



IIT DELHI



CENTRE OF EXCELLENCE FOR RESEARCH ON CLEAN AIR  
INDIAN INSTITUTE OF TECHNOLOGY, DELHI  
HAUZ KHAS, NEW DELHI-110016

Date: 24.04.2021

## **CALL FOR RESEARCH PROPOSALS**

To

**All Faculty Members,  
Indian Institute of Technology, Delhi  
Hauz Delhi -110016**

**Subject: Call for Research Proposals on New, Innovative and Eco-friendly utilization of ash (fly ash and bottom ash) produced by coal-based thermal power stations**

Centre of Excellence for Research on Clean Air (CERCA) invites research proposals from expert faculties of IIT Delhi for developing innovative technologies/processes for CO<sub>2</sub> Emission reduction in Cement and Concrete production. The selected proposal would be considered for financial support by CERCA, IITD.

### **Fly Ash as a Major Source of Air Pollution**

Fly ash is one of the biggest sources of air pollution. Fly ash contains toxic and heavy metals as well. Communities living close to coal ash ponds often experience coal ash storms during the dry seasons. The fly ash dumped in ash ponds becomes dry as temperature increases and gets airborne. Thus, it becomes one of the major sources of air and water pollution. Apart from causing various diseases, it also leads to a reduction in the recharging of groundwater. Heavy metals from coal ash affect the aquatic ecosystems adversely, which in turn impacts the livelihoods and nutrition security of fishermen. Air in areas around coal-fired power plants is polluted with fly ash. It is also pertinent to mention that Delhi experienced a serious impact of fly ash pollution from Badarpur and Rajghat power stations which have now been shut down by an NGT order. Also, an IIT-Kanpur study on Delhi pollution in 2016 revealed fly ash as one of the major contributors to particulate matter (PM) pollution and both coal and fly ash contributed to around 37% and 26% of PM<sub>10</sub> and PM<sub>2.5</sub> respectively in summer.

### **Impact of climate change**

Climate change heightens the risk from coal ash ponds in areas prone to flooding. In addition to the increased risk of spills, scientists are of the opinion that the heavier rains expected to come from a warming planet also threaten to bring about rising water tables that may seep into the ash ponds, contaminating groundwater used for agriculture and drinking.

### **Recent notification by ministry of environment, forests and climate change (MOEFCC) for 100% utilization of fly ash based on polluter pays principle**

Ministry of Environment and Forests issued a notification in Sept 1999 for restricting the excavation of topsoil for manufacturing of bricks and promoting the utilization of fly ash in the manufacturing of building materials and in construction activity within a specified radius of three hundred kms from the coal or lignite based thermal power plants. To implement these Notifications more effectively based on the polluter pays principle (PPP) thereby ensuring 100 % utilization of fly ash by the coal or lignite based thermal power plants and for the sustainability of the fly ash management system, the Central Government reviewed the existing Notifications and has suggested penalties/fines for thermal power stations which fail to meet the ash utilization targets based on the polluter pays principle.

**The following are the broad responsibilities of thermal power stations to dispose both Fly and Bottom ash as per the draft notification issued by the Central Government on Apr 22, 2021.**

1. Every coal or lignite based thermal power plant (including captive and / or co-generating stations) shall be primarily responsible to ensure 100% utilization of ash (fly ash, and bottom ash) generated by it in an eco-friendly manner as given in para below.
2. The ash generated from coal or lignite based Thermal Power Plants (TPP) shall be utilized only for the following eco-friendly purposes:
  - i. Manufacturing of brick /blocks/tiles
  - ii. Cement manufacturing, ready mix concrete

- iii. Construction of road and fly over embankment, Ash and Geo-polymer-based construction material
- iv. Construction of dam
- v. Filling up of low-lying area
- vi. Filling of mine voids
- vii. Manufacturing of sintered/ cold bonded ash aggregate
- viii. Agriculture in a controlled manner based on soil testing
- ix. Construction of shoreline protection structures in coastal districts
- x. Export of ash to other countries
- xi. Any other eco-friendly purpose as notified from time to time.

A committee shall be constituted under the chairmanship of Chairman, Central Pollution Control Board (CPCB) and having representatives from Ministry of Environment, Forest and Climate Change (MoEF&CC), Ministry of Power, Ministry of Mines, Ministry of Coal, Ministry of Road Transport and Highways, Dept. of Agricultural Research & Education, Institute of Road Congress, National Council for Cement and Building Materials, to examine, review and recommend the eco-friendly ways of utilization of ash and make inclusion/ exclusion/modification in the list of such ways as mentioned above based on technological developments and requests received from stakeholders. The committee may invite SPCB/PCC, operators of Thermal Power Plants & mines and other stakeholders as and when required for this purpose. Based on the recommendations of the Committee, MoEF&CC may publish such eco-friendly purpose.

It is a known fact that coal based thermal power stations produce huge quantities of ash and disposal of such huge quantities of ash is a challenge. Moreover, fly ash generated by the thermal power stations is a big source of air pollution. Though, Fly ash is being used for making Pozzolana cement, bricks, blocks, in road pavements, as part of road building material including reclamation of low-lying areas and backfilling of open-cast mines and stowing of underground mines, but ash utilization has lagged far behind the utilization potential that exists in India. In view of the recent notification, fines/penalties would be imposed on thermal plants who fail to meet ash utilization targets based on the Polluter pays principle. Therefore, it has become increasingly necessary and important for coal power plants to look for innovative and eco-friendly ways of ash utilization for meeting their ash utilization targets in order to avoid huge penalties and fines in addition to several other already existing utilization methods as suggested in the notification above.

**In view of the above draft notification issued by MoEF&CC, CERCA invites Research Project proposals on innovative, new and eco-friendly technologies and methods for utilization of both fly ash and bottom ash produced by coal based thermal power stations. Joint Proposals with Public-Private-Partnership in technologies development and dissemination are also welcome.**

#### **Eligibility and Qualification**

1. All IIT Delhi faculties are eligible to apply against this Invitation for Proposal.
2. Applications against this Invitation for Proposal in emerging technologies of CO<sub>2</sub> Sequestration may be in association with Industry / NGO.
3. The program encourages multi-disciplinary proposals envisaging network/collaboration of various departments/Centres/Schools within IIT Delhi including collaboration with reputed external institutions having diverse expertise and facilities for synergistic implementation of the Project. However, CERCA would provide financial support to IITD Faculty who would also be the Principal Investigator of the project.

To qualify for such funding, Principal investigators (PIs) are required to provide a concrete and sound research proposal that includes Introduction, Project description, objectives, experimental methods including importance and use of the specific project research outcome. It is expected that the PI will remain in service throughout the duration of the Project.

#### **Review and selection process:**

A two-phase selection process would be followed. CERCA Research Project selection Committee comprising of members from the academic/scientific community (including from outside IITD), Government and Industry would shortlist a few project proposals. The shortlisted project proposals would be submitted before CERCA Advisory Committee for final selection of Research Proposal/Proposal(s) out of the shortlisted proposals for consideration of financial support by CERCA.

#### **Financial Support by CERCA:**

**CERCA will fund 25% of the Research project cost up to a maximum of Rs. 25 lacs whichever is lower.** Research Proponents would arrange balance fund requirements either through Government grants or collaboration with Industry/NGO/Reputed Institutions both within India and Abroad.

## **Submission Details**

Interested faculty should send an email containing:

1. A cover letter.
2. A detailed project proposal document.

## **Address for Communication**

**Email Address:** [cerca@iitd.ac.in](mailto:cerca@iitd.ac.in), Alternate Email Id: [cerca.iitd@gmail.com](mailto:cerca.iitd@gmail.com)/[hemantkaushal.india@gmail.com](mailto:hemantkaushal.india@gmail.com)

Email subject (to be used verbatim): Call for Research Proposals on New, Innovative and Eco-friendly utilization of ash for CERCA financial assistance.

**Application Deadline:** Applicants can submit their proposal by **30<sup>th</sup> June 2021**.

## **List of Annexures:**

Proposal guidelines

**Annexure**

## **CERCA Project Proposals Guidelines**

Each application should provide a project title and proposed timeline, the name(s) of the Principal Investigators (PI) or Co-PI(s), an abstract of 300-500 words, and the following documents: the CV(s) of the PI and Co-PI(s)

The project proposal should have a summary statement of the objective of the proposal, describing how the project will benefit from. It should also include following necessary points mentioned below:

- What additional knowledge/ insights do we expect to generate?
- What problem can it help in solving? (in the broad context of Climate change)
- What will be the deliverables and timeline?
- Are we being asked to fund a particular component of a larger project?
- Is the project a pilot study or seed project leading to a larger one? Or is it a one-off project, complete in itself?
- Have the applicants also applied for other grants?
- What is the overall significance of the project for which funding is being sought?

## **Budget Guidelines**

The budget proposal may include costs necessary to accomplish project objectives and to carry out the described research activities. It should also include an itemized estimate of costs and describe how estimates were calculated and how it is reasonable in relation to the anticipated outcomes.