IBAAS-JNARDDC 2022
TECHNICAL LECTURE SERIES

POLICY INTERVENTIONS FOR ALUMINIUM RECYCLING SECTOR

Al

आज़ादी का अमृत महोत्सव

R N CHOUHAN

Disclaimer

1. *This Presentation contains images of recycling industry which are for illustration purpose only and doesn't intend to abase or exalt any specific industry.*

2. *JNARDDC (MRA) is involved in various policy related work like "Circular Economy in non-ferrous Metal Sector" and "National Non-Ferrous Metal Recycling Framework-2020"*

3. *Various actions and policy references used in presentation are from the published policies, rules, guidelines as well as recommendations and proposals of various agencies including Metal Recycling Authority*

on a lighter note

RRR……..

RESPONSBILITIES

REGULATION

POLICY INTERVENTIONS FOR ALUMINIUM RECYCLING SECTOR

Cost of Replacing a Faulty Laptop or Phone Giving You Sleepless Nights? Govt Looks to Bring 'Right to Repair'

• By: Rupashree Nanda • CNN-News18 • Last Updated: JULY 14, 2022, 14:47 IST

'Right to Repair' is a growing phenomenon across the globe. UK has a law that mandates all electronic appliance manufacturers must provide consumers with spare parts for repair, while Australia has free 'repair cafes'. (Shutterstock)

'Right to Repair' is consonant with PM Narendra Modi's idea of 'Lifestyle for Environment' (LiFE) which lays emphasis on value of reuse and recycle. The signal to manufacturers is clear --- don't restrict repair of your product and force the consumer to buy a new model

Recycling activities are governed by several policies and regulations in the country

R N CHOUHAN ?

Name
R N CHOUHAN

Designation
Sr Principal Scientist & HOD, DOWNSTREAM

Affiliation
Jawaharlal Nehru Aluminium Research Development & Design Centre Autonomous body, Ministry of Mines Amravati Road, Wadi Nagpur – INDIA

Educational Qualifications
BE MET 1998 GEC RAIPUR, M TECH MET 2000 IIT KGP

Relevant Experience
Associated with various activities related to Circular Economy in Non-Ferrous Metal Sector (NITI AAYOG), Non-Ferrous Metal Recycling Framework (Ministry of Mines), Bureau of Indian Standard, Metal Recycling Authority (Ministry of Mines),

Jawaharlal Nehru Aluminium Research Development & Design Centre, Nagpur

AUTONOMUS BODY, MINISTRY of MINES, GOVT Of INDIA

JNARDDC –journey

1989 — Established by MoM & UNDP

1996 — FULLY OPERATIONAL

2014 — SILVER JUBILEE CELEBRATIONS

2020 — 14 MN EXTRUSION PRESS

2021 — MRA & COAL REFEREE LAB

2022 — CIRCULAR ECONOMY

JNARDDC – set up

Shri Pralhad Joshi
Minister of Coal, Mines & Parliamentary Affairs

Shri Raosaheb Patil Danve
Hon'ble MoS for Rail, Coal & Mines

Secretary, Ministry of Mines, is Ex-officio chairman of the **General** and **Governing Body**

Dr Alok Tandon, IAS

General Body	Secretary(Mines)
Governing Body	Secretary(Mines)
Research Advisory Committee	Prof S P Mehrotra, IIT G
Project Monitoring Committee	Prof S Subramanian, IISc B

Director

Dr. Anupam Agnihotri
B. Tech Metallurgy-IIT Kanpur
M. Tech Metallurgical & Materials Science, VNIT, Nagpur
PhD Metallurgical & Materials Science, VNIT Nagpur

JNARDDC-Expertise

Bauxite/Alumina

- Technological Evaluation
- Beneficiation
- Petrography
- Alumina Technology
- Special Alumina

Smelter

- Instrumentation
- Smelter Process
- Cell Monitoring

Aluminium

- Metal Forming
- Casting
- Alloy / Product development
- Characterisation

Analytical

- Physico chemical analysis of ores & minerals
- Metal & Material characterization
- TCLP / STLC for heavy metal
- Coal Testing (Referee Lab)

Others

- Mathematical Modelling
- Waste utilization
- Energy conservation
- Environment management

ISO 17025-2017 Accredited
(Chemical & Mechanical)

ISO 17034-2016
Accreditation in progress (CRM)

सत्यमेव जयते
Goverment Of India

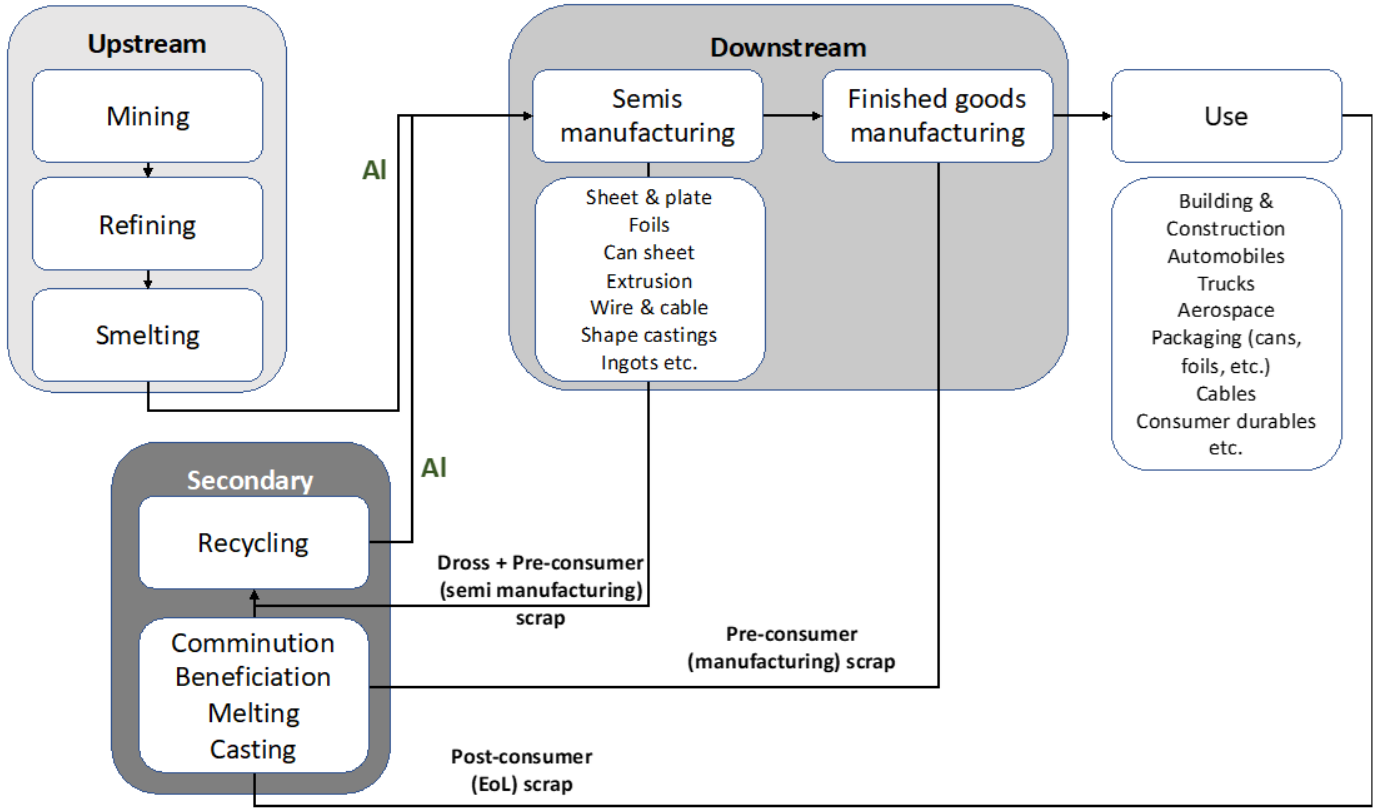
Ministry of Mines

- Draft Aluminium Scrap Recycling policy
- Techno-economic study of aluminium Recycling
- Metal Recycling Authority (NNFMSRF-2020)
- IMC for import substitutes in Al-industry

NITI Aayog

- REE from red Mud and coal fly ash
- Strategy paper on Resource efficiency in aluminium sector
- Circular Economy in Non-Ferrous Metal Sector

Aluminium value chain

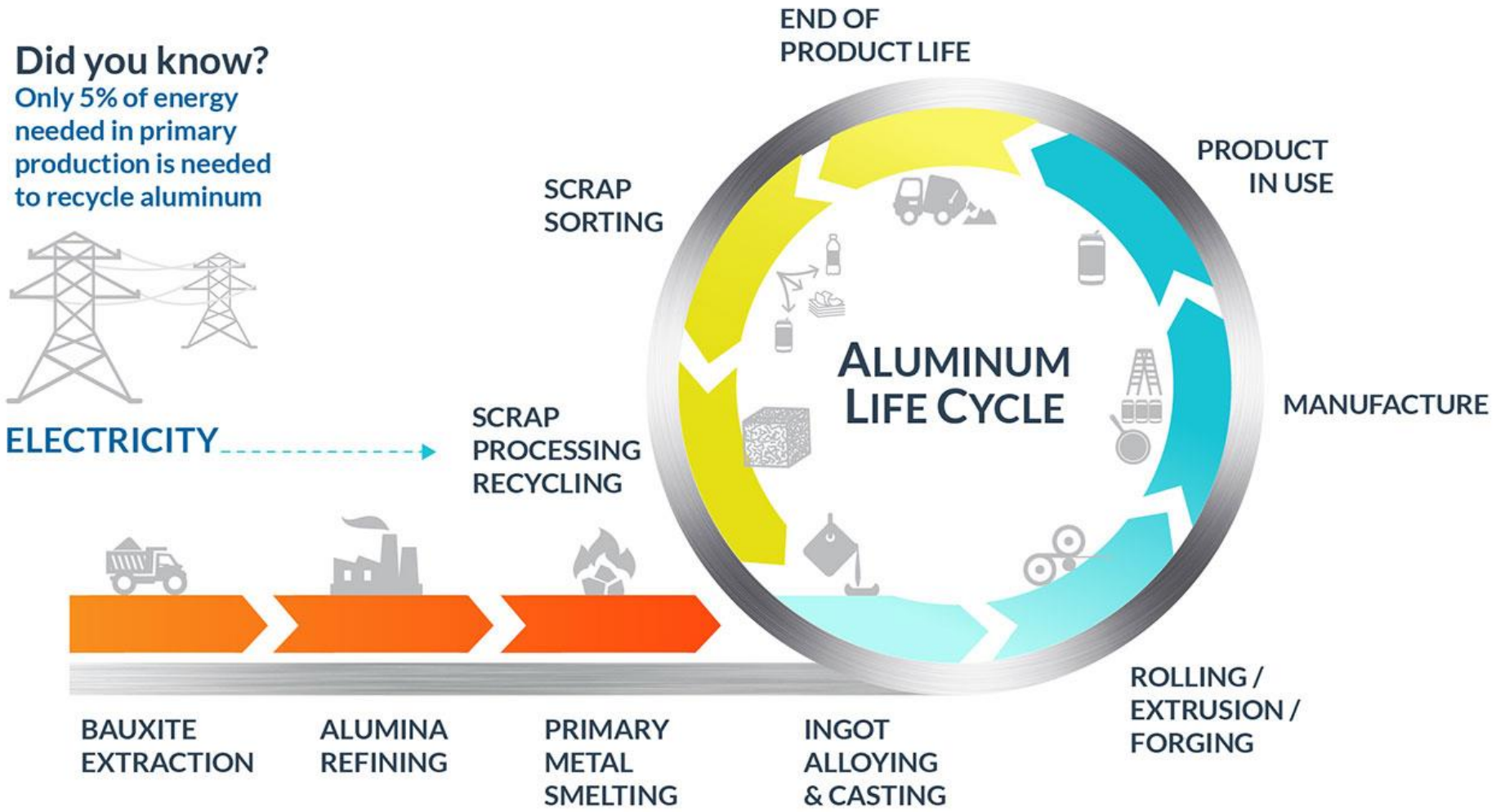


Aluminium value chain

Government	Scrap Supply	Industry
Policies	Local Collection	Manufacturing
Regulations	Import	HR & Social
Taxation	Trading	Infrastructure
Support	**Consumers**	**Services**
R&D	Auto	Transport
Academia	B&C	Warehouse
Trade Associations	Utensil	Financial

Secondary Aluminium Value Chain

Al-Life Cycle



https://www.almexa.com.mx/circular-economy/

Product life

Market	Average product life (years)	Estimated metal recovery (%)
Building and construction	40	85
Transportation: aerospace	30	90
Transportation: auto and light truck	13	90
Transportation: truck, buses and trailers	20	90
Transportation: rail	30	90
Transportation: other	20	90
Consumer durables	15	90
Electrical	35	90
Machinery and equipment	25	90
Containers and packaging: foil	1	90
Containers and packaging: other	1	90
Other	15	90

Recyling

Step 1
EoL Scrap Collection

Step 2
Dismantling
Crushing
Cutting
Shredding

Step 3
Scrap Sorting

Step 4
Remelting

Step 5
Casting
Forming (Product Manufacturing)

Step 1 Scrap Collection

Import

Manufacturing discards

Industrial Auctions

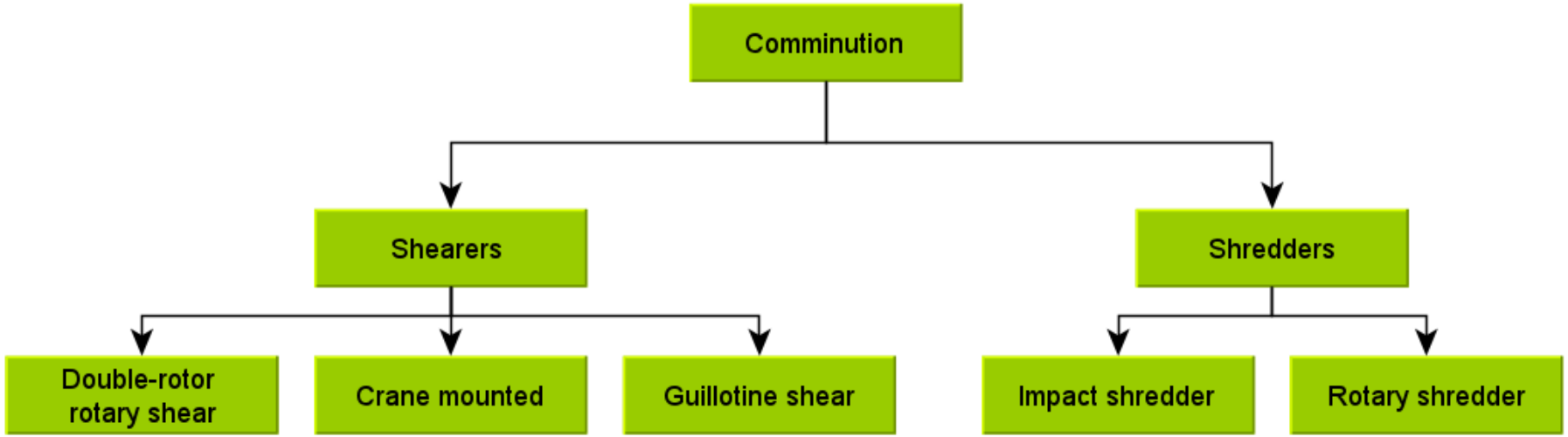
Domestic scrap

Municipal wastes

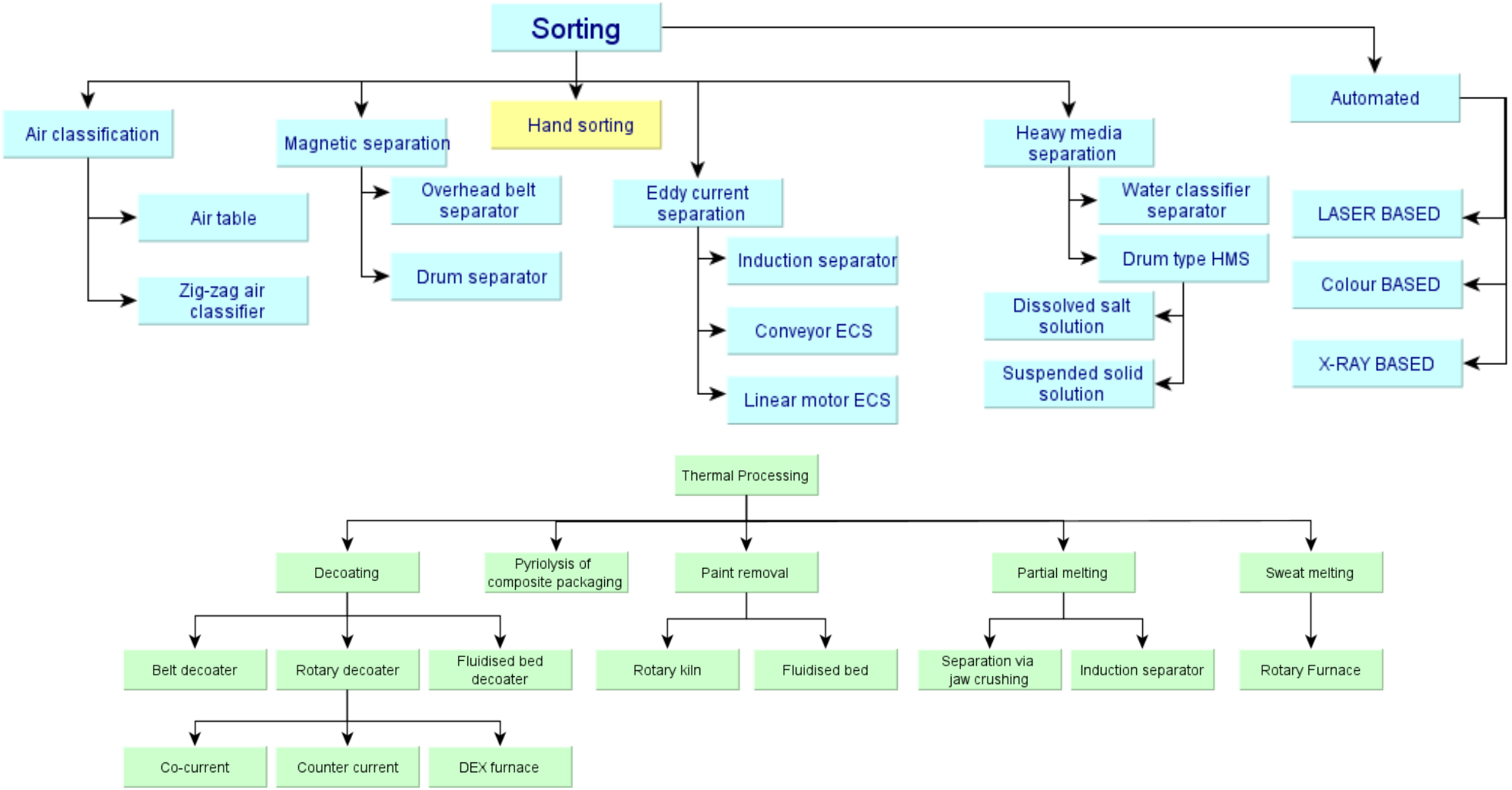
Kabadiwala

Dismantling

Step 3
Dismantling
Crushing
Cutting
Shredding

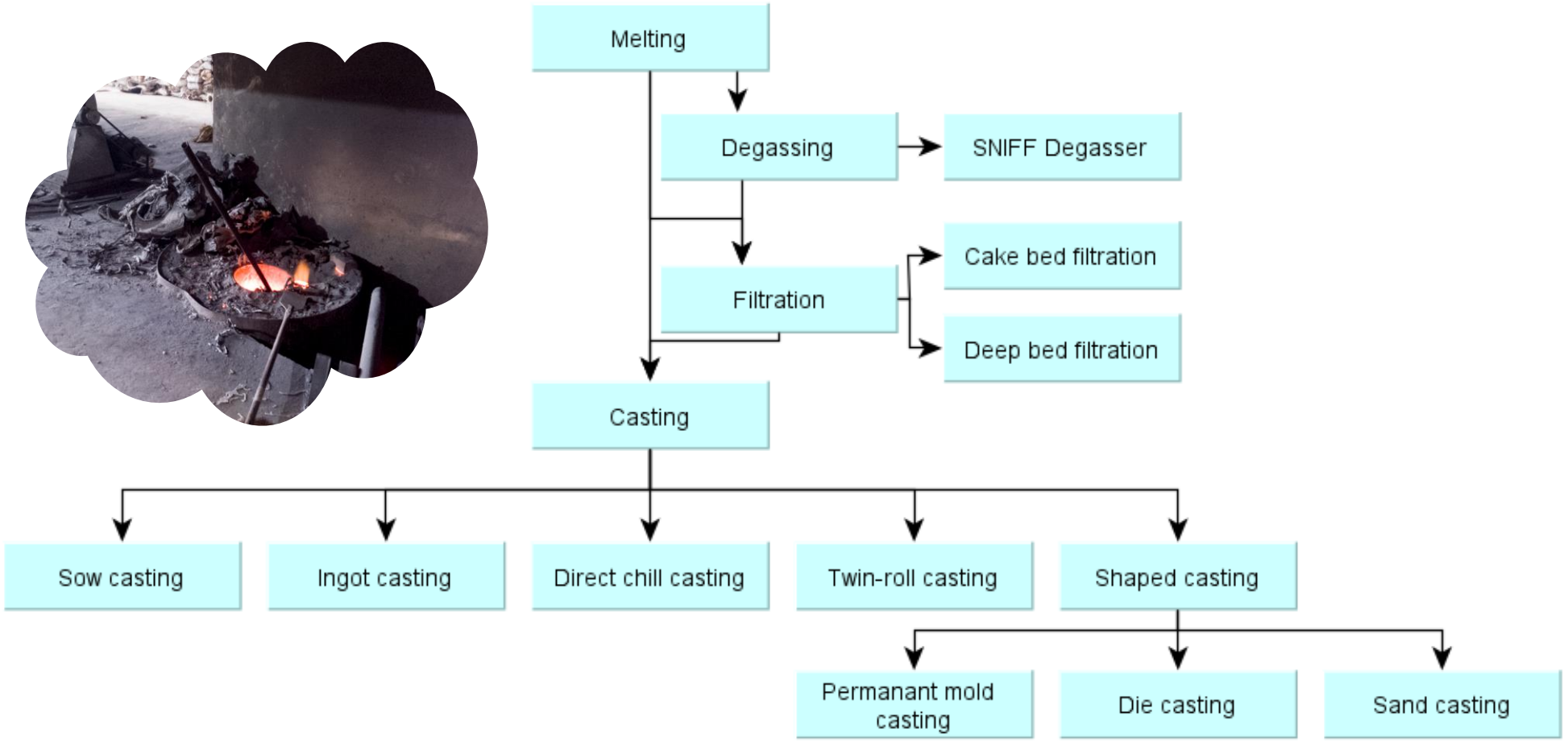


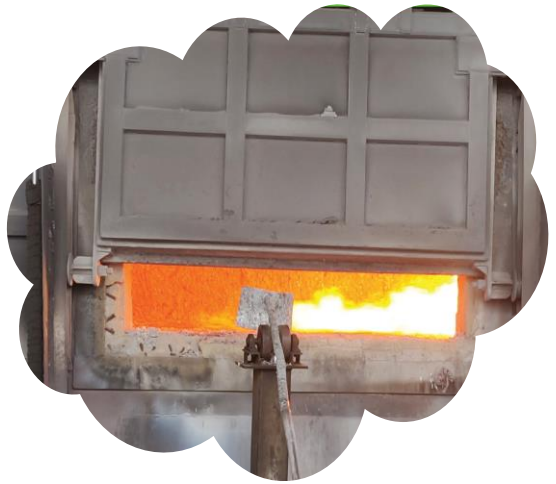
Sorting



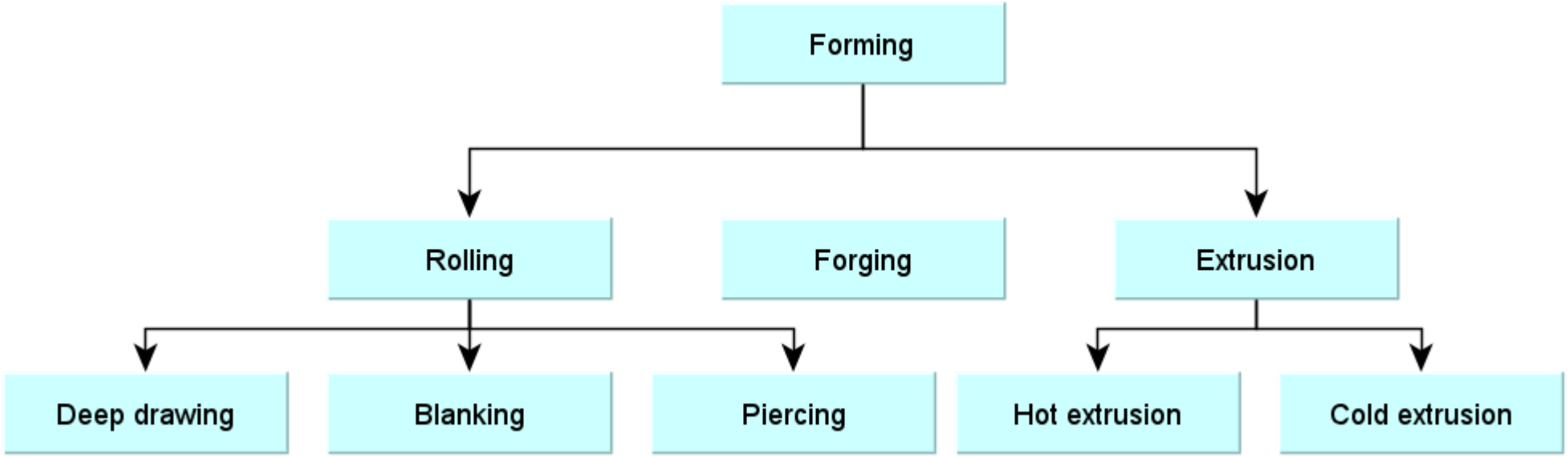
Step 3
Scrap Sorting

Melting


Melting
Degassing
SNIFF Degasser
Filtration
Cake bed filtration
Deep bed filtration
Casting
Sow casting
Ingot casting
Direct chill casting
Twin-roll casting
Shaped casting
Permanant mold casting
Die casting
Sand casting

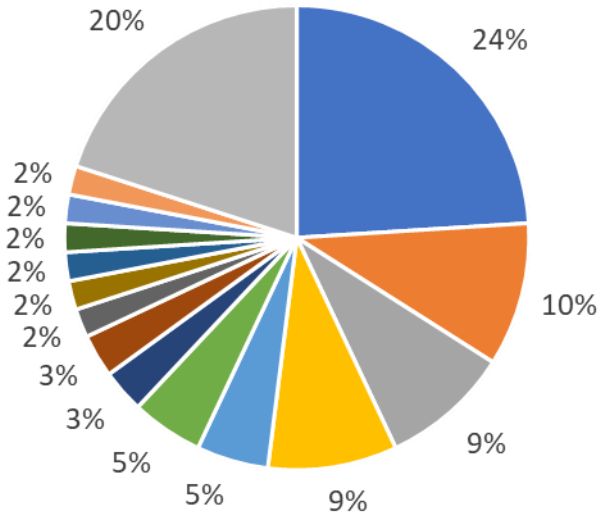


Step 5
Casting
Forming (Product Manufacturing)

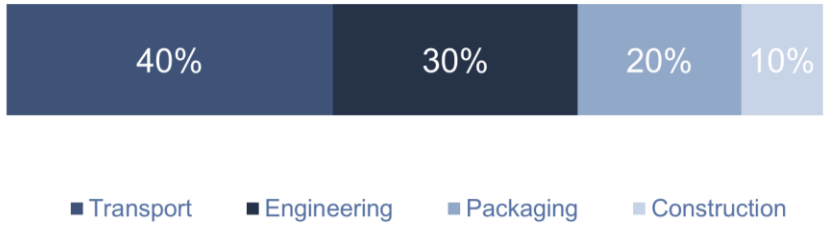


Indian aluminium recycling industry is dependent on scrap imports

Source: Import-Export Databank, Dept of Commerce, GoI

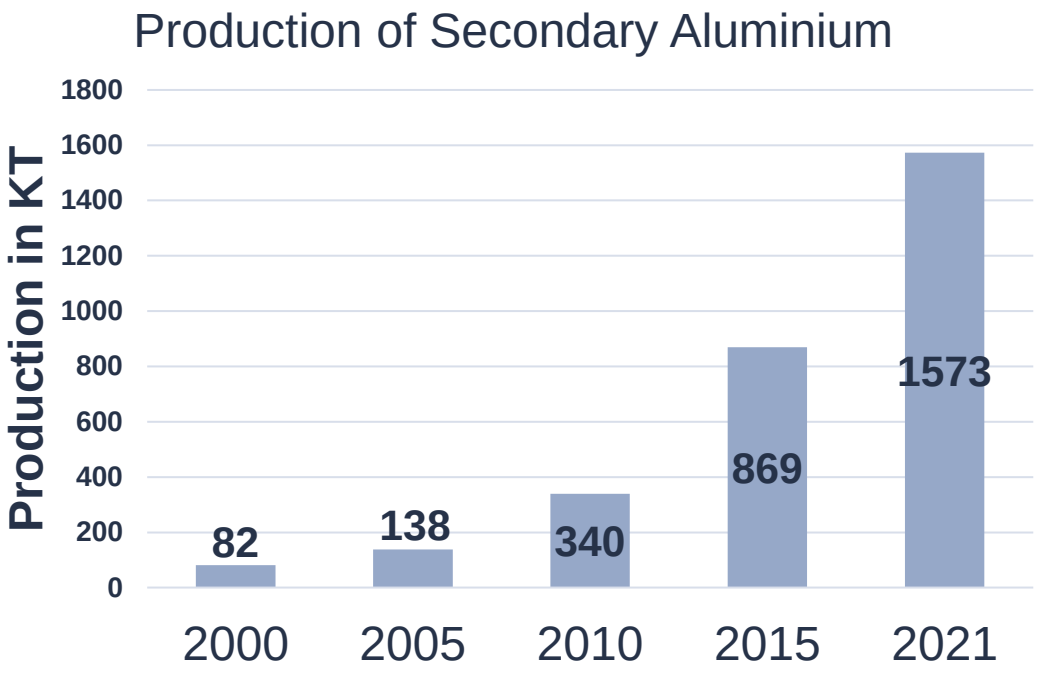


Domestic SCRAP

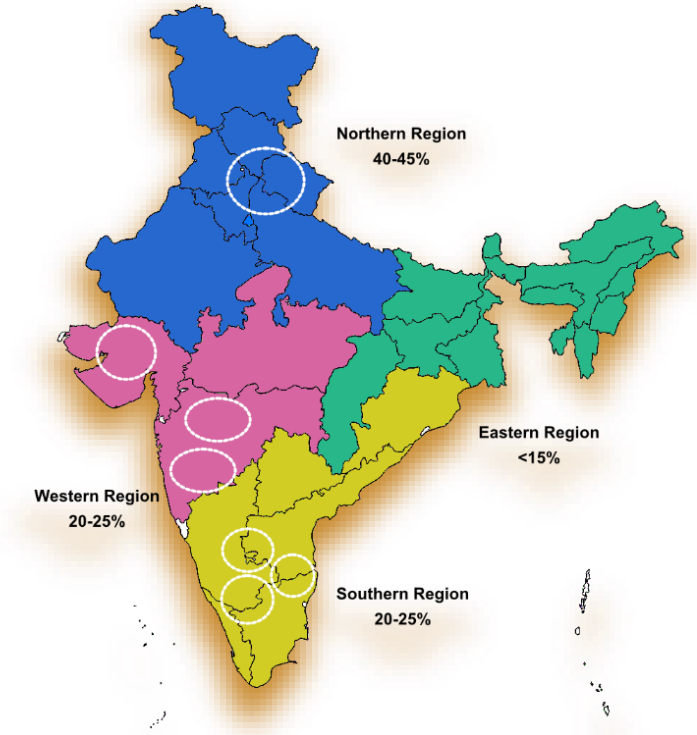


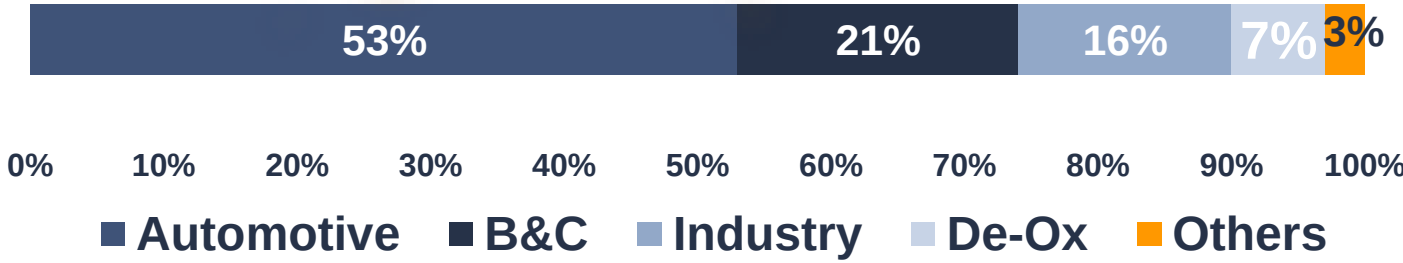
U S A, U K, SAUDI ARAB, U ARAB EMTS, AUSTRALIA, NETHERLAND, SINGAPORE, GERMANY, BELGIUM, HONG KONG, CANADA, SOUTH AFRICA, KUWAIT, MALAYSIA, Others

Production & Usage of Secondary Aluminium



Overall CAGR since 2000 is 15 %





Secondary Aluminium Production

Country	Production in million tonnes										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
India	0.34	0.47	0.63	0.74	0.72	0.87	0.87	0.93	1.12	1.35	1.6
China	4	4.4	4.8	5.2	5.65	6.2	6.3	6.9	6.9	6.9	6.95
S Korea		0.437	0.503	0.561	0.561	0.561	0.561	0.561	0.561	0.573	0.446
Japan		0.759	0.788	0.809	0.836	0.772	0.788	0.801	0.826	0.795	0.69
Germany	0.611	0.635	0.635	0.597	0.599	0.631	0.595	0.765	0.761	0.692	
Italy	0.609	0.713	0.622	0.664	0.734	0.706	0.721	0.743	0.684	0.687	
Austria	0.117	0.122	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	
Thailand		0.055	0.017	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
Poland	0.001	0.006	0.007	0.0027	0.0074	0.0022	0.0047	0.0083	0.0113	0.0088	0.0139
Spain	0.261	0.294	0.284	0.236	0.272	0.251	0.269	0.276	0.265	0.36	0.246
Czechia	0.039	0.05	0.064	0.064	0.0644	0.0636	0.0791	0.0617	0.066		
UK	0.0996	0.0992	0.149	0.149	0.149	0.149	0.149	0.149	0.149	0.149	

Glance at Indian Al-Recycling Industry

Container Unloading

Scrap Yards

Glance at Indian Al-Recycling Industry

Baled UBC Scrap

Radiator Scrap

Wastes in Scrap

Misc attachments in Scrap

Glance at Indian AI-Recycling Industry

Scrap Compactor

Lead removal

Glance at Indian Al-Recycling Industry

Radiator Shredding

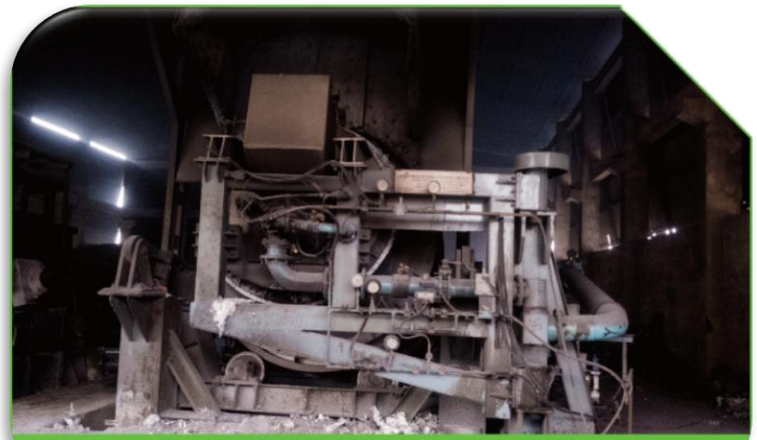
Hand Sorting

Washing Table

Conveyor (Mechanisation)

Glance at Indian Al-Recycling Industry

Oil Fired Furnace



Rotary Furnace

Wood Fired Furnace

Swarf (Chips)Melting

Cast Iron Crucibles

Glance at Indian Al-Recycling Industry

Primitive Book Casting

Glance at Indian Al-Recycling Industry

Alloy Ingots

Water cooled Book Moulds (Utensils)

Glance at Indian Al-Recycling Industry

Fume Hoods

Fugitive Emission

Pollution Control System

Pollution Control System

Cost of aluminium scrap

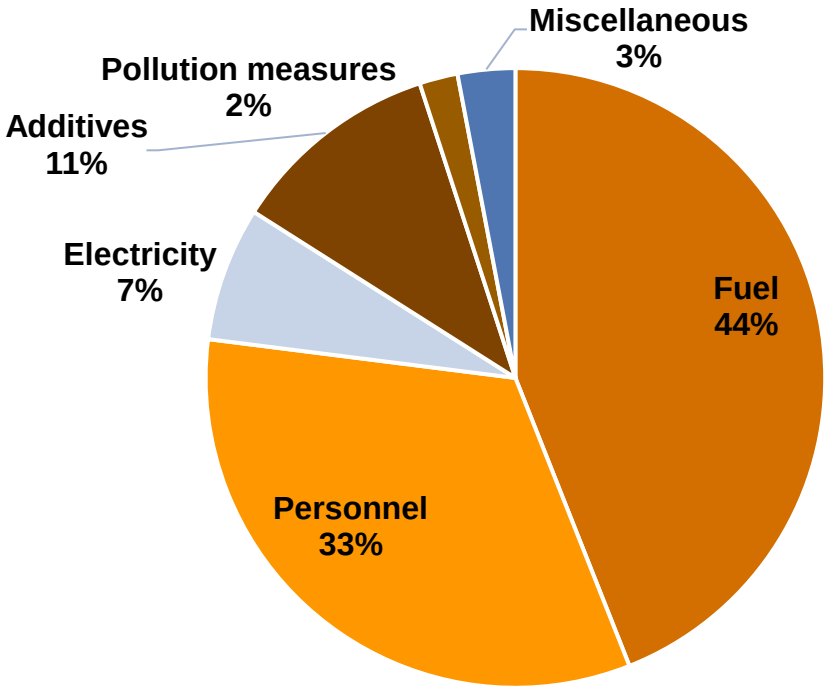
Rs 80 - 200

10-25% of LME

Basic Customs Duty (BCD)
5%

GST: 18%

Cost of Recycling



On an average secondary aluminium remelters incur Rs. 9 for melting and Rs. 4 for forwarding & clearing per kg of aluminium produced.

Scrap processing cost

Overall cost

SCRAP = 70-85 %,

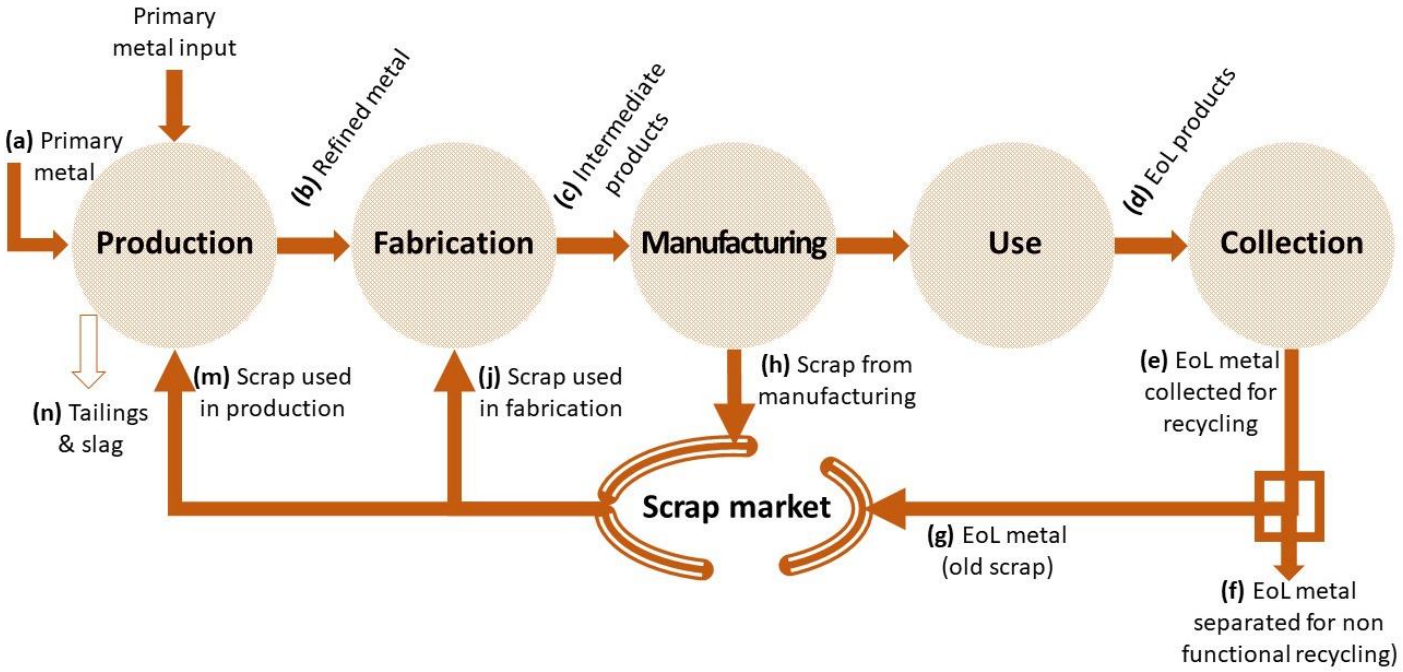
MELTING = 4-10 %,

Personnel = 2-5%;

Maintenance = 1-2%

OTHERS = 8-10 %

The EoL-Recycling rate



	2017	2018	2019	2020	2021
Reported Recycled Al scrap (g)	138190	149982	177933	180498	183446
Estimated Al scrap generated (d)	608,235	587,159	687,002	756,143	775,748
EOL - RR = g/d	**22.72%**	**25.54%**	**25.90%**	**23.87%**	**23.65%**

The EoL-RR in India is approximately 25%

Foil packaging has lowest recycling rate of around 20% in India.

Globally beverage cans has highest recycling rates reaching 99%

Building and transportation sectors has highest recycling rates (80%) in India (globally above 90%).

Global average EoL-RR is about 50%.

Issues observed

- 70 – 80% of the products were produced with stringent quality measures as per OEM's standards
- 20 – 30% of the products were directly sold in the market to general public without any 3rd party quality checks/QA
- Not equipped with testing facilities
- "Failure to process" is the quality indicator
- There are concerns from retail users about quality of utensils and extrusions

- *Hand sorting is common which is labour intensive*
- *Health and safety of workforce*
- *Training is very limited*

Issues observed

- Most of the recyclers in India use crude technology - low metal yield and high melt loss, even quality of metal is compromised
- No SOPs available for treatment of various grades/types of scrap
- Minimal/No guidelines for suitable pollution abatement measures
- Minimal/No in-house quality control infrastructure

Issues observed

- Only large recyclers are environment conscious
- Minimal/no guidelines for suitable pollution abatement measures
- No SOPs for treating different kinds of waste generated during scrap processing
- Waste generated is disposed in unethical way
- Workers are also exposed to poor working atmosphere

Demand of Aluminium Recycling Industry

- Government should create and build recycling zones in all the states.
- Recycling zones should be either nearer to the customer or nearer to the ports.
- Energy subsidies to the recycling industry.
- Uniform taxation for recycling industry across the country.
- Lower tax rates and import duties on equipment bought for aluminium recycling industry.
- Basic custom duty on aluminium scrap to equalize the import duty of finished products from FTA countries which are @ 0% basic custom duty.
- Income-tax incentive to the recycling industries as it is friendly to environment – large job employer and creating value from scrap
- Production linked incentive scheme to the aluminium recycling industry to boost aluminium recycling in the country
- No issue in complying with bis product standards for finished products.
- BIS standards for aluminium scrap are unwarranted and clearance in India is smoothly running as per the norms laid down by DGFT.
- Aluminium scrap / input for recycled aluminium can not be put under negative list because recycling is today the need of the country.
- Eradicate the fallacy about aluminium and health.
- Encourage the export value added aluminium products
- Smooth custom clearance at ports for ease of doing business.
- Government to work towards resource security for the recycling industry

Need of the Al Recycling industry (MRA's Views)

- Digitalization of aluminium recycling eco-system to improve data collection
- Traceability of secondary aluminium to ensure source of scrap and end applications
- Setting up of recycling zones/clusters with central laboratories and testing centres to help small (micro) entrepreneurs who find it difficult to maintain laboratory set-up.
- Introduction of Extended Producer Responsibility (EPR) for aluminium containing products so that scrap can be channelled in organised way.
- Awareness programs about resource efficiency and circular economy for OEMs to promote usage of recycled aluminium in end products
- Standardisation of recycling practices and products
- Certification of recycled products to ensure quality and maintain recyclability of the aluminium products for long

Need of the Al Recycling industry (MRA's Views)

- R&D on aluminium and health to find whether aluminium utensils specifically from recycled aluminium can cause any health problems
- R&D system for aluminium recycling sector to improve the efficiency of aluminium value chain and quality of the recycled products
- Quality control orders for recycling industry to ensure product quality specifically for the retail consumers who can not ensure the product quality easily
- Capacity building for informal value chain like reg pickers, kabadiwalas, local aggregators or traders
- SOP for obtaining clearances for setting up and operations of recycling units.
- Measures for prevention of metal theft specifically from public infrastructures.
- Fiscal incentives/support to recycling industry/recycled product users for technology upgradation
- Uniformity in rules & regulations for the aluminium recycling eco-system

Need of the Al Recycling industry (MRA's Views)

- Minimum recycled content for the aluminium end products to promote the recycling industry
- Public procurement of recycled materials and products
- Minimum infrastructure guidelines to improve the operating standards of the aluminium recycling industry
- Eco-labelling of aluminium products for environment friendly branding
- Establishment of Recycling Authority to act as nodal agency to facilitate and promote the recycling industry
- Technology - exchange programs with international bodies like EU, OECD, and other countries that produce more recycled aluminium
- Technical training programs for aluminium recycling shop floor persons
- Bilateral agreements between the countries for the supply of high-quality aluminium scrap
- Set up of aluminium recycling technology demonstration and R&D centre.

Issues & Challenges

Domestic Scrap Availability	Metal Price Stability	Adapting to manufacture of new products	Environmental protection from recycling industry wastes
Human Health from Hazardous Substances	Recycling or waste management practices	Lack of Appropriate Recycling Infrastructure	Management of End-of-Life Products
Recycling technologies for the complex and elementally diverse products	Collection Segregation norms for industrial/domestic scrap	Disassembly of Modern and Complex Multi Material Product	Compliance to the National Product Standards

The secondary aluminum sector is regarded as ***unorganized***

Opportunities

MAKE IN INDIA	FAME INDIA SCHEME	NATIONAL NON-FERROUS METAL RECYCLING FRAMEWORK	AATMANIRBHAR BHARAT ABHIYAN
USD 5 TRILLION ECONOMY	CIRCULAR ECONOMY IN SCRAP METAL	VEHICLE & SHIP SCRAPPAGE POLICY	SOLAR POWER
INDUSTRIAL CORRIDORS	CARBON BORDER ADJUSTMENT MECHANISM	SMART CITIES AMRUT CITIES	ELECTRICITY AND HOUSING FOR ALL

Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS

Sustainable Development Goals

SDG Priorities

Top Priority Development Needs
(SDGs in which India's performance is lowest)

Other Strong Development Needs
(SDGs in which India's performance is relatively low)

UNITED NATIONS

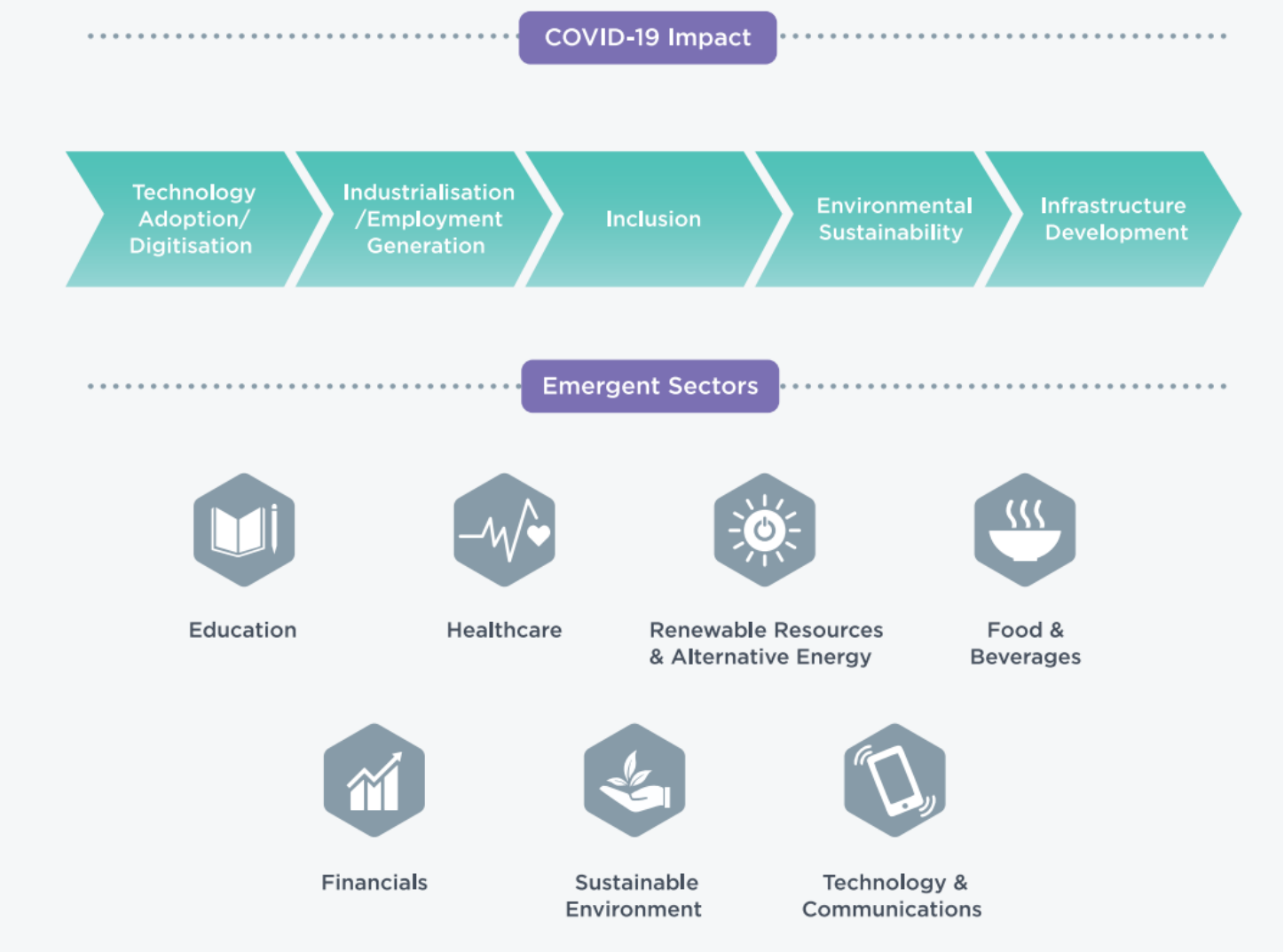
NITI Aayog

SDG INDIA

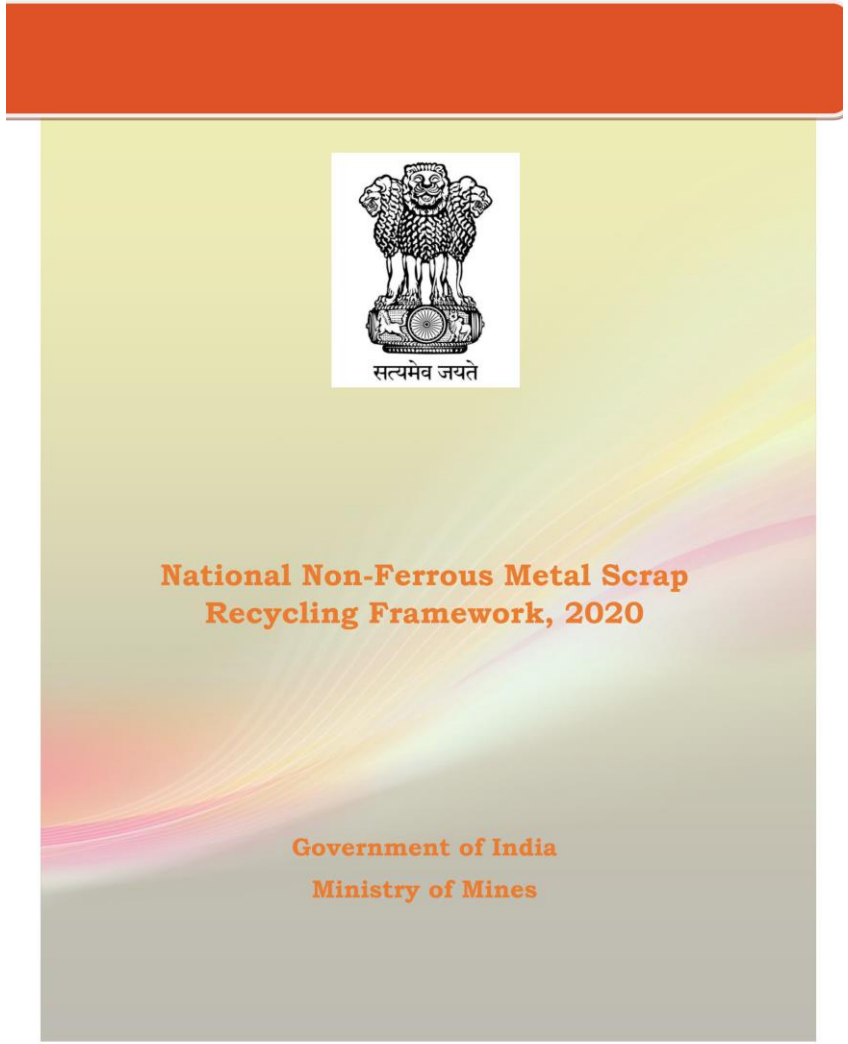
Index & Dashboard 2020-21

Partnerships in the Decade of Action

Impact of Covid-19



Reforms



- Vehicle Scrappage Policy (MoRTH)
- Non-Ferrous Metal Import Monitoring system (MoM)
- Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules (MoRTH)
- E-Waste (Management) Rules, 2016

NITI Aayog's recommendations

- Mapping of waste generation in the entire chain from mining to primary production and recycling industry
- Opportunities for waste utilization and promoting circular economy through adoption of 6Rs principles of Reduce, Recycle, Reuse, Recover, Redesign and Remanufacture
- Identification of Best Available Technologies and Global best practices
- Promotion of scrap recycling for conservation of natural resources and minimize GHG emission as recycling reduces energy requirement by 80-95%.
- Practices being adopted globally for transition from linear economy to circular economy
- Government support needed for promotion of circular economy
- Need for additional standards, laboratories and test houses for promotion of circular economy
- R&D needs

NITI Aayog's recommendations

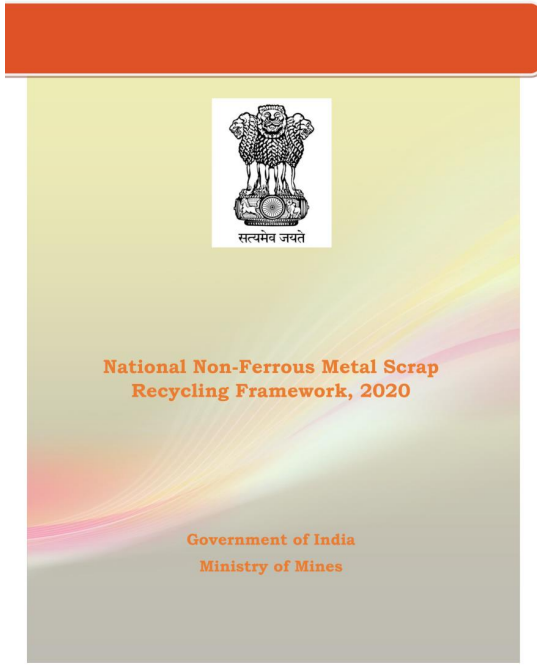
- ❑ Digitalization of Scrap and Waste Management
- ❑ Setting up of Recycling Zones
- ❑ Setting up of Laboratories and Testing Centres in Zones
- ❑ Building Robust Reverse Logistics Supply Chain
- ❑ Public Procurement of Recycled Materials and Products- " Green Procurement"
- ❑ Extended Producer Responsibility (EPR) and Shared Responsibility
- ❑ Bringing Awareness about Resource Efficiency and Circular Economy
- ❑ Strengthening Research and Knowledge base
- ❑ Industry status for Scrap Recycling segment
- ❑ Fiscal/ Financial Incentives to promote circular economy- Viability Gap funding & Others
- ❑ Integration of Scrap Collectors/Aggregators/Kabadiwalas into the Recycling Ecosystem
- ❑ Creation of Independent Authority for Material recycling for a focused& synergetic approach

Non-Ferrous metal scrap recycling framework, 2020 was published (March 2021) by **Ministry of Mines** to regulate, improve, support non-ferrous metal recycling activity specifically for **aluminium, copper, lead and zinc**.

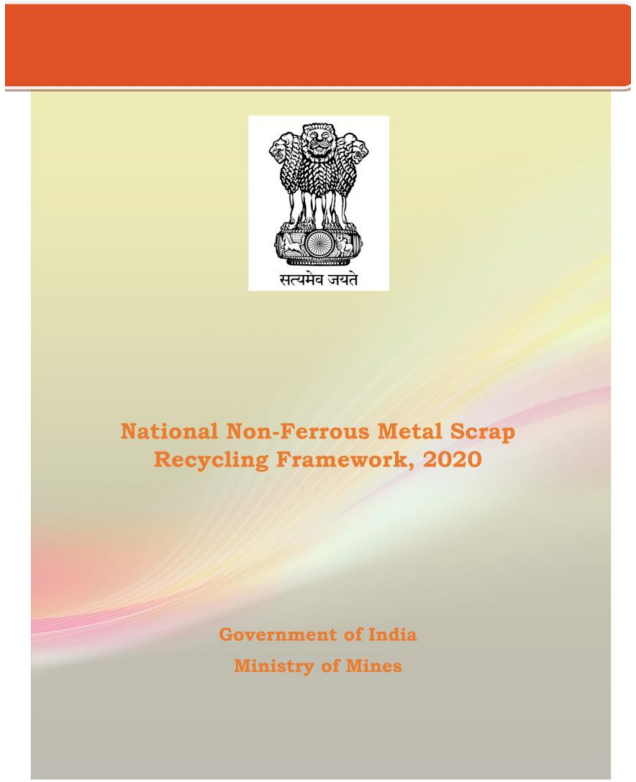
As per the framework, various roles and **responsibilities of scrap value chain** viz. scrap dismantlers, processers, recyclers, original equipment manufacturers, and even public at large are envisaged to **improve up on overall recycling scenario** in the country.

This framework also refers to already existing rules/regulations/policies by various administrative ministries/departments and **proposes a few new guidelines** to bring the effect.

Metal Recycling Authority (MRA) will be the nodal agency for implementation/ monitoring/ developing framework measures.



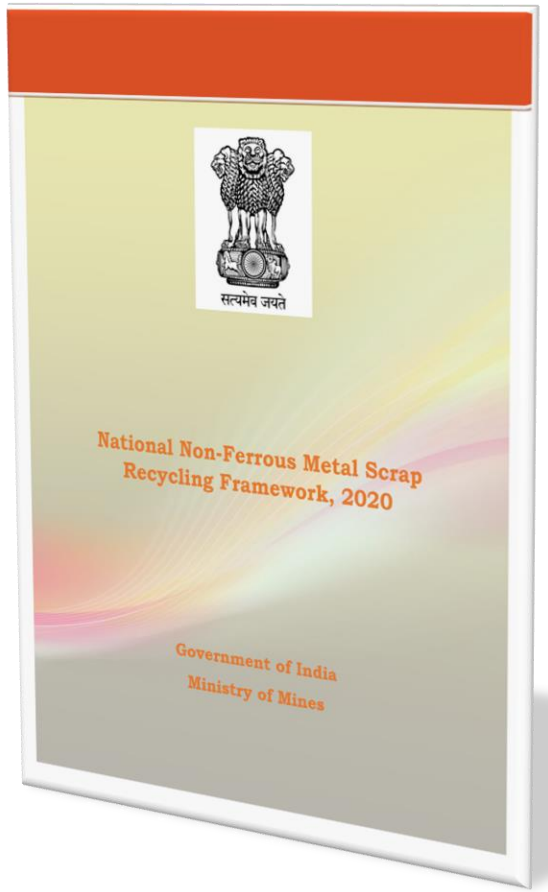
"Metals are a shared inheritance, with the State in the role of a trustee on behalf of the people. It is the endeavor of Ministry of Mines to work towards utilisation of Non-ferrous metals in an environmentally sustainable manner keeping active stakeholders' participation while maintaining high level of trust amongst all stakeholders.



OBJECTIVEs

Promoting Organized Recycling Ecosystem
and work towards
Economic Wealth Creation, **Job Creation**
and **increased contribution to GDP** through
METAL RECYCLING

Shift towards a
CIRCULAR ECONOMY
in coming years



Framework envisages setting up of a **CENTRAL AUTHORITY** for **RECYCLING OF NON FERROUS METALS** which may be called as Metal Recycling Authority. The Authority will act as **FACILITATOR** to implement the Non-Ferrous Metal Scrap Recycling Framework.

Some of the responsibilities

- To **standardize** the recycling practices
- To devise and maintain **databank of recycling value chain**
- **Technology to the recycling units**
- **Infrastructure** like Recycling zone etc.

Fallout of National Non ferrous metal scrap recycling framework

Action Plan and Timelines

8. ACTION PLAN AND INDICATIVE TIMELINES

Action Point			Agency	Timeline by
1.	**Institutional Set- up**	Setting up of Metal Recycling Authority (MRA)	M/o Mines & MoEFCC	End of Q1 of FY 2021-22
2.	**Framework, Product and Process Requirements**	Laying down overall framework for recycling of metal scrap	MRA in consultation with MoEF&CC	Q2-Q3 of FY 2021-22
		Laying down Quality standards for Scrap to be used in recycling	MRA in consultation with BIS or any other agency of similar nature	End of Q3 of FY 2021-22
		Laying down Quality standards/ Quality certification standards for final recycled metals	MRA in consultation with BIS or any other agency of similar nature	End of Q3 of FY 2021-22
		Laying down process standards for scrap	MRA	Q3-Q4 of FY 2021-22
		Laying down Minimum Infrastructure requirement for recycling units	MRA in consultation with MoEF&CC	Q3-Q4 of FY 2021-22
		Laying down 'Minimum Recycled Content Requirement' for manufacturing of select products.	MRA	Q3-Q4 of FY 2021-22
3.	**Data Base Requirement**	Developing framework for registration of collection, segregation, dismantling units.	MRA	Q1-Q2 of FY 2022-23
		Developing online mechanism for auction/ sale of scrap from organizations to registered collection, segregation, dismantling units	MRA	Q2-Q3 of FY 2022-23
		Developing framework for collection of data on recycled products from registered recycling units	MRA	End of Q4 of FY 2022-23
		Developing a reporting mechanism for registered recycling units	MRA	End of Q4 of FY 2022-23
		Developing a mechanism for ranking and evaluation of units based on performance	MRA	End of Q1 of FY 2023-24
4.	**Development Targets**	Identify 10 recycling Zones and develop Scrap Collection and Dismantling Centers at each zone.	MRA	End of Q1-Q2 of FY 2022-23
		Development of Urban Mine facilities.	MRA	End of Q3 of FY 2022-23

Stakeholders

POLICY MAKERS	Ministry of Mines	MoEF&CC	NITI AAYOG	State Gov
REGULATORY BODIES	MRA	CPCB/SPCB		Local Bodies
TRADERS	Importers	Local Traders		
PROCESSROS	Aggregators/ Segregators	Scrapping Facilities (e.g. RVSF)	Recyclers	
END USERS	OEMs	Public		
Advisory Body/ Associations	MRAI, FAIAUM, ASMA, ANMA BNFMA etc		ISRI	
Others	Academia	R&D		

Stakeholders consultations

Meeting with MoEF&CC-BIS
13-08-2021
MoEF&CC & BIS welcomed the MoM's initiative and confirmed their support to the envisaged work

Meeting wit Al, Cu, Pb, Zn Producers
30-08-2021
suggested standardization of recycling value chain

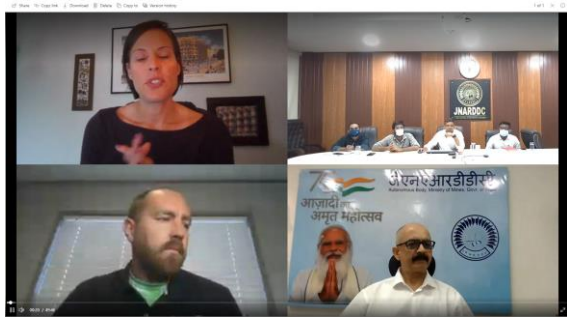
Meeting with Recycling & Environment Industry Association of India (REIAI) & International Zinc Association (IZA)
06-08-2021
International Zinc Association assured involvement of international partners for Best Available Technologies & REIAI will support MRA

Meeting with ISRI (28-09-2021)
ISRI will share some global practices

Meeting with Material Recycling Association of India (MRAI) 06-08-2021
Welcomed the initiative and shared their concern about scrap standard

Aluminium (19-09-2021) & Copper (20-09-2021)
MRA participated in the MRAI's Business summit and addressed the gathering about the objectives and plans of MRA
MRAI Business Summit participants appreciated the MoM's initiative of nominating JNARDDC as MRA

Aluminium Recycling Value chain Stakeholders Meeting on 18-10-2021
Participants welcomed the initiatives and shared existing practices, rules, regulations etc.



Meeting with RIOS 05-10-2021
customized management system for Indian context to bring more transparency, compliance with the regulations etc as well as process standards

Reference for guidelines

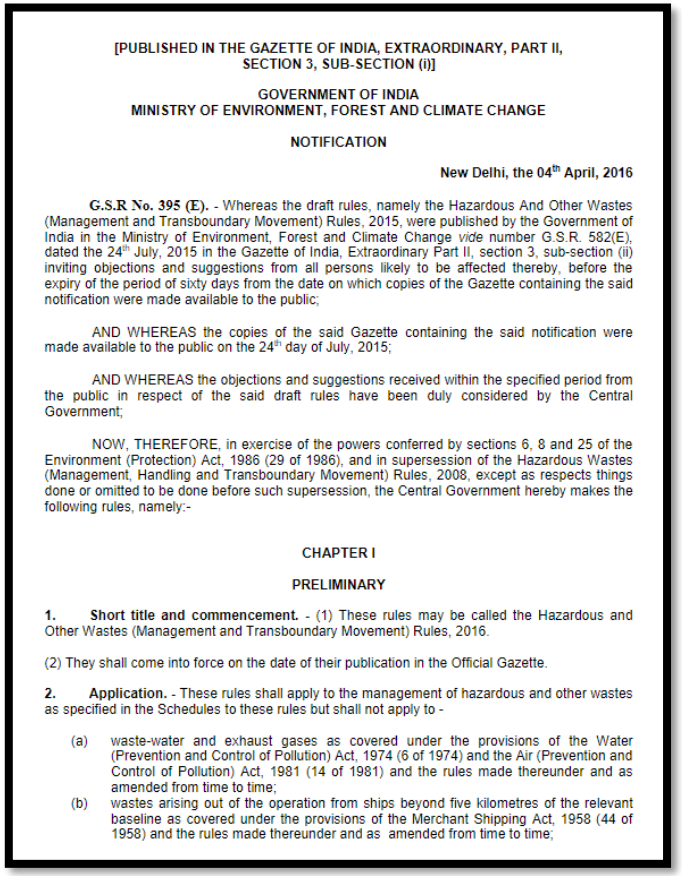
Country	References for Comprehensive Framework: International Regulations
Australia	Scrap metal industry act 2016 no 42
Canada	Scrap metal dealers and recyclers identification act
China	Procedures of Shanghai Municipality on the administration of recycling of renewable resources
EU	Waste Framework Directive
Gibraltar	Public health (scrap metal dealers rules) 2014
Kenya	Scrap metal act
Latvia	Regulations regarding the procedures for purchasing and selling of ferrous and non ferrous metal cuttings and scrap and for issuing licenses for the purchase of metal cuttings and scrap in latvia and also the rate of state fee for a license for purchase of ferrous and non ferrous metal cuttings and scrap and the payment procedures for the state fee.
Malaysia	Announcement on the implementation of revised guidelines for the importation and inspection of Metal scrap
Marshall Island	Scrap Metal Dealer Inspection Act 2009
Michigan	Michigan compiled Laws Act 429 of 2008 Scrap metal regulatory act
Nevada	Dealers in Junk and second hand Materials- Scrap Metal Processors
Oklahoma	Oklahoma scrap metal dealer Law and Rules.
UK	Guidance for scrap Metal Dealers, Scrap metal Dealers Act 2013
Ukraine	Law of Ukraine about Scrap Metal
USA	Aluminium Import Monitoring and Analysis System, Waste Import Export Tracking system (WIETS)
Vietnam	Environmental protection in the import of scrap for use as production material.
Zambia	The Scrap metal Dealer Act

Reference for Guidelines /Standards

Metal	Country	Name of the guidelines/standard
Aluminium	Malaysia	Guidelines for importation and inspection of metal scraps; (Ref: ISO 2859-1)
	China	GB/T34640 (Ref: GB/T 3190); GB/T 38472
	EU	BS EN 13920-1; COUNCIL REGULATION (EU) No 333/2011
Copper	Malaysia	Guidelines for importation and inspection of metal scraps
	EU	EN 12861: Copper and copper alloys-scrap
	Japan	JIS H 2109: 2006
	China	GB/T 13587-2020
Zinc	EU	EN 14290:2004; EN 13283:2002;
	China	GB/T 21651-2018; GB/T 13589-2007;
	ASTM	ASTM B 960 – 18
Lead	EU	Regulation (EC) No 1907/2006; Directive 2018/849
	China	GB/T 37281-2019; GB 13392-2005

References for Standard documents
International standards, regulations or guidelines for NF metal scrap

References for Comprehensive Framework: Indian Regulations



[PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY, PART II, SECTION 3, SUB-SECTION (i)]

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 04th April, 2016

G.S.R No. 395 (E). - Whereas the draft rules, namely the Hazardous And Other Wastes (Management and Transboundary Movement) Rules, 2015, were published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* number G.S.R. 582(E), dated the 24th July, 2015 in the Gazette of India, Extraordinary Part II, section 3, sub-section (ii) inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of the period of sixty days from the date on which copies of the Gazette containing the said notification were made available to the public;

AND WHEREAS the copies of the said Gazette containing the said notification were made available to the public on the 24th day of July, 2015;

AND WHEREAS the objections and suggestions received within the specified period from the public in respect of the said draft rules have been duly considered by the Central Government;

NOW, THEREFORE, in exercise of the powers conferred by sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008, except as respects things done or omitted to be done before such supersession, the Central Government hereby makes the following rules, namely:-

CHAPTER I

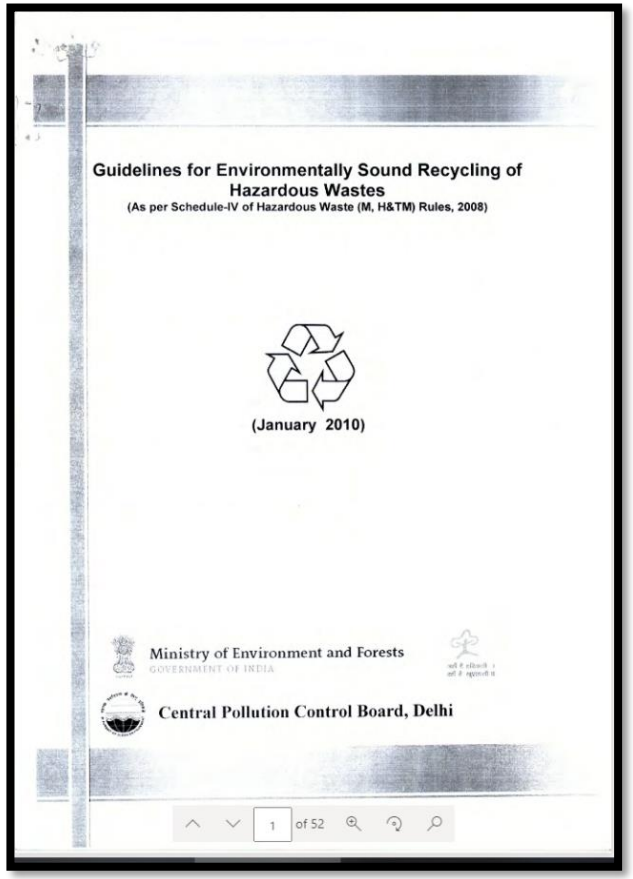
PRELIMINARY

1. **Short title and commencement.** - (1) These rules may be called the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. **Application.** - These rules shall apply to the management of hazardous and other wastes as specified in the Schedules to these rules but shall not apply to -

(a) waste-water and exhaust gases as covered under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) and the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder and as amended from time to time;
(b) wastes arising out of the operation from ships beyond five kilometres of the relevant baseline as covered under the provisions of the Merchant Shipping Act, 1958 (44 of 1958) and the rules made thereunder and as amended from time to time;



Guidelines for Environmentally Sound Recycling of Hazardous Wastes

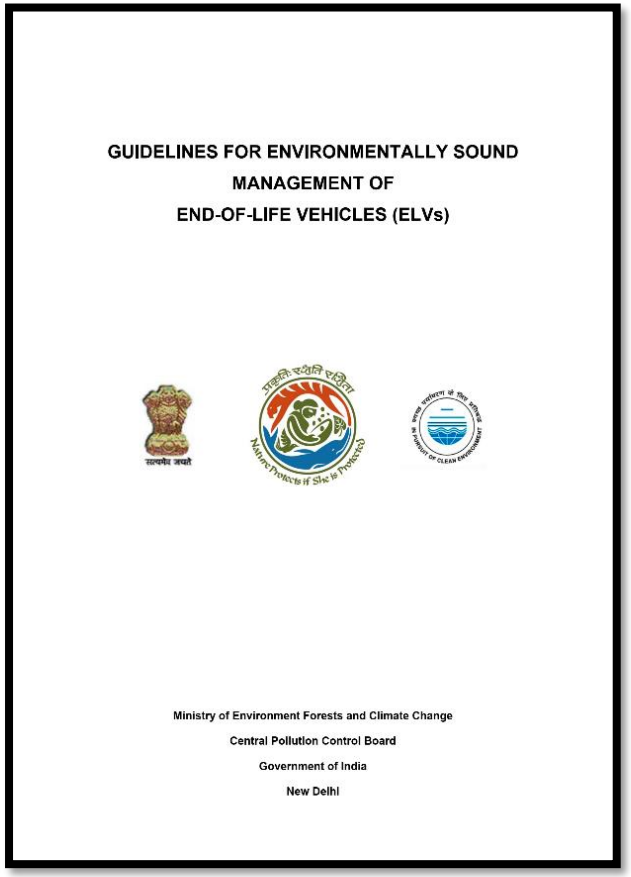
(As per Schedule-IV of Hazardous Waste (M, H&TM) Rules, 2008)

(January 2010)

Ministry of Environment and Forests
GOVERNMENT OF INDIA

Central Pollution Control Board, Delhi

1 of 52



GUIDELINES FOR ENVIRONMENTALLY SOUND MANAGEMENT OF END-OF-LIFE VEHICLES (ELVs)

Ministry of Environment Forests and Climate Change

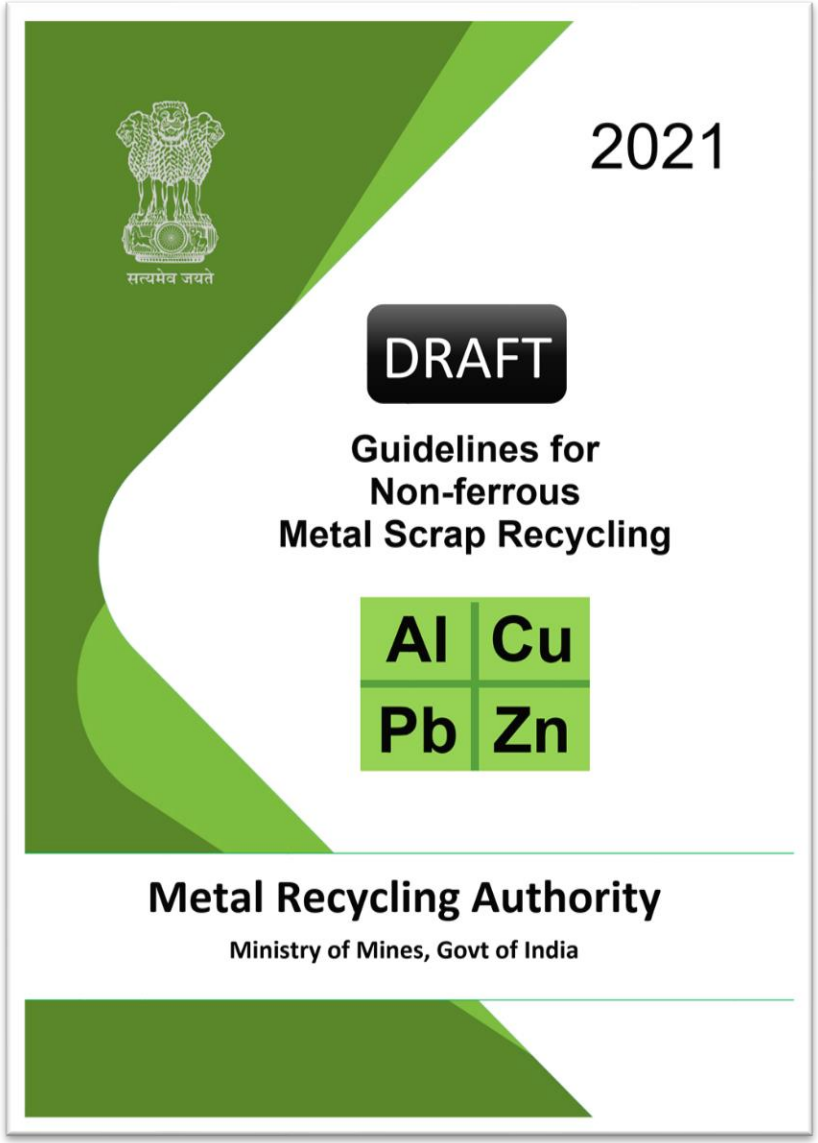
Central Pollution Control Board

Government of India

New Delhi

Circular Economy in Scrap Metal (NITI Aayog & MoS)	**Vehicle Scrappage Policy (MoRTH)**	**Non-Ferrous Metal Import Monitoring system (MoM)**
Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules (MoRTH)		**E-Waste (Management) Rules, 2016**

Draft Guidelines for Non-Ferrous metal scrap recycling (MRA)



CONTENTS

Roles & responsibilities of Stakeholders

1. Scrapping Facilities
2. Aggregators/Segregators
3. Importers
4. Local Traders
5. Recyclers
6. OEMs
7. Public

Action Plan for Circular Economy Metal
(Ferrous and Non-Ferrous)

Zero waste management policy in line with zero discharge to encourage utilization of various wastes and improving sustainability in metal Sector

Study of existing practices and benchmarking the same
Collection of BAT and their viability for Indian scenario
Stakeholders' consultations

Ministries to carry out scoping and have stakeholder consultation for EPR provisions for different wastes and scraps for effective utilization

Identification of products for EPR
Initial stage – Products with shorter life-span
Stakeholders' consultation

Series of conferences on resource efficiency, circular economy, recycling etc.

Conferences on resource efficiency and circular economy
Coming up – IBAAS=JNARDDC 2022, Raipur

Exchange programs with international bodies like EU, OECD and other countries to bring "Best Available Technologies (BAT)

Globally renowned technology suppliers and their BATs
MoUs for exchange programs
Institute of Scrap Recycling Industries (ISRI), Recycling Industry Operating Standard (RIOS)
Bureau of International Recycling (BIR)
Organisation for Economic Co-operation and Development
European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (CENELEC), American National Standards Institute (ANSI), the British Standards Institution (BSI)
International Aluminium Institute (IAI)
European Aluminium Association (EAA)
Aluminium Stewardship Initiative (ASI)
Russian Aluminium Association

Support for setting up centralized Dross treatment facility for Al recovery & producing chemicals (Aluminium)

Useful to aluminium recyclers for bulk utilisation of dross generated

Quantities of dross generated by individual recyclers is too low to be used in cement industry

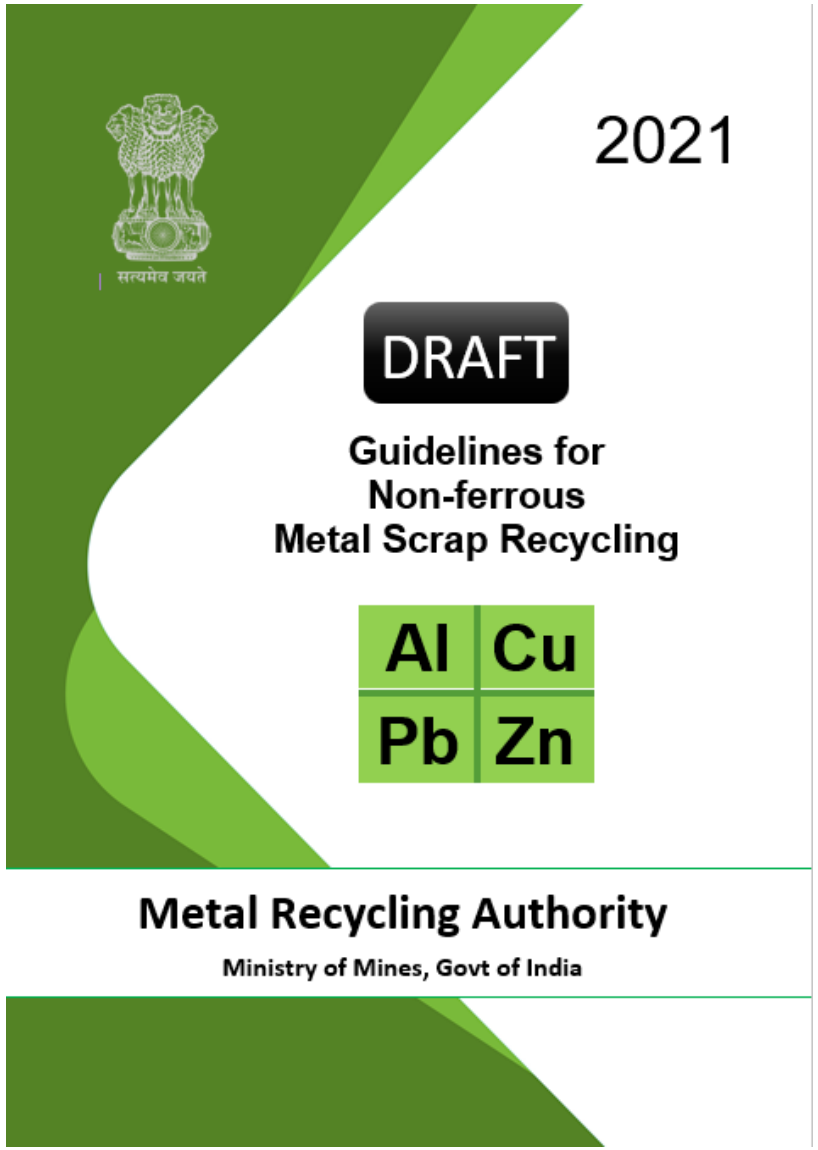
Support R&D projects to develop technologies for resource efficiency & circular economy, utilisation of industrial wastes, by-products, carbon capture utilisation and storage technologies, skill upgradation

Useful to aluminium recyclers for bulk utilisation of dross generated

Promotion of green products labels. Certifications and development of standards for recycled products

To promote usage of products with recycled content and stimulating the potential for market-driven continual environmental improvement

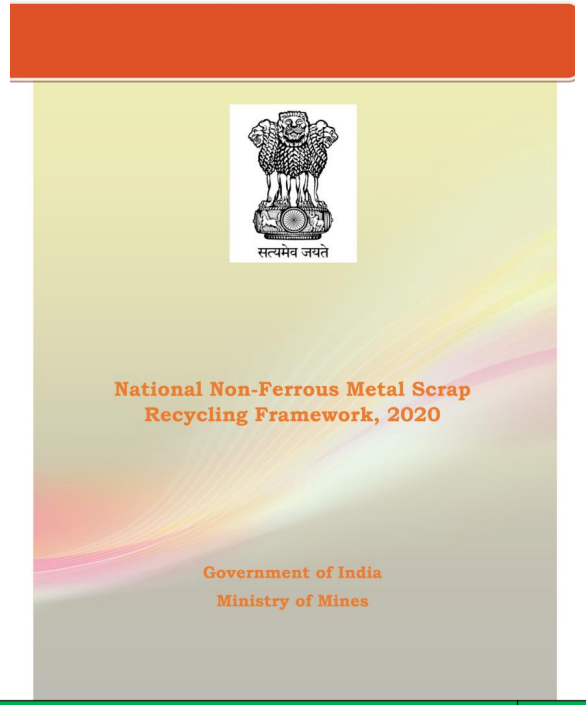

DRAFT
Zero Waste Management policy for Sustainability and Waste Utilisation in Aluminium Downstream & Recycling Industry
सत्यमेव जयते
Ministry of Mines

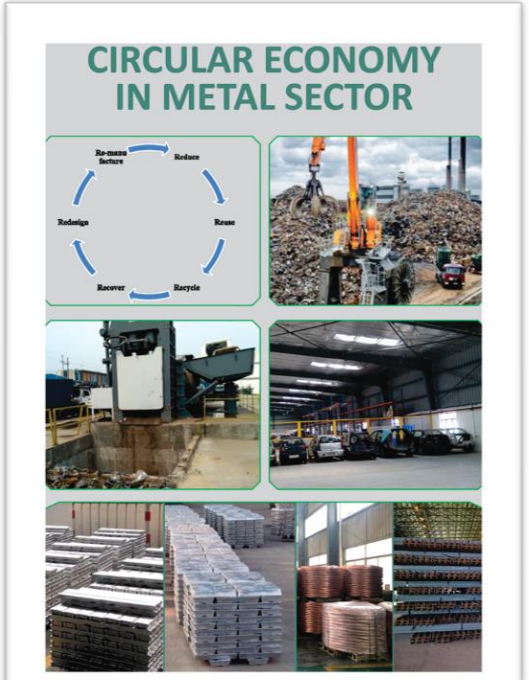

सत्यमेव जयते
2021
DRAFT
Guidelines for Non-ferrous Metal Scrap Recycling
Al Cu
Pb Zn
Metal Recycling Authority
Ministry of Mines, Govt of India

Policy Interventions - Challenges faced by Aluminium Recycling Industry

Domestic Scrap Availability	Metal Price Stability	Adapting to manufacture of new products	Environmental protection from recycling industry wastes
Human Health from Hazardous Substances	Recycling or waste management practices	Lack of Appropriate Recycling Infrastructure	Management of End-of-Life Products
Recycling technologies for the complex and elementally diverse products	Collection Segregation norms for industrial/domestic scrap	Disassembly of Modern and Complex Multi Material Product	Compliance to the National Product Standards

MAKE IN INDIA	FAME INDIA SCHEME	NATIONAL NON-FERROUS METAL RECYCLING FRAMEWORK	AATMANIRBHAR BHARAT ABHIYAN
USD 5 TRILLION ECONOMY	CIRCULAR ECONOMY IN SCRAP METAL	VEHICLE & SHIP SCRAPPAGE POLICY	SOLAR POWER
INDUSTRIAL CORRIDORS	CARBON BORDER ADJUSTMENT MECHANISM	SMART CITIES AMRUT CITIES	ELECTRICITY AND HOUSING FOR ALL





Circular Economy in Scrap Metal (NITI Aayog & MoS)	Vehicle Scrappage Policy (MoRTH)	Non-Ferrous Metal Import Monitoring system (MoM)
Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules (MoRTH)		E-Waste (Management) Rules, 2016

Domestic scrap availability

- Domestic scrap generation is not well organized / documented, and recyclers are mostly using imported scrap.
- Domestic scrap generation is around 10 – 15% of the total scrap used.
- Domestic sources of aluminium scrap include aluminium cables, automobiles, consumer durables and appliances, utensils, and packaging. Electricity Boards, railways, and road transport industry etc. auction scraps containing aluminium form the major source of domestic scrap.

Policy Interventions

- Vehicle Scrappage Policy (MoRTH)
- Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules (MoRTH)
- National Non-Ferrous Metal Scrap Recycling Framework (MoM)
- Circular Economy in Metal Sector (NITI Aayog)
- Swach Bharat Abhiyan

- Around 1.67 million tons of scrap is imported mostly from USA, UK and middle east countries
- The Indian recycling supply chain and value chain includes micro and small enterprises.
- LME

Policy Interventions

- Non-Ferrous Metal Scrap Recycling Framework 2020:
  - Introduction of Quality Certification Mechanism for recycled secondary metal to facilitate market uptake of recycled material/product
  - Online market platform/ exchange platform for auctions of recycled metal/End of life metal products
  - Public Procurement
  - Financial incentives
  - Green Rating

Adapting to manufacture of new products

- Existing technology is to be retrofitted
- Guidance is required

Policy Interventions

- Metal Recycling Authority (MRA) – Process and Product standards, infrastructure guidelines will help choosing right infrastructure and process
- Exchange programs with international bodies like EU, OECD and other countries to bring "Best Available Technologies (BAT)
- Support R&D projects to develop technologies for resource efficiency & circular economy, utilisation of industrial wastes, by-products, carbon capture utilisation and storage technologies, skill upgradation

Environmental protection from recycling industry wastes

- Organized sector sends to TSDF
- Illegal dumping by unorganized sector

Policy Interventions

- NITI Aayog's Circular Economy in Metal Sector – "Zero Waste Management policy for Sustainability and Waste Utilisation in Aluminium Downstream & Recycling Industry"
- Metal Recycling Authority (MRA) – Process standards, Minimum Infrastructure requirements

- Poor working conditions in unorganized sector

Policy Interventions

- Metal Recycling Authority (MRA):
  - Registration of all players involved in recycling, scrap sorting, scrap aggregating, scrap trading, etc.
  - Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- NITI Aayog's Circular Economy in Metal Sector – "Zero Waste Management policy for Sustainability and Waste Utilisation in Aluminium Downstream & Recycling Industry"

Lack of standardization of recycled products

- Adversely affecting market adoption
- 30% of the products are manufactured by 70% of recyclers who belongs to unorganized sector

Policy Interventions

- Metal Recycling Authority (MRA) – Registration of all players involved in recycling, scrap sorting, scrap aggregating, scrap trading, etc.
- Metal Recycling Authority (MRA) – Product standards, Green rating of products, rating of recycling industry (RRI)
- Non-Ferrous Metal Scrap Recycling Framework 2020: Recycled metal will be certified for its physicochemical quality by accredited agencies, to enable its uptake by goods producers/ manufacturers

Lack of standardization of recycled products

Product standards

There is a place for mandatory instruments to ensure higher levels of recycled content in various aluminium products which are to be identified and assessed.

QCOs

Aluminium Products	Standard	Aluminium Products	Standard
Aluminium alloys for IC engines	IS 7793:1975	Sheet and strips of Al and its alloys	IS 737:2008
Aluminium ingots for general engineering purposes	IS 617:1994	Notched bars and ingots for remelting purposes	IS 1820:1979
Forging stock	IS 734:1975	Rivet stock	IS 740:1977
Bolt and screw stock	IS 1284:1975	Corrugated aluminium sheet	IS 1254: 2007
Al-Bronze ingots and castings	IS 3091:1999	Aluminium collapsible tubes	IS 3101: 1995
Aluminium for use in iron and steel manufacture	IS 1253:1992	Aluminium tubes for refrigeration purposes	IS 9612: 1980
Anodized wrought aluminium for external architectural applications	IS 11857: 1986	Round top aluminium Containers for Liquid Pesticides	IS 12340: 1988
Bars, rods, sections of Al and its alloys	IS 733:1983	Plates of Al and its alloys	IS 736:1986
Al alloy ingots for bearings	IS 6754:1972	Aluminium foil stock	IS 10257:1982

- Age-old technologies

Policy Interventions

- Metal Recycling Authority (MRA) – Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- NITI Aayog's Circular Economy in Metal Sector – "Zero Waste Management policy for Sustainability and Waste Utilisation in Aluminium Downstream & Recycling Industry" – Apart from administrative rules, utilisation options for wastes will be discussed

Lack of Appropriate Recycling Infrastructure/Technology

- Age-old technologies and infrastructure

Policy Interventions

- Metal Recycling Authority (MRA) – Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- Support for setting up centralized Dross treatment facility for Al recovery & producing chemicals (Aluminium)
- Exchange programs with international bodies like EU, OECD and other countries to bring "Best Available Technologies (BAT)

Management of End-Of-Life Products

- Cradle-to-Cradle
- Prevent downcycling

Policy Interventions

- Metal Recycling Authority (MRA) – Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- Metal Recycling Authority (MRA) – Responsibilities of stakeholders
- Metal Recycling Authority (MRA) – development of urban mine facilities
- Vehicle Scrappage Policy & RVSF

Collection, Segregation norms for industrial/domestic scrap

- Technologically sound sorting

Policy Interventions

- Metal Recycling Authority (MRA) – Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- Non-Ferrous Metal Scrap Recycling Framework 2020: Online market platform/ exchange platform for auctions of scrap
- Circular economy actions- informal value chain

Lack of an organized / systematic scrap recovery mechanism

- At the core of an effective material recycling eco system is a systematic, organized and user friendly collection, segregation and sorting process.

Policy Interventions

- Metal Recycling Authority (MRA) – Process standards, infrastructure guidelines, rating of recycling industry (RRI)
- Non-Ferrous Metal Scrap Recycling Framework 2020: To promote a formal and well organized recycling ecosystem by adopting energy efficient processes for recycling leading to lower carbon footprints and to work towards sustainable development and intergenerational equity
- Circular economy actions- Skill Development of informal value chain
- Circular economy actions- EPR

Policy interventions at different levels - Manufacturer

- **Extended Producer Responsibility (EPR)** guidelines
  - facilitate the collection of recyclable either through take back schemes or through tie ups with scrap recycling units
- Designing the products to contain **safer** materials and that are easier to **recycle** and **reuse**
- Proper coding of reusable component and material
- Provide dismantling information for each type of product
- Consumer awareness on environmental friendly management of wastes
- special incentives on new products upon exchange of end of life products

Policy interventions at different levels - Public

- Dispose scrap at designated scrap collection centers for their effective and environmentally sound processing
- Hazardous scrap may be disposed off separately at the designated centers
- To ensure that all scrap & waste go to the authorized recycling units

Policy interventions at different levels - Government

- Promoting Ease of Doing Business in recycling
- Streamline the regulatory requirements, eliminating multiple clearances wherever feasible
- Standard Operating Procedures (SOP) for obtaining clearances for setting up of recycling units
- Institutional mechanism for carrying out detailed studies and advanced research related to recycling of metals
- Creating public awareness
- Providing necessary support to promote R&D in metal scrap recycling
- Provision for fiscal and non-fiscal incentives

Policy interventions at different levels - Government

- Ensuring that any hazardous waste is routed to authorized recyclers only
- public procurement of goods with targeted content of recycled/secondary metals
- “Minimum Recycled Content Requirement” for manufacturing of select products

Policy interventions at different levels - MRA

- Technical, safety and environmental norms and standard operating procedures (SOPs) for handling and processing of scraps
- Quality standards for scrap
- Process standards and Infrastructure Guidelines
- Mechanism for registration of segregators, dismantlers, recyclers, collection centers
- Increasing the number of collection and processing centers in organized sector
- Develop performance indicators
- Mechanism for ranking and evaluation of units

Policy interventions at different levels - MRA

- Setting up
  - Specified metal recycling zones
  - Urban mines
- Introduction of Quality Certification Mechanism for recycled secondary metal
  - Facilitate market uptake of recycled material/product
- Online market platform/ exchange platform for auctions of recycled metal/End of life metal products
- Digital platform/ portal for aggregating central and state level recycling database
- Promoting Start-ups in coordination with MSME

Other Policy Interventions- MRA's views

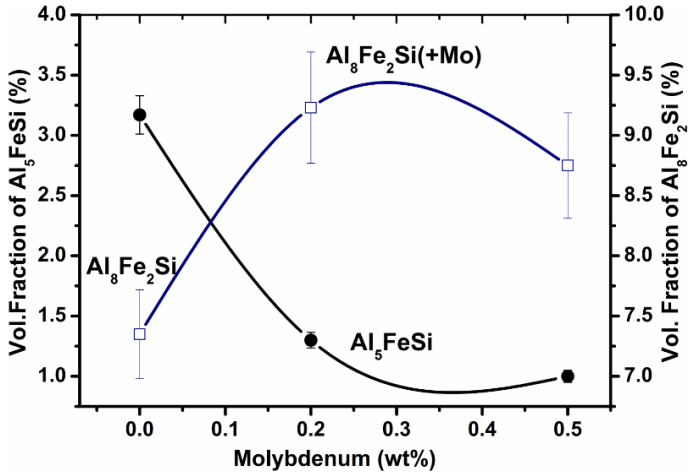
- Capacity building for informal value chain like rag pickers, kabadiwalas, local aggregators or traders
- Measures for prevention of metal theft specifically from public infrastructures
- Fiscal incentives/support to recycling industry/recycled product users (industry status)
- Uniform rules & regulations for the aluminium recycling eco-system
- Technical training programs for aluminium recycling shop floor persons
- Bilateral agreements for the supply of high-quality aluminium scrap
- Set up of aluminium recycling technology demonstration centre.

Un-diluted Recycling of Cast Aluminium Alloys Containing High Fe Impurity Suitable for SMEs

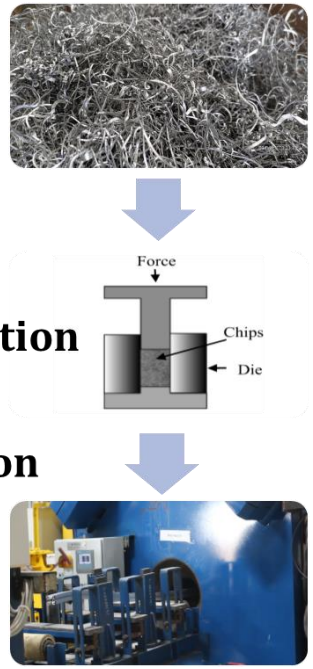
		Si	Fe	Cu	Mn	Mg
Mn-(40g) (NANO)	w/o powder	3.84	1.09	0.31	0.067	0.18
	Top	3.73	0.90	0.29	0.075	0.16
	Middle	3.59	0.74	0.31	0.070	0.12
	Bottom	3.52	0.73	0.30	0.071	0.11

Fe Filtration

Intermetallic modification



WQ Ain, MK Faisal, W Darham, TM Kumar, MM Ratnam, Y Kwon, NJ Kim and AK Prasada Rao, Effect of Mo on the high-temperature creep resistance and machinability of a recycled Al alloy with high Iron impurity" J. Mater. Eng. Perf., Vol. 25 (10) (2016), pp 4310–4316.

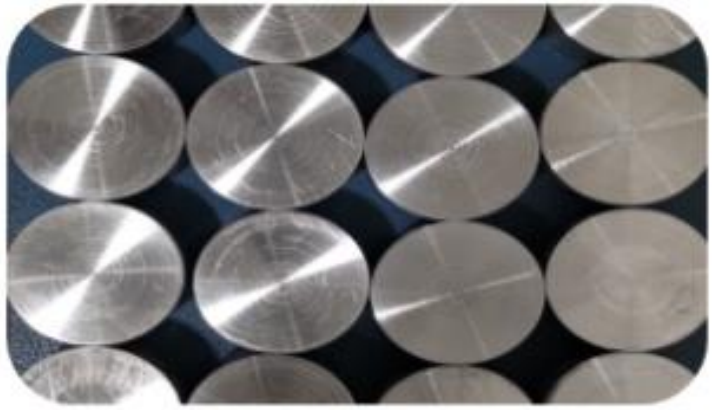


Solid-state Recycling of Aluminium Swarf/ Chips for Pilot Scale Extrusion Billets

Production and Certification of Certified Reference Materials for the Analysis of Aluminium Alloys

Indigenous production of CRM at an affordable price
Wide range and alloy specific CRMs
Uncertainties on par with imported CRMs (ALCAN, ARCONIC, MBH, NIST, etc)

Candidate CRM Discs manufactured at JNARDDC



Imported CRM Disc with Certificate

ARCONIC SPECTROCHEMICAL REFERENCE MATERIALS

Certificate of Analysis

Certified: June 05, 2019

WA-6063 D

Distributed by:
Brammer Standard Company, Inc.
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Houston, TX 77069 USA
phone 281-440-5396
www.brammerstandard.com

Element	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag
Weight Percent	0.450	0.180	0.0101	0.0314	0.477	0.0004	0.0016	0.0014	0.0121	0.0000
Estimated Uncertainty	0.008	0.003	0.0004	0.0005	0.007	0.0002	0.0002	0.0002	0.0005	0.0002

Element	As	B	Be	Bi	Ca	Cd	Co	Ga	Li	Na
Weight Percent	(0.0000)	0.0001	0.00000	0.0000	0.0000	0.0000	0.0001	0.0138	0.00000	0.00012
Estimated Uncertainty		0.0002	0.00005	0.0002	0.0002	0.0002	0.0002	0.0004	0.00005	0.00005

Element	P	Pb	Sb	Sc	Sn	Sr	V	Zr
Weight Percent	(0.0000)	0.0006	(0.0000)	0.0000	0.0000	0.0001	0.0098	0.0007
Estimated Uncertainty		0.0002		0.0002	0.0002	0.0002	0.0004	0.0002

This certificate of analysis applies to sections 1 thru 35.

Alcoa Spectrochemical Standards is now part of Arconic and has been renamed Arconic Spectrochemical Reference Materials. Some products and packaging may still be marked with the Alcoa logo while this is marked with the Arconic logo. The CRM or RM is traceable to this COA through the lot number stamped on the CRM or RM regardless of the logo.

Arconic * Arconic Spectrochemical Reference Materials * 100 Technical Drive * New Kensington, PA 15068

Jacobs, Jenee L.
Technical Manager

Page 1 of 1

Testing Certificate # 1019.01
17025:2005 Chemical Testing

Registered to ISO 9001:2015 by Bureau Veritas

See Reverse for Application Notes

ISO 17025 ACCREDITED

ISO 17034 ACCREDITATION IS IN PROGRESS

आज़ादी का अमृत महोत्सव

Upcoming activities

IBAAS 2022

One day Brainstorming on Non-Ferrous Metal Recycling in India

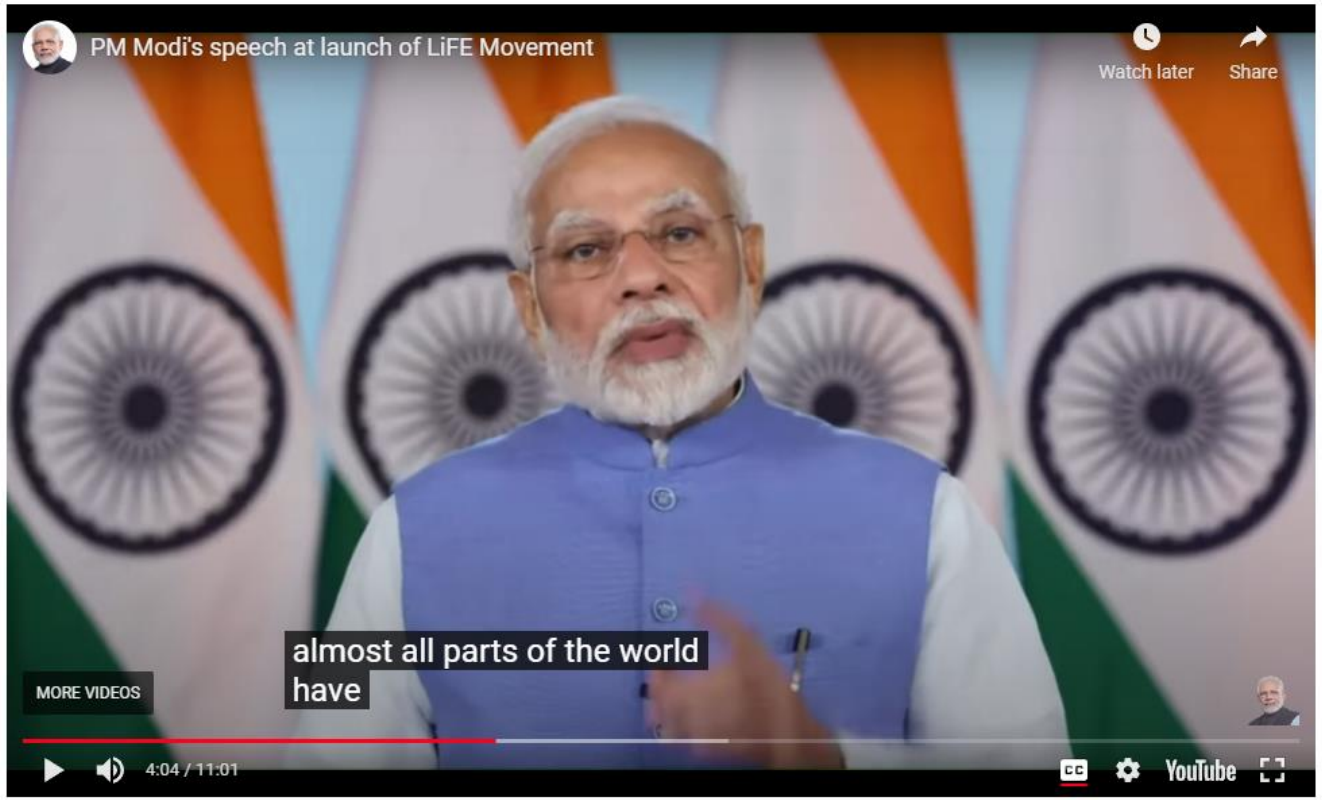
Organised by

Metal Recycling Authority (JNARDDC), Ministry of Mines, Govt of India

17th September 2022

Venue: Courtyard by Marriott, Raipur (India)

Lifestyle for the Environment (LiFE)



LiFE
LIFESTYLE FOR ENVIRONMENT

Ministry of Environment, Forest and Climate Change Government of India

NITI Aayog

PM Launches
'LiFE Movement'
for Adoption of Environment-Conscious Lifestyle

https://www.pmindia.gov.in/en/news_updates/pm-launches-global-initiative-lifestyle-for-the-environment-life-movement/

आज़ादी का अमृत महोत्सव

Let's do our bit

What is LiFE?

The idea of LiFE was introduced by the Prime Minister during the 26th United Nations Climate Change Conference of the Parties (COP26) in Glasgow last year. The idea promotes an environmentally conscious lifestyle that focuses **on 'mindful and deliberate utilisation'** instead of 'mindless and wasteful consumption'.

The LiFE Movement aims to **utilise the power of collective action and nudge individuals across the world to undertake simple climate-friendly actions in their daily lives.** The LiFE movement, additionally, also seeks to leverage the strength of social networks to influence social norms surrounding climate. The Mission plans to create and nurture a global network of individuals, namely 'Pro-Planet People' (P3), who will have a shared commitment to adopt and promote environmentally friendly lifestyles. Through the P3 community, the Mission seeks to create an ecosystem that will reinforce and enable environmentally friendly behaviours to be self-sustainable.

The Mission envisions replacing the prevalent 'use-and-dispose' economy—governed by mindless and destructive consumption—with a circular economy, which would be defined by mindful and deliberate utilization.

https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1831364

Thank you

I stand in recognition of all those who are driving the idea of a "Circular Economy" in India.

R N Chouhan

SENIOR PRINCIPAL SCIENITST
HEAD, DOWNSTREAM DIVISION

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