

**GUIDELINES & APPLICATION FORMAT
FOR
INVITING R&D PROPOSALS**



**CENTRE FOR HIGH TECHNOLOGY
(MINISTRY OF PETROLEUM & NATURAL GAS)
OIDB BHAWAN, TOWER 'A', 9TH FLOOR,
SECTOR-73, NOIDA – 201 301 (U.P.)
(www.cht.gov.in)**

Guidelines & Application Format for Inviting R&D Proposals

Centre for High Technology (CHT), established as dedicated technology cell of MoP&NG, is engaged in promoting indigenous technologies through sponsoring R&D projects and their commercialisation in the downstream sector. CHT co-ordinates activities related to “Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG”. SAC consists of eminent scientists / academia / industry professionals and its mission is to Promote Application of Science and Technology in the Downstream Hydrocarbon Sector.

New Research & Development project proposals are taken up in the identified areas for grant-in-aid and aimed at development of new product or process, or major improvement in an existing process or product with attractive commercialisation potential. The proposals are received from R&D and academic institutions/organizations & presented before Scientific Advisory Committee (SAC) on Hydrocarbon of MoP&NG for recommendation and approval from Executive committee (EC)/Governing Council (GC).

The proposals may be submitted with following approach:

- Need to have crossed the proof of concept stage.
- Need to team up with interested PSUs (members of CHT) and evolve a technology development plan.
- Plan with the aim of reaching demonstration scale with a commitment to move to commercial scale should the demonstration be a technological success.

Following are the guidelines for inviting R&D proposals through EOI:

Objectives

- a. Encouraging innovation, Research, Development, Demonstration with the final objective of commercialisation of innovative cutting-edge product and process technologies for hydrocarbon / oil sector and alternate energy.
- b. Development of Technologies which can lead to import substitution
- c. Strengthening the interface between R&D establishments and Industry through collaboration
- d. Translating scientific discoveries and cutting-edge inventions into technological innovations
- e. Accelerating transformational technological advances in oil & gas industry

Sectors of Interest

Downstream Hydrocarbon sector, Alternative & Non-conventional energy.

Project Proposals

CHT invites new R&D project proposals throughout the year. Projects should aim at development of a new product or a process, or major improvement in an existing product or process, with attractive market potential. The projects should result in significant benefits to hydrocarbon sector / oil industry.

Nature of Proposals:

- Value addition to refinery streams including petrochemicals
- Carbon Capture, Utilization and Sequestration (CCUS)
- Domestic fossil energy: shale gas, gas hydrate, coal bed methane, etc.
- Gasification of Coal, Pet-coke, Biomass, waste, etc.
- Industry 4.0: Digitalization to improve efficiency
- Water Conservation / waste water treatment
- Bio-fuels: Cost effective Biomass and bio-oil valorization
- Waste: Domestic, Municipal, Sewage, Plastic, agricultural, Industrial valorization

- Syngas valorization
- Hydrogen production and Storage
- HCNG: mixing and pipeline transportation
- Batteries & Energy storage systems
- Fuel cell technology
- Solar energy technologies
- Electrification of cooking
- Biotechnology
- Nanotechnological Interventions

Activities Supported:

Partial financial support is provided by CHT primarily to cover development, cost of pilot plant, cost of process equipment, consumable cost, test and evaluation of products, user trials etc. The proposal deliverables should have measurable innovative element and preferably address the following aspects:

- a. Development of a new or improved product resulting in prototype development and ending with demonstration in commercial environment
- b. Development of a new or improved process resulting in establishment of process / technology know-how, development of process equipment and demonstration in a pilot plant
- c. New Technologies for Process or products utilizing waste material to produce fuel or energy.
- d. Indigenization of imported technology
- e. Technology development projects for improvement of products / processes
- f. Development & demonstration of technologies for use by cluster of industries

Eligibility Criteria

- Oil industry (PSUs / Private with PSU partner) organizations
- DSIR recognized Research Institutes / CSIR Labs with financial commitment from one of the PSU oil companies
- Educational Institutes of repute (like IIT, NIT, etc.) with financial commitment from one of the PSU oil companies
- Individuals with financial commitment from one of the PSU oil companies
- The proposal should have already progressed to minimum Technology Readiness Level (TRL-3) as detailed in **Annexure -1**.

Application Procedure:

- Application format for submitting project proposal is given in **Annexure-2**. Proposals (in 2 hard copies and 1 soft copy) on the above lines are invited from Individuals, R&D Establishments, Technical Institutions and Industries as per the eligibility criteria. Proposals should be forwarded by the Director/ Head of the organization to:

Executive Director
 Centre for High Technology
 9th Floor, OIDB Bhawan,
 Plot no. 2, Sector – 73,
 NOIDA – 201 301 (U.P.)
 Ph: 0120-2593701

Soft copy of the proposal to be also e-mailed on the following:

1. kulkarni@cht.gov.in
2. manoj.thomas@cht.gov.in
3. gaurav.lunawat@cht.gov.in
4. singh.vijay69@cht.gov.in

Last date of proposal submission is 31st March 2023.

Evaluation Procedure

The project proposals are initially scrutinized by CHT. During initial examination, proposal is evaluated from eligibility point of view along with expected outcome and its relevance with scheme objectives outlined in guidelines. Required additional information is sought from applicants, wherever necessary.

1. Chairman SAC may constitute Screening Committee for shortlisting the proposals for consideration by SAC.
2. The applicant is required to give a detailed presentation before the Screening Committee describing the features of the R&D Project and the expected outcome with time-lines. The Committee also deliberates upon cost involved and likely benefit to the target group.
3. The Committee scrutinizes all the proposals, advises modifications, if required and shortlists for consideration of SAC.
4. Applicants of projects which are not approved by Screening Committee are informed along with reasons.
5. SAC deliberate on all the shortlisted proposals and recommend the same for approval by Executive Committee (EC) / Governing Council (GC) of CHT.
6. CHT signs Memorandum of Understanding (MOU) with participating agencies and a nodal agency is decided among participating agencies by CHT. Subsequently based on project cost, CHT forms Project Monitoring Committee (PMC) / Project Steering Committee (PSC) by taking one coordinator from each participating agency for monitoring of the project progress.
7. Grant-in-aid is released based on the expenditure, utilization certificate and the project elements as defined in MOU.
8. The progress of the project is reviewed regularly by PMC/PSC and the status is presented to SAC.
9. Projects closure/foreclosure is decided by SAC.
10. Based on SAC recommendations, nodal agency submits the final report to CHT along with way forward.
11. License fee/ Royalties arising from the project are to be shared between CHT and participating agencies on equitable basis which are mutually decided between CHT and Grantee during MOU finalization.
12. The lien over the physical assets purchased or acquired out of CHT / OADB grant shall vest with CHT only till buy back / disposal of the assets. The assets may be disposed or bought back (on its residual book value) by the participating agency on closure of the project or extension sanctioned by SAC for continuance of testing / trial.

Parameters for scrutiny of Proposals by Screening Committee

S.N	Criteria	Remarks
Necessary Conditions		
1	Relevance to downstream sector: Link to Position Paper	
2	Whether the project is at translational level (The proposal should have progressed to minimum Technology Readiness Level (TRL -3) as detailed in Annexure-1).	
3	PSU tie-up / interface	
Checklist		
4	Innovativeness, potential as breakthrough/ game changer	
5	Supported by Literature scan & benchmarking	
6	Capability for Scale-up and sustained development	
7	Commercialisation potential	
8	Proposed model for scale up and commercialisation	
9	Realistic deliverables, timelines	
10	Financials: Cost details, funding requested vs. contribution, justification	
11	Linkage with Next phase	

Technology Readiness Level (TRL) and the Innovation Chain

Technology Readiness Level (TRL) is a measure used to assess the maturity of evolving technologies prior to incorporation into a system and subsystem. The innovation channel is described in nine levels starting from TRL 0 (Idea) to TRL 9 (Full Commercial application). Lower TRL indicates high risk and as the project reaches higher TRL levels, the risk involved in the project is mitigated.

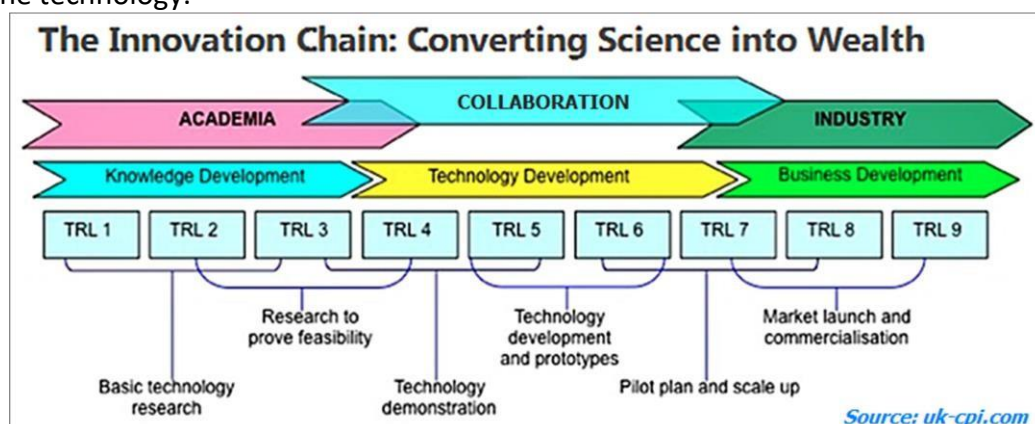


Technology Readiness Levels

- TRL 0: Idea.** Unproven concept, no testing has been performed.
- TRL 1: Basic research.** Principles postulated and observed but no experimental proof available.
- TRL 2: Technology formulation.** Concept and application have been formulated.
- TRL 3: Applied research.** First laboratory tests completed; proof of concept.
- TRL 4: Small scale prototype** built in a laboratory environment ("ugly" prototype).
- TRL 5: Large scale prototype** tested in intended environment.
- TRL 6: Prototype system** tested in intended environment close to expected performance.
- TRL 7: Demonstration system** operating in operational environment at pre-commercial scale.
- TRL 8: First of a kind commercial system.** Manufacturing issues solved.
- TRL 9: Full commercial application,** technology available for consumers.

As can be seen from above, the proof of concept of the technology is established once TRL 3 is achieved. At this level, the basic technology research is considered to be completed through involvement of Academia and testing in Research Laboratory.

Thereafter, there is a need to develop and demonstrate the technology. In general, collaboration with Commercialisation partner brings in innovation at subsequent stage till TRL 6 and further commitment to commercialisation upon successful scale up. It is also recognised that handholding with engineering partner in the middle stage of development brings in innovations leading to cost reduction as well as resolving issues that might come up during scale up of the technology.



In general, CHT undertakes a project which has reached TRL3 level. An industrial partner

(commercial partner) willing to part-finance the project with tactical commitment to commercialise at the end of successful development meeting techno-commercial considerations, is selected. The commercial partner before committing its involvement may carry out due diligence including following;

- Does technology have technical/economic merit?
- Have impediments and risks been identified?
- Have competitive alternatives been identified?
- Are energy advantages and emissions consistent with expectations
- Has technical feasibility (TRL-3 level) been demonstrated?
- Is scale up feasible?
- Will technology be competitive in the market?
- Do market factors promote commercialization?
- Is management support there for financial commitment including investment in commercialisation.

Stage Gate Funding

Technology development and execution both entail risk and require commitment in terms of money, and manpower. There is no point going through the process of ideation if the both developer and executor is not going to do anything with the end result.

The gated funding model limits the risk by forcing ideas to meet predetermined goals, or “gates” to progress toward next gate. Stages and gates are designed to facilitate the development of new technology and enable industrial partners to take it forward to commercial launch. emphasis is placed on developing effective R&D plans for each stage, and thoroughly understanding the technical and economic risks and benefits associated with new science and technology. These are reviewed regularly with developments in the technology or its alternatives. The project team comprising of developer, commercial partner and engineering partner evaluates the progress and viability of the end product considering the merit of the technology over available/ emerging alternatives, market potential, etc. If an idea passes a gate, it gets additional resources (people, budget, etc.) and a new set of goals that the team will need to achieve to move on to the next gate.

Format for Submitting Project Proposal

The R&D Project Proposal submitted to CHT for funding by OADB through Scientific Advisory Committee should cover the following points:

1. Project Title
2. Team Organization and Capabilities
3. Executive Summary of the Proposal
4. Principal Co-coordinators & Investigators, Likely Partners and their particulars + brief CVs
5. Objective- (Enter a clear and concise statement of the goal(s) of the project as well as the expected outcomes).
6. Introduction and background of Research
7. Current Status / developments in the proposed area-
 - a. global – status of development and future programs
 - b. within the country.
 - c. Work carried out so far by same organization and other organizations
 - d. Gaps to be covered - including scope for adoption by identified end-users
8. Novelty of the Proposal- clarity to be provided on the novelty of the project both global level as well as the country level. Clear metrics, goals and deliverables expected to be achieved and its comparison with achievements already taken place by various alternative methods globally and within the country need to be defined.
9. How the project work is useful to the oil industry and to the country-
10. Expected benefits:
 - a. Impact of Innovation both quantitative as well as qualitative
 - b. Commercialisation Potential of the Proposed study- Clear goal and plan for commercialisation of the project to be outlined.
 - c. Prospective Commercializing Agency
11. Scope of Work and Work Plan for each collaborator:
 - a. Brief description of research, design, Engineering, trial run to be undertaken by each entity.
 - b. Tangible and Measurable deliverables by each entity
 - c. Responsibilities
 - d. Bar chart of Activities & milestones for each entity
12. Whether the proposer is satisfied that proposal has progressed to minimum Technology Readiness Level (TRL -3) as detailed in Annexure -1. Please provide details.
13. Project Deliverables:
 - a. Product
 - b. Technology
 - c. Report
 - d. Software
 - e. IPR
 - f. Data
14. Project schedule / timeframe for each milestone and their Technical tasks
15. Cost estimates: Project cost will have two components
 - a. Actual Cost to be incurred in project execution as per following heads
 - i. Non-recurring costs like equipment costs
 - ii. Recurring cost like temporary Manpower cost, Consumables, Travel, Contingency, Overheads, Consultancy, taxes & duties / GST etc.
 - b. Cost related to usage of Internal resources like existing and available equipment, infrastructure and permanent manpower for the project on shared basis.
Hiring of manpower for the project will be on temporary basis with a condition that there will be no liability of such staff for confirmation. The staff services shall discontinue immediately after the project closure is approved.

16. Source of funding:
 - a. Please mention who are the contributors in project cost
 - b. Funds required from CHT / OADB: Details to be given head wise.
 - c. Phasing of expenditure: Quarterly plan of utilization of internal funds as well as CHT / OADB grant
17. Checklist to be filled by PI

S.No.	Criteria	Input	Remarks
1.	PI Contact details (email, landline & mobile number)		
2.	Project has reached TRL-3 (Yes/No)		
3.	PSU Partner Certificate attached (Yes/No)		
4.	Soft copy of the proposal attached (Yes/No)		
5.	Financial Contribution letter from any Organization/PSU		
6.	Total Project Cost Excl. GST/duties		
7.	Total Project Cost Incl. GST/duties		
8.	Fund required from CHT/OADB		

18. Intellectual Property Rights:
 - a. Background Intellectual Property Rights
 - b. Expected Intellectual Property Rights to be generated in the project
19. Path Forward:
 - a. Linkage with Next Phase of development
 - b. Clear roadmap for commercialisation
20. Whether the research lab under the Institution, recognized by Government / DSIR
21. References

DECLARATION

I/We hereby declare that

- i) I/We have not undertaken this project earlier with any other organization
- ii) I/We have not taken any financial help for this project from any other institution
- iii) In case of receipt of grant-in-aid from CHT, financial help shall not be taken from any other Govt. organization against this project.
- iv) Items, which are to be purchased are listed with estimated cost of each.

Signature

Date:

Principal Investigator

