

**The Office of the Principal Scientific Adviser  
to the Government of India**

**Invites**

**Expression of Interest (EoI)**

**For**

**Matchmaking Event on Battery Recycling Technologies for Electric  
Vehicles organized by India – EU TTC Working Group 2 (WG 2) on  
the Green & Clean Energy Technologies**

**Call for Start-ups & Small and medium-sized enterprises (SMEs)**

## **DOCUMENTS of Expression of Interest (EoI)**

**This EoI document comprises of the following sections:**

1. Section-I: Invitation for Expression of Interest
2. Section-II: General Information for the Applicants
3. Section-III: Application Form (Annexure-I)

**SECTION-I:**

**INVITATION FOR EXPRESSION OF INTEREST**

**DETAILED NOTICE INVITING EXPRESSION OF INTEREST (EoI)**

EoI No.: 01

Date: 09.04.2024

**Expression of Interest for Battery Recycling Technologies for Electric Vehicles to be showcased in the Matchmaking event organized by India – EU TTC**

The Office of the Principal Scientific Adviser (O/o PSA) to the Government of India is pleased to invite an Expression of Interest (EoI) for Indian Start-ups/SMEs operating in the domain of Electric Vehicle Battery Recycling Technologies. This EoI is an invitation for innovative ventures to participate in a Matchmaking event to be organized under the umbrella of India and the European Union Trade and Technology Council (TTC).

**2. Background (About India – EU TTC):**

On 25 April 2022, the Honourable Prime Minister Narendra Modi and the President of the European Commission Ursula Vonder Leyen agreed to launch a Trade and Technology Council (TTC) to strengthen and deepen cooperation between India and the EU at the nexus of trade, trusted technology, and security. The TTC was established on 6 February 2023 and consists of three working groups:

- Working Group 1 on Strategic Technologies, Digital Governance and Digital Connectivity;
- **Working Group 2 on Green and Clean Energy Technologies;** and
- Working Group 3 on Trade, Investment and Resilient Value Chains.

The TTC meets annually, alternating between India and the EU. The Working Group (WG2) concentrates on collaborative initiatives spanning clean energy, waste management, circular economy, and plastic pollution. The inaugural Ministerial Meeting on May 16, 2023, resulted in a three-action work plan, focusing on tackling wastewater management, including waste to energy and marine plastic pollution; E-mobility and battery performance and recycling, and standards. The WG2 Internal Workshop held on 10-11 October 2023 aimed at exchanging insights on policy and regulatory frameworks, identifying gaps and grey areas in cutting-edge green technologies, fostering co-development of technologies, identifying partners for leap-frogging and establishing institutional collaboration between both sides. In view of the same, India and the EU have agreed to organize a Matchmaking event among Start-ups/SMEs from India and the EU on recycling of batteries for Electric vehicles aiming at speeding up solutions for this challenge.

The O/o PSA is facilitating this Matchmaking event for Indian Start-ups/SMEs operating in the domain of **Electric Vehicle Battery Recycling Technologies** where a few selected start-ups/SMEs will be provided with an opportunity to pitch their technologies to Indian and European incumbent companies and venture capitalists. The EU is doing the same by scouting for Start-ups/SMEs from the European Union and selecting startups/SMEs to meet at the joint Matchmaking event with companies and venture capitalists interested in the sector. For this purpose, hereby, the **Expression of Interest (EoI)** is launched.

**3. Need for EV Battery Recycling:** Electric Vehicle Battery Recycling is a critical aspect of sustainable and responsible environmental practices. As the adoption of electric vehicles continues to rise globally, the recycling of EV batteries becomes paramount to minimize environmental impact, recover valuable materials, and ensure the efficient utilization of resources.

#### **4. Overview of EV Industry & Battery Recycling in India and EU:**

India's EV battery recycling market is expected to expand to 128 GWh by 2030 from a mere 2 GWh in 2023, which is a 6400% increase.<sup>1</sup> Modern batteries are a complex mix of materials and will require specialist policies and infrastructure for India to fully realize its recycling targets. Between 2022 and 2030, electric vehicle batteries are expected to majorly contribute to the recycling market, with 75% of the overall recycling market led by public transport.<sup>2</sup> The need to recycle EV batteries is four-fold: firstly, it helps to reduce the environmental impact of batteries, which can contain toxic chemicals that can harm the environment if not disposed of properly. Secondly, recycling batteries can help insulate against supply issues, as it can help recover valuable materials that can be used to manufacture new batteries. Thirdly, recycling batteries can help optimize second-life applications, such as using them for energy storage in homes and businesses. Finally, recycling batteries can help to reduce carbon emissions, as it is estimated to lower their production cycles' carbon emissions by up to 90%.<sup>1</sup>

The Electric Vehicle (EV) battery recycling industry in the European Union (EU) presents a compelling opportunity for Start-ups/SMEs and scale-ups, fueled by a rapidly expanding market. The EU's commitment to sustainability has propelled the EV market's growth, with the battery-recycling sector expected to witness substantial expansion. The current European Electric Vehicle Lithium-Ion Battery Recycling market is growing at a CAGR<sup>3</sup> of 21.3% and is expected to reach

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<sup>1</sup> Bhattacharjee, Aniruddha. "EV battery recycling in India - Opportunities and challenges." Clean Mobility Shift, 28 February 2023, <https://cleanmobilityshift.com/ecosystem/ev-battery-recycling-in-india-opportunities-and-challenges/>.

<sup>2</sup> Enabling EV Battery Reuse and Recycling in India." WRI India, 9 August 2023, <https://wri-india.org/sites/default/files/Conference%20Proceeding-Battery-revised%2028%20july-final.pdf>.

<sup>3</sup> CAGR - Compound Annual Growth Rate

EUR 255 million by 2029,<sup>4</sup> and experts predict further robust growth in the coming years as EV adoption accelerates. In terms of battery types, lithium-ion batteries dominate the EV landscape, powering a wide range of vehicles from compact cars to heavy-duty electric trucks. These batteries, commonly found in electric cars and plug-in hybrids, contain valuable materials like lithium, cobalt, and nickel, making them prime candidates for recycling.

**5. Objective of EoI:** The primary objective of this initiative is to identify, support, and promote Indian Start-ups/SMEs dedicated to advancing the field of Electric Vehicle Battery Recycling. Selected Indian Start-ups/SMEs will have the opportunity to participate in a Matchmaking event, providing a platform to showcase their technological prowess, forge strategic bilateral partnerships with the EU, and explore potential investment avenues from the EU ecosystem.

**6. Eligibility for Participation in EoI:**

- The Start-ups/SMEs must be actively engaged in the field of Electric Vehicle Battery Recycling Technologies.
- The Start-ups must be registered with the Department for Promotion of Industry and Internal Trade (DPIIT) and/or the Central Pollution Control Board (CPCB).
- The Start-ups/SMEs must demonstrate a clear and scalable technology in the EV battery recycling domain.
- The technology's overall suitability for the European market and opportunities for collaboration is an added value (also refer to Annexure I)

**7. Important Dates:**

- Notification date of Expression of Interest: 9<sup>th</sup> April 2024
- Expression of Interest Submission Deadline: 30<sup>th</sup> April 2024
- Result Declaration based on Expression of Interest: End of May 2024 (tentatively)
- Virtual Matchmaking Event: 20<sup>th</sup> June 2024 (tentatively)
- Result declaration of the Matchmaking Event: End of June 2024 (tentatively)
- Visit of 3 Indian Startups/SMEs to EU- October 2024 (tentatively)

**8. Expression of Interest Submission:**

Interested Indian Startups and Small and medium-sized enterprises (SMEs) are invited to submit their EoI. Submissions should include the following documents:

- Cover Letter: A brief introduction to the Startup/SME and its core competencies.
- Applicant Details, Company Profile, and Technical Information: Detailed information about the Startup/SME along with the details of the key team members, and detailed information on various technical aspects (refer to Annexure I).

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<sup>4</sup> Europe Electric Vehicle Lithium-Ion Battery Recycling Market Growth, Size, Share, Segmentation." Data Bridge Market Research, <https://www.databridgemarketresearch.com/reports/europe-electric-vehicle-lithium-ion-battery-recycling-market>.

By submitting an expression of interest in response to this call, the Start-ups/SMEs are indicating their acceptance of the call's terms.

#### **9. Evaluation Process:**

- **Screening of Application:** A preliminary screening of the applications received will be carried out based on clause 6 of section I of the EoI document. Incomplete applications will be screened out.
- **Presentation to the Selection Committee:** The screened-in applicants will be asked to present to the selection committee consisting of sector experts. Each application will be scored based on selection criteria defined in section II of the EoI document.
- **Final Selection:** Six Indian Start-ups/SMEs will be shortlisted based on the scores from the presentation round. These Start-ups/SMEs will be given an exclusive virtual platform to connect with industry leaders, potential investors, and collaborators from both India and the European Union.

#### **10. Submission Instructions:**

The completed Technical Application Form (Annexure 1), along with all relevant documents appropriately filled out, be shared with [india-eu-ttc-psa@gov.in](mailto:india-eu-ttc-psa@gov.in) by 30<sup>th</sup> April 2024. Late submissions will not be considered.

#### **11. Contact Information:**

For any inquiries or clarifications, please write to [india-eu-ttc-psa@gov.in](mailto:india-eu-ttc-psa@gov.in)

#### **12. Terms and Conditions:**

- The O/o PSA shall not be liable for delays in receipt of EoI documents after the stipulated date and time. EoIs submitted without supporting documents (as mentioned in Sec-I clause 6 and Annexure-I mentioned in Sec- III) will be summarily rejected.
- The O/o PSA reserves the right to reject or accept any or all applications, cancel/withdraw the EoI process without assigning any reason whatsoever, and in such case, APPLICANT shall not have any claim arising out of such action. The language of the responses to EoI or any query/clarifications/correspondences shall be in English only.
- The applicant(s) should provide the names, contact information, complete addresses, phone numbers, and email addresses of two individuals who hold positions of reasonable seniority within the Start-up/SME company on the application form.
- The O/o PSA may, at its sole discretion, ask for additional information/documents and/ or seek clarifications from the APPLICANT(s) after the Deadline for submission of a response, inter alia, for removal of inconsistencies or infirmities in their responses.

## SECTION-II

### GENERAL INFORMATION FOR THE APPLICANTS

#### Selection Criteria:

- All applications will be evaluated and scored, based on the parameters given below:

Parameters
Affordability
Scalability
Sustainability
Universality
Rapid
Excellence
Distinctive

- The top 6 scorers will be invited to the Matchmaking event where these Start-ups/SMEs will be given an exclusive virtual platform to connect with industry leaders, potential investors, and collaborators from both India and the European Union.
- A maximum of three Indian Start-ups/SMEs, based on their scores, will receive a fully funded, opportunity to visit European Union facilities specializing in Electric Vehicle Battery Recycling Technologies.



### **SECTION-III:**

#### **APPLICATION FORM (ANNEXURE-I)**

##### **Instructions to Applicants:**

- This Expression of Interest is to identify interested parties for the objective mentioned particularly in clause 5 of the Detailed Notice Inviting Expression of Interest.
- The Technical Application Form in Annexure I is given in Section III. It must be duly filled and sent to the O/o PSA by the APPLICANT in soft copy.

## **Technical Application Form**

### **Recycling of Batteries for Electric Vehicles**

#### **1. Basic Information**

- a) Name
- b) First name
- c) Last name
- d) Phone
- e) Email
- f) Designation (preferably founder)
- g) LinkedIn

#### **2. Start-up/SME Details**

- a) Name of the Start-up/SME
- b) Founding Year
- c) Is your company incorporated: Yes No
- d) Start-up/SME Country HQ (address)
- e) Operational Place
- f) Website
- g) Details of a single point of contact
- h) Name of the Collaborating Industry (if any) and incubator (if any) with address
- i) Name of the founder and leading project team profile
- j) Name of the project team members of the collaborating Industry (if any)
- k) Description of the Start-up/SME
- l) Technology Title

#### **3. A Broad Overview of the Technology**

- a) Brief technical description of the technology (7-8 points)
  - i. Design capacity (tonnes per annum) - min/max
  - ii. Battery type
  - iii. Procurement of used batteries and relevant data, if any.
  - iv. Process flow diagram of recycling.
- b) Current status of the technology offering – (planned/ongoing/ready for pilot/prototype ready/ready for commercialization)

- c) Technology readiness level (TRL)
  - d) Status of compliance to standards – {meets existing standards (Indian/international), does not meet existing standards, has not been tested against existing standards, standards do not exist}
  - e) All stakeholders, involved in the creation process
  - f) Details of process economics or unit economics with specific details (CAPEX & OPEX in INR)
  - g) Indicative ROI for unit and scaled-up scenarios can be provided to understand the economic feasibility of the project
4. Details of End-user / Partner for the execution of project work/field implementation and nature of involvement of partner

#### **5. Key Outcome Indicators**

- a) Technology differentiators - benefits/returns from the project work (indicate likely benefits to the Battery Recycling sector in India)
- b) Economic competitiveness (Atmanirbhar Bharat)
  - i. Scalability of the technology/ solution.
  - ii. Details of the processes adopted for technology development/ product design (Lean manufacturing, Design for Manufacturing, and others)
  - iii. Future readiness to accommodate new battery types
  - iv. Will the technology offer a potential increase in Indian exports or a reduction in imports?
- c) Sustainable manufacturing
  - i. How energy efficient is the offering compared to existing solutions if any?
  - ii. Does the technology address the creation of low-value waste from the project? How mature is the technology to yield zero waste/ infinite loop recycling of battery waste?
  - iii. Has the recycled product created a metallic mix that can be consumed by specific battery OEMs or pure metals that enable the usage of metals in other applications?
  - iv. Besides the above, what kind of environmental footprint does the offering have?

**6. International Readiness**

- a) Describe your interest in expansion to the EU Market
- b) Describe how your solution can benefit battery recycling in the EU
- c) Have you expanded internationally before and where?
- d) Where is your solution currently operational?
- e) How many existing international customers use your solution?
- f) Do you have processes in place that support international scaling? (marketing, Sales, manufacturing, Logistics)
- g) Details of opportunities for collaboration and managing regional risks, if any.

**7. Specific Deliverables of the Project**

- a) Patents
- b) Knowledge gained by industry/lab/apprentices/interns etc.
- c) Research publications (specific to technology, not more than 5 nos.)
- d) Contribution towards improvements in issues concerning System Operation.
- e) Value addition
- f) Process and product development.

**8. Funding & Financial Details**

- a) Share your IRL (investment readiness level)
- b) Did you raise any funding? (yes, no)
- c) How much funding did you raise? (option for answer modes: INR Amount, Range or Stage (seed, series etc.)
- d) Please share your annual revenue in 2023
- e) Please share your year-on-year growth

9. Current Facilities Available in the Start-up/SME (Equipment/Computational capacity/Auxiliary facilities)

10. Foreseeable Roadblocks in implementing the proposed offering (ex. Technical, raw material assurance, scalability, governance, policy, etc.)
11. Support needed from the Venture Capitalist/Incumbent Industries for technology scale-up and product management – (piloting support, engineering support, techno-economic feasibility studies, procurement, and others)
12. Provide a tentative/ indicative business plan for how technologies developed can be commercialized Or Provide an example of how the proposed technology has been deployed elsewhere in India or Middle-Income Countries (MICs)
13. Facilities provided by the collaborating Industry, if any, (in terms of equipment/accessories)
14. Any linkage with National Missions, if any (Atma Nirbhar Bharat, Swaach Bharat, Start-Up India, Skill India, etc.)

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*Disclaimer:* Applicants are kindly advised to limit their responses to the specific questions asked. Please provide objective and quantitative information wherever applicable for a more effective evaluation process. Excessive or irrelevant details may impact the evaluation.