



गेल (इंडिया) लिमिटेड

(भारत सरकार का उपक्रम – महारत्न कंपनी)

GAIL (India) Limited

(A Government of India Undertaking - A Maharatna Company)

गेल जुबली टॉवर,
बी - 35 एवं 36, सेक्टर - 1, नोएडा - 201301
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GAIL/NOIDA/R&D/PP-New/2018

21.11.2018

To
The Dean (R&D)
Industrial Research and Development,
Indian Institute of Technology – Delhi
Hauz Khas, New Delhi – 110016

Subject: New Research & Development Project Proposals

Dear Sir,

As you may be aware, GAIL (India) Limited is India's largest Natural Gas company involved in Natural Gas Transportation and Distribution. We also have business interests in several fields related to natural gas and its derivatives like Liquid Hydrocarbons, LPG Transmission, Petrochemicals, City Gas Distribution, E&P and Renewable Energy. GAIL has taken good strides in its business and is India's youngest Maharatna Company. More details on GAIL activities are available at GAIL's website: www.gailonline.com

GAIL employs the best-in-class technologies in all its operations. GAIL lays special emphasis on regularly updating and improving its processes and systems to keep pace with latest technologies. GAIL recognizes the importance of R&D to improve its technological capabilities to remain competitive. GAIL pursues a focused R&D strategy to further its competitive edge in its existing businesses by improving operational efficiency while also exploring new resources of energy to meet the growing demand of India's populace for clean energy.

GAIL intends to spend significant budget on R&D efforts and has framed R&D Strategy to help achieve its goal. GAIL has a Research Advisory Council (RAC) comprising of external experts to recommend and guide our R&D efforts.

GAIL has completed over 37 collaborative R&D projects and filed 29 patents jointly with premier educational Institutes / CSIR Labs. GAIL is currently pursuing 24 R&D projects through various Institutes /CSIR Laboratories.

पंजीकृत कार्यालय :
गेल भवन, 16 भीकाएजी कामा प्लेस
नई दिल्ली - 110066, इंडिया
REGD. OFFICE
GAIL BHAWAN, 16 BHIKAJI CAMA PLACE
NEW DELHI-110066, INDIA

GAIL is also pursuing sponsored R&D projects with your institute as listed at *Annexure-I*

GAIL is interested to further broad base the R&D efforts and hereby requests R&D proposals from your Institute on innovative ideas that can be customized for GAIL's business application. Hence, we request your good self to widely circulate this letter amongst your faculties to enable submission of R&D Project proposals for sponsorship. A format for submission of proposals along with Draft clauses and broad terms and conditions governing the project proposals are enclosed at *Annexure- II & III* for immediate reference and ease of submission/ evaluation. The R&D proposals may be forwarded through email at: cor&d@gail.co.in. Alternatively, Scientists can also submit a preliminary Abstract (2 to 5 pages) and GAIL team shall interact with the faculties to develop the final proposal. Sh. Rahul Sharma, Email: rahul.sharma@gail.co.in may be contacted for any further clarification.

The R&D Proposals need to be in the Thrust Area (attached at *Annexure-IV*) and synergistic to GAIL's business areas. Although we are keen to pursue application oriented Projects that can be commercialized in the near to medium term but fundamental research projects that can provide good value in the long-run are also of interest to us.

We look forward for encouraging response from your faculty on or before 20th December, 2018.

Thanking You

Yours sincerely,



(Manoj R Meshram)

Executive Director (PC-CO, E&P & R&D)

Email: mr02914@gail.co.in

Encl : As above

List of R&D Projects with your Institute

1. Development of Solid Oxide cell for conversion of CO₂ to hydrocarbon
2. Development of performance Single Polymer Composite
3. Development of protocols for production of value added Bio-degradable polymers from Methane & CO₂
4. Pilot Project on development of an Economical, Eco-friendly and Energy Efficient Process for Production of Ethanol from Lignocellulosic Biomass
5. Development of Robust Single-site Solid Catalyst based on Metal-Organic Frameworks (MOF) for Conversion of NGL to Hexane and Cyclohexane

Annexure-II

CHECKLIST FOR R&D PROJECT PROPOSALS

S NO.	<u>Description</u>	<u>Remarks</u>
1.	Title	Title should reflect the R&D work to be undertaken
2.	Organization Details <ul style="list-style-type: none"> • Name • Address • Legal status (indicate if CSIR, Engg. Institution – Govt. / Private, University, Government Department, Corporate Body, Registered Society, Private Company etc. A brief write-up about the Institute to be provided that also mentions whether it is an approved R&D facility	Agency to provide details to ensure that the expenditure incurred on the Projects gets qualified as R&D expenditure, as per DPE guidelines..
3.	Brief on GAIL& Relevance of the project to GAIL's business	To be elaborated
4.	Principal Investigator <ul style="list-style-type: none"> • Name • Designation • Department • Address 	CV of the PI to be provided. The CV should also include the details on completed and ongoing Projects undertaken and their Publications. Details of similar Projects executed by the Agency, if any, to be provided
5.	Co-Principal Investigator <ul style="list-style-type: none"> • Name • Designation • Department • Address 	CV of the Co-PI to be provided. The CV should also include the details on completed and ongoing Projects undertaken and their Publications.
6.	Nature of Project <ul style="list-style-type: none"> • Basic Research • Applied Research • Application oriented Research <ul style="list-style-type: none"> • Bench-scale • Lab-scale • Pilot Scale • Design work • Modeling & Simulation • Others (Please specify) 	To be elaborated by the Agency
7.	Declaration from PI	That he/ she has not submitted / working on similar Project idea with any other organization.

8.	Undertaking from PI	That to the best of his/ her knowledge, his/ her proposed Work is innovative and not carried out by any other group. Moreover, it has not been reported in any Research Publications.
9.	Methodology / Work-plan	
10.	National / International Status of the Technology	
11.	Past Work carried out by the PI / Institute. Credentials of the PI (as Annexure)	
12.	Project Milestones	
13.	Expected outcome / Deliverables of the Project culminating in Final Report.	
14.	Potential benefits to GAIL/ Relevance to GAIL	
15.	Final Report to include Technology Package, Way Forward, Recommendations etc.	
16.	Total Budget with break-up: Equipment Manpower Consumables Travel & Training Contingency Institute Overheads Taxes (GST) Project is on lump sum, firm & fixed cost basis & there shall not be any change during the currency of the project	A brief justification for the expenditure to be included This aspect shall also be mentioned by GAIL in its Letter of Award (LOA)
17.	Custody of the equipment purchased in the Project after completion	Clarity is required in the Proposal itself.
18.	Payment Terms	To be preferably linked with project milestones (Last payment of 5 to 10% after submission of Final Report) Inform whether Institute is exempt from Income Tax so that TDS is not effected by GAIL while making payments. (TDS exemption certificate is to be enclosed with the Invoices)
19.	Project Monitoring: Thru Quarterly Report and review at GAIL / Institute by a Joint Project Team (JPT) led by PI. Mid-course modifications, if any	Draft Clause is provided.

	<ul style="list-style-type: none"> • Minor technical changes by JPT • Major technical course correction to be appraised to GAIL's RAC • Increase in Financial outlay only after formal approval of GAIL 	
20.	Results of Project : Patents & Publications	Draft Clauses are provided
21.	Confidentiality	- do -
22.	Arbitration	- do -
23.	Force Majeure	- do -
24.	Insurance / Indemnification Clause	- do -
25.	Jurisdiction	- do -
26.	Contract Performance Bank Guarantee (CPBG)	It may be mentioned whether CPBG can be provided to GAIL.
27.	Price Reduction Schedule (PRS)	It may be mentioned that all efforts would be made to complete the Project milestones as per agreed time-lines.
28.	RTGS Form	For E-transfer (required along with 1 st Invoice or earlier). Format is attached.
29.	Project is on lump sum, firm & fixed cost basis	Agency to confirm acceptability that the project cost is on Lumpsum, firm & fixed cost basis.
30.	Signed Project Proposal is to be sent thru concerned Administration Department with covering letter.	

DRAFT CLAUSES

1. PROJECT MONITORING

A Joint Project Team (JPT) comprising members from Institute and GAIL will be constituted by nominating one or two representative(s) each to the JPT. The coordinator of the JPT will be the Principal Investigator (PI) of the Project. One of the JPT member from GAIL's side shall be the GAIL's Engineer-In-Charge for the Project. The JPT will be responsible for carrying out a technical review of the Project and shall prepare a detailed programme for meeting the milestones as per the agreed timelines, in line with the Scope of Work and Work Plan.

Institute shall submit a Quarterly Progress Report on the Project to GAIL. The JPT shall meet on a Quarterly basis in GAIL / Institute to monitor the Project's Progress and final outcome. The JPT shall be responsible for review of the Project and its mid-term correction, if necessary.

In case, the Project faces any difficulties in meeting the desired Objectives and needs major mid-course correction, the matter shall be appraised by the JPT to GAIL's Research Advisory Council (RAC) for necessary advice and approval.

Any increase in financial outlay of the project shall be permissible only with the approval of GAIL through Amendment of Letter of Award (LOA)

2. RESULTS OF THE PROJECT :

(a) PATENTS:

1. If the results of the investigations are such that IPR could be secured through legal instrument i.e. Patents etc. then Institute shall apply, secure, defend and maintain the IP rights with intimation to GAIL. The Intellectual Property (IP) generated in the Project shall be shared equally between GAIL and Institute, the extent of ownership being equal. The procedural formalities for securing and maintaining the IP Rights shall be the responsibility of Institute. The expenditure incurred thereof shall be borne equally by Institute and GAIL. The decision on whether IP should be secured and the territory where these shall be secured and the time for which these shall be secured, shall be decided by GAIL and Institute jointly at the appropriate time.
2. GAIL shall have the rights to commercially exploit/use the technology developed under the Project. No additional payments would be made by GAIL to the Institute for the same.
3. Institute, would however, retain the rights to use the R&D results generated during the Project for their own R&D programs as well as reporting in B.Tech Project report, M.Tech Dissertation and Ph.D Thesis without any obligation to the other.

4. GAIL/Institute shall have the right to License the IP generated in the Project to others in consultation with each other. The premia/royalty accruing from Licensing or Sale of the IP to other party (ies) shall be shared equally between GAIL and Institute.

(b) PUBLICATIONS:

Institute and GAIL shall consult each other before any publication in respect of the Project. Publications shall be in the name of the research personnel of Institute and GAIL associated with the Project who have contributed to the work. In all the publications made by Institute, it will be duly acknowledged that the project work has been carried out under funding from GAIL. It is expressly understood that it shall be the responsibility of the party publishing the information to take necessary precaution to avoid any problems in securing the IP of the Project, in future.

3. CONFIDENTIALTY:

Institute and GAIL would maintain strict confidentiality and prevent disclosure thereof, of all the information and data exchanged / generated pertaining to work under this Project except to those who reasonably require the same for execution of the Project.

4. FORCE MAJEURE

Institute shall not be held responsible for non-fulfillment of its obligations under this Agreement due to exigency of one or more of the Force Majeure events such as, but not limited to Acts of God, War, Flood, Earthquakes, Strike, Lockout, Epidemic, Riot, Civil commotion etc. provided on the occurrence and cessation of any such event, Institute shall give a notice to GAIL within one month of such occurrence or cessation. If the Force Majeure conditions continue beyond six months, the Institute and GAIL shall jointly decide about the future course of action.

5. WARRANTIES/GURANTEES.

It is expected the Institute shall carry out the work diligently in accordance with prudential scientific practices and principals, governing such work, with a view to enable further work and ultimate commercialization. Accordingly, the Institute shall stand guarantee/ warranty to the results of the tests and claims made in the final report/ deliverables submitted by them, as a part of project.

6. ARBITRATION

In the event of any dispute or difference in the interpretation and applications of the provisions of the Contract, such disputes or differences shall be resolved in accordance with Arbitration and Conciliation Act, 1996. The venue shall be New Delhi.

7. INSURANCE / INDEMNIFICATION

Institute shall carry out the Work under the Project with due professional standards. It is expressly understood that the personnel engaged by the Institute for the Project are not employees of GAIL. Therefore GAIL shall not be liable for any kind of claims,

proceedings, damages, costs & expenses of any nature on account of such personnel's. *Institute* shall protect & fully indemnify GAIL from any such claims.

8. JURISDICTION:

All suits in respect of this contract shall be under the jurisdiction of the courts in New Delhi.

List of GAIL(R&D) Thrust Areas

- 1) **Energy Efficiency/ Conservation in Process Plants/ Pipelines:** Any projects on improvements which can result into conservation of natural resources, improved safety in process plants / pipelines etc.
- 2) **Corrosion Protection/ Monitoring of underground Pipelines:** Any projects which are targeted for improvement in life span for the pipelines; which may result into ease of operational monitoring etc.
- 3) **Process Optimization:** Optimization of the existing processes in the process plants / compressor stations and application of new technologies for improved ease, process integration, and for improved operational flexibility, energy savings etc.
- 4) **Process De-bottlenecking Techniques:** De-bottlenecking of the existing systems which may be a result of improved equipments, systems, processes with a view to reduce the specific consumptions and increased productivity.
- 5) **Development of New catalysts or Substitution of Proprietary Catalysts:** Applications with a view to gain technological advantage in the long-run.
- 6) **Development of new Polymer Grades including bio-degradable polymers:** Such type of applications with a view to develop technologically superior products for better applications and also environmentally friendly products.
- 7) **Conversion of CO₂ to value added products:** To enable leveraging the utilization prospects of the CO₂ released in the gas processing.
- 8) **Development of Glass Reinforced Epoxy Pipes / High Strength Steel Pipes:** Such development should leverage in reduced costs of the gas / liquid pipelines.
- 9) **Micro & Nano Materials:** Such materials could be used in improvement of processes in natural gas and other business areas of GAIL.
- 10) **Fuel Cells- Reformer for natural gas conversion:** or improved efficiencies in the gas utilization and also conversion of natural gas / hydrogen to power for wider range of applications.
- 11) **Development in Renewable Technology:** Such renewable technologies could be Organic material based Photo-voltaic cells in Solar energy; improved materials and applications in other renewable energy areas etc.
- 12) **Gas Hydrates/ Shale Gas/ UCG :** Any applications oriented towards absorption and assimilation of new technologies in the new business areas of GAIL.

- 13) **Direct Conversion of Methane to Olefins:** To enable continue to the existing GAIL's operations, even if faced with low feedstock availability in future.
- 14) **Satellite Monitoring of Pipeline network integrity:** For improvement in the pipeline monitoring systems for its integrity.
- 15) **Transportation Sector:** Products and processes for applications in CNG in transportation sector including applications of ANG.
- 16) **Liquefaction Technologies:** Products and processes for applications in GTL, LNG sectors.

In addition to the above thrust areas, the R&D projects in other areas that could benefit GAIL in other business areas could also be taken-up.