Department of Science and Technology
(Technology Mission Division-EWO)

Call for Proposals

Research & Technology Development for Blending of Agro-Residues with Coal in Thermal Power Plants

1. Preamble

In India, power is generated both from conventional and renewable sources. However, power generation through coal-based thermal power plants occupies 75% of the total power generation. The use of biomass especially agro-based with coal is an eco-friendly and cost-effective technique to deal with present environmental concerns. During combustion of Agro-Residues beyond a limit in coal-fired thermal power plants, safety is a cause of concern as it contains various volatile matter including Sulphur dioxide, nitrogen oxides and carbon monoxide, which pose a threat to stable operation of power plant.

The ash generated from co-firing also needs to be utilized effectively. Scientific interventions are solicited to ensure that the resulting blend limits with coal shall increase while maintain plant output without damaging the boiler and balance of plant.

2. Objectives of Call

The objective of the call is to promote translational research utilizing available lab-scale know-how to consolidate research outputs to advance current technologies in the related field to deliver potential solutions to enhance the share of Renewable Energy for industrial and societal applications. Lead Principal investigator should have a research team to foster interdisciplinary, multi-institutional networked research projects synergizing strengths of respective partners to deliver efficient Technology to meet national needs in thermal power plant. The call envisages close interaction between industry, academia and research institutions. Participation of industrial collaborators from early stage is desirable to build long term linkage and take up leads to develop technologies that could eventually find a space in market place. The outcome of the scientific endeavour under the call should be scalable.

3. The identified thrust area are as under:-

3.1 Research to reduce Chlorine & Alkali contents in Agro residues Biomass.

Issue: Biomass includes a large variety of fuels with different chemical composition and combustion characteristics. Agro-residue contain high concentration of alkali metals and chlorine. These are primarily organically associated as simple salts and can readily release to the gas phase during combustion.

High concentration of alkali metals in biomass results in a variety of severe ash related problems. During combustion, alkali metals condense on the heating surface and forms a sticky slagging layer. Slagging particularly reduces heat transfer efficiency and damage superheaters. Chlorine causes increased oxidation, metal wastage, void formation. The high contents of chlorine of biomass influences the volatilization of alkali from coal in co-firing system resulting in corrosion of pressure parts.

Deliverables: Research to find out leaching or other suitable methods may be carried out to remove Chlorine and Alkali content from agro residue for getting better combustion / heat transfer and improved residual life of pressure parts in boilers with biomass co-firing.

3.2 Research on effective techniques / modern harvesting methods / combine attachment for harvesting agro based residue (or stubble) from farm fields.

Issue: Stubble burning is a practice where fire is purposely put to the stubble which remains after grains, such as paddy, wheat, rice, corn etc. Harvesting of various crops generate large volumes of residues and hence burning these residues have an adverse effect on the global air quality and human respiratory problems which leads to public health complications. Apart from contributing to air pollution, stubble-burning deteriorates the soil's organic content, essential nutrients and microbial activity which together affects the soil's long-term productivity.

Deliverables: An effective method to cut the crop near the surface of the soil by utilizing combined harvesting / other suitable technology will be

able to totally eliminate the crop residue burning. Research to find out effective harvesting techniques /machines may be carried out , which will save the energy and labour time of the farmers , enhance the quality of agro residues by uniform cutting and reduce the air pollution.

3.3 Research on use of biomass fly ash in cement based materials.

Issue: The fly ash resulting from the combustion of biomass fuels either alone or with coal has got different characteristics compared to fly ash from coal alone. The elevated alkaline content in fly ash from biomass, mostly Na & K, may make these ash not suitable for cement industries like conventional fly ash from coal combustion. Proper solution in this direction will lead to enhanced use of Ash utilization with co-firing in Thermal power plants.

Deliverables: At present, there is no comprehensive data / standard on quality of fly ash resulting from biomass co-firing with coal, mostly due to low percentage of biomass usage. Research may be carried out on the ash generated from co firing of different types of biomass in various proportions with coal and to examine whether this ash can be used in cements, bricks, asbestos and concrete industries.

3.4 Research on release of volatile matters in co-firing biomass with coal.

Issue: Biomass has higher volatile matter than coal and in combustion it causes disturbances especially when the proportion of biomass co-firing with coal increases. Release of volatile matter is also important in flame front propagation during combustion. As the percentage of biomass increases there are chances of auto-ignition due to higher percentage of volatile matter, which can pose safety hazardous.

Deliverables: Reduction of volatile matter in biomass pellets (through Torre faction / others) will help in blending high proportion of biomass with coal without safety hazard in all type of Boilers. Research may be taken up for techno-economic solution of volatile matter reduction in biomass pellets to bring it down close to that of coal.

3.5 Research on using gasified products of the agro residue (biomass) as syngas in the existing coal PC-fired boilers.

Issue: Gasification of biomass is a proven technology. With the increased thrust on use of biomass in higher proportion with coal / to replace coal in a large percentage, technology development may be required to have compatible biomass feeding systems, physical processing of biomass that is easily gasified, integration of gas firing system into the existing pulverized coal furnace.

Deliverables: R&D may be carried out to explore the possibility of gasification of agro residue (biomass) and co-firing the syngas so produced along with coal in the existing PC-fired boilers. If technology is developed, the project may be taken up to convert coal fired boilers into 100% biomass-fired boilers.

3.6 Research on use of Municipal Solid Waste pellets (MSW pellets) in Thermal Power Plants.

Issue: Biomass consists of different forms of fuels with exclusive chemical compositions and burning characteristics. Municipal Solid Waste or MSW is one such type of biomass that presents another opportunity for power production as well as environmental protection via the reduction in waste landfills. India produces around 70 MMT of MSW per year in urban areas alone. There is a need to comprehend the properties of MSW in order to better understand its suitability a for power production applications. MSW usually contains 35-40% moisture content in addition to combustible components, such as plastic, cardboard, paper, and biodegradable waste. Therefore, its pelletization involves several additional steps like drying, separation of combustible mass from MSW, size reduction, mixing with binder and additives etc. Even after these additional steps, it is found that there is wide variability in the characteristics of MSW MSW-based lets. Hence, further research is required in order to develop a better understanding of the effect of the constituents of MSW on its characteristics and the challenges faced on firing it in thermal power plants.

Deliverables: Research may be done to give reliable estimates of ash, moisture, fixed carbon/ combustible mass, volatile matter etc. in typical category of municipal waste and an estimate for the range of fuel-related characteristics to be achieved via pelletization of MSW (e.g. GCV, ash, hardness, etc.). Recommendations may be given on the type of additives or alternate biomass that can be added to MSW in order to improve its characteristics.

3.7 Research on pelletization technologies

Issue: Different types of techniques are used to produce pellets. The most commonly used pelletization processes are hot melt extrusion, Gear Extrusion, Powder layering, Extrusion spheronization etc. All these methods are expected to consume energy/ heat in one form or the other. Since, biomass is a renewable resource, it would be in the interest of the environment to ensure that the pelletization process itself is eco-friendly in nature. A study can be introduced to evaluate the comparative advantages/disadvantages of different pelletization methods in order to identify those which are able to produce quality pellets while consuming least resources and having least impact on the environment.

Deliverables: A thorough review and description of the available pelletisation techniques with their comparative benefits/ drawbacks may be done. Recommendations on the most viable method for pelletization of biomass in the existing techno-economic scenario of the country, estimate of the type and quantum of the environmental impact and resource consumption in the recommended technique may be given.

3.8 Research on addressing challenges in co-milling of more than 10% Biomass Pellets with Coal in TPS

Issue: Co-firing biomass along with coal is being suitably adopted in Thermal Power Stations (TPS) across the country. However, there is a need to increase the level of co-firing from the existing target of 5-10%. There are, however, certain hurdles that make this

intervention challenging. The first such challenge is encountered in the milling system of TPS where rubbing/ impact is used to crush the solid fuel into a fine power for onward combustion in the furnace. Addition of biomass to fuel makes the milling part difficult primarily due to its fibrous nature and high volatile content. Hence, further research is required to identify the interventions/ structural changes/ methods that can be adopted to make high co-milling of biomass to make it a technically viable option in TPS.

Deliverables: Research may done for understanding and describing the current challenges in high level of co-milling of biomass in TPS, a detailed list of interventions/ changes/ methods that can be adopted to enable high levels of biomass co-milling in TPS and estimate of the maximum level of biomass co-milling that can be done with the suggested interventions.

4. WHO CAN APPLY

The proposals are to be led by Faculties of recognized universities and academic institutions, scientists working in National and State Laboratories, R&D institutions and Research organizations recognized by DSIR individually or in consortium. Genuine and meaningful participation of Thermal Power Plant entity/industry (with statutory recognitions) having capability in the area and have potential to commercialize the developed technology is desirable.

Eligibility: The proposals have to be submitted in the institute – industry / user partnership only. The proposals are to be led by faculties/ scientists working in recognized academic institutions, public funded R&D Institution/ Laboratories, DSIR recognized SIRO organization in partnership with other academic/ R&D organisation, state line departments, S&T based voluntary organisation, etc. Participation of industries/ start-ups and industry association is strongly recommended. The role of industry in the proposal should be tangible and it should show interest in promoting or encouraging the developed technology. The company/industry has to be willing to contribute in the form of industry attributable technical inputs and resources in kind. Cash contribution will be added advantage.

Project Cost: Up to 5 crores for the credible scale prototype / Facility / demonstration system. The cost of instrumentation research, testing and characterization equipment used in labs should not exceed 30% of project cost. The plant and fabrication cost is not covered in this 30% ceiling. However, if the proposal have novelty and merit, justified higher cost may also be considered

Project duration: Upto 3 years.

5. Call Duration – 2 months from the date of release/uploading of the Call. (Extended for 1 month till 30th September 2022)

6. SPECTRUM OF ACTIVITIES SUPPORTED

The spectrum of activities focuses on translational research to convert available know-how to useful products/processes etc. It also includes applied research aimed the performance enhancement of existing systems. The applicants are advised to indicate TRL level at the beginning and end of the project.

Disclaimer: Topics given are not prioritized and are the suggestions received from stakeholders. Submissions of the project proposal on these topics do not indicate preferential treatment or otherwise. The onus or establishing need and demand of the research convincingly rest on proposal through supportive facts and data. Any other topic which could provide solution for the area through technological innovations can also be proposed. The interdisciplinary and transformative R&D proposals leading to development of efficient system that could be adopted in the real field/industry utilization would be preferred. Proposal on fundamental science, material science etc. would not be acceptable under the call. The scientific outcome of the proposal should have clear connection with application in industrial/ societal application.

7. PROJECT FORMULATION GUIDELINES

The proposals should clearly define the objectives and list the deliverables and these deliverables should include a target performance; how their proposed process/ product/system stands in comparison to comparable national and international ones in terms of performance and projected cost. The CV of the project investigators should be brief and highlight their competence and experience related to the proposed project area. Consortia may be formed wherever required by clearly explaining the need for forming the consortia and the roles and responsibilities of

each partner. The industry partner should have proven standing and R&D capability in the area related areas and should exhibit the potential to commercialize the products / systems developed under the proposal. The extent of participation and contribution of the industry partner should be clearly defined. Participating Industry would be required to invest within its own system i.e. production/ test lines and/or develop required infrastructure to adopt research leads and is expected to bring design and engineering capability for the benefit of the project. Contribution in cash, though welcome, is not mandatory for the projects submitted under this call.

8. ONLINE SUBMISSION OF PROPOSAL

Proposals are accepted only online at e-PMS under Technology Mission Division in the prescribed format till office time on closing date of proposal. Proposal format can be downloaded from Website https://onlinedst.gov.in/Login.aspx. Go to: Schemes And Formats: Technology Mission Division: Technology Development for Blending of Agro-Residues with Coal in Thermal Power Plants: Download Call format. The proposal in any other formats will be summarily rejected. Kindly comply with the instructions as mentioned below during online submission of proposal:

a. Under objective mention clearly defined targets.
b. Under Principle Investigator tab: In Co-Investigator List- Please ensure to mention the details of all the persons involve in the project including collaborator.
c. Under Suggested Referees tab: At least 3 referees are mandatory to be mentioned.
d. Under Ongoing projects tab: Declared those projects related to the Principle investigator.
e. Under Submission tab: Certificate from PI (Pdf Max 800 Kb): Please ensure certificate of all PI's and Co-PI's in the project team should be merged together and uploaded as a single pdf document.
f. Under Submission tab: Endorsement from Head of Institute (Pdf Max 800 Kb): Please ensure that certificate from relevant institutes (if any) of all PI's,Co-PI's , collaborators, Letter of Intent from beneficiary (as applicable for selected stream) of project should be merged together and uploaded as a single pdf document.
g. Nomenclature for soft copy of Project proposal document: (PI first name – Institute -City) eg; if PI name is Dr. Anil Kumar and his affiliation is National Institute of Technology, Raipur then soft copy file name is Anil-NIT-Raipur.docx /Anil-NIT-Raipur.pdf It is advised to submit the proposal at the earliest and not wait till last moment, as submission of proposal on the closing day of call may hamper due to congestion on server.

9. For online submission problem: Contact Portal Help-Desk Executive at 011-26590545, E-Mail - pmso.dst@nic.in.

10. For any other Information: Contact Programme officers: Dr. Vineet Saini, Scientist 'F' / Mr. Dhirendra Tiwari, Scientist 'C'; Technology Mission Division (E&W), Department of Science & Technology (DST), Technology Bhavan, New Mehrauli Road, New Delhi- 110016 (Ph 011-26590372/011-26590622).

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Research & Technology Development for Blending of Agro-Residues with Coal in Thermal Power Plants

FORMAT FOR SUBMISSION OF PROPOSAL

Note:- Please clearly indicate the focused thrust area for which the proposal is being submitted. Thrust areas as mentioned under Para 3 i.e. 3.1 to 3.8 of Call Document.

CONTENTS

I. Proposal Summary

(To be limited to two A-4 pages)

Ensure to read the Guidelines (in italics fonts) and fill the selected/relevant text only in the boxes

	Ref no	***(to be filled by DST)***	
1.	Project Title		
2.	Project cost *(Amount in lakhs)*	DST:	Collaborator(s) *(if any):*
3.	Duration *(in months)*		
4.	PI Name Date of Birth		
5.	Co-PI (s) Name Date of Birth		
6.	Lead Organisation		
7.	Status of Lead Organisation	*Recognized universities and academic institutions/ National Laboratories/R&D institution,/Research organizations recognized by DSIR/Others-Specify the affiliation clearly*	
8.	Collaborator/Consortium partner name(s), *if any*	*(Consortium may be formed wherever necessary. In sections 11 and 12 of the proposal, clearly explain the need for forming the consortium and the roles and responsibilities of each partner).*	
9.	Collaborators'/ Consortium partners' Status	*(In case of private sector company, please indicate* ***DSIR*** *registration number of recognition of in-house R&D units) (Industry partner/Thermal Power Plant Entity should have proven standing and R&D capability and should exhibit the potential to commercialize the products / systems developed under the proposal. The extent of participation and contribution of the industry partner should be clearly defined in the proposal).*	
10.	Objectives	*(Precise and quantified)*	
11	Unique selling proposition(USP) of development	*(with in 50 words)*	
12.	Deliverables	*(Deliverables should include targeted specification)*	

13. Budget details:

A.	Project Manpower *(Post & Nos Research group/ institution-wise if more than one institutions are involved)*	DST: (*JRF/SRF/Research Associate/ Project Assistant / other Professional Manpower)*	Collaborator(s):
B.	List of Equipments required *(Research group/ institution-wise if more than one institutions are involved)*	DST:	Collaborator(s):
C.	Fabricated system /prototype, if any	DST:	Collaborator(s):
D	Nature of Contribution from Collaborators	In Cash & Kind *(Please elaborate)*	

14. Funds requirements from DST:

S. No	Item Head	1st Year	2nd Year	3rd Year	Total (Rs.)
A	**Non-recurring (Capital Items)**				
1	Permanent Equipments				
2.	Plant cost /Fabricated systems/ Demonstration models				
	Sub total (capital items)				
B	**Recurring Items (General)**				
1.	Manpower				
2.	Consumables				
3.	Contingencies				
4.	Travel				
5.	Other Costs (Outsource work etc),if any				
6.	Overhead				
	Sub total (General)				
C	**Total cost of the project (A+B)**				

Total requirement of funds from DST =

Contribution of participating institution(s), if any=

Total project cost =

II. CORE PROPOSAL

(Kindly ensure to read the Guidelines (in italics fonts) and fill the text accordingly)

1. **Project Title**

2. **Lead Organization Principal Investigator (PI)***

   Name:
   Designation:
   Complete Address *(with city pin code)**:***
   Telephone & Mobile No. :
   E-mail:

   Lead Organization Co-Principal Investigator(s) (Co-PI)
   Name:
   Designation:
   Complete Address *(with city pin code)**:***
   Telephone & Mobile No. :
   E-mail:

3. **Consortium partner organization(s) / collaborator(s):**
   Name(s) of Principal Investigator(s):
   Designation:
   Complete address *(with city pin code)***:**
   Telephone & Mobile No. :
   E-mail:

(No project shall be considered in absence of Co- PIs . One Principal Coordinating Investigator must be identified in case of Consortium Projects)*

4. **Collaborating Agencies/Industries** *(If any)*
   (Consortia may be formed wherever necessary. In sections 11 and 12 of the proposal, clearly explain the need for forming the consortia and the roles and responsibilities of each partner.)

5. **Target Beneficiaries:** *(with in solar sector/ potential outside solar sector for other applications)*

6. **Objectives of the Proposal**
   (Precise and quantified: Estimated possible values, Use bullet form)

7. **Critical Review of Status Identifying Gaps**
   (*include important references & IPR survey*)
   7.1 National Status Review
   7.2 International Status Review

8. **Unique Selling proposition of Development** (*not more than 50 words)*

9. **Outline of the Project**
   (*Define the problem and give technical details including schematics wherever necessary)*

10. **Deliverables of the project** *(Deliverables should include target performance and projected cost when Commercialized, and mention how these targets compare with existing national and international ones)*

11. Methodology

(This section should also include base work ready by the investigators, which is relevant to the project. The description of methodology should adequately demonstrate the pathways, main work element etc and highlight the capability of the investigators to work on base work

12. **Work Plan** (*mention project activities and Highlight Milestones)*

Sl no.	***Activity/Milestone***	***1st year***		***2nd year***		**3rd year**	
		1-6 M	***6-12 M***	***13-18 M***	***19-24 M***	***25-30 M***	***31-36 M***
A1							
A2							
-							
**	*Draft completion report for review (3 month prior to date of completion)*						

13. Names of 5 Experts/Agencies/ Institutions working in the similar area

(Please give complete Name, Designation, Email, Address with pin code, telephone number)

14. **Any other information relevant to the Project proposal/ execution of the project**

(Importance of the proposed R & D to India, Group strength, site details, economic analysis, Institutional Details etc)

15. **Facilities and Infrastructure already available to the PI(s) at their Institute for Implementing the project**.

S.no	**Equipment Name / Funding Source**	**For which purpose it would be utilised in current project**

III. BUDGET ESTIMATES

Break-up of Total Budget

I. Funds requirement from DST
All amount in lakh

Institute name in consortium	**Capital Items (A) (Non- recurring) (Rs.)**	**Other items (B) Recurring head (Rs.)**	**Total (C = A+B) (Rs.)**
Total			

II) Nature of Contribution from Collaborators, if any : Cash / Kind *(Please elaborate)*

III) Total cost = Rs. (DST) + Rs. (Cash amount provided by Collaborator,if any) = Rs.

Budget

(* To be given institution/ research group-wise in case of consortium projects)

Name of the Institute:

a) DST Support (All Amount in Lakh)

S. No	**Item Head**	**1st Year**	**2nd Year**	**3rd Year**	**Total (Rs.)**
A	**Non-recurring (Capital Items)**				
1	Permanent Equipment				
2.	Plant cost /Fabricated systems/ Demonstration models				
	Sub total (capital items)				
B	**Recurring Items (General)**				
1.	Manpower				
2.	Consumables				
3.	Contingencies				
4.	Travel				
5.	Other Costs (Outsource work etc),if any				
6.	Overhead				
	Sub total (General)				
C	**Total cost of the project (A+B)**				

Details of Itemized Budget

(To be given separate for each institution/ research group-wise in case of consortium projects)*

Name of the Institute :

A. Non-recurring (Capital Items)

A1. Equipment*

Budget for Permanent Equipment (To be borne by DST**)**

Description of Equipment	**Unit Landed Price (CIF+ Custom Duty/ Taxes + others charges etc)* (Rs.in lakh)**	**Nos. of Equipment**	**Total Cost (Rs. in lakh)**	**Justification in context of proposed work.**
		Gross total =		

Page/sheet indicating the total landed cost in Indian rupees(**Ensure to mention Currency Exchange rate considered in case of imported equipments, freight , taxes, spares, special installation, etc) **Please project the actual cost taking into account reliable cost estimates as no cost revision would be admissible***

A2. Fabrication system: Tailor made models/ experimental set up (if any)

i) Budget for Fabrication system/Tailor made items

Description of fabricated system	**Unit Landed Price (CIF+ Custom Duty+ others charges)* (Rs in lakh)**	**Nos. of Equipment**	**Total Rupees (Rs. in lakh)**	**Justification in context of proposed work**
	Gross total			

Page/sheet indicating the total landed cost in Indian rupees(**Ensure to mention Currency Exchange rate considered in case of imported equipments, freight , taxes, spares, special installation, etc) **Please project the actual cost taking into account reliable cost estimates as no cost revision would be admissible***

B. Recurring Items (General)

B1. Manpower

Designation*	**Educational Qualification**	**Experience in years, if applicable**	**Justification**

(*Emoluments shall be provided as per DST Guidelines for Research fellow, Research Scientist and Project Assistant .In case any special manpower is needed ,enclosed your Institute manpower order)

Manpower Budget

JRF /SRF/ Research Associates/ Project Assistants Details (applicable for the given category)

Designation	**Total Emoluments (in Rupees)**				**No. of persons**	**Total Amount (Rs.) (Inclusive of all Allowances)**
	1st Year	2nd Year	3rd Year	Total (1st +2nd+3rd Years)		
	Gross amount required for manpower budget head =					

Please mention category/ class of city for admissible HRA along with %. _____

B2. Consumables

Budget for Consumable Materials (*To be borne by DST***)**

Items	**Unit Price**	**Qty Neeeded**	**Amount (Rs. in lakh)**	**Justification**
Gross total =Rs lakh				

B3. Contingencies

Budget for Contingencies (*To be borne by DST***)**

Items *(unforeseen expenses, patents,report preparations etc)*	**Amount (Rs. in lakh)**	**Justification**
Total		

B4. Domestic Travel*

Budget for Domestic Travel (To be borne by DST**)**

Items (to attend)	**Total Amount**	**Detailed Justification (In case of extensive field visits needed in project indicating breakup of cost w.r.t. to journeys, mode and class of transport needed)**
Review meetings		
Total		

(*) Foreign travel is generally not permitted under DST grants. Class and mode of transportation should be as per the entitlement of the concerned staff in the institute.

B5. Other Costs, if applicable

Budget for Other Costs (To be borne by DST**)**

Item	**Total (Rs. in lakh)**	**Detailed Justification (derived cost calculation and relevant Quotation at Annexure- / page no*)**
Outsource work		
Other items,if any		
Gross total =	Rs.	

Collaborator budget / Contribution

Submit similar above detail breakup for each collaborator, if any

IV. Proforma for Bio-Data of Principal Investigator(s) (PI), Co-Principal Investigator(s) (Co PI) and Coordinating Investigator of each partner Institution (Please be brief and follow the format)

1. Name

2. Gender

3. Date of Birth

4. E-mail ID

5. Qualifications

S. No.	Degree	Institution	Year	Division/Class

6. Employment Experience

S. No.	Position & Organisation	Nature of Job	Period

7. **Selected List of Ten Best Publications** *(relevant to the proposed project)*

8. **Patents filed/Granted with details** *(relevant to the proposed project)*

9. **Books Published /Chapters contributed** ***(relevant to the proposed project)***

10. Sponsored Research Projects (last five years)

S. No	Title	Sponsoring Agency and Officer Concerned	Period	Amount	Achievements

a. Consultancy Projects (last five years)

S. No	Title	Sponsoring Agency	Period	Amount

b. Sponsored Research/Consultancy Projects submitted for approval

S.No.	Title	Funding Agency	Duration	Amount

11. Awards and Honours:

A. National list

B. International list:

12 Technologies Developed / Transferred:

(please provide details of technologies transferred to industry, technologies commercialized)

Date (Signature of PI)

V. CERTIFICATE FROM THE INVESTIGATOR(S)

Project Title:

1. I/We have carefully read the terms and conditions of the Solar Energy Research Initiative (SERI) Programme and I/We agree to abide by them.
2. I/We have not submitted this or a similar Project proposal elsewhere for financial support.
3. I/We have explored and ensured that the equipment and the basic facilities described in the Research Proposal, will actually be available as and when required for the purpose of the Project. I/We shall not request financial support under this project, for procurement of these items.
4. I/We undertake that spare or idle capacity of the permanent equipment procured under the project will be made available to other legitimate users from parent and other organizations.
5. I/We have enclosed the following :

A Endorsement from the Heads of the Institution *(on letter head)*

B Undertaking from the Collaborator(s) *(on letter head)*

C Complete Project Proposal with all enclosures

Name(s) and Signature(s) of the Investigators*

Date
Place

(* To be signed by PI and Co-PI of each Participating Institution)

VI. ENDORSEMENT FROM THE HEAD OF THE ORGANISATION

(*To be typed on the letter-head of the organization*)
(To be provided by each of the participating Institutions)

Project Title

1. Certified that the organization welcomes the participation of Dr/Mr/Mrs .....as the PI and Dr/Mr/Mrs…..... as the Co-PI for the project and that in the unforeseen and legitimate event of discontinuation by the PI, the Co-PI will assume full responsibility for completion of the project. Information to this effect, endorsed by me, will be promptly sent to the DST
2. Certified that the equipment, other basic facilities and other administrative facilities as per the terms and conditions of the award of the Project, will be extended to the investigator(s) throughout the duration of the project
3. The Organization shall ensure that financial and purchase procedures are followed as per the prevailing norms of the organization, within the allocated budget.
4. The Organisation shall provide timely the Statement of Expenditure and the Utilisation Certificate of the grant as required by the DST in the prescribed format.
5. **The grant for the proposal, if approved, the funds shall be transferred to following organization account:**

1	Name of A/c holder (as per Bank record)	
2	Bank Account No.	
3	Bank Branch Name & Address	
4	MICR Code	
5	IFSC Code	
6	E-mail (Agency /PI)	
7	Mobile No. (Agency/PI)	
8	Unique agency code*	

***** *As per the extant guidelines of Govt. of India, institutes are requested to register on PFMS/EAT/TSA website and inform unique agency code to facilitate the electronic fund transfer. {website link- https://pfms.nic.in/Users/LoginDetails/Login.aspx}.*

(Head of the Institute)
Seal/Stamp

Date
Place

VII. Endorsement from collaborating Industry/ Agency *(if any)*

(On the official letter head)

I have gone through the Project proposal entitled…….. submitted by ……*(Name of PI)* …of…….*(Name of the Institute)* for DST funding and noted the obligations and responsibilities indicated in our name which are as below :

1. Contribution in financial terms *(mention amount in Rs.)*

2. Contribution in kind *(list activities)*

I hereby affirm that my organization/ industry is committed to participate in the Project to the full extent as indicated including financial liabilities accruing therefrom as detailed above. A brief profile of my organization is summarised below:

Name of Organisation
Line of Business/ Major Products
No. of employees
Annual Turn over

The Annual Report for the last financial year is enclosed.

(Head of the Organisation)
Seal/Stamp

Date
Place

VIII. Terms & Conditions of the Grant

1. Approval of the Research Proposal and the grant released for it is for the specific Project sanctioned and the released grant should be exclusively spent on the Project within the stipulated period. The Institution may use funds obtained from any other Organisation with the concurrence of DST, for the Project. **Any un-spent balance out of the amount sanctioned must be surrendered to the Government of India by depositing in bharatkosh account by using link**(www.bharatkosh.gov.in)
2. For permanent, semi-permanent assets acquired solely or mainly out of the project grant, an audited record in the form of a register shall be maintained by the Institute. The term "Assets" include (a) the immovable property acquired out of the grant; and (b) movable property of capital nature where the value exceeds Rs 1000/-. The Institute is required to send to the Department of Science & Technology a list of Assets acquired from the grant. The grant shall not be utilised for construction of any building unless specific provision is made for that purpose. Full infrastructural facilities by way of accommodation, water, electricity, communication, etc. for smooth implementation of the project shall be provided by the Institute.
3. All the Assets acquired from the grant will be the property of the Government of India and should not be disposed off or encumbered or utilised for purposes other than those for which the grant had been sanctioned, without the prior sanction of the DST.
4. At the conclusion/ termination of the project, the Government of India will be free to sell or otherwise dispose off the Assets which are the property of the Government. The Institute shall render to the Government necessary facilities for arranging the sale of these assets. The Government of India has the discretion to gift the Assets to the Institutions or transfer them to any other Institution if it is considered appropriate.
5. The Institution/ PI will furnish Half Yearly Progress Report (5 copies) of the work on the Project on half-yearly basis (i.e. if the date of start of a project is 12.09.20 the first Six Monthly Technical Progress report shall be for the period 12.09.20 to 31.03.21, the next will be from 01.04.20 to 30.09.20 and so on). In addition, the DST may designate a Scientist/ Specialist or an Expert Panel to visit the Institution periodically to review the progress of the work being carried out and to suggest suitable measures to ensure realisation of the objectives of the Project. During the implementation of the Project the Institution will provide all facilities to the visiting scientist/ specialist or the Expert Panel by way of accommodation, etc. at the time of their visit. In case of exceptional circumstances, request for extension for time period must be submitted to DST six months prior to the approved date of completion of the project. On completion of the Project, submit the final statement of Expenditure along with utilization certificate and ten copies of self-contained Project Completion Report as per DST format.
6. At the time of seeking further instalment of the grant, The Institution/ PI has to furnishthe following documents:
   a) Statement of Expenditure (SE) and Utilisation Certificate (UC) for financial year up to 31st March (in original or copy if sent earlier)
   b) An authenticated up-to-date Statement of Expenditure including Committed Expenditure for the Project on the date of seeking further instalment.
7. Request for specific approval of the Department to **carry forward** the unutilised grant to the next financial year for utilisation for the same Project, should be sent along with SE & UC, after completion of the financial year.

8. Selection of Manpower, Sanctioned for Project will be done as per Govt. norms and one representative from DST shall be nominated in the Selection Committee as an observer.

9. <u>The Comptroller & Auditor General of India, at his discretion, shall have the right of access to the books and accounts of the Institution maintained in respect of the grant received from the Government of India.</u>

10. The Institution will maintain separate audited accounts for the Project. If it is found expedient to keep a part or whole of the grant in a bank account earning interest, the interest thus earned should be reported to the DST and should be reflected in the Statement of Expenditure.

11. The Institution will not entrust the implementation of the work (except the out-sourced part as approved) for which the grant is being sanctioned to any other institution nor will it divert the grant receipts to other institutions as assistance. In case the Institution is not in a position to implement or complete the Project, it should refund back to the DST the entire grant received by it or the balance grant thru **Bharatkosh Portal.**

12. PIs/grantee organizations will ensure that procurement process in such cases are completed within the same financial year as specified in the sanction , provided that grant is released at least 8 Months prior to the close of financial year. Carry forward of such capital grant will be permitted only for Immediate succeeding financial year with the approval of DST only.

13. PIs / Institute must ensure that all interest gained on unspent balance in both heads will be deposited to Government of India account in bharatkosh by using link(www.bharatkosh.gov.in) before issuing UC/SE for releasing of next Installment.

14. In no case inter head expenditure will permitted and PIs/Institute must ensure be adhere to make expenditure accordingly as per sanction issued.

15. All the personnel including Research personnel appointed under the project, for the full/ part duration of the project, are to be treated as temporary employees and will be governed by the Administrative rules/ service conditions (for leave, TA/DA etc) of the implementing Institute. They are not to be treated as employees of the Government of India and <u>the DST will have no liability, whatsoever, for the project staff after the completion of the Project duration.</u> For the expeditious implementation of the research Project, the PI will take the assistance of the Institution in the process of selection and appointment of staff and payment to them. Scale and emoluments for the posts not covered under DST's OM are governed by the norms prevalent in the implementing Institution or as agreed upon in consultation with the DST.

16. <u>The DST reserves the right to terminate the project at any stage if it is convinced that the grant has not been properly utilised or satisfactory progress is not being made.</u>

17. **The Project becomes operative with effect from the date on which the ECS/Draft/ Cheque is received by the implementing Institution.** <u>This date should be intimated by the Institution authorities/ Principal Investigator to the DST. *It will, in no case be later than one month after the receipt of the draft/ cheque by the Institution.*</u>

18. If the Principal Investigator (PI) to whom a grant for a project has been sanctioned wishes to leave the Institution where the project is based, the PI/Institution will inform the DST of the same at least 6 months before in advance with suitable justification and reasons and in consultation with the DST, evolve steps to ensure successful completion of the Project, before the PI is relieved.

19. The data pertaining to the project should be systematically collected, scientifically documented and submitted to DST which later would be placed in public domain. This clause would not be applicable for the projects where legal protection of the know–how generated is felt necessary.

20. Investigators wishing to publish technical/ scientific papers based on the research work done under the project should acknowledge the assistance received from the DST, indicating the scheme. Investigators are expected to publish some of the research papers emerging out of the Project work in leading Indian Journals.

21. If the results of research are to be legally protected, the results should not be published without securing legal protection for the research results. For projects identified to have a distinct potential for generating know-how, in the form of product/ process, that could be protected through patenting, copyrights etc., the PI should carefully follow the "**Guidelines/ Instructions for Technology Transfer and Intellectual Property Rights"** provided in the **Guidelines for Implementing Research Projects** booklet issued by the DST. [http://www.tifac.org.in] For further information/ clarification on this subject- The Director, Technology Information, Forecasting and Assessment Centre (TIFAC), AI Block, 5th Floor, Technology Bhawan, New Mehrauli Road, New Delhi- 110016, E-mail: tifac@nda.vsnl.net.in, may be contacted.

DEPARTMENT OF SCIENCE AND TECHNOLOGY
POLICY ON CONFLICT OF INTEREST

FOR APPLICANT

Issues of Conflicts of Interest and ethics in scientific research and research management have assumed greater prominence, given the larger share of Government funding in the country's R & D scenario. The following policy pertaining to general aspects of Conflicts of Interest and code of ethics, are objective measures that is intended to protect the integrity of the decision making processes and minimize biasness. The policy aims to sustain transparency, increase accountability in funding mechanisms and provide assurance to the general public that processes followed in award of grants are fair and non-discriminatory. The Policy aims to avoid all forms of bias by following a system that is fair, transparent and free from all influence/ unprejudiced dealings, prior to, during and subsequent to the currency of the programme to be entered into with a view to enable public to abstain from bribing or any corrupt practice in order to secure the award by providing assurance to them that their competitors will also refrain from bribing and other corrupt practice and the decision makers will commit to prevent corruption, in any form, by their officials by following transparent procedures. This will also ensure a global acceptance of the decision making process adopted by DST.

Definition of Conflict of Interest:

Conflict of Interest means "any interest which could significantly prejudice an individual's objectivity in the decision making process, thereby creating an unfair competitive advantage for the individual or to the organization which he/she represents". The Conflict of Interest also encompasses situations where an individual, in contravention to the accepted norms and ethics, could exploit his/her obligatory duties for personal benefits.

1. **Coverage of the Policy**:

a) The provisions of the policy shall be followed by persons applying for and receiving funding from DST, Reviewers of the proposal and Members of Expert Committees and Programme Advisory Committees. The provisions of the policy will also be applicable on all individuals including Officers of DST connected directly or indirectly or through intermediaries and Committees involved in evaluation of proposals and subsequent decision making process.

b) This policy aims to minimize aspects that may constitute actual Conflict of Interests, apparent Conflict of Interests and potential Conflict of Interests in the funding mechanisms that are presently being operated by DST. The policy also aims to cover, although not limited to, Conflict of interests that are Financial (gains from the outcomes of the proposal or award), Personal (association of relative / Family members) and Institutional (Colleagues, Collaborators, Employer, persons associated in a professional career of an individual such as Ph.D. supervisor etc.)

2. **Specifications as to what constitutes Conflict of Interest**.

Any of the following specifications (non-exhaustive list) imply Conflict of Interest if,

(i) Due to any reason by which the Reviewer/Committee Member cannot deliver fair and objective assessment of the proposal.

(ii) The applicant is a directly relative# or family member (including but not limited to spouse, child, sibling, parent) or personal friend of the individual involved in the decision making process or alternatively, if any relative of an Officer directly involved in any decision making process / has influenced interest/ stake in the applicant's form etc.

(iii) The applicant for the grant/award is an employee or employer of an individual involved in the process as a Reviewer or Committee Member; or if the applicant to the grant/award has had an employer-employee relationship in the past three years with that individual.

(iv) The applicant to the grant/award belongs to the same Department as that of the Reviewer/Committee Member.

(v) The Reviewer/Committee Member is a Head of an Organization from where the applicant is employed.

(vi) The Reviewer /Committee Member is or was, associated in the professional career of the applicant (such as Ph.D. supervisor, Mentor, present Collaborator etc.)

(vii) The Reviewer/Committee Member is involved in the preparation of the research proposal submitted by the applicant.

(viii) The applicant has joint research publications with the Reviewer/Committee Member in the last three years.

(ix) The applicant/Reviewer/Committee Member, in contravention to the accepted norms and ethics followed in scientific research has a direct/indirect financial interest in the outcomes of the proposal.

(x) The Reviewer/Committee Member stands to gain personally should the submitted proposal be accepted or rejected.

The Term "Relative" for this purpose would be referred in section 6 of Companies Act, 1956.

3. <u>Regulation</u>:

The DST shall strive to avoid conflict of interest in its funding mechanisms to the maximum extent possible. Self-regulatory mode is however recommended for stake holders involved in scientific research and research management, on issues pertaining to Conflict of Interest and scientific ethics. Any disclosure pertaining to the same must be made voluntarily by the applicant/Reviewer/Committee Member.

4. <u>Confidentiality</u>:

The Reviewers and the Members of the Committee shall safeguard the confidentiality of all discussions and decisions taken during the process and shall refrain from discussing the same with any applicant or a third party, unless the Committee recommends otherwise and records for doing so.

5. <u>Code of Conduct</u>

(a) The applicant must refrain from suggesting referees with potential Conflict of Interest that may arise due to the factors mentioned in the specifications described above in Point No. 2.

(b) The applicant may mention the names of individuals to whom the submitted proposal should not be sent for refereeing, clearly indicating the reasons for the same.

6. Final Appellate authority:

Secretary, DST shall be the appellate authority in issues pertaining to conflict of interest and issues concerning the decision making process. The decision of Secretary, DST in these issues shall be final and binding.

7. Declaration

I have read the above "Policy on Conflict of Interest" of the DST applicable to Applicant and agree to abide by provisions thereof.

I hereby declare that I have no conflict of interest of any form pertaining to the proposed grant *

I hereby declare that I have conflict of interest of any form pertaining to the proposed grant *

* & # (Tick whichever is applicable)

(Name /Signature with date)