

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
(Technology Mission Division)

Call for Oriented Research & Technology Development Proposals on
"Hydrogen and Fuel Cell (HFC)" - 2018

Preamble: DST is seeking to support innovative Hydrogen and Fuel research proposals addressing one or more of the following challenges:

- ❖ Research on hydrogen and fuel cell as renewable energy carrier, such as hydrogen production and distribution, hydrogen storage for renewable energy integration and fuels cells for power and combined heat and power generation.
- To develop transformational technologies that reduce the cost of hydrogen production, distribution & Storage, diversify the feedstock available for economic hydrogen production, enhance the flexibility of the power grid, reduce emissions through novel uses of low-cost hydrogen.
- Projects should seek to achieve performance advances in terms of durability of fuel cell technology. Proposal submitted under this topic should focus on developing and optimizing advanced electrocatalysts and novel synthesis methods. The conceptual and detailed design of a High temperature Fuel Cell-Combined Heat and Power (HTFC-CHP) system optimised for raw biomass-derived gaseous fuel operation in a real environment, processing different types of biogas feedstock, coping with gas composition fluctuations and pollutants.

Aim: Reduce the production cost of fuel cell systems to be used in transport applications, while increasing their lifetime to levels which can compete with conventional technologies, increase the electrical efficiency and the durability of the different fuel cells used for power production to levels which can compete with conventional technologies, while reducing costs, increase the energy efficiency of production of hydrogen mainly from water electrolysis and renewable sources while reducing operating and capital costs, so that the combined system of the hydrogen production and the conversion using the fuel cell system can compete with the alternatives for electricity production available on the market; demonstrate on a large scale the feasibility of using hydrogen to support integration of renewable energy sources into the energy systems, including through its use as a competitive energy storage medium for electricity produced from renewable energy sources; reduce the use of the 'Critical raw materials', for instance through low-platinum or platinum-free resources.

The proposers are encouraged to consider following aspects in their proposals where appropriate:

- Hydrogen production technologies using photoelectrolysis, photocatalysis or thermal decomposition, pyrolysis, water oxidation etc.

- Hydrogen storage and transportation technologies using metal hydrides, organic hydrides, or liquid hydrogen, etc.
- Hydrogen utilization technologies such as renewable fuel cells or hydrogen turbines, etc.
- Reduce the cost & improve the performance and durability of fuel cell technologies, developing & optimizing advanced electro catalysts and novel synthesis methods.
- Alternative synthesis route that can sustain hydrogen production in the presence of oxygen.

Please note that the call is not exclusive to these topics and is open to any other research addressing problems related to HFC technology.

Proposals that are oriented towards emerging technologies or idea based on unique and innovative concepts are encouraged All proposers must indicate how their proposed work would solve a particular need.

Funding Available:

Research Stream (Stream A) : 1 Crore maximum

Technology Stream (Stream B) : 5 Crore maximum

Project Duration : 3years maximum

Equipment:

Where possible, researchers are advised to make use of existing facilities and equipment, including those hosted at other universities. If equipment is needed as part of the research proposal, applicants must follow DST's norm for requesting equipment which will be made available only on the basis of strong dedicated requirement for the project.

Who can apply:

The collaborative research and/or technology endeavour is primarily between scientists and engineers in India.

Research Stream (Stream A): Faculties/ Scientists working in regular position in recognised Academic Organisation/ Public funded R&D Institution/ Laboratories are eligible to apply. Interface with select foreign University / Institutions could be considered on a very selective basis under the overall umbrella of Science & Technology agreement with concerned country provided it does not envisage any funding to foreign partners. Only mobility support to Indian Scientists, especially young researchers could be considered, where absolutely essential.

Technology Stream (Stream B): The call is invited from Scientists, in recognised academic organisation/ public funded R&D Institute / laboratories, preferably in consortium of industrial partner and academic/ research institution. Participation of industry with clearly identified role is mandatory. The roles and responsibilities of each partner should be clearly delineated in the proposal. The industrial partner should have proven standing and R&D capability in the area of Clean Energy. **The proposals submitted without 'proof of concept' and adequate preliminary work and research results will not be considered further. These proposals will also not be transferred to Research Stream 'A'. The applicants are therefore, advised to ensure that their proposal conform to the requirements of the technology stream.**

Submitting an application

Please submit the proposal online at <http://onlinedst.gov.in/Login.aspx>. Send 2 hard copies of complete project proposal in prescribed format with all enclosures (1 marked original + 1 hard copies) & Soft copy of complete proposal in MS word and PDF in Pen Drive in an envelope marked "**Call for Oriented Research & Technology Development Proposals on Hydrogen and Fuel Cell (HFC) - 2018**".

The complete set of documents are to be addresses to: **Dr. Ranjith Krishna Pai**, Scientist 'D' / Principal Scientific Officer, Room no: 13-C, Block-1, Technology Mission Division, Department of Science and Technology (DST), Ministry of Science and Technology, Government of India, Technology Bhavan, New Mehrauli Road, New Delhi -110016 before the closing date of the call.

Soft copy of Project Proposal is to be e-mailed (Subject Captioned: Call for Research & Technology Proposals on "*Materials for Energy Storage*" (MES) - 2017 / Stream Name / PI Name) to ranjith.krishnapai@gov.in by **29th June, 2018**.

Assessment

Proposals will be screened and considered by an expert panel. **Applicants will be informed of the outcome as soon as possible after the panel meeting and PI(s) may be called for presentation on the proposal for the next level of evaluation.**

The panel will be requested to assess the proposals against the assessment criteria as listed below. As such the nature of the challenge and the scientific quality of the proposal are critical, as well as the fit of the proposal to the call.

Assessment criteria

The relevance of proposal to call objectives need to be conclusively established. The proposal relevant to call objectives will be evaluated based on following criteria:

- a. Novelty of the proposed work,
- b. Need assessment and demand for proposed work,
- c. Scientific appropriateness of deliverable of proposed approaches and technical merit
- d. Expertise and track record of individual researcher or project consortium as applicable. Appropriateness of industrial partner, competence of each member, facilities available to conduct researcher will also be given due consideration.
- e. Proposal formulation. Literature/patent review, qualified objectives, methodology and work plan, clear and well defined deliverable.

The weightage of above parameters will vary for both the streams.

Project Implementation: The grantee organization/ PI must provide progress report of the work carried out under the project, that will be assess with quarterly milestones. DST approved committee may visit the organization

periodically to review the progress of the work being carried out and suggest suitable measures to ensure realization of the objectives of the project.

Note: Kindly note that:

The PI can submit only one proposal against this HFC 2018 Call either in stream A or stream B. Submission of more than 1 proposal from a PI, would liable to be disqualification of all the submitted proposal.

Key Dates:

Activity	Date
Deadline for Full Proposals Stream A and Stream B	15th July, 2018

Contacts: Any enquiries related to this call should be directed to:

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