

Ref No: NBC/R&D/87/2696

Date: 14.10.2025



NATIONAL ALUMINIUM COMPANY LTD

Nalco Bhawan, Plot No: P/1, Nayapalli,
Bhubaneswar-751013

EXPRESSION OF INTEREST (EoI) FOR R&D COLLABORATION/ COMMERCIALIZATION
OF TECHNOLOGY

EXPRESSION OF INTEREST

1. TITLE:

Expression of Interest (EoI) for R&D Collaboration/Commercialization of Technology with NALCO.

2. BRIEF ABOUT NALCO:

National Aluminium Company Limited (NALCO) is one of the largest Aluminium and Alumina producers in India having its Corporate Office at Bhubaneswar and Alumina Refinery & Bauxite Mines at Damanjodi in the state of Odisha, India.

Mines Division is the captive bauxite mine of NALCO situated on Panchpatmali hills at an elevation of 1300m above mean sea level near Damanjodi, in the district of Koraput, Odisha state, India. The mines have a capacity to produce 68.25 Lakh Tons per Annum of Bauxite. The bauxite is transported through hilly terrain by Cable Belt Conveyor System and then fed in Alumina refinery plant at Damanjodi for purification. The process of extraction of Alumina from its mineral bauxite in caustic liquor solution is commonly known as 'Bayer's Process'.

Nalco's Alumina Refinery, having a normative capacity of 21 Lakh Tons per Annum, is the lowest cost Alumina producer in the world. The alumina produced is used to meet Company's requirement for producing primary aluminium at its Smelter Plant, located at Angul, Odisha and the surplus alumina is exported to overseas market.

Nalco's Smelter Plant at Angul, Odisha has a capacity of 4.6 Lakh Tons of Aluminium per Annum. Here, Alumina is converted into primary aluminium through a smelting process by using AP18 smelting technology. The plant has integrated facilities for manufacturing standard and alloy ingots, T-ingots, billets, wire rods, rolled products and chequered sheets. The product is sold in domestic/ international market.

To meet the power demand of the Smelter Plant, NALCO has its own Captive Power Plant, 10X120 MW capacities at Angul & 40 LTPA coal Mine at Angul.

More details on NALCO can be viewed on company's website www.nalcoindia.com.

3. ABOUT R&D ACTIVITIES OF NALCO:

Research & Developmental activities of National Aluminium Company Limited (NALCO) are carried out by its DSIR recognized R&D units at S&P Complex, M&R Complex and NRTC, BBSR. NALCO in its pursuit towards organizational growth through sustained development in process, product and technology development lays great emphasis on R&D activities either by in- house effort or in collaboration with National/ International Laboratories/ academic institutions/ JNARDDC/ IIT/ NIT/ Engineering Colleges/ CSIR Labs/ Other DSIR approved labs/ agencies depending on the needs.

OBJECTIVE OF EoI:

NALCO is interested for taking up collaborative R&D projects with an objective of improvement in process and new product development, technology development, implementation of the R&D findings in its own plant, setting up scale up facilities and commercialization including transfer of technology. The EoI is aimed at inviting suitable project proposals from reputed research institutes/ organizations/ academic institutes/ private R&D organizations who are interested in carrying out Research & Development works related to Aluminium Industry. Proposals from Institutes/ Organization having R&D experience in the field of Bauxite/ Alumina/ Aluminium/ Power Plants is solicited.

In view of the above this Expression of Interest (EoI) is being sought from different Universities, Central R&D organizations, National academic institutions, private institutions/ companies individually or in collaboration in the following areas.

4. POTENTIAL AREAS FOR THE STUDY:

A. Potential Research Areas – Mines and Refinery

- i. Increasing process productivity and/or efficiency, for possible implementation in Alumina Refinery.
- ii. Development of additives for scale inhibitors, bauxite flowability aid, filtration improvement aid etc.
- iii. Development of Alumina related value-added products like High pure alumina, precipitated microfine ATH, Brown fused alumina (Make in India initiative) etc.
- iv. Extraction of critical minerals and REE from bauxite/fly ash/Red Mud/Bayer Liquor etc. and synthesis of ferro-vanadium using vanadium sludge recovered from Bayer liquor.

B. Potential Research Areas - Smelter & Power Plant

- i. Improve Pot Productivity, Reduction in energy consumption, increasing pot lining life etc.
- ii. Improving Carbon Anode quality.
- iii. Development of new/ strategic Aluminium Alloys, new Aluminium products etc. having application potential, including possible prototype development & their validation in relevant industry. Preference will be given to alloys which are being imported (Make in India initiative).
- iv. Efficiency improvements in different area of thermal power plants e.g. Boiler/ Coal Handling Plant etc. at CPP.

C. Common Research Areas

- i. Modern in situ/ online instrumental techniques for Chemical, Physical & Morphological characterization of Ores, Minerals and Raw Materials for Metal, slurry, process parameters etc. for other utility application.
- ii. Development of New Analytical Techniques and standard samples.
- iii. Carbon capture, storage and utilization in alumina/aluminium/power plant.
- iv. Additive manufacturing with Aluminium alloys for value added products.
- v. Waste utilization (Fly Ash, Dross etc.)
- vi. Development of scalable, sustainable & commercially viable technologies for 100% utilization of red mud.
- vii. Digital transformation related projects for improving efficiency & performance of processes in Alumina & Aluminium industry.

5. R&D Project Proposals with Commercialization Potential:

NALCO is interested in setting up of pilot plant/ demonstration plants and also technology transfer of following projects successfully completed/ patented/ other lab scale / bench scale studies carried out through collaborative research/ in-house research with terms & conditions as applicable.

Interested parties with Engineering and Scientific knowledge, good financial background and adequate experience of product manufacturing & fabrication with technical capability is desirable.

- i. Fabrication of a highly porous pervious concrete material from Fly Ash.
- ii. Production of red mud-fly ash based geo-polymer concrete.
- iii. Extraction of vanadium sludge from Bayer process
- iv. Aluminium recovery from aluminium dross and value-added products from dross residue.
- v. A process for production of cement from refractory portion of SPL.
- vi. Process for preparing prebaked carbon anodes having improved oxidation resistance for aluminium production.
- vii. Process for preparation of light weight foamed bricks (LWFBs) utilizing red mud and fly ash admixtures.
- viii. Process for preparation of glass ceramic tiles utilizing red mud as the main base material.
- ix. Process for Production of Wear resistant ceramic tiles from low carbon fly ash as

the major base material.

- x. A process for the production of Aluminium based metal-matrix composite reinforced with in-situ alumina –silicon carbide-carbon ceramic composite.
- xi. Controlled heat treatment process for destruction of leachable toxic cyanide in first cut aluminium spent pot lining material.
- xii. Process for preparation of low ferric alum from waste or low-grade aluminium dross
- xiii. Liquidus/Superheat temperature measurement system for Molten Cryolite Bath.
- xiv. Improvement in oxidation behavior of calcined petroleum coke used for production of anodes in aluminium industry.
- xv. Development of Al-graphene battery for EV application.

6. CRITERIA FOR PROJECT SELECTION

- i. Project proposals should be application-oriented and focused on practical results such as product development or pilot-scale deployment. Proposals intended only for academic publication will not be considered.
- ii. Proof of concept (PoC) is essential criteria and all proposals are to be submitted with PoC. Proposals submitted without PoC will not be considered.
- iii. All projects to be submitted in the format attached at Annexure-5.
- iv. Time period of the projects should not be more than 30 months.
- v. Proposals from the research institutes having an industry partner, will be preferred. The industry partner may be a prospective user of the process/ product developed through this project.

7. AVAILABILITY OF EoI DOCUMENTS:

- i. The bidders/ applicant may go through the EoI document for an overview of the scope of work, bidder's qualification criteria, other bidding terms and conditions etc.
- ii. Bidders should download the complete set of EoI documents which is available in our website www.nalcoindia.com.
- iii. Bidders are requested to visit the above website regularly for corrigendum towards any modification/ addition/ bid due date extension etc. for this EoI, since the same shall not be published in newspapers.

8. Criterion for participating in the Expression of Interest (EoI)/ Qualification Criteria:

- i. (a) The Govt organizations like Universities, IIT, NIT, CSIR, ICAR, ICMR, DRDO,

JNARDDC, BARC, S&T Laboratories under Govt of India (GoI).

OR

(b) Laboratory/ R&D facilities of the organizations/ companies/ institutes in India that have been certified by Department of Scientific and Industrial Research (DSIR) (Proof of valid certificate to be submitted) with positive net worth. Financial details to be submitted in the format at ANNEXURE-3.

- ii. In addition to the criterion mentioned at Clause 8.i, in order to apply for pilot plant/ demonstration plant (Refer Clause no 5), the applicant is required to have successfully installed at least one pilot scale project or demonstration plant in India with its own design & engineering group or department or through a third party for its own technology or technology obtained through an agreement from any recognized research institute(s) or/and company for a developed technology within last seven years from the due date of submission of proposal against this EoI. Copies of basic engineering drawings & flow sheet along with photographs of existing demonstration plants/ pilot plants details as proof of experience shall be required if shortlisted. A separate agreement shall be signed between Nalco and the selected party for setting up of the pilot/demonstration plant.
- iii. In order to apply for transfer of technologies listed at Clause No 5; Apart from the institutes covered under clause 8.i and 8.ii, Companies registered under Companies act, National/ International Laboratories/ Academic institutions/ Startups may also apply. For such Institutes financial details are to be submitted in the format at **ANNEXURE-3**.

9. Requisite of supporting documents for Applicants (Institute and PI):-

The applicants (Institutes and PI) are requested to go through the following & submit required supporting documents.

- I. Experience of collaborative R&D Projects with National Labs/ International Labs/ PSU/ Govt Agencies along with proof of document to be submitted including commercialization, if any.
- II. The institute should furnish details about technical capability (facilities & experts), Intellectual Property Rights (Patent filed/ granted), previous experience in R&D.
- III. Principal Investigator (PI) who is submitting the application should be a permanent employee of the organization/ institute and a declaration in this regard is to be submitted.
- IV. Institute may also submit any other relevant information PI desires to furnish on his own to supplement his capabilities pertaining to this EoI.

- V. Applicant (PI) should not be under court receivership or similar proceeding.
- VI. If selected/ shortlisted a certificate may be submitted stating that the applicant or its Proprietor/ Partner(s)/ Director(s) of the firm/ organization have not been convicted by a court of Law for an offence involving moral turpitude in relation to business dealings during the past seven (7) years. The proposer(s) qualifying under clause 8.i.b and 8.iii are required to submit a declaration to this effect. NALCO reserves the right to reject a proposal, if it is determined that any applicant participating in the EoI is engaged in corrupt and fraudulent work practice.
- VII. Collaborative proposal of two or more institutes/ organizations is acceptable with one institute as the nodal agency. Details of the scope of work of each institute(s) is to be submitted along with endorsement certificate(s) of other collaborative institute(s).

10. Other Conditions:

- I. NALCO reserves the right to withdraw this EoI or reject any proposal without notifying the reason.
- II. NALCO shall not be responsible for any expenditure incurred by the applicants in connection with the preparation and delivery of their applications or any other expenses incurred as regards the subject EoI.
- III. Telefax/ E-mail/ CD shall not be accepted if not accompanied with a formal signed document. NALCO takes no responsibility for any delay/ loss during posting for non-receipt of document sent by Post/ Courier within the due date.
- IV. Mere submission of the proposal/ application does not entitle automatic qualification.
- V. Proposals found suitable shall be shortlisted for detailed discussion/ presentation by the PI or Co- PI before final acceptance as per NALCO's approved procedure.
- VI. Any clarification against this EoI can be sought from the designated official(s) only in writing or through e-mail, which shall be clarified by the designated official only through e-mail. The applicant(s) are required to send their queries at least 5 working days prior to the due date as given at 11(i). Clarification sought from/ obtained from anybody, other than the designated official shall not be entertained.
- VII. Principal Investigator (PI)/ Co-PI of shortlisted projects shall be called for a presentation before the selection committee at NALCO Bhubaneswar on a suitable date to be intimated in advance. PI/ Co-PI may be asked for forwarding the presentation in advance for sharing with the designated committee members & must attend the presentation at their own expense.
- VIII. All projects which will be selected for financial grant will sign an NDA and technology transfer agreement as per the requirement of Nalco for further commercialization by Nalco.

11. SUBMISSION OF EOI PROPOSAL:

- I. Due date for this EoI is 01.12.2025. Duly signed proposals must be submitted so as to be reach the designated place by 15.00 Hrs.
- II. The applicant(s) is (are) expected to examine all instructions, forms, terms, job requirements and other details in the EoI documents. Failure to furnish complete information as mentioned in the EoI documents or submission of a proposal not substantially responsive to the EoI documents in every respect will be at the bidder's risk and may result in rejection of the proposal.
- III. Interested parties are to submit their proposals against this Expression of Interest offline along with all requisite details, documents, annexure etc. The hard copy of the EoI proposal in sealed cover are to be sent in the following address, so as to reach on or before the due date as mentioned at 11(I) above.

Mr. Ananyaja Khuntia
DGM (Met.)
National Aluminium Company Limited
Nalco Bhawan, P/1, Nayapalli,
Bhubaneswar, Odisha – 751013, India
E-mail: ananyaja.khuntia@nalcoindia.co.in
Mobile No – 8260355814
- IV. NALCO may, in exceptional circumstances and at its discretion, extend the deadline for submission of EoI proposals by issuing an addendum to be made available on NALCO's website, in which case all rights and obligations of NALCO and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.
- V. The hard copy of the EoI proposals must contain the following documents:
 - a. Covering Letter from the Proposer(s) in the format provided in **Annexure-1**.
 - b. Original/ Photocopy copy of certificates, affidavits, declarations, undertakings etc. sought.
 - c. Details of relevant project experience of the investigator(s), patents in the format (**Annexure- 4**) along with the supporting documents.
 - d. General information about the organization (limited to 400 words) along with other details in the format provided in **Annexure-2**.
 - e. Financial details of the organization in the format provided in **Annexure-3**.
 - f. Documentary evidence by way of copies of Agreement/ work orders, work completion certificates, audited Annual Reports containing audited balance sheets; profit loss accounts statements for preceding 3 financial years, Corporate

Undertaking etc. in support of fulfilling the Qualification Criteria under clause 8.i(b). Proposals getting qualified under clause 8.i.a are not required to submit these documents.

- VI. NALCO reserves the right to complete the evaluation based on the details furnished in the bid without seeking any additional information/ documents.
- VII. NALCO shall not be responsible for any postal delay and/or misplacement. Late and delayed offers will not be entertained.

12. OPENING OF EoI PROPOSAL:

- I. **The EoI proposals shall be opened on the due date at 15:30 Hrs. (IST).**
- II. NALCO reserves the right to extend due date. In case of extension of the due date, the same shall be hosted in NALCO Website. In such case the proposer(s) shall have the right to resubmit a revised proposal, which shall be considered and the proposal submitted earlier shall be ignored.

13. SPECIAL CONDITIONS:

- I. This EoI is issued by NALCO and is intended to only short-list potential innovative projects. NALCO's decision with regard to the short-listing through this EoI shall be final and binding. NALCO reserves the right to reject any or all the proposals without any liability.
- II. NALCO reserves the right to withdraw this EoI without any liability for such action if it determines that such action is in the best interest of the organization.
- III. The details given above are for enabling the proposer(s) to submit their response against the EoI. Timing and sequence of events resulting from this EoI shall ultimately be determined by NALCO.
- IV. No oral conversations or agreements with any official or employee of NALCO shall affect or modify any terms of this EoI and any alleged oral agreement or arrangement made by a bidder with any department, official or employee of NALCO shall be superseded by the definitive agreement. Any oral communications or any written materials provided by any person other than the authorized officials (either from the bidder's side or from NALCO) shall not be considered.
- V. Neither the proposer(s) nor any representative shall have any claim whatsoever against NALCO or any of their respective officials, arising out of or relating to this EoI or the procedures thereof.
- VI. **Right to Contents of this EoI:** All EoI offers along with accompanying documentations received shall become the property of NALCO and will not be returned after opening of the offers/ proposals.

- VII. **Acknowledgement of Understanding of EoI Terms & Conditions:** By submitting an offer against this EoI, proposer(s) shall be deemed to have acknowledged that they have carefully read all sections of this EoI documents, including all forms, schedules along with the annexure and they are fully informed about all conditions and limitations contained in the EoI.
- VIII. **Evaluation of the Offers:** The offers received against this EoI shall be evaluated based on the qualification criterion by a committee as per the approved procedure of NALCO. The proposer(s) are required to submit all required documentations in support of the 'Qualifying Criteria's specified, such as detailed project citations and completion certificates, client contact information for verification, profiles of project resources and all other documents, required for evaluation.
- IX. **Language of Offers:** The EoI offer along with all correspondence and documents shall be in English.

ANNEXURE-1

COVERING LETTER

(On Company/ Institute letterhead)

Date:

To,

Mr. Ananyaja Khuntia
DGM (Met)
National Aluminium Company Limited
Nalco Bhawan, P/1, Nayapalli, Bhubaneswar,
Odisha – 751013, India

Ref.: Expression of interest for R&D Collaboration/Commercialization of Technology.

Dear Sir,

Having examined the Expression of Interest (EoI) the undersigned, on behalf of our company intend to participate in R&D Collaboration with NALCO/ Transfer/ commercialization of Technology and submit the Qualification requirements proposal in response to the Expression of Interest (EoI) for the said project. We attach here with the response, as required by the EoI, which constitutes our proposal. Primary and Secondary contacts for our company are:

	Primary Contact
Name of Principal Investigator (PI):	
Title:	
Name of the Nodal Organisation/ Institute:	
Address:	
Phone No:	
Mobile No:	
Fax:	
E Mail:	

I/We confirm that the information contained in this response or any part thereof, including its exhibits and other documents is true, accurate, verifiable and complete. It

is being declared herewith that I, the principal investigator of this project is a permanent employee of the Organisation/ Institute. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead NALCO in its short- listing process. I/We fully understand and agree to comply that on verification, incorrect information, if found to have been furnished the bid/ order is liable for rejection at any stage of evaluation/ work execution. Our institute agrees for acceptance of all the terms and conditions set out in the EOI documents. It is hereby confirmed that I am/ we are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.

Dated this.....Day of 2025

(Signature and Seal of Company)

(In the capacity of)

ANNEXURE-2

DETAILS OF THE ORGANIZATION/ INSTITUTE

Name of organization/ Institute:

Nature of business:

Date of Incorporation/ Establishment:

Other Relevant Information:

Total number of Teaching and Research Faculty with PhD qualification:

ANNEXURE-3

FINANCIAL DETAILS

	FY 2022-23	FY 2023-24	FY 2024-25
Annual turnover			
Net Profit			
Net Worth			
Debt/Equity ratio			

Note- Please submit Audited Annual Reports containing audited balance sheets and profit loss accounts statements for preceding 3 financial years

ANNEXURE-4

EXPERIENCE CRITERIA & PROVEN TRACK RECORD

List top five R&D and Industrial consultancy or projects ongoing/ completed, if any (Last 10 years)

Name of the Project	Sponsoring Agency	Amount sanctioned (Rs Lakhs)	Amount Released (Rs Lakhs)	Duration (in years) From - To	Awards (If any)

Patents, if any (Last 5 Years)

a. Filed (No)/ Application number of relevant Patents, if any:

b. Granted (No)/ Patent number of relevant Patents, if any:

Annexure 5

APPLICATION PRO FORMA FOR GRANT FOR RESEARCH PROJECT

(To be filled by the Principal Investigator)

A. PROFORMA FOR PROPOSALS

1. Title of the Project:
2. Names and address of the PIs and Implementing Institutions and their affiliations.
3. Objectives (for collaboration)
4. Mandatory requirement for the proposal

B. The detail project proposal should consist of the following:

- | | |
|-------------------|---|
| Part-I | An Abstract (not exceeding one page), describe the background, objectives, Methodologies, figures of year wise budget and keywords. |
| Part-II | Background of the project. |
| Part-III | Objectives of the Project Proposal. |
| Part- IV | Methodologies to be undertaken |
| Part-V | Budget for the project with breakup year-wise / activity wise and institute wise (if Co- PI from another institute is there) |
| Part-VI | Timeline for the project with activity schedule |
| Part-VII | Details of the Proof of Concept (PoC) |
| Part- VIII | Expected outcomes of the project or deliverables |