UK Government

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Bureau of Energy Efficiency
Ministry of Power, Government of India

ASPIRE PROGRAMME

Accelerating Smart Power & Renewable Energy in India

SUMMARY REPORT

Policy Roundtable on

ENABLING CIRCULAR ECONOMY AND RESOURCE EFFICIENCY IN ALUMINIUM AND CEMENT SECTORS -

Utilising Spent Pot Lining (SPL) and Other Waste Products of Aluminium Sector

June 2023

CONTENT

ABBREVIATIONS

Abbreviations	Acronyms
AFR	Alternate Fuel Resources
ASPIRE	Accelerating Smart Power and Renewable Energy in India
BEE	Bureau of Energy Efficiency
CE	Circular Economy
CPCB	Central Pollution Control Board
FCDO	Foreign Commonwealth and Development Office
GCCA	Global Cement & Concrete Association
HOWMTM	Hazardous and Other Wastes Transboundary Movement
JNARDDC	Jawaharlal Nehru Aluminium Research Development & Design Centre
MF	Mixed Fines
Mn	Million
MOEFCC	Ministry of Environment, Forest and Climate Change
MoU	Memorandum of Understanding
MT	Metric Tonne
NCCBM	National Council for Cement and Building Materials
NOX	Nitrous Oxide
PPE	Personal Protective Equipment
RCC	Reinforced Cement Concrete
RE	Resource Efficiency
SOP	Standard Operating Procedure
SPCB	State Pollution Control Board
SPL	Spent Pot Lining
STLC	Soluble Threshold Limit Concentration
TCLP	Toxicity Characteristic Leaching Procedure

BACKGROUND

The Aluminium and Cement sectors play a crucial role in India's industrial landscape, contributing significantly to its economy. However, these industries are highly energy-intensive and have a significant carbon footprint of **~20 tons of CO_2e** per ton of aluminium and **~0.6 tons of CO_2e** per ton of cement produced. India is a major player in these sectors, ranking second globally in both aluminium and cement production withmarket share of ~5.3% and ~9% in terms of production output. Given India's significant presence, it is crucial for the country to prioritise decarbonisation efforts in these industries to achieve its net-zero emissions target by 2070.

To address these challenges, the ASPIRE Programme[1] in collaboration with the Bureau of Energy Efficiency (BEE) organised sector-specific workshops for the Aluminium and Cement sectors in November 2022 and March 2023, respectively. The workshops highlighted the importance of adopting Circular Economy and Resource Efficiency practices in both the sectors to promote sustainability.

In the above workshops, the need for adopting Circular Economy and Resource Efficiency practices to promote sustainability in both the sectors was highlighted. In view of this, the ASPIRE Programme in collaboration with the BEE organsied a Policy Roundtable on June 9th, 2023 at the Bureau of Energy Efficiency, Conference Room, New Delhi. The theme of the policy roundtable was - 'Enabling Circular Economy and Resource Efficiency in Aluminium and Cement Sectors: Utilising Spent Pot Lining (SPL) and other waste products of Aluminium Sector'.

About Spent Pot Lining (SPL)

SPL is a solid waste byproduct generated during the production of primary aluminium. Primary aluminium production involves the Hall-Héroult process, an electrolytic process where alumina feedstock is subjected to a molten bath mixture of cryolite, alumina and aluminium fluoride. Through the application of a significant electric current, the process separates aluminium and oxygen, resulting in molten aluminium metal. This process occurs within carbon-lined steel pots to produce molten aluminium metal. Carbon-lined steel pots are utilized during this process to contain the molten metal, consisting of an insulating refractory lining and an interior carbon lining. As the pot lining ages, it gradually deteriorates, leading to the formation of cracks that compromise its ability to retain the liquid metal within the cell. At the end of operational lifespan, typically after 4-7 years, the lining of the pot is deemed as Spent Pot Lining (SPL).

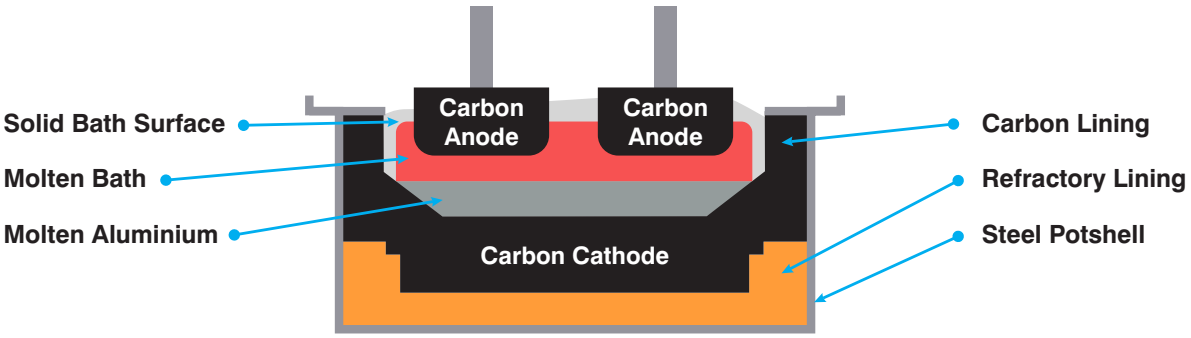


Figure 1 Cross-section of aluminium pot

SPL waste consists of two distinct components: (i) the carbon cathode (referred to as "first cut" and (ii) the refractory portion (referred to as "second cut"). In terms of weight, SPL typically comprises ~60% carbon and ~40% refractory material. The specific generation of SPL is estimated to be ~15-25 kilograms per metric ton of Aluminium produced. In the Aluminium smelting industry, the lifespan of a pot is ~2500-3000 days, with each pot generating ~55-60 metric tons of SPL at the end of its operational life.

[1] About ASPIRE Programme
Accelerating Smart Power and Renewable Energy in India (ASPIRE) is a bilateral programme implemented by Foreign Commonwealth and Development Office, Government of UK in association with Ministry of Power and Ministry of New and Renewable Energy, Government of India. KPMG is the lead delivery partner for the ASPIRE Programme. Idam Infrastructure Advisory Private Limited (India) and Carbon Trust (UK) are the key consortium members.

SPL has been classified as hazardous waste due to several factors including, presence of toxic fluoride and cyanide compounds that are leachable in water; exhibits corrosive properties resulting from high pH due to alkali metals and oxides and reacts with water producing inflammable, toxic and explosive gases.

To ensure safe and effective utilisation of SPL, the **Central Pollution Control Board (CPCB)** has developed comprehensive guidelines in form of **Standard Operating Procedures (SOPs)**. Key provisions of the CPCB guidelines are as follows:

- SPL transportation to be carried out using covered containers for the SPL ranging in size from 200-500 mm
- Authorization from State Pollution Control Board (SPCB) is necessary for both sender and receiver involved in the transportation of SPL
- SPL storage requires a cool, dry, well-ventilated covered shed with impervious Reinforced Cement Concrete (RCC) flooring to prevent rainwater intrusion. The design and authorization of this shed should be approved by SPCB/Pollution Committee. The covered storage shed should have a designated space for unloading of SPL
- The crushing and screening system should operate in a closed environment under negative suction, connected to a cyclone, pulse jet bag filter, and ID fan.
- The screened SPL (less than 30 mm) should be subjected to heat treatment in the rotary kiln at a minimum temperature of 430°C.
- Proper ventilation should be maintained in the work zone and process areas. It is mandatory for personnel to use appropriate Personal Protective Equipment (PPE) to mitigate potential risks
- The unit shall provide suitable fire safety arrangements and flame-proof electrical fittings to minimise fire-related risks
- SPL should only be sourced from industries with valid authorization for its generation and storage, as mandated by Rules and Regulations
- The unit is liable for addressing environmental damage caused by improper handling of hazardous waste, including spillage of hazardous waste
- The unit must comply with the requirements of the Public Liability Insurance Act, 1991, as amended, during the utilization and handling of hazardous waste, where applicable.

Current Disposal Practices for SPL

- **Encapsulation and Landfilling:** SPL is encapsulated within a suitable matrix and disposed of in designated landfills with necessary approvals from SPCB.
- **Utilization in Cement Kilns:** SPL is utilized as an alternative fuel and raw material in cement kilns, following specific guidelines and approvals from SPCB.
- **Recycling and Recovery:** SPL is treated and processed to recover valuable materials such as carbon, fluoride, and aluminium, through approved recycling facilities authorized by SPCB.
- **Secure Storage and Monitoring:** SPL is stored in secure facilities equipped with necessary safety measures and regular monitoring to ensure compliance with environmental regulations.

Objective of the Policy Roundtable

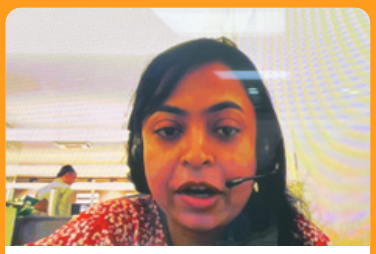
- Deliberate and explore the potential of utilising Spent Pot Lining (SPL) from the Aluminium sector in the context of circular economy. This includes identifying and evaluating suitable approaches and technologies for its utilisation.
- Identify policy interventions required to facilitate safe and environmentally friendly disposal or reprocessing of SPL.
- Address challenges associated with SPL management, including its hazardous nature, proper handling, homogenisation, storage, and compliance with regulatory directives.
- Foster collaboration & develop effective strategies for sustainable SPL management, contributing to resource efficiency, energy conservation & reduced environmental impact.

Highlights

- The policy roundtable witnessed participation from **30+** senior officials from BEE, Jawaharlal Nehru Aluminium Research Development & Design Centre (JNARDDC), Global Cement & Concrete Association (GCCA) India, Dalmia Cement, Vedanta Aluminium, UltraTech Cement, Hindalco Industries, JK Cement, Shree Cement, JK Lakshmi Cement, JSW Cement, My Home Industries, ACC Ltd., etc.
- The event featured **7** interactive and informative presentations.
- 6 speakers including **2 Women** speakers

INAUGURAL SESSION

Speakers



Ms. Sanyukta Das Gupta
Senior Adviser,
Smart Power,
British High Commission

Sunil Khandare
Director,
BEE

Mr. Dipak Khandare
Associate Director,
Idam Infra,
ASPIRE Team

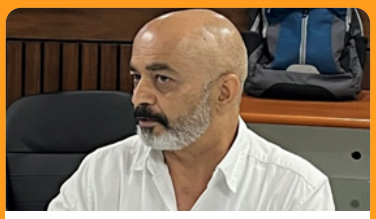
Key Takeaways

- Government of India's long-term strategy aims to develop a low emission industrial system, with specific focus on energy & resource efficiency, circular economy, and emerging technologies like green hydrogen & CCUS.
- Energy intensive sectors such as Aluminium and Cement are poised to play a critical role in India's decarbonisation efforts.
- Circular economy and resource efficiency are key focus areas for industries across both Aluminium and Cement sectors.
- SPL, a residual material generated in the primary aluminium smelting industry, holds significant potential as a valuable alternative raw material for the cement and ferro-alloy sectors due to its abundant carbon & mineral content making it valuable resource for these industries.
- Utilizing SPL or its derivatives in cement kilns as an alternate fuel and raw material (AFR) offers several benefits including:
  - ✓ **Reduction in fuel consumption:** Burning first cut SPL as fuel, reduces the the kiln's reliance on primary fuel
  - ✓ **Lower clinker temperature:** The fluoride content present in SPL acts as a flux, lowering the clinker temperature from 1450°C to 1350°C, which is beneficial for the cement production process.
  - ✓ **Reduced nitrous oxide (NOX) emissions:** The presence of Ammonia and cyanide in SPL can contribute to upto one-third reduction in NOX emissions from the cement kiln
- SPL or its derivatives can be introduced into a cement kiln in two ways: (i) injection alongside pulverized coal through the Kiln burner (for first cut SPL only) and (ii) pneumatic injection into the pre-heater end of the Kiln (for both first and second cut SPL).
- Extensive research and development in the United Kingdom have led to expertise in repurposing waste from the aluminium sector for cement production. The UK is actively developing new technologies for the repurposing of SPL and other waste materials.

Photograpghs from the policy roundtable discussions

ROUNDTABLE DISCUSSION

Speakers



Dr. Anupam Agnihotri
Director,
JNARDDC,
Nagpur

Dr. Alka Mishra
General Manager,
Sustainability Solutions,
Dalmia Cement (Bharat) Ltd.

Mr. Nitin Tiwari
Chief Operating Officer,
Vedanta Aluminium,
Jharsuguda (Odisha)

Dr. Rina Shinde
General Manager (QC),
UltraTech Cement Ltd
(Unit: Vikram Cement Works)

Mr. Kaustubh Phadke
India Head,
GCCA India

Mr. Bhushan Patil
International Fund Associate,
Carbon Trust,
ASPIRE Team

Highlights from the Presentations:

- **Dalmia Cement** emphasized the possibility of judiciously utilizing SPL-MF (Mixed Fines) as a raw mix component in cement kilns, under the guidelines of the Central Pollution Control Board (CPCB)/ State Pollution Control Board (SPCB). However, careful implementation is essential to address challenges and meet regulatory requirements.
- Dalmia Cement's trial at its Rajganjpur (Odisha) plant, demonstrated successful absorption of up to **1%** of SPL-MF in clinker production, depending on the quality of SPL-MF received from the Aluminium Industry.
- Apart from SPL, the aluminium sector generates additional waste/ secondary products such as red mud and dross, which hold potential for repurposing in other sectors. These by-products offer opportunities for sustainable resource utilization beyond their initial production process.

- The utilization of SPL is inevitable with the advancement of Circular Economy (CE) and Resource Efficiency (RE). **JNARDDC** offers the technology for incorporation of SPL in cement production as per the compositional requirements specified by cement industry.
- It was highlighted that there is a need to formulate a mechanism to share profits/ costs between aluminium smelting and cement industries to enable a sustainable circular economy ecosystem.
- Industries highlighted the need for an incentive mechanism such as inclusion in Carbon Trading Scheme by the government to support removal of legacy hazardous wastes. This would provide various benefits including ensuring environmental protection, enable carbon credit transactions, promote compliance, and facilitate transition to a circular economy.
- Effective utilization of SPL requires removal of impurities, use of the carbon component should in small quantities since there are challenges in handling SPL including difficulties in grinding, cyanide content, and storage issues.
- Exploring the trial utilization of alumina, refractory waste, and carbon dust as well as considering cast house dross with aluminium, alumina, and fluoride content can further enhance resource utilisation.
- Addressing the challenges of hazardous waste from aluminium units requires adopting a cluster approach and leveraging the role of SPCBs as facilitators. Investments and focused efforts are crucial for advancing sustainable practises in the aluminium sector.
- The aluminium industry in the UK serves as a prime example of leading practises including closed-loop supply chains, whole-life design innovation, and a national recycling strategy. These practices hold great potential for fostering a circular economy within India's aluminium industry.
- Adoption of such sustainable approaches enable resource efficiency and minimisation of waste generation, thus enhancing overall efficiency of the sector and contributing to the country's action on climate change.

FEEDBACK FROM THE PARTICIPANTS

- ~93% of the participants were satisfied with the organisation and structure of the policy round table (provided 3+ rating on a scale of 5).
- ~93% of the participants were more than satisfied with the quality of the information and insights shared by the speakers (provided 3+ rating on a scale of 5).
- Following aspects of the policy roundtable were highly appreciated by the participants:
  - ✓ Discussion on SPL utilization, emphasizing the need for pilot studies to assess its impact on kiln and clinker formation.
  - ✓ The aluminium industry demonstrated a clear commitment to facilitating SPL utilization. Both sectors explored various means of using SPL as part of raw material replacement and Alternate Fuel Resources (AFR).
  - ✓ The collaborative atmosphere between the aluminium and cement sectors showcases an openness to finding mutually beneficial solutions.
  - ✓ Dalmia Cement Rajganjpur Plant (Odisha) case study which showcased successful implementation of SPL utilisation.
- Following recommendations were provided by the participants for future policy roundtables and similar events:

- Mr. Joginder Singh Kalra
BEE

Organize additional roundtables in Cement Clusters near Aluminium Manufacturing Units to facilitate focused discussions and targeted solutions.

- Mr. Manoj T. Nimje
JNARDDC

Organise discussion groups on holistic understanding of SPL, processing of SPL, role of the aluminium and cement industries regarding SPL, etc.

- Mr. Surrinder Handoo
My Home Industries

Incorporate global case studies on successful implementation of SPL utilization in cement sector to provide valuable insights and guidance for effective practices.

- Mr. Nitin Kumar Tiwari
Vedanta Limited

Active participation from CPCB in roundtable discussions, along with strengthened synergy between the Central and state governments, will be crucial for effectively realizing India's circular economy vision.

WAY AHEAD

Participants and Speakers engaged in discussion

The response to the Policy Roundtable has been positive with significant participation from BEE, JNARDDC, GCCA India, Dalmia Cement, Vedanta Aluminium, UltraTech Cement, Hindalco Industries, JK Cement, Shree Cement, JK Lakshmi Cement, JSW Cement, My Home Industries, ACC Ltd., etc. The policy roundtable effectively facilitated discussions on the circular economy, allowing both the cement and aluminium industries to identify and evaluate suitable approaches and technologies for utilizing SPL from the aluminium sector.

Future intervention or actions identified during the policy roundtable:

- Establishing clear guidelines and requirements for the detoxification of SPL is crucial to ensure compliance with the necessary standards.
- Establish common guidelines from Ministry of Environment, Forest and Climate Change (MoEFCC) and government authorities to enable unrestricted movement of materials between states, fostering an effective circular economy.

- The need for a national-level policy was emphasized as a crucial future intervention. This policy should aim to address key challenges and promote the development of an efficient value chain, enabling widespread and sustainable utilization of secondary products in an economically viable manner.
- Deploying the polluter pays principle is essential. By implementing this principle, industries responsible for generating hazardous waste, such as SPL, would bear the financial responsibility for its management and proper disposal. This approach encourages accountability and incentivises industries to adopt cleaner and more sustainable practices while ensuring the costs of waste management are appropriately allocated.
- Need for extensive and comprehensive trials to be conducted for utilizing First Cut waste in cement plants. These trials will provide valuable insights and data to evaluate the feasibility, efficiency, and potential impact of incorporating First Cut waste as a resource in cement manufacturing processes.
- Classification of SPL MF/SPL 2nd Cut (Refractory part) as non-hazardous waste may be reconsidered, considering its low concentration levels of cyanide content based on Toxicity Characteristic Leaching Procedure (TCLP) and Fluoride content based on Soluble Threshold Limit Concentration (STLC). This evaluation should align with the specifications outlined in Schedule II of the Hazardous and Other Wastes Transboundary Movement (HOWMTM) Rules, 2016, which apply to SPL Cut-1 (Carbon-rich material).
- Establishment of a task force to foster research, development, and effective utilisation of SPL. The Task Force may comprise of representatives from the industry, research institutes such as JNARDDC and National Council for Cement and Building Materials (NCCBM), Central and State Pollution Control Boards, experts appointed by the government.

For more information please contact:

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KPMG India
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ANNEXURE

BACKGROUND NOTE

UK Government | G20 | iDeeksha | Azadi Ka Amrit Mahotsav | Bureau of Energy Efficiency, Ministry of Power, Government of India

ASPIRE PROGRAMME

Accelerating Smart Power & Renewable Energy in India

Industrial Energy Efficiency and Decarbonisaton Knowledge Sharing (iDeeksha) Platform

Policy Roundtable on

ENABLING CIRCULAR ECONOMY AND RESOURCE EFFICIENCY IN ALUMINIUM AND CEMENT SECTORS

Utilising Spent Pot Lining and Other Waste Products of Aluminium Sector

Date: June 9, 2023 | 10:00 - 14:00 hrs (IST)

Venue: Conference Room, Bureau of Energy Efficiency, 4th Floor, Sewa Bhawan, New Delhi

BACKGROUND

The ASPIRE Programme[1] aims to support India's sustainable and low-carbon energy transition to deliver net-zero commitments, with a focus on accelerating the adoption of industrial energy efficiency and decarbonisation (IEED) technologies/ solutions available globally (including from the UK). In view of this, the ASPIRE Programme in collaboration with the Bureau of Energy Efficiency (BEE) developed the IDEEKSHA[2] platform and organised sectoral workshops for four energy intensive sectors – Aluminium, Cement, Iron & Steel and Textile. The **Aluminium and Cement** sectors are **highly energy-intensive**, with carbon intensity of ~20-ton CO_2e per ton of aluminium and 0.576-ton CO_2e per ton of cement, respectively. India is the **second-largest** producer of aluminium and cement in the world with a share of ~**5.3%**[3] and ~**9%**[4] of global output, respectively. Thus, decarbonisation of these two sectors is critical to enable the country in achieving its goal of **net-zero by 2070**.

In the IDEEKSHA workshops, stakeholders deliberated on various best practices, technologies/ solutions and policy interventions required to accelerate decarbonisation of energy-intensive industrial sectors. During the Aluminium and Cement sectoral workshops, 'Circular Economy' and 'Resource Efficiency' were identified as the key focus areas.

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1 **About ASPIRE Programme** – Accelerating Smart Power and Renewable Energy in India (ASPIRE) is a bilateral programme implemented by Foreign Commonwealth and Development Office, Government of UK in association with Ministry of Power and Ministry of New and Renewable Energy, Government of India. KPMG is the lead delivery partner for the ASPIRE programme. Idam Infrastructure Advisory Pvt. Ltd. (India) and Carbon Trust (UK) are the key consortium members.

2 IDEEKSHA – Industrial Decarbonisation and Energy Efficiency Knowledge Sharing Platform

3 https://www.indianmirror.com/indian-industries/2022/aluminium-2022.html

4 https://www.ibef.org/industry/cement-india

In view of the above, the ASPIRE Programme in collaboration with the BEE is organising a Policy Roundtable on the theme – *'Enabling circular economy and resource efficiency in Aluminium & Cement sectors: Utilising spent pot lining and other waste products of Aluminium sector'*. The details for the Policy Roundtable are provided below:

Date & Time: 9th June 2023 | 10:00 to 14:00 Hrs (IST)
Venue: Conference Room, Bureau of Energy Efficiency, 4th Floor, Sewa Bhawan, New Delhi
The **Agenda** for Policy Roundtable is attached in Annexure.

Opportunity for enabling Circular Economy & Resource Efficiency in Aluminium & Cement sectors

Some of the waste products of Aluminium sector, including Spent Pot Lining (SPL) and other wastes, offer significant potential for being re-purposed as an input for the Cement sector.

About Spent Pot Lining (SPL)

SPL, a by-product of Aluminium sector is formed when the carbon and refractory lining of an Aluminium electrolytic cell, also known as a pot, reaches the end of its useful life. SPL consists of a mixture of carbon, refractory lining materials, and fluoride compounds. SPL is classified as a hazardous waste due to its potential toxicity and corrosiveness as mentioned below:

- Contains toxic fluoride and cyanide compounds that can leach into water sources.
- Exhibits high pH levels, making it corrosive due to the presence of alkali metals and oxides.
- Reactive with water, producing flammable, toxic, and explosive gases.

SPL waste consists of two parts: (i) first cut i.e., the carbon cathode, and (ii) second cut i.e., the refractory portion. Typically, SPL comprises ~60% carbon and ~40% refractory by weight. The specific generation of SPL is estimated to be around 15-25 kilograms per metric ton of Aluminium produced. In the Aluminium smelting industry, the lifespan of a pot is typically around 2500-3000 days, and each pot generates ~55-60 metric tons of SPL.

Key challenges in disposal of SPL through co-processing

- **Hardness & Crushability:** Challenges in crushing SPL due to its high bond index (~40-45), making the use of a lime crusher impractical compared to limestone (bond index of 13-15).
- **Process and maintenance impact:** SPL is abrasive, contains variable levels of sodium and fluorine, and has a high ignition temperature for the carbon fraction, which can impact process efficiency and maintenance.
- **Chemical Properties and Handling:** SPL has the potential to form toxic and inflammable gases, such as Hydrogen, Ammonia and Cyanogen, when in contact with moisture. Careful transportation and feeding methods are required to prevent moisture exposure.
- **Homogenisation:** Ensuring material homogenisation is crucial before utilising SPL. Alkali and fluoride content can vary significantly, and the segregation of Aluminium metal, carbon material, and refractory material needs to be addressed.
- **Storage:** Storage of SPL in the open sky or without sealed paved ground is prohibited to ensure proper containment.
- **Safety:** Safety measures are vital at all stages of SPL handling to mitigate risks and ensure worker well-being.
- **Permitting Process:** The permitting process for SPL disposal from the Central Pollution Control Board (CPCB) involves lengthy procedures.
- **Willingness to pay for co-processing/Proper disposal:** Many Aluminium smelters are unwilling to pay even minimum tipping fees for SPL disposal, creating challenges for its proper management.
- **Continuous availability of raw material:** Ensuring a consistent supply of SPL for utilisation.
- **Disposal through unorganised sector:** Crucial to find a permanent solution for safe & environmentally friendly disposal of SPL, particularly concerning the unorganised sector.

- **Waste Quantification and National Database for SPL:** The Indian Cement industry does not have reliable quantification of total SPL available for disposal, including current generation and existing stockpiles. This hinders accurate cost-benefit analysis for long-term SPL disposal through Cement co-processing.

Current practices for disposal of SPL

Historically, SPL has presented a significant environmental challenge, as disposal methods often involved landfilling or improper storage, leading to potential groundwater contamination and soil pollution. Recognising the need for sustainable management of SPL, various stakeholders, including Aluminium smelters, regulators, and waste management experts, have been exploring potential circular economy solutions for SPL.

Opportunity for Circular Economy and Resource Efficiency

In March 2017, the Central Pollution Control Board (CPCB) issued standard operating procedures (SOPs) and checklist for Utilisation of SPL generated from primary Aluminium smelting industries. Under Section 32 of the same, utilisation of SPL for manufacturing of Carbon Mineral Fuel to be used as resource/ energy recovery in Cement kiln has been highlighted. Impact of such SOPs need to be assessed in order to enhance co-processing of SPL in the Cement industry.

The Cement industry, being a major consumer of natural resources, holds immense potential for integrating SPL into its production processes. SPL can serve as a valuable alternative raw material, replacing traditional materials like bauxite, clay, and limestone. By using SPL in Cement production, not only can the Cement industry reduce its dependence on virgin materials, but it can also contribute to lowering the environmental footprint of both the Aluminium and Cement sectors. Additionally, the calcium and silica present in SPL can act as stabilisers, enhancing the mechanical properties of Cement.

Apart from SPL, the Aluminium sector generates various other waste products, such as dross, salt slag, and Aluminium slag, which can be explored for their potential in the circular economy. These waste products can be utilised in sectors like construction, metal recovery, and manufacturing of building materials, reducing the demand for virgin resources, and promoting resource efficiency.

Objectives of the Policy Roundtable

Key objectives of the policy roundtable include:

- Deliberate and explore the potential of utilising SPL from the Aluminium sector in the context of circular economy including identification and evaluation of suitable approaches, technologies
- Identification of policy interventions required to facilitate safe and environmentally friendly disposal or reprocessing of SPL.
- Seek to address challenges related to SPL management, such as its hazardous nature, proper handling, homogenisation, storage, and regulatory directives.
- Foster collaboration & develop effective strategies for sustainable SPL management, contributing to resource efficiency, energy conservation & reduced environmental impact.

Intended Stakeholders

Stakeholders from Bureau of Energy Efficiency (BEE), Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC), Aluminium and Cement industries in India, R&D and industrial associations of the two sectors, regulatory authorities, sectoral experts, etc.

AGENDA

Time (IST)	Session	Presenter
10:00 – 10:30	Registration	
10:30 – 10:35	Welcome Address	ASPIRE Team
10:35 – 10:45	Keynote Address	FCDO Representative
10:45 – 10:55	Inaugural Address	Director General, BEE
10:55 – 11:10	Presentation on Circular Economy	ASPIRE Team
11:10 – 11:40	Presentation on Co-processing Hazardous Waste of Aluminium in Cement Sector	Dr. Anupam Agnihotri, Director, JNARDDC
11:40 – 11:55	Presentation by Vedanta, Jharsuguda (Utilisation of SPL to replace iron slag in Cement Plant)	Representative of Vedanta Ltd.
11:55 – 12:10	Presentation by industries/ industry association from Aluminium sector	Representative of an Aluminium industry (TBC)
12:10 – 12:25	Presentation by industries from Aluminium sector	Representative of an Aluminium industry (TBC)
12:25 – 12:40	Presentation by industries from Cement sector	Representative of a Cement industry/ Association (TBC)
12:40 – 12:55	Presentation by industries/ industry association/ R&D institution from Cement sector	Representative of National Council for Cement and Building Materials (NCCBM), India (TBC)
12:55 – 13:10	Virtual Presentation by UK Aluminium/ Cement industry/ industry association/ R&D institution*	Representative of UK industry/ industry association/ R&D institution (TBC)
13:10 – 13:50	Open House	
13:50 – 14:00	Closing Remarks and Way Forward	BEE & ASPIRE Team
14:00 onwards	Lunch and Networking	

ATTENDANCE SHEET

S. No	Name	Designation	Organisation
1	Dr. Anupam Agnihotri	Director	JNARDDC, Nagpur
2	Mr. Manoj T Nimje	Senior Principal Scientist	JNARDDC, Nagpur
3	Dr. Rina Shinde	General Manager (QC)	UltraTech Cement Ltd (Unit: Vikram Cement Works)
4	Mr. Kaustubh Phadke	India Head	Global Cement Concrete Association (GCCA) India
5	Dr. Alka Mishra	General Manager, Sustainability Solutions	Dalmia Cement (Bharat) Ltd
6	Mr. Nitin Tiwari	COO	Vedanta Aluminium, Jharsuguda
7	Mr. Prakhar Kumar Shrivastava	Corporate QC Head	JK Cement
8	Mr. Jay Kumar	Corporate Head- Supply Chain Management	JK Cement
9	Mr. Sunil K. Khandare	Director	Bureau of Energy Efficiency
10	Mr. Jagdeesan V	Sector Expert	Bureau of Energy Efficiency
11	Mr. Ravi Shankar Prajapati	Joint Director	Bureau of Energy Efficiency
12	Ms. Sanyukta Das Gupta*	Senior Adviser, Smart Power	FCDO
13	Mr. Anurag Sirola	Manager	KPMG
14	Mr. K. K. Chakarvarti	Senior Advsior	Idam Infra
15	Mr. Dipak Khandare	Associate Director	Idam Infra
16	Mr. Rajiv Shukla	Executive Director	Idam Infra
17	Ms. Dhaarna Rawat	Analyst	Idam Infra
18	Mr. Deepak Dash	General Manager-Pot Room Operation	Hindalco Industries Limited
19	Mr. Abhishek Kumar	DGM-Corporate Affair	Hindalco Industries Limited
20	Mr. Sanjay Singh	Head-Energy Management	Shree Cement
21	Mr. Abhishek Kumar Rai	Corporate Head -Quality	Shree Cement
22	Mr. Arpit Dixit	Corporate Head-AFR	Shree Cement
23	Mr. Debapratim Bhadra	Sr. Manager Energy & Environment	ACC Ltd Bargarh Cement Works
24	Mr. Manish Vijay	Manager (Process)	JK Lakshmi Cement, Sirohi, Rajasthan
25	Dr. S. K. Handoo		My Home Industries
26	Mr. Bhushan Patil*	International Funder Associate	Carbon Trust
27	Mr. Kartik Sharma	Head Corporate Strategy	Vedanta Limited
28	Mr. J. S. Kalra	PTSE	BEE

S. No	Name	Designation	Organisation
29	Dr Rachana Sharma*		Cement Manufacturers Association
30	Mr. Girdhari Lal Yadav*	Environment Officer	Shree Cement
31	Mr. Naresh Doot*	Environmental Specialist	Aditya Birla
32	Ms. Garima Sharma*	Assistant Manager	Aditya Birla
33	Mr. Raghuvansh Kumar*	Sr. Manager (Environment)	Aditya Birla
34	Mr. Abhishek Patni*	Asst Manager	Shree Cement
35	Ms. Archana Lakshmanaswamy*	Asst Manager	Shree Cement
36	Mr. Khan Saba Nashit*	Consultant	Idam Infra, ASPIRE Team

**Attended Virtually*