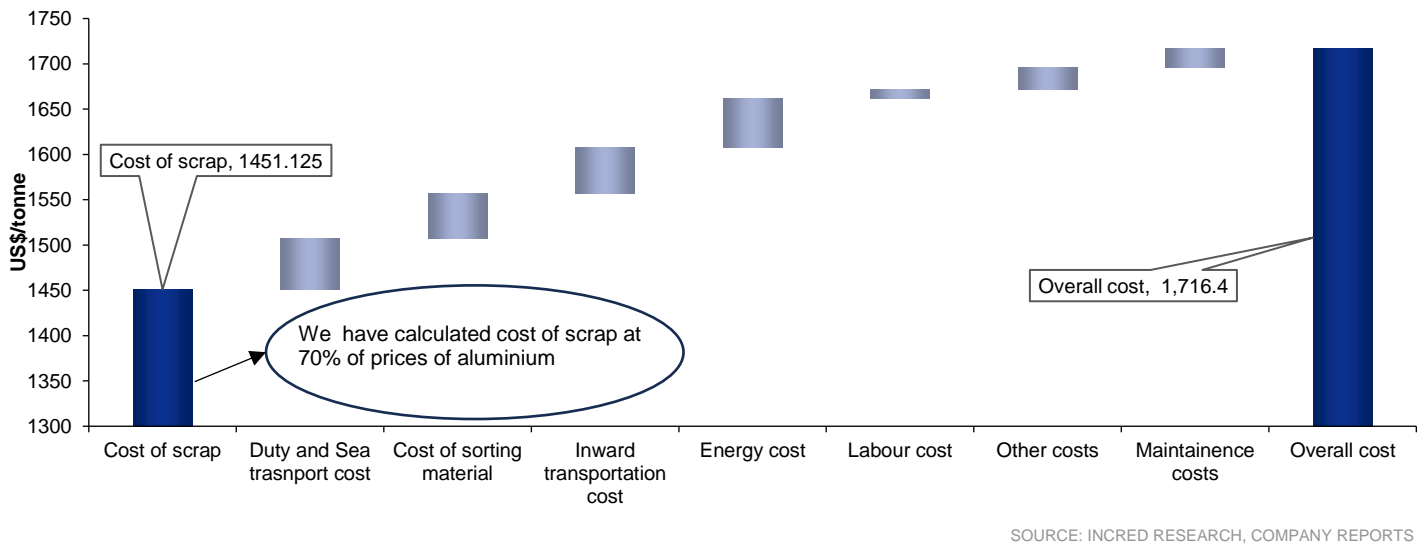


SOURCE: INCRED RESEARCH, COMPANY REPORTS

The cost of conversion of scrap to pure metal depends on the following:

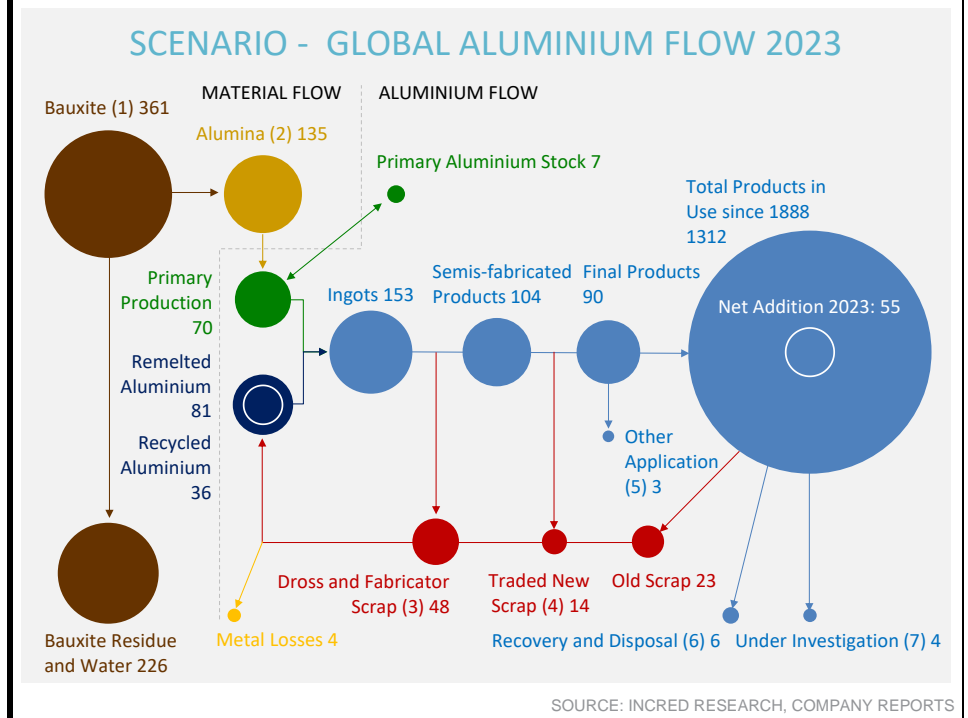
1. Cost of sorting the material, as normally scrap has many unwanted materials.
2. Cost of transportation of the scrap to the plant.
3. Melting cost of the scrap.
4. Metal losses in the process of melting (in technical terms, it is called furnace loss).
5. Cost of casting and metal losses in the casting process.

Figure 14: At current aluminium and scrap prices, its quite beneficial to produce metal from scrap as EBITDA/t on Zorba scrap is ~US\$600/t



Scrap-used metal pool is continuously rising ➤

Figure 15: Globally, used metal pool of aluminium is around 1,312mt



Higher scrap availability will keep aluminium prices under check ➤

One keeps hearing arguments about aluminium cost curves and how they have become unviable now because of high energy prices. However, aluminium prices are likely to remain under pressure because of higher scrap availability. As aluminium prices come down, the high margins in scrap will also decline.

Given the current cost structure, if Zorba scrap prices rise to 80% of pure aluminium prices, then scrap will lose all arbitrage benefits ➤

Figure 16: If the prices of scrap rise to more than 80% of aluminium prices, then it will be difficult for scrap converters to make money (shaded area shows EBITDA/t on various aluminium prices and Zorba scrap prices as a % of aluminium prices

		Aluminium prices (in US\$/t)							
		1,900	1,950	2,000	2,050	2,100	2,150	2,200	2,250
Zorba Scrap as % of Aluminium Prices	60%	533	551	570	588	606	624	643	661
	63%	477	494	511	528	545	562	578	595
	66%	422	437	453	468	483	499	514	529
	69%	366	380	394	408	422	436	450	464
	72%	311	323	336	348	361	373	386	398
	75%	255	266	277	288	299	310	321	332
	78%	200	209	219	228	238	248	257	267
	81%	144	152	161	169	177	185	193	201
	84%	89	95	102	109	115	122	129	135

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Companies having their own scrap supply chain will have much greater leverage ➤

While we have done the analysis of aluminium scrap based on traded prices of scrap, please note that's it is a very fluid market. If any company has set up scrap collection centres and has an established supply chain of scrap, then its procurement cost will be lower and its arbitrage gains over the pure metal will be higher.

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