

CALL FOR RESEARCH PROPOSAL UNDER THE “Mission on Advanced and High Impact Research (MAHIR)” (First Call)

The Ministry of Power and the Ministry of New and Renewable Energy have jointly launched a National Mission on 7th June 2023 to identify emerging technologies in the power sector and develop them indigenously, at scale, for deployment within and outside India. The National Mission, titled “Mission on Advanced and High-Impact Research (MAHIR)” aims to facilitate indigenous research, development and demonstration of the latest and emerging technologies in the Power Sector. By identifying emerging technologies and taking them to the implementation stage, the Mission seeks to leverage them as the main fuel for future economic growth and thus make India a manufacturing hub of the world.

The key objectives of the Mission are as follows:

- To identify emerging technologies and areas of future relevance for the Global Power Sector and take up indigenous end-to-end development of relevant technologies
- To provide a common platform for Power Sector Stakeholders for collective brainstorming, synergetic technology development and devise pathways for smooth transfer of technology
- To support pilot projects of indigenous technologies (developed especially by Indian Start-ups) and facilitate their commercialization
- To leverage foreign alliances and partnerships to accelerate research & development of advanced technologies and to build competencies, capabilities and access to advanced technologies through bilateral or multilateral collaborations, thereby facilitating exchange of knowhow and Technology Transfer.
- To seed, nurture and scale up scientific and industrial R&D outcomes in the country and to create vibrant & innovative ecosystem in the Power Sector
- To make our Nation among the leading Countries in Power System related Technologies & Applications development

In the present call, proposals are invited from Academia, Industry, Utilities, Start-ups and R&D Institutions etc. on some of the identified research areas of MAHIR. The topics for research is enclosed as **Annexure I**. Apart from the identified areas, research proposals with disruptive ideas will also be accepted under the MAHIR. Also, proposals for scaling up of the indigenous laboratory prototypes to higher TRL levels may be proposed under the call. Project proposals are to be formulated keeping its view on impact for the future Power Sector. Project should have substantial research content and element of innovation. The objectives of the project should be clearly defined with a plan for implementation and the final outcome is expected to be a product/prototype which can be demonstrated.

Proposals along with technical and financial particulars may be submitted in the prescribed format (enclosed as **Annexure II** and also available on the CPRI website) under the MAHIR to:

Additional Director & HoD R&D Management Division Central Power Research Institute, Prof.Sir.C.V.Raman Road, Sadashivanagar P.B.No.8066, Bangalore -560 080	Phone - 080-22072234 E-mail: mvrao@cpri.in and rnd@cpri.in
---	--

Last date of submission for the proposal is: 20th January 2024

List of research areas:

- a) Carbon Capture & Utilization
 - Economical and efficient technology suitable to capture CO₂ from waste flue gas
 - Utilization of captured CO₂ for value added products like liquid fuel, gaseous fuel, fertilizer etc.
 - Development of co-electrolyser (where CO₂ and water/steam acts as input with syngas as output)
- b) Green hydrogen for mobility (High Efficiency Fuel Cell)
 - Electrolyser & Fuel Cells:
 - High efficiency Electrolyser development for Hydrogen generation like High Temperature Steam Electrolyser (HTSE)
 - Development of High Efficiency PEM electrolyzers
 - Indigenous development of Membrane Electrode Assembly (MEA) for PEM/ AEM Electrolyzers
 - Composite Metal Plates for Fuel Cells and Electrolyzers
 - Sea water Electrolyser for Green hydrogen
 - Development of high efficiency PEM fuel cells
 - Hydrogen Storage:
 - Low-Cost Type-IV Hydrogen Storage Cylinders based on carbon fiber.
 - Cost Competitive alloys for Hydrogen Storage (Type-I, II)
 - Solid state H₂ storage technology like metal hydride
- c) Automation and Artificial Intelligence: indigenous development of the eco-system
 - Indigenous Development of SCADA software
 - Real Time Data Analytics by using Big data (SCADA/PMUs/DR signal) for System Operators
 - Forecasting of Run-of-River Hydropower Generation for effective scheduling & Real Time Grid Management
 - Development of LVRT/HVRT compliance monitoring tool
 - AI Based Analytical Engine for analyzing MISP (Malware Information Sharing Platform) Information using Super Computing
 - Cyber Security of the Power Sector
- d) Geothermal Energy
- e) Alternatives to Lithium-Ion storage batteries

Apart from the above innovative proposals on emerging/ disruptive technologies will be accepted for evaluation under the MAHIR.

Format for submission of Proposals

1. a) Name of the Implementing Organization/Institute and Address
b) Name of the Collaborating Industry and Address
2. a) Name of the Principal Investigator (PI) and Project team
b) Name of the project team members of Collaborating Industry
3. Project Title
4. Objectives
5. Justification
6. Facilities required by the Implementing Organization/Institute (*in terms of equipment's / accessories*)
7. Facilities provided by the collaborating Industry (*in terms of equipment's / accessories*)
8. Broad overview of technical programme
9. Bar chart of technical work on quarterly basis with major milestones to be achieved.
10. Total Estimated cost of Project (*Rs Lakhs*)
 - a) Expenditure break up*:

SL No	Particulars	Year wise break up (<i>Rs Lakhs</i>)		Total Cost (<i>Rs Lakhs</i>)
		I year	II year	
1	Major Equipment's			
	a.			
	b.			
	c.			
2	Software / Hardware			
3	Temporary man power (SRF/JRF/RA/PA/Consultancy)			
4	Consumables / Miscellaneous			
5	Travel / Contingencies			
6	Outsourcing of facilities			
7	Others (<i>if any</i>)			
8	Institutional overheads (10%)			
Grand total				

b) Financial contribution from the Industry

11. Project duration

12. Details of End user / Partner for execution of project work / field implementation and nature of involvement of partner

13. Specific deliverables of the project in terms of

- i. *Knowledge gained*
- ii. *Research publications*
- iii. *Patents*
- iv. *Process and product development*
- v. *Contribution towards improvements in issues concerning System operation*
- vi. *Value addition*

14. Benefits / returns from the project work (*indicate likely benefits to Indian Power Sector / Indian Utility / Manufacturer / Society*)

Mandatory Enclosures:

- Brief summary of work carried out by PI and team members in the last 5 years.
- Details of Publications in National / International Journals / Patents.
- Details of Research projects completed / ongoing of the PI (*if any*)

SL No	Project Title	Outlay (Rs Lakhs)	Sponsored (Scheme)	Project Outcome / Deliverables	Publications / Patents (numbers)
1					

- Brief CV / Bio data of PI and team members
- Complete address of PI for communication (*includes Mobile, Landline and Fax number, email id etc.*)
- Details of Existing Lab / Analytical / Computational facilities.
- In case of Engineering Colleges, details of research center, facilities, PG courses, Doctoral program and number of PhD Scholars may be furnished.
- Letter of consent from the collaborating Industry to support the research project

Note:

- A soft copy of the proposal may be sent to mvrao@cpri.in , the hard copy of the proposal may be sent to CPRI

Certificate

- A. This proposal has the approval of the Organization and all the existing facilities shall be made available for carrying out the studies on the proposed scheme
- B. That the research work proposed in the scheme does not in any way duplicate the research work already done or being carried out in the research station on the subject.
- C. That the project is not being partly or fully financed by grant from any other Organization / Government

Name and Signature of the Principal Investigator

Signature of the HOD / Head of the Implementing Institution / Organization

(With seal)

Date: