India

Overweight *(no change)*

Non Ferrous

Lead recycling sector's EBITDA may have peaked

- Our analysis of lead battery scrap, mine production & lead acid battery demand indicates that lead battery recyclers' aggregate EBITDA may have peaked.
- As electric vehicles (EVs) take centrestage & the usage of lead-acid batteries even in 12V applications (in EVs) falls, the overall lead demand may not grow.
- We don't cover any stock in the battery recycling universe. However, we believe that earnings multiples of listed recyclers will decline.

Lead recycling industry's EBITDA may be close to its peak level

Approximately 65% of the lead comes from recycling and 35% from mining production. Over the past few years, mining production has been declining and consumption is likely to go down and therefore, incrementally, battery scrap availability will also decline. Hence, either of the two scenarios is possible (based on the pace of adoption of lithium-ion in a 12V vehicle battery application): 1) If the pace is slow i.e., the lead-acid battery demand decline is slower than the mining production decline, then battery scrap prices will rise, thereby squeezing the margins of battery recyclers. 2) On the other hand, if lead-acid battery demand declines faster than the mining production decline, then spreads will rise in the medium term but there won't be any volume growth for recyclers. In either case, in the medium- to long-term, we are not likely to see any material EBITDA growth. There will be winners in this declining industry as well, but that will depend on the supply chain of battery scrap procurement, efficiency, and environmentally compatible operations.

Lead mining production is on the decline

Lack of investment in mining assets, depleting reserves and demand uncertainty is leading to a decline in mining production. Australia has the biggest lead reserves in the world, but we see minimal investment. China's lead production is rising, but it has limited reserves to maintain the current production rate of 2mt for even two-to-three years.

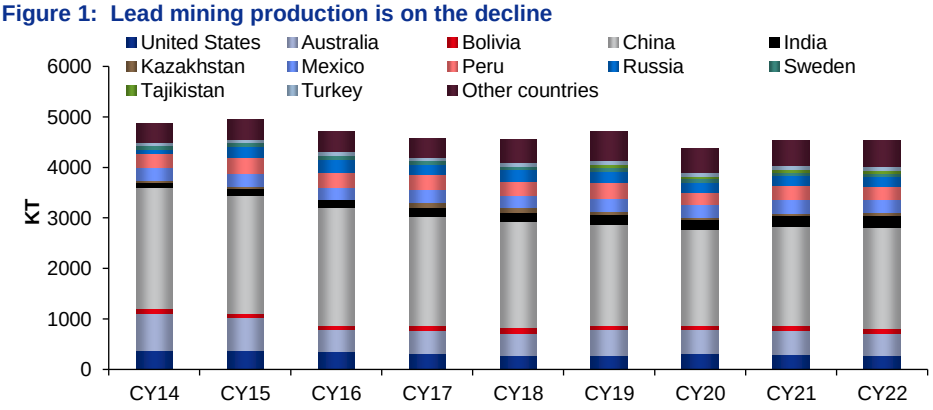
Demand, stagnant for last decade, may fall in near- to medium-term

Overall lead demand has remained around 12mt for the last 10 years. Increased EV penetration, and replacement of lead-zinc batteries with non-hazardous batteries is leading to this stagnancy. In the coming years, as EVs take centrestage and they replace lead-zinc batteries for low voltage (12V) applications (some brands like Tesla are already doing it), lead demand is likely to fall.

Declining demand and falling mine production - bad for recyclers

In the equilibrium stage, mine production may stabilize around 3-3.5mt. The profitability of recyclers at that time will depend on the pace of demand decline in the previous years (as it will determine scrap availability). The higher the pace of demand decline, the lower the scrap availability. It's like a see-saw situation - profitability in terms of EBITDA/t may go up but volume will decline and vice versa. In the end, the product of these two i.e. EBITDA/t * volume may not increase, or in a worst-case scenario, may decline significantly over the medium term.

Figure 1: Lead mining production is on the decline



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Analyst(s)

Satish KUMAR
T (91) 22 4161 1562
E satish.kumar@incredcapital.com

Abbas PUNJANI
T (91) 22 4161 1598
E abbas.punjani@incredcapital.com

Lead recycling sector's EBITDA may have peaked

Lead recycling is a process of recovering lead from used lead products and re-using it to make new products. Lead is a valuable metal that can be recycled indefinitely, making it one of the most sustainable metals in use today. Approximately 65% of lead produced comes from recycled metal.

Lead recycling industry may face headwinds in medium term

Lead recycling is a process of converting used lead materials into new lead products. Lead is a valuable metal that can be recycled many times without losing its quality. It is also one of the most recycled metals in the world, with a recycling rate of over 90%.

Lead recycling is an important process ➤

Lead recycling is important for several reasons:

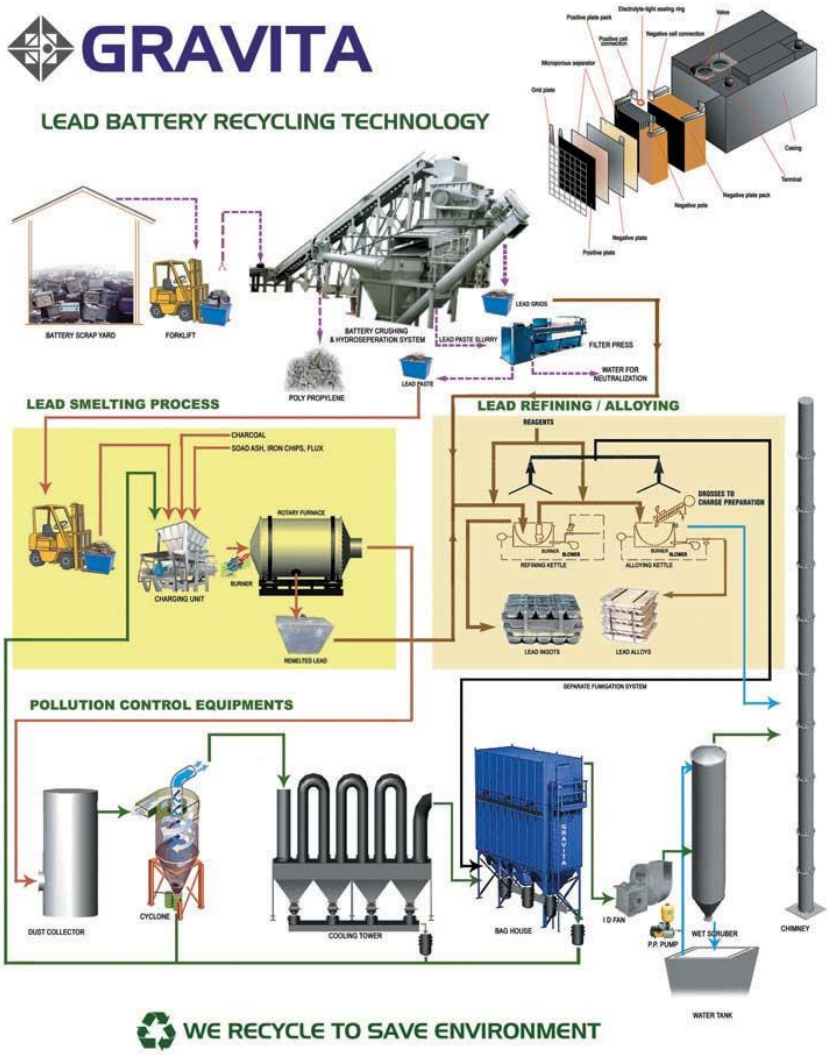
1. Firstly, it helps to conserve natural resources. Lead is a non-renewable resource, which means it cannot be replaced once it is mined. Recycling lead helps to reduce the need to mine new lead that can have a negative impact on the environment.
2. Secondly, lead recycling helps to protect public health. Lead is a toxic metal that can cause serious health problems, especially in children. Recycling lead helps to reduce the amount of lead that ends up in landfills and waterways, where it can pollute the environment and pose a risk to human health.
3. Finally, lead recycling is economically beneficial. Lead recycling creates jobs and generates revenue for businesses. It also helps to reduce the cost of lead products, which can benefit the consumers.

Lead recycling process ➤

The lead recycling process typically involves the following steps:

1. **Collection:** Lead scrap is collected from a variety of sources, including battery recycling centres, scrap metal yards, and industrial facilities.
2. **Preparation**: The lead scrap is sorted and cleaned to remove any contaminants.
3. **Melting:** The lead scrap is melted in a furnace to form a molten lead alloy.
4. **Purification:** The molten lead alloy is purified to remove any remaining impurities.
5. **Casting:** The purified lead alloy is cast into ingots or other shapes that can be used to make new lead products.

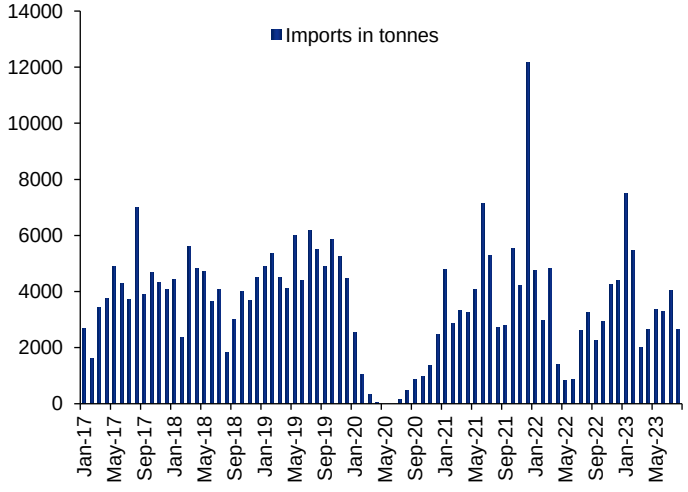
Figure 2: The battery recycling process is given below



SOURCE: INCRED RESEARCH, GRAVITA WEBSITE

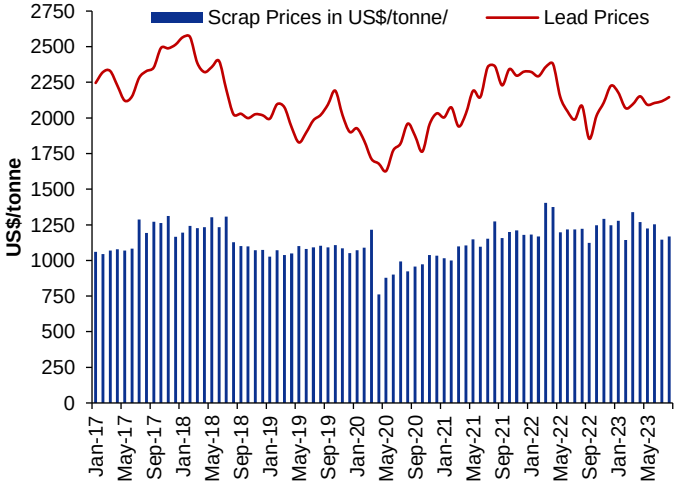
Lead-acid battery scrap is mostly imported in india »

Figure 3: On an average, India imports ~4,000t of battery scrap per month



SOURCE: INCRED RESEARCH, COMPANY REPORTS

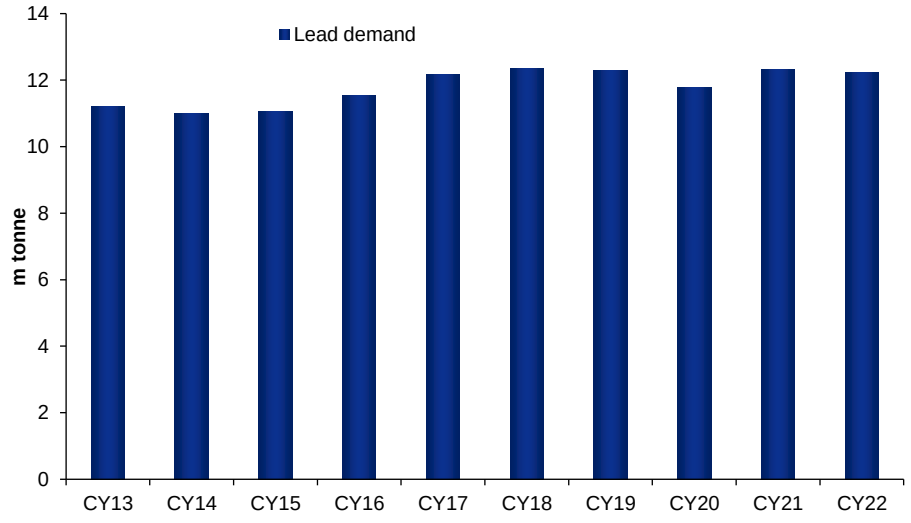
Figure 4: Despite volatility in lead prices, battery scrap prices have remained in the range of US$1,000-1,250/t



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Lead consumption is stagnant in global markets »

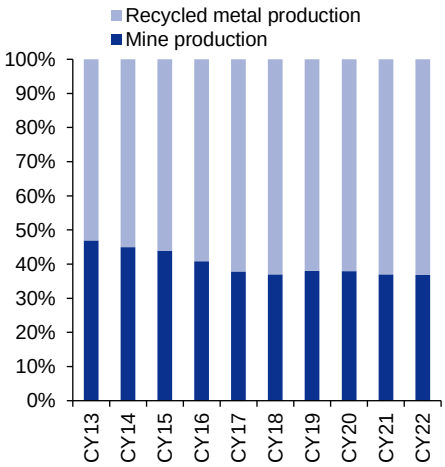
Figure 5: Lead demand has remained stagnant for last decade



SOURCE: INCRED RESEARCH, COMPANY REPORTS

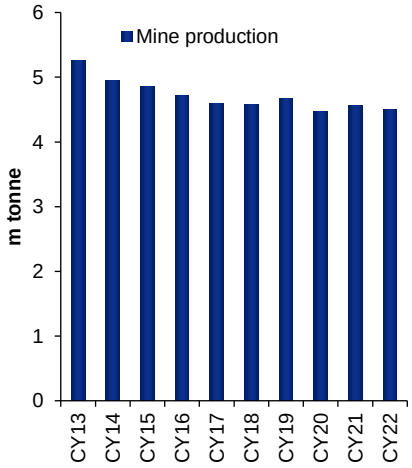
Lead recycling is still a major source of lead metal »

Figure 6: Battery scrap supplies more than 60% of the refined lead metal



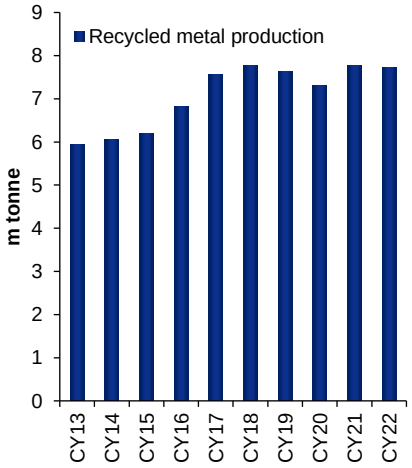
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 7: Mined production of lead has been declining over the years…



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 8: …which is getting replaced by lead recycled from batteries

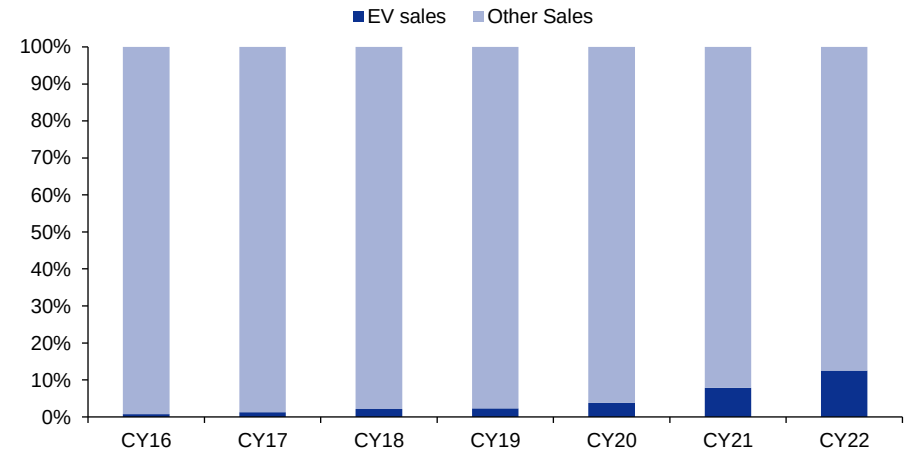


SOURCE: INCRED RESEARCH, COMPANY REPORTS

We are not bullish on lead demand as incremental demand for lead-acid batteries is going down »

Going by the trend since the last few years as well as the fact that incremental demand from the automobile sector, mainly from EVs, is not met by the usage of lead-acid batteries in these vehicles, has made the future of lead metal very bleak.

Figure 9: EVs capture incremental market share among vehicles



SOURCE: INCRED RESEARCH, COMPANY REPORTS

EVs are increasingly replacing lead-acid batteries for low voltage (12V) power requirement ➤

For the main battery that powers the electric motor and drivetrain, EVs do not need lead-acid batteries. Lithium-ion batteries are the preferred choice for EVs because they have a higher energy density, longer life span, and a faster charging time than lead-acid batteries.

However, some EVs still use lead-acid batteries for a secondary purpose: to power the vehicle's 12V electrical system. This system is responsible for powering low-voltage accessories such as the lights, radio, and windshield wipers.

There are a few reasons why EVs still use lead-acid batteries for their 12V systems:

1. Lead-acid batteries are relatively inexpensive and widely available.
2. They are relatively durable and can last for several years.
3. They can handle the high current requirement of some low-voltage accessories, such as the starter motor.

However, there are also some drawbacks of using lead-acid batteries for 12V systems in EVs:

1. They are heavier than lithium-ion batteries, which can reduce the vehicle's range.
2. They are less efficient than lithium-ion batteries, which means they waste more energy.
3. They can be hazardous if they are not properly maintained.

As lithium-ion battery prices continue to fall, it is likely that more and more EVs will switch to using lithium-ion batteries for their 12V systems as well.

It is important to note that some newer EVs, such as the Tesla Model S Plaid and the Lucid Air, do not use lead-acid batteries for their 12V systems at all. Instead, they use lithium-ion batteries that are specifically designed for low voltage applications.

This means we are unlikely to see any significant demand growth in lead consumption, at best it can remain stagnant ➤

As EVs take a lion’s share in the vehicle market, the need for lead-zinc batteries will keep coming down.

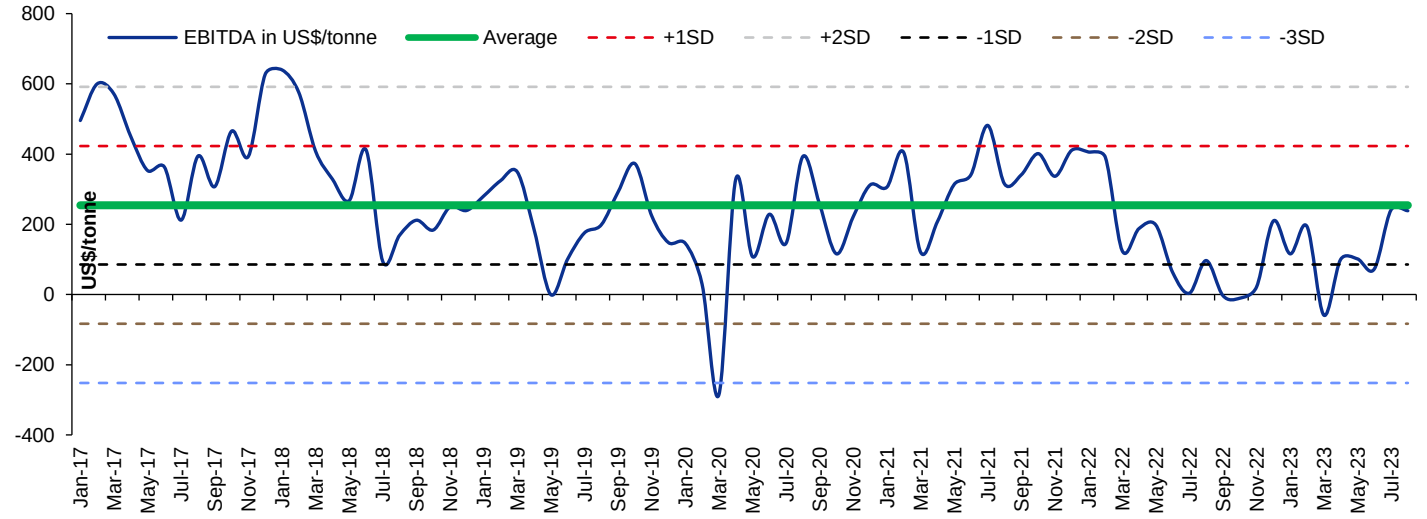
We believe battery recyclers can have a long runway as lower mining production will counterbalance the stagnant demand ➤

Please note that lead consumption has remained constant for the last decade or so and secondary lead generation is touching all-time high. However, we may not be near the tipping point when battery scrap may not be able to counterbalance

lower mining production. Battery scrap prices will be determined by how soon EV-makers replace their 12V lead-zinc battery requirement with lithium-ion or other similar batteries. We do believe that mining production decline will be slow and may be the demand decline counterbalances it. However, in a nutshell, it appears that lead recyclers can have a good time for some more years.

Indian battery recyclers are making more or less similar EBITDA like that of primary metal manufacturers »

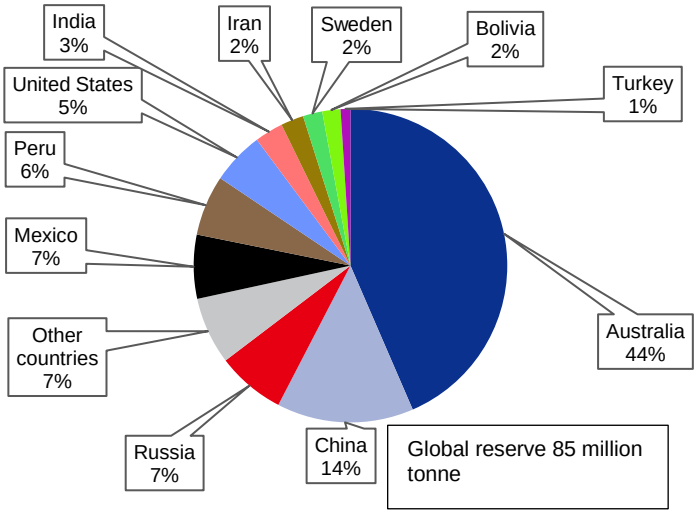
Figure 10: As of now, lead recyclers are making US$225/t



SOURCES: INCRED RESEARCH, COMPANY REPORTS

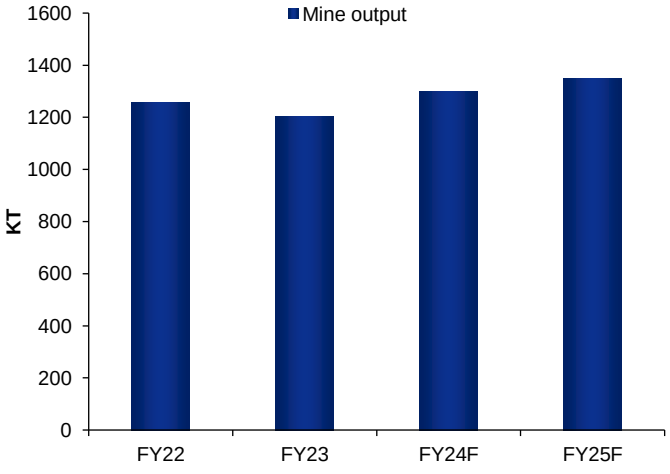
Lack of investment in mining will keep mined metal production under check »

Figure 11: Australia has the highest lead mining reserves and its not investing in mining



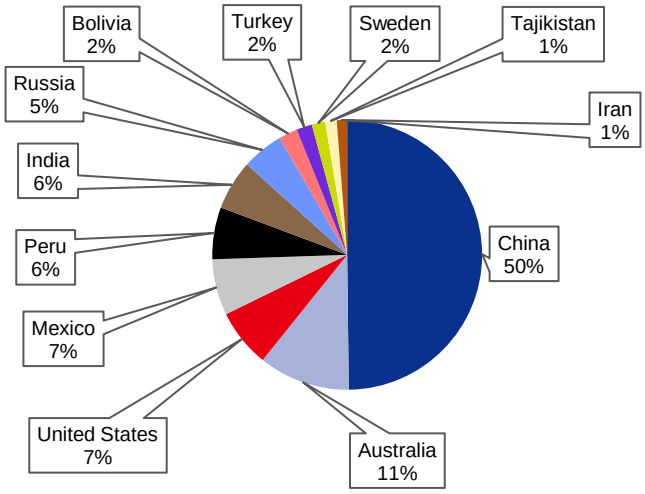
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 12: Normally, lead is mined along with zinc; in Australia, lead production is unlikely to grow significantly



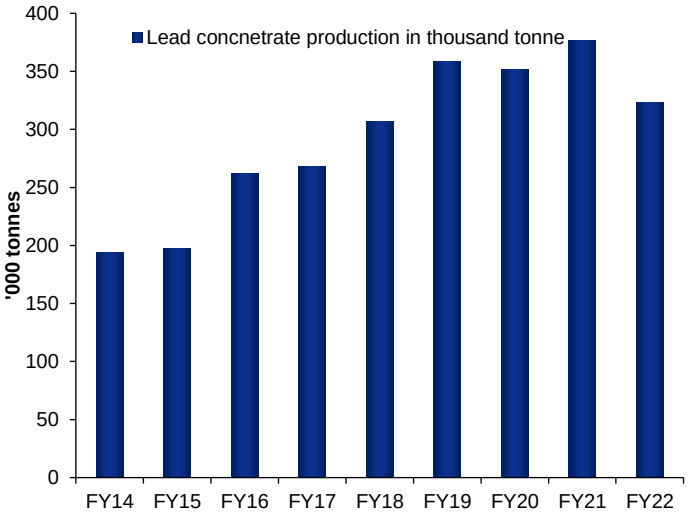
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 13: China's mine production rate of 2mt is too high to sustain (given the fact that its reserves are only 12mt)



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 14: India's lead production has already peaked

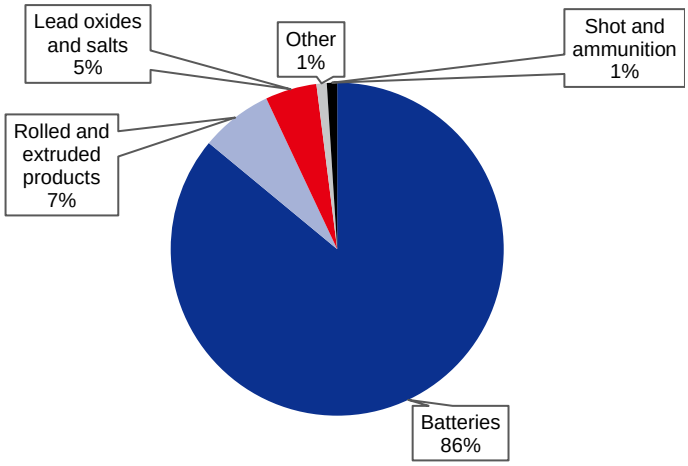


SOURCE: INCRED RESEARCH, COMPANY REPORTS

Almost 86% of lead produced is used in lead-acid batteries

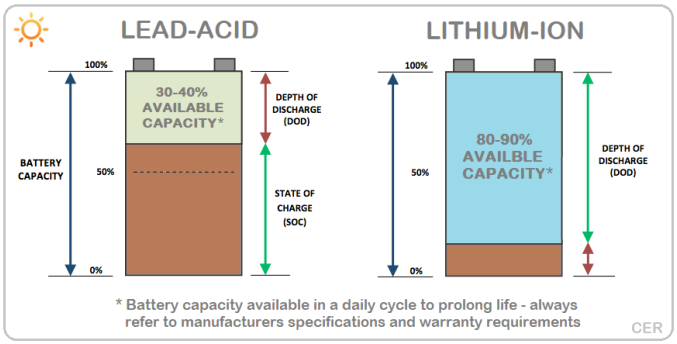
Lead-acid batteries have a normal life of three-to-five years. Hence, it's possible to recycle lead that has been used in batteries after four years.

Figure 15: Almost 86% of the lead produced is used in lead-acid batteries



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 16: Lead-acid batteries cannot be discharged like lithium-ion batteries and hence, even if assuming only a 30-40% discharge per day, they can have a maximum life of three-to-five years

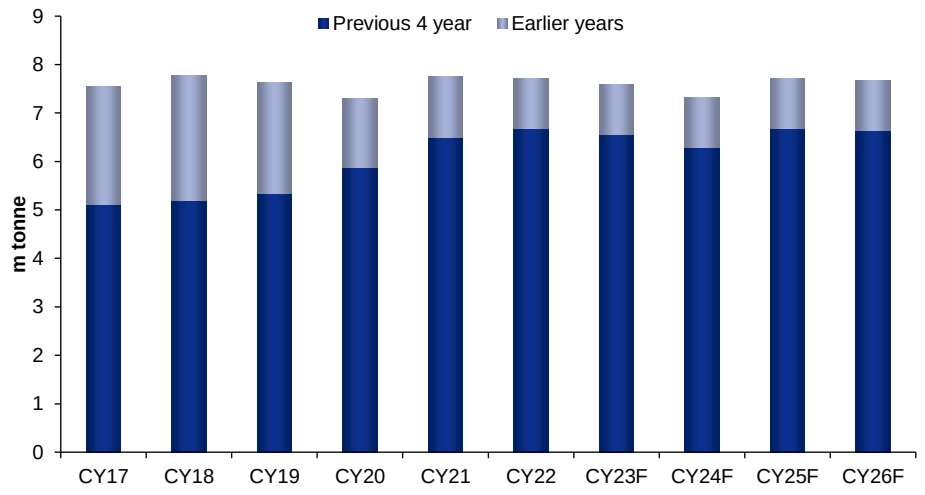


SOURCE: INCRED RESEARCH, COMPANY REPORTS

Given the consumption trend, scrap availability may stagnate around the current level

Globally, lead-acid battery consumption can only decline and hence, we estimate that overall lead consumption will slowly fall over a period.

Figure 17: Given the past consumption trend, it's possible that scrap availability may stagnate around the current level



SOURCE: INCRED RESEARCH, COMPANY REPORTS

It appears that EBITDA of battery recyclers may not rise going ahead

Mine production is declining and as consumption is going down, incrementally, battery scrap availability will also decline. Hence, either of the two scenarios is possible (based on the pace of adoption of lithium-ion in 12V vehicle battery application)

1. If the pace is slow i.e. lead-acid battery demand decline is slower than the mining production decline, then battery scrap prices will rise, thereby squeezing the margins of battery recyclers.
2. On the other hand, if lead-acid battery demand declines faster than the mining production decline, then spreads will rise in the medium term, but there won't be any volume growth for recyclers.

DISCLAIMER

This report (including the views and opinions expressed therein, and the information comprised therein) has been prepared by Incred Research Services Private Ltd.(formerly known as Earnest Innovation Partners Private Limited) (hereinafter referred to as "IRSPL"). IRSPL is registered with SEBI as a Research Analyst vide Registration No. INH000007793. Pursuant to a trademark agreement, IRSPL has adopted "Incred Equities" as its trademark for use in this report.

The term "IRSPL" shall, unless the context otherwise requires, mean IRSPL and its affiliates, subsidiaries and related companies. This report is not directed or intended for distribution to or use by any person or entity resident in a state, country or any jurisdiction, where such distribution, publication, availability or use would be contrary to law, regulation or which would subject IRSPL and its affiliates/group companies to registration or licensing requirements within such jurisdictions.

This report is being supplied to you strictly on the basis that it will remain confidential. No part of this report may be (i) copied, photocopied, duplicated, stored or reproduced in any form by any means; or (ii) redistributed or passed on, directly or indirectly, to any other person in whole or in part, for any purpose without the prior written consent of IRSPL.

The information contained in this report is prepared from data believed to be correct and reliable at the time of issue of this report.

IRSPL is not required to issue regular reports on the subject matter of this report at any frequency and it may cease to do so or change the periodicity of reports at any time. IRSPL is not under any obligation to update this report in the event of a material change to the information contained in this report. IRSPL has not any and will not accept any, obligation to (i) check or ensure that the contents of this report remain current, reliable or relevant; (ii) ensure that the content of this report constitutes all the information a prospective investor may require; (iii) ensure the adequacy, accuracy, completeness, reliability or fairness of any views, opinions and information, and accordingly, IRSPL and its affiliates/group companies (and their respective directors, associates, connected persons and/or employees) shall not be liable in any manner whatsoever for any consequences (including but not limited to any direct, indirect or consequential losses, loss of profits and damages) of any reliance thereon or usage thereof.

Unless otherwise specified, this report is based upon reasonable sources. Such sources will, unless otherwise specified, for market data, be market data and prices available from the main stock exchange or market where the relevant security is listed, or, where appropriate, any other market. Information on the accounts and business of company(ies) will generally be based on published statements of the company(ies), information disseminated by regulatory information services, other publicly available information and information resulting from our research. Whilst every effort is made to ensure that statements of facts made in this report are accurate, all estimates, projections, forecasts, expressions of opinion and other subjective judgments contained in this report are based on assumptions considered to be reasonable as of the date of the document in which they are contained and must not be construed as a representation that the matters referred to therein will occur. Past performance is not a reliable indicator of future performance. The value of investments may go down as well as up and those investing may, depending on the investments in question, lose more than the initial investment. No report shall constitute an offer or an invitation by or on behalf of IRSPL and its affiliates/group companies to any person to buy or sell any investments.

The opinions expressed are based on information which are believed to be accurate and complete and obtained through reliable public or other non-confidential sources at the time made. (Information barriers and other arrangements may be established where necessary to prevent conflicts of interests arising. However, the analyst(s) may receive compensation that is based on his/their coverage of company(ies) in the performance of his/their duties or the performance of his/their recommendations. In reviewing this report, an investor should be aware that any or all of the foregoing, among other things, may give rise to real or potential conflicts of interest. Additional information is, subject to the duties of confidentiality, available on request.

The report is not a "prospectus" as defined under Indian Law, including the Companies Act, 2013, and is not, and shall not be, approved by, or filed or registered with, any Indian regulator, including any Registrar of Companies in India, SEBI, any Indian stock exchange, or the Reserve Bank of India. No offer, or invitation to offer, or solicitation of subscription with respect to any such securities listed or proposed to be listed in India is being made, or intended to be made, to the public, or to any member or section of the public in India, through or pursuant to this report.

The research analysts, strategists or economists principally responsible for the preparation of this research report are segregated from the other activities of IRSPL. Information barriers and other arrangements have been established, as required, to prevent any conflicts of interests.

The research analysts, strategists or economists principally responsible for the preparation of this research report are segregated from the other activities of IRSPL. Information barriers and other arrangements have been established, as required, to prevent any conflicts of interests.

IRSPL may have issued other reports (based on technical analysis, event specific, short term views etc.) that are inconsistent with and reach different conclusion from the information presented in this report.

Holding of Analysts/Relatives of Analysts, IRSPL and Associates of IRSPL in the covered securities, as on the date of publishing of this report

	Analyst/ Relative	Entity/ Associates
any financial interests in the company covered in this report (subject company) and nature of such financial interest	NO	NO
actual/beneficial ownership of 1% or more in securities of the subject company at the end of the month immediately preceding the date of publication of the research report or date of the public appearance;	NO	NO
any other material conflict of interest at the time of publication of the research report or at the time of public appearance	NO	NO
received any compensation from the subject company in the past twelve months for investment banking or merchant banking or brokerage services or investment advisory or depository or distribution from the subject company in the last twelve months for products/services other than investment banking or merchant banking or broker- age services or investment advisory or depository or distribution from the subject company in the last twelve months	NO	NO
managed or co-managed public offering of securities for the subject company in the last twelve months	NO	NO
received any compensation or other benefits from the subject company or third party in connection with the research report	NO	NO
served as an officer, director or employee of the subject company	NO	NO
been engaged in market making activity for the subject company	NO	NO

Analyst declaration

- The analyst responsible for the production of this report hereby certifies that the views expressed herein accurately and exclusively reflect his or her personal views and opinions about any and all of the issuers or securities analysed in this report and were prepared independently and autonomously in an unbiased manner.
- No part of the compensation of the analyst(s) was, is, or will be directly or indirectly related to the inclusion of specific recommendations(s) or view(s) in this report or based any specific investment banking transaction.
- The analyst(s) has(have) not had any serious disciplinary action taken against him/her(them).
- The analyst, strategist, or economist does not have any material conflict of interest at the time of publication of this report.
- The analyst(s) has(have) received compensation based upon various factors, including quality, accuracy and value of research, overall firm performance, client feedback and competitive factors.

IRSPL and/or its affiliates and/or its Directors/employees may own or have positions in securities of the company(ies) covered in this report or any securities related thereto and may from time to time add to or dispose of, or may be materially interested in, any such securities.

IRSPL and/or its affiliates and/or its Directors/employees may do and seek to do business with the company(ies) covered in this research report and may from time to time (a) buy/sell the securities covered in this report, from time to time and/or (b) act as market maker or have assumed an underwriting commitment in securities of such company(ies), and/or (c) may sell them to or buy them from customers on a principal basis and/or (d) may also perform or seek to perform significant investment banking, advisory, underwriting or placement services for or relating to such company(ies) and/or (e) solicit such investment, advisory or other services from any entity mentioned in thisreport and/or (f) act as a lender/borrower to such company and may earn brokerage or other compensation. However, Analysts are forbidden to acquire, on their own account or hold securities (physical or uncertificated, including derivatives) of companies in respect of which they are compiling and producing financial recommendations or in the result of which they play a key part.