



## **Funding Opportunity Announcement (FOA): Sustainable Biofuels Innovation Challenge (IC#4)**

### **1. PREAMBLE**

Mission Innovation (MI) is a global initiative of 23 countries and the European Union to accelerate the global clean energy innovation. As a part of this initiative, the participating countries have committed to double their government's clean energy research and development (R&D) investments over five years while encouraging greater level of private sector investments in clean energy technologies. These additional resources will dramatically accelerate the availability of the advanced technologies that will define a future global energy mix that is clean, affordable, and reliable. Mission Innovation was announced on November 30, 2015, as world leaders came together in Paris to undertake ambitious efforts to combat climate change.

**MI countries have agreed to double their R&D investments from base year of 2015 in five years i.e. by 2020.** Government of India has given the responsibility to Department of Biotechnology (DBT), Ministry of Science & Technology to coordinate the Indian MI activities (Please see details at [www.mission-innovation-india.net](http://www.mission-innovation-india.net)).

India is a member of all seven Mission Innovation (MI) challenges for clean energy development and is a co-lead in three challenges. India has taken a lead in MI activities by arranging country workshops in all seven areas and has also arranged successful international conferences. MI India Unit set up by Department of Biotechnology (DBT), Ministry of Science & Technology, Govt of India, has identified priority areas in seven challenges where international cooperation and mutually beneficial engagements can be established.

The Sustainable Biofuels Innovation Challenge (SBIC) under MI is co-led by India, Brazil, Canada and China. The other participating countries include Australia, the European Commission, Finland, France, Indonesia, Italy, Mexico, Norway, Sweden, the Netherlands, UK and US.

The usage of fossil fuels for transportation contributes significantly to global greenhouse gases (GHG) emission. The sustainable biofuels have ability to reduce the GHG emission load and this consideration led to establishment of Sustainable Biofuels Innovation Challenge (SBIC) under Mission Innovation (MI). The Sustainable Biofuels Innovation Challenge is a key opportunity for Government, researchers

and industry to work together on rapidly accelerating research and development, with the goal of achieving performance breakthroughs and cost reductions for large scale production of Advanced Biofuels.

Advanced sustainable biofuels can be produced from non-food biological materials (biomass) such as forest and farming residues and other waste materials, specially grown high yield plants or algae, and refined into fuels for use in transportation or industry. If managed sustainably, biofuels are a renewable energy resource that can contribute significantly less GHG emissions and other air contaminants than fossil fuels. If climate targets are to be achieved, especially in the short and medium terms, biofuels have an important contribution to make.

A key challenge for some countries constraining wider adoption of biofuels is the high costs of advanced conversion technologies that are at various stages of development. Research and Development aimed at accelerating advanced biofuels availability must address key challenges ranging from the sustainable generation and supply of biological feedstock which takes into account life-cycle impacts and increasing competition for food, feed and material production, to demonstrating the economic feasibility of technologies to produce biofuels that meet current fuel specifications and that can be blended with existing fuels.

*There is a strong need to continue support for R&D in areas of Advanced Biofuels and an effective cooperation between researchers of MI countries is one of best ways to giving this a special boost.*

## **2. OBJECTIVES:**

The objective of this Call is to undertake **Joint Research & Development with member MI countries** in the field of advanced sustainable Biofuels, which can be produced from non-food biological materials. Production of low cost high performance Enzymes and yeasts are essential for reducing the production costs of Biofuels. Exchange of best practices in feedstocks including, collection, handling, transport and pre-treatment practices and integrated bio refinery projects need extensive R&D. The technology developed must be scalable and cost effective in long run.

## **3. PURPOSE:**

The purpose of developing a **Sustainable Biofuels** Joint call is to develop ways to produce, at scale, widely affordable, advanced biofuels for transportation and industrial applications. Also, the purpose is to conduct research, development and demonstration (RD&D) to foster technology innovations that are technically feasible, robust and cost-effective. It is expected to evolve technologies and develop methodologies and business models tunable to local as well as at global needs.

## **4. SCOPE:**

This funding opportunity will financially support activities, of Indian researchers, towards design, research & development and demonstration that can address the issue of development of widely

affordable, Advanced Biofuels. Both Bilateral and Multilateral collaborations between Indian scientists and scientists from MI member countries of IC#4 Innovation Challenge are within the scope of this call.

## **5. IDENTIFIED RESEARCH PRIORITIES:**

*Indicative list of R&D priority areas identified for this call are listed below:*

- Research and improve upon technology for production of sustainable Advanced Biofuels from agricultural residues leading to cost reduction in project capital and operations
- Use of MSW for CNG/Methanol
- LCA for production of biofuels for environmental impact assessment
- Development and demonstration of biorefinery with high value by products
- Microbial fermentation of waste material for advanced biofuel production
- Production of low cost high performance enzymes and yeasts for biofuel/bio-products including genetic manipulations.
- Advanced methods for improvements of biological feedstocks
- Lignin valorization
- Production of advanced biofuels like biobutanol, biohydrogen, drop-in fuels, bio-jet fuels, hydrocarbons etc using synthetic and systems biology approaches.
- Heterotrophic algal production from waste stream.

## **6. ELIGIBILITY:**

The proposals have to be led by qualified researchers/ professionals from Science, Technology and Engineering disciplines working in regular position at Indian institutions drawn from academia and public funded R&D laboratories. DSIR recognized industrial R&D units can jointly apply with academia for funding with matching grant.

*The institutions/industries of Mission Innovation (MI) member countries are welcome to join the partnership with the lead Indian institute / organization to carry out collaborative work. While there is no restriction on upper number of participating MI countries (including European Union), participation of at least one organization (institution/industry/researcher) from MI country is mandatory.*

*The funding under this call will be provided to successful Indian researchers / Institutes who are expected to draw common R&D programs in the listed areas with researchers/ institutes of MI member countries. The MI member countries are encouraged to take part in this call by providing financial support to their researchers / institutes. The proposals under the EU's Research Framework Programme Horizon 2020 (LC-SC3-RES-22-2018) are also eligible to apply.*

*Lead Indian PI submitting this LOI proposal shall need to identify and contact researcher/institute from MI countries listed above for their interest and participation in this programme.*

## 7. FUNDING:

<b>Total Funding Size:</b>	<b>US \$ 5 million</b> or equivalent in local currency of participating MI country
<b>Floor limit:</b>	<b>US \$ 0.2 million</b>
<b>Ceiling limit:</b>	<b>US \$ 1 million</b>

## 8. COMPONENTS OF FUNDING

- Additional Research manpower especially hired for the project in India (Existing research manpower will not be eligible for funding).
- Travel (Domestic and international) for student / researcher mobility to Indian applicants
- Dissemination activities and stakeholder workshops
- Contingent expenditure such as stationery, incidentals etc.
- Equipment (not exceeding 30 % of project cost)
- Field/Pilot demonstration in India (upto 50 % of project cost, if proposed).
- Providing local hospitality and travel assistance to visiting researchers from participating MI country

## 9. EVALUATION CRITERIA

The integrated proposals which can address one or more research challenges right from R&D to development and demonstration at lab / field level, wherever feasible. Standalone proposal focusing on pressing challenges/issues with clear path to bring about affordability, robustness and accessibility are welcome. Besides, fulfillment of minimum eligibility, the following criteria will be used in grant making decisions:

- I. Relevance to objectives of MI Sustainable Biofuels Innovation Challenge(**IC#4**)
- II. R&D led breakthroughs for sustainable biofuels.
- III. Technical Innovation on improving the production process of advanced biofuels
- IV. Addressing critical R&D issues requiring early stage grant funding that will allow for the development and testing of innovative technological solutions.
- V. Potential for accelerating the commercialization integrated bio-refinery process
- VI. Contribution of proposed work to enhance cost effectiveness and sustainability of advanced biofuels

## 10. PROCESS:

The evaluation process will be conducted in **two stages**:

- **Stage-I:** All interested applicants are invited to submit a Letter of Intent (LoI) in Consortium mode with agreement of MI member country researchers/ institutes.
- **Stage-II:** From these initial submissions, Evaluation Committee (EC), as constituted by DBT, will shortlist the eligible applicants through peer review process.

Applicants found eligible at **Stage-I** evaluation will be requested to submit detailed proposals for participation in **Stage-II** and these will be critically evaluated by constituted expert committees, duly constituted by DBT, in India. In case there is an equal funding call from other Mission Innovation (MI) member country, then a joint review of the proposals will be undertaken.

## 11. TIMELINES

Call for Letter of Intent (LoI)	<b>15<sup>th</sup> June 2018</b>
Last date of submission of LoI Form	<b>31<sup>st</sup> Aug 2018</b>
Invitation for submission of detailed proposals	Early Nov 2018
Receipt of detailed proposals	Mid Dec 2018
Evaluation of proposals and due diligence	Early Feb 2019
Announcement of Awards	Last week of May 2019

## 12. GENERAL GUIDANCE ON PROPOSAL FORMULATION

*The below guidance is not exhaustive but is designed to help interested organizations to develop proposals.*

- Proposed projects should necessary be based on clean energy and should be truly innovative and transformational. Proposals should make clear how they are adding value and not duplicating an existing solution; multiple forms of innovation are eligible and will be considered. Proposals should also clearly illustrate how the work proposes to overcome technical barriers of existing advanced biofuel technologies
- Proposed projects should be for applied research, establish proof-of-concept in the early stages of development, defined broadly as the critical transition phase of idea/ concept to development thus making support from this grant would be most impactful.

- The maximum duration of the project **should not be more than 36 months**. Each project is subject to review at key milestones to continue funding.
- The project administrative costs should be kept to a minimum. The permanent equipment maximum upto 30 % of the cost of project may be provided to the organization to develop the solution.
- In case, the collaborating partner is from an institute/organization of MI member country, a consent letter **from respective partner institute is needed regarding their active participation in the project**. The grant places strong emphasis on evidence-based results. Proposals must clearly define the indicators of success **in the application form to show quantified tangible gain during the project lifecycle**.

The grant also places a strong emphasis on sharing the results more widely. Project implementing organizations will be required to maintain an Open Access Policy.

### 13. SUBMISSION GUIDELINES

- i) A Soft copy (MS Word) should be e-mailed to **Dr. Sangita Kasture**, Scientist 'E', Department of Biotechnology, Ministry of Science and Technology, Government of India at [sangita.kasture@nic.in](mailto:sangita.kasture@nic.in) with cc to [IC4@mission-innovation-india.net](mailto:IC4@mission-innovation-india.net). Please mention **MI-India-IC#4: Name of Principal Investigator/ Name of Institute** in the subject line of the email.



## **Funding Opportunity Announcement (FOA): Sustainable Biofuels Innovation Challenge (IC#4)**

**Letter of Intent (LoI) Form**  
All applicants **MUST** use this form to apply

### **Instructions**

1. Please review the Call for LoI carefully before completing this form.
2. **Do not exceed the word limit where specified otherwise application may not be considered**
3. Use 11-point Arial font to fill the information.
4. All questions should be answered clearly. Incomplete applications will be disqualified.
5. By submitting this LoI, you are certifying that the answers to the questions are accurate to the full extent of your knowledge.
6. Enclosure (letter of intent from partners MI country participant)

### **Section A: General Information**

<b>Ref Number (do not fill this field)</b>	
<b>Project Title</b>	
<b>Project Type</b> <ul style="list-style-type: none"><li>• <b>Research/Design</b></li><li>• <b>Cost reduction</b></li><li>• <b>Demonstration</b></li><li>• <b>Early Concept of Biofuel technologies</b></li></ul> as listed in point 4 of this document	
<b>(I)Total Funding Request (INR)</b>	
<b>Lead Implementing Organization and its</b>	

<b>Status (Must be an Indian Organization)</b>	
<b>Partnering Organization from MI Country/ Countries</b>	
<b>In India: Industry Partner (If any)</b>	
<b>MI Country Industry Partner</b>	
<b>(II) Contribution in Cash /kind from partnering institutions, if any</b>	
<b>Total cost (I + II) =</b>	

### Section B: Project Information

<b>Project Description</b> ( <i>max 500 Words only</i> )	
<b>Expected Outcomes</b> ( <i>max 200 Words only</i> )  <i>Describe the short and long-term outcomes and impacts of the project</i>	
<b>Expected duration of project activities</b>	<i>Years Months</i>
<b>The novelty and relevance to the Sustainable Biofuel Innovation Challenge</b>  <b>Context of MI IC#4</b> ( <i>max 250 words only</i> )	
<b>Result Indicators:</b> List specific results and Indicators you will use to measure success of this project towards achievement of impacts and outcomes. <b>Examples are given here:</b> you may develop additional indicators as needed that best reflect goals and performance. Contribution to Cost effectiveness and access are of paramount importance.	<ul style="list-style-type: none"> <li>• What Impact it will have on cost reduction?</li> <li>• How the findings can be integrated in the existing bio-refinery products?</li> <li>• How can be findings be tuned to adapt to local conditions?</li> </ul>
<b>Monitoring and Evaluation approach (max 150 words)</b>	
<b>Project Sustainability and long term viability : What steps shall be taken to make the project</b>	

<b>scalable and sustainable in the long- term? (max 200 words)</b>	
<b>Project Risks (Maximum 200 words)</b> What are the main risks and challenges in the execution of the project (technical risks, market risks, regulatory risks, financial risks, etc.)?	
<b>How complete and realistic are the impacts identified for this work. (max 150 words)</b>	

**Section C: Financial requirement (all figure must be INR in lakhs)**

*Examples of budget heads are given here; you may develop additional budget head as needed that best reflects the proposed activity*

S. No.	Item Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	Total (Rs. In Lakh)
<b>Non- Recurring Cost</b>				
1.	Permanent Equipment (located in lab/ implementing organization)			
2.	Fabricated systems/ models			
A'	<b>Sub Total (Capital Items)</b>			
<b>Recurring Cost</b>				
1.	Manpower			
2.	Consumables			
3.	Contingencies			
4.	Domestic Travel			
5.	International travel to participating MI countries			
6.	Other Cost, if any			
7.	Overhead			
B'	<b>Subtotal (General)</b>			
C	<b>Total cost of the project (A'+B')</b>			

**I. DBT Contribution to Project costs:**

**II. Contribution of consortium (if any):**

**Total Budget (I +II): Rs. \_\_\_\_\_ Lakhs**

## Section D: Applicant Details

<b>Name of the Lead Organization</b>		
<b>Address: Please include phone numbers, fax, emails and website</b>		
<b>Applicant Type</b>  <b>Broad:</b> Government /Non- Government  <b>Sub entity:</b> Academic or research institution or DSIR recognized Centre or any other		
<b>Primary Point of Contact: Lead Principal Investigator (PI)</b>	Name:	
	Designation	
	Email	
	Telephone:	
	Mobile	
<b>Secondary Point of Contacts</b>	Name:	
	Designation	
	Email	
	Telephone:	
	Mobile	
<b>Information on Lead PI (<i>maximum 250 words</i>)</b>  <ul style="list-style-type: none"> <li>• <i>Relevant experience and track record</i></li> <li>• <i>Project team (key personnel, skills &amp; experience)</i></li> <li>• <i>Provide up to 3 past performance references that can speak to ability of applicant to achieve results, successfully implement a project of similar magnitude and complexity</i></li> </ul>		

<p><b>Partner institution (in India) * IF ANY</b></p> <p><i>if applicable, and what skills and experience they will contribute to the implementation and scale of the project:</i></p>	
<p><b>Partner Institutions / researchers (in Mission Innovation countries) *</b></p> <p><i>what skills and experience they will contribute to the implementation and scale of the project</i></p>	

\* The same information as required for lead PI may also be provided for partner organization.

**Section E: Enclosure details, if any**

**(Letter of intent from partnering institutions / researchers)**