



INDIAN OIL CORPORATION LIMITED
BHARAT PETROLEUM CORPORATION LIMITED
HINDUSTAN PETROLEUM CORPORATION LIMITED

Invite

**Expression of Interest
(EOI)**

From

ENTREPRENEURS / SOLE PROPRIETORSHIPS / PARTNERSHIPS /
LIMITED LIABILITY PARTNERSHIPS / COMPANIES/ COOPERATIVE SOCIETIES /
TECHNOLOGY PROVIDERS

For

PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

Under

SATAT
(Sustainable Alternative towards Affordable Transportation)

Indian Oil Corporation Ltd.
SCOPE Complex, Core-6,
5th Floor,
7- Institutional Area,
Lodhi Road,
New Delhi -110003

Bharat Petroleum
Corporation Ltd.
Sewree Fort Road,,
Sewree(East),
Mumbai - 400015

Hindustan Petroleum
Corporation Ltd.
Richardson & Crudas
Building
Sir JJ Road, Byculla
Mumbai - 400008



(Press Release)

NOTICE INVITING EXPRESSION OF INTEREST (EOI)

Ref.: CBG01

Date: 1/10/2018

**PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG) TO OIL
MARKETING COMPANIES (OMCs) ACROSS INDIA**

1. INDIAN OIL CORPORATION LIMITED (IndianOil), BHARAT PETROLEUM CORPORATION LIMITED (BPCL), HINDUSTAN PETROLEUM CORPORATION LIMITED (HPCL) (all Central Public Sector Enterprises), invite online offers through Expression of Interest (EOI) from **Entrepreneurs / Sole Proprietorships / Partnerships / Limited Liability Partnerships / Companies/ Cooperative Societies / Technology Providers** (herein after called **APPLICANT**), for supply of Compressed Bio Gas (CBG), from Plants processing biomass / waste and providing the produced Compressed Bio Gas (CBG) to various Retail Outlets of IndianOil/ BPCL/ HPCL across the country. IndianOil, BPCL & HPCL shall be referred as OMCs – Oil Marketing Companies in this EOI document.
2. The purpose of inviting this EOI is to encourage the APPLICANT to set up Biomass/Waste to CBG Plants and further utilising the existing potential of CBG in India.
3. Finalization of APPLICANTS as mentioned in this EOI Document is an ongoing process.
4. Due to technical issues related to problem of keeping the e-tender open for six months and mid-term evaluation of applications submitted, six separate EOIs shall be uploaded, one every calendar month starting from 1.10.2018 to 1.3.2019. Each of the six EOIs shall get closed at the end of the month, in which they have been uploaded. The EOI uploaded on 1.10.2018 will get closed on 31.10.2018. The evaluation of the EOI which closed on 31.10.2018 shall be initiated from 1.11.2018. Also on 1.11.2018, a fresh EOI for the month shall be floated and subsequently the same process shall continue till the EOI period.
5. The EOI document, name of the EOI and terms - conditions & further selection criteria of shall remain same for all the subsequent released EOIs.

EOI No: CBG01, dated 1st October 2018 System ID 46978

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

6. Schedule of the release of EOI is tabulated below

EOI No	Start date	End Date	Initiation of evaluation	Status
EOI 1	1.10.2018	31.10.2018	1.11.2018	Released (this EOI)
EOI 2	1.11.2018	30.11.2018	1.12.2018	To be released
EOI 3	1.12.2018	31.12.2018	1.1.2019	To be released
EOI 4	1.1.2019	31.1.2019	1.2.2019	To be released
EOI 5	1.2.2019	28.2.2019	1.3.2019	To be released
EOI 6	1.3.2019	31.3.2019	1.4.2019	To be released

However, these dates may be further extended as per the decision of the OMCs.

Major Timelines & Other details for this EOI

EOI Download Schedule (for individual e-tenders refer to the table above)	From 1.10.2018 17.00 hrs upto 31.3.2019 15:00 Hrs
Last date & time of submission of EOI	31.3.2019 17:00 Hrs
EOI opening date	As this is an ongoing process of empanelment, there is no fixed date for opening of the EOI by OMCs. The submitted EOI complete in all respect shall be opened and evaluated by the OMCs periodically and the APPLICANT will be informed accordingly.
EOI Cost	NIL

7. **Queries:** Applicants to note that any queries related with EOI of the concerned OMC are to be submitted online only at sites mentioned below against the respective OMCs. Queries/clarifications received in any other form are liable to be unanswered. A written reply from the concerned OMC will be given on the same site and that answer / clarification shall be visible to all the Applicants except confidential information.

Name of OMC	E-tendering portal
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Bharat Petroleum Corporation Ltd.	https://bpclproc.in/

8. For details of complete EOI, interested parties may refer to CPPP, Government e-Marketplace (GeM); Central Public Procurement Portal of Government of India (<https://eprocure.gov.in/epublish>); IndianOil website (www.iocl.com) under tender section:

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link "Tenders & Contracts"); BPCL website (www.bharatpetroleum.com/) and HPCL website (www.hindustanpetroleum.com) under Tenders and contracts.

- All revisions, clarifications, corrigenda, addenda, time extensions etc., to the EOI will be hosted on above websites. APPLICANTS should regularly visit this website to keep themselves updated.

10. Submission of EOI

The EOI complete in all respect for Indian Oil Corporation Ltd., Bharat Petroleum Corporation Ltd. and Hindustan Petroleum Corporation Ltd. should be submitted only through online portal of respective OMC, detailed as under. No physical EOI shall be accepted.

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Bharat Petroleum Corporation Ltd.	https://bpcleproc.in/

Due to updating technologies and plant configurations during the EOI period, APPLICANT's may submit revised EOI applications for any particular Plant. On submission of revised application, the original application for that particular Plant shall stand cancelled. The applicant shall have to provide an undertaking on their letter-head to the effect. Once Letter of Intent (LoI) is placed upon an applicant for a particular Plant, no further EOI applications can be submitted for that particular Plant.

APPLICANTS may apply to a specific OMC for a particular Plant. If EOIs are submitted to more than one OMC for the same Plant, the EOI for the Plant will be rejected by all OMCs.

- The selection/empanelment of the APPLICANT shall be made individually by the respective OMC, based on marking system as detailed in the EOI document and APPLICANT shall be informed accordingly.

I. INTRODUCTION

1. Waste / Bio-mass sources like agricultural residue, cattle dung, sugarcane press mud, municipal solid waste and sewage treatment plant waste, etc. produce bio-gas through the process of anaerobic decomposition. The bio-gas is purified to remove hydrogen sulphide (H₂S), carbon dioxide (CO₂), water vapour and compressed as Compressed Bio Gas (CBG), which has methane (CH₄) content of more than 90%. CBG has calorific value and other properties similar to CNG and hence can be utilized as green renewable automotive fuel. Thus it can replace CNG in automotive, industrial and commercial areas, given the abundance biomass availability within the country.
2. Ministry of Petroleum & Natural Gas has already announced the National Policy on Bio-Fuels 2018, which emphasizes on promotion of advanced Bio-fuels including CBG in the country.
3. To create a steady supply chain for CBG and entrepreneurship opportunities, CBG Plants shall mainly be set up by independent entrepreneurs. OMCs shall off-take CBG produced from such Plants. OMCs shall also provide technical support for such Plants, if required.
4. OMCs propose to procure CBG from existing, upcoming & planned Compressed Bio Gas (CBG) Plants in India. In this regard, OMCs have prepared a conceptual framework for implementation of the said programme, which is enclosed as '**White Paper on CBG**' (**Annexure-I**) with this EOI document and which may be referred for any further information related to the matter.
5. The general terms for the APPLICANT shall be on the following lines:–
 - a) APPLICANT shall be responsible for planning, preparation, engineering and execution of the project, including storage of raw material, operation and maintenance of the plant, maintaining final product output quantity and quality, managing the by-products and wastes from the plant as per existing central / state norms and providing performance guarantee for the project at their own cost.
 - b) Setting-up and commissioning of the CBG Plant and its continuous operation is the complete responsibility of the APPLICANT including arranging the entire land and finance. OMCs role in the above matter is only as a facilitator.
 - c) Compressed Bio Gas (CBG) to be supplied shall meet **IS 16087:2016** specifications of BIS (detailed below) and any other further revisions in the said specifications.

IS 16087 : 2016 Standard		
S No.	Characteristic	Requirement
1	Methane percentage (CH ₄), minimum	90.0 %
2	Only Carbon Dioxide percentage (CO ₂),, maximum	4%
3	Carbon Dioxide (CO ₂)+ Nitrogen (N ₂)+ Oxygen (O ₂) percentage maximum	10%
4	Oxygen (O ₂) percentage maximum	0.5%
5	Total sulphur (including H ₂ S) mg/m ³ , maximum	20 mg/m ³
6	Moisture mg/m ³ , maximum	5 mg/m ³

Also as per the **IS 16087:2016** specifications, the following shall also be met

- i. CBG shall be free from liquids over the entire range of temperature and pressure encountered in storage and dispensing system
 - ii. The CBG shall be free from particulate matter such as dirt, dust, etc.
 - iii. CBG delivered shall be odorized similar to a level found in local distribution (ref. IS 15319)
- d) The CBG is to be compressed at 250 Bar and supplied through Cascades to the Oil Company Retail Outlets as mentioned in the EOI document.
 - e) The off-take of CBG by the respective OMC shall be as per the demand in the market and it is expected that from the initial launching phase to the subsequent off-take upto designed capacity of the Plant, the supply shall be increasing gradually over a period of time.
 - f) The existing/new ROs which have already installed or plan to install facilities for dispensing of Auto LPG or CNG shall be excluded from the retailing of CBG from the concerned RO.
 - g) The minimum designed capacity of a single CBG Plant is 2.0 Tonnes Per Day (TPD) of CBG. Though, there is no limit to the maximum designed capacity, the capacity is to be decided on basis of market survey by OMCs.

6. Qualification criteria

- a) The APPLICANT should be of minimum 21 years of age (in case of individual APPLICANT).
- b) The APPLICANT shall be of Indian nationality AND/OR a company registered in India AND/OR Non-Resident Indians/Persons of Indian Origin AND/OR a Multi National Company having its registered office in India / Overseas Corporate Bodies having its registered office in India.
- c) The APPLICANT shall follow all the statutory norms as prescribed from time to time by Government of India or local government/government bodies for setting-up and its operation & maintenance of the CBG Plants.

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

- d) The APPLICANT should have a valid Digital Certificate for entering details in the e-tendering portal.
- e) Evaluation of the EOIs shall be carried out of a total of 100 marks allocated as per table hereunder. The prospective APPLICANT has to score minimum of 35 marks to qualify.

S. No.	Qualification Criteria	Marks	Document Required
(i)	Number of Years' Experience of the Firm in any sector as on 30.9.2018	Max 15 marks	APPLICANT to submit relevant documents on registration of Company
a)	More than or equal to 5 years	15	
b)	More than or equal to 2 years, but less than 5 years	10	
c)	Less than 2 years	5	
(ii)	Past Experience in preceding 10 years (Sep 2008 – Sep 2018) of project execution including supply, installation, commissioning of Facilities to produce biogas or past experience in any other project work in energy/healthcare/social welfare/infrastructure/power/biomass/transport.	Max 25 marks	APPLICANT to submit relevant Work Orders/ Completion Certificate / any other document in support of execution of the Plant
a)	Minimum 1 project with investment between INR 5 – INR 10 crore each	25	
b)	Minimum 1 project with investment between INR 2 – INR 5 crore each	15	
c)	Minimum 1 project with investment between INR 1 – INR 2 crore each	10	
d)	Minimum 1 project with investment of upto INR 1 crore	5	
(iii)	Turnover (Average of last 3 Financial years i.e. 2015-16, 2016-18 & 2017-18 as per audited balance sheet)	Max 30 marks	Annual reports containing audited balance sheets and profit & loss accounts statement
a)	More than or equal to INR 5 crore	30	
b)	More than or equal to INR 3 crore, but less than INR 5 crore	20	
c)	More than or equal to INR 1 crore, but less than INR 3 crore	10	
d)	Less than INR 1 crore	5	
(iv)	Technical competencies & tie-ups	Max 30 marks	APPLICANT to submit relevant technical documents including documents
a)	Possessing in-house technical know-how / Tie up with technology provider on digester	10	
b)	Possessing in-house technical know-how / Tie up with technology provider on purification system	10	

S. No.	Qualification Criteria	Marks	Document Required
c)	Possessing in-house technical know-how / Tie up with technology provider on compressor	10	proving in-house technology / technology tie-ups

7. Risks

The APPLICANT should be well aware of the various risks involved in the setting up the CBG Plant and its marketing and should conduct independent due diligence before committing to any investment decision. OMCs shall not be responsible for any of their business decisions or any future losses arising due to any unforeseen circumstances.

8. The prospective APPLICANTS shall clearly specify Plant-wise the name of the concerned OMC viz. IndianOil, BPCL & HPCL through which they choose to market the CBG. In case of multiple Plants being set up by the same APPLICANT, the APPLICANT can apply to different OMCs for these different Plants at different locations. However, the condition of attachment of CBG Plant with the suitable OMCs RO may be realigned/changed/modified as per requirement by the OMCs in discussion with the APPLICANT.

The APPLICANTS should clearly specify their preference in the following table:

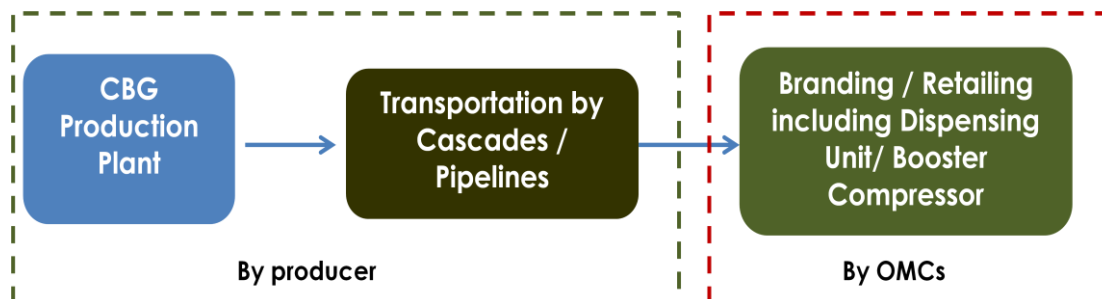
S. No.	NAME & LOCATION OF EXISTING/PLANNED PLANT	NAME OF OMC THROUGH WHICH CBG WILL BE RETAILED
1		
2		
3		
4		

9. Business Model for supply of CBG

Producer(s) / Seller(s) (Party/Entrepreneur) shall deliver CBG (within 25 Km, an indicative maximum distance), at Public sector Oil Marketing Companies' existing or new Retail Outlet / Stand alone Selling Point, through Cascades. The equipment for dispensing CBG at Public sector Oil Marketing Companies' existing or new Retail Outlet / Stand alone Selling Point shall be installed and maintained by Public sector Oil Marketing Companies', however, the CBG nozzles shall be manned and operated by RO Dealer. Electricity expenses towards dispensing of CBG through sale point shall be reimbursed to

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

the Party who is actually bearing the costs. The outlet flange of the Cascade / Inlet Flange of Compressor at the Retail Outlet shall be the Point of Sale for CBG. The cascade to remain connected to the compressor at retail outlet till the dispensation is operationally feasible.



Pricing Framework of CBG

(To be retailed through OMCs / Fixed for three years from 1.10.2018 / The price will be reviewed at the end of 3 years.)

Item	Unit	Price
Basic Price of CBG meeting IS 16087 : 2016 standard, compressed at 250 bar and delivered at OMC Retail Outlet in cascades	Rs./kg	46.00
GST at 5%	Rs./kg	2.30
Total supply price (incl. GST) to be paid to party	Rs./kg	48.30

Additionally, an element of Rs. 2 per kg of CBG towards cost of setting up of infrastructure e.g. booster compressor, dispensing unit, etc. at retail outlet shall be provided to OMC or APPLICANT, as per whosoever sets up infrastructure at retail outlet. Electricity charges at the rate of Rs. 0.50 per kg of CBG dispensed towards operation of booster compressor, dispensing unit, etc at retail outlet, shall be paid/ reimbursed to the Party, whosoever pays the charges.

10. Finalization of APPLICANTS as mentioned in this EOI Document is an ongoing process as mentioned in the Notice Inviting Tender, which may be further extended depending on the decision of OMCs. OMCs reserve the right to discontinue the process at any point of time without assigning any reasons. All applications received shall be evaluated periodically against the qualification criteria mentioned in this EOI Document. On evaluation, if applicant is found to have submitted incomplete or ambiguous documents in

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support of any qualification criteria, a techno-commercial query may be sent to the applicant seeking clarification / required documents in support of the qualification criteria.

11. The empanelled APPLICANT shall be informed separately by the respective OMC regarding their empanelment based on the documents submitted against qualification criteria. APPLICANT must submit application only after verifying their qualification against criteria mentioned in this EOI Document.

II. **GENERAL**

1. This document contains 32 pages including the cover page and comprises three sections namely, Notice Inviting EOI, White Paper on Compressed Biogas (attached as **Annexure-I**) and Format for submission of EOI (attached as **Annexure-II**, including a Cover Letter & its **Annexure-A**)
2. All revisions, clarifications, corrigenda, addenda, time extensions etc., to the EOI will be hosted on CPPP, Government e-Marketplace (GeM); Central Public Procurement Portal of Government of India (<https://eprocure.gov.in/epublish>); IndianOil website (www.iocl.com) under tender section: link "Tenders & Contracts"; BPCL website (www.bharatpetroleum.com) and HPCL website (www.hindustanpetroleum.com) under Tenders and contracts. APPLICANTs should regularly visit these websites to keep themselves updated.
3. **Submission of EOI**
The EOI complete in all respect for Indian Oil Corporation Ltd., Bharat Petroleum Corporation Ltd. and Hindustan Petroleum Corporation Ltd. should be submitted only through online portal of respective OMC, detailed as under. No physical EOI shall be accepted.

Name of OMC	E-tendering portal
Indian Oil Corporation Ltd.	https://iocletenders.nic.in
Hindustan Petroleum Corporation Ltd.	https://etender.hpcl.co.in
Bharat Petroleum Corporation Ltd.	https://bpcleproc.in

APPLICANTs may apply to a specific OMC for a Plant. If EOIs are submitted to more than one OMC for the same Plant, the EOI for the Plant will be rejected by all OMCs.

4. The APPLICANT shall also furnish self-certification of being not under liquidation, court receivership or similar proceeding in support of their fulfilling the eligibility criteria. The same to be provided for all the partners, wherever applicable. A format for the same is attached as **Annexure III**.
5. OMCs will not be responsible for any cost or expenses incurred by the APPLICANT in connection with preparation or delivery of EOI.
6. After the empanelment/selection of the APPLICANTS as per the evaluation criteria, the following shall be the procedure
 - a. Market survey by OMC for evaluation & deciding about:
 - i. Feedstock
 - ii. Market Size
 - iii. Retail Outlet
 - iv. Business Model
 - b. Binding LOI document
 - c. Signing of Commercial Agreement based on Plant progress
7. Within one month of acceptance of LOI, APPLICANT to submit a bank guarantee of Rs. 50 lakh, per retail outlet identified, to safeguard investment of OMCs towards retailing of CBG.
8. The APPLICANT is required to furnish all information and documents as called for in this EOI in English language. Any printed literature / documentary evidence submitted in another language, along with the EOI documents needs to be accompanied by an authentic English translation, in which case, for the purpose of interpretation of the document, the English version will govern.
9. OMCs reserves the right to call the APPLICANT for presentation. OMCs will not be responsible for any cost or expenses incurred by the APPLICANT, for the same. Also, the representatives from OMCs may visit the plant site(s) of the APPLICANT for verification. The APPLICANT shall have no objection whatsoever in this regard and shall facilitate OMCs visit.

III. **SPECIAL TERMS AND CONDITIONS**

The following are indicative but not exhaustive terms and conditions for supply of CBG to OMCs

▪ **Business model**

- Specific business model, as mentioned in point 9, to be finalized.
- CBG to be sold under brand name of OMC.

▪ **Quality Parameters**

- Supply of CBG shall be as per IS 16087 : 2016 standards and CBG shall be compressed at 250 Bar pressure during delivery.
- APPLICANT shall have a well equipped laboratory, online Gas Chromatograph/ gas analyzer and all relevant testing equipment.
- All lab equipment maintained by the APPLICANT shall duly certified periodically by a Government Approved Testing Laboratory.
- Test reports certified by APPLICANT shall accompany each batch of supply.
- OMCs shall have right of independent sample testing, which shall be binding on all Parties.

▪ **Supply Conditions**

- The production of CBG shall be synchronized to market demand with increase in production gradually to meet market demand.
- It is expected that full capacity utilization of CBG Plant shall be achieved within 12-18 months as per market conditions.
- The term of commercial agreement shall be 10 years. The same shall be extended on mutual consent.

▪ **Supply Disruption**

- In the event supplies are not maintained for a continuous period or are intermittent, OMCs shall be free to either suspend supplies or terminate the commercial agreement and obtain CBG from other sources at producers risk & cost.

▪ **Bank Guarantee**

- Within one month of acceptance of LOI, APPLICANT to submit a bank guarantee of Rs. 50 lakh, per retail outlet identified, to safeguard investment of OMCs towards retailing of CBG.

▪ **Approvals**

- Seller shall obtain all necessary statutory approvals for its Facility and Equipment.

▪ **Safety Procedures**

- Both parties shall follow all the applicable safety procedures.

IV. **INTEGRITY PACT**

APPLICANT shall also have to essentially sign an Integrity Pact (IP) for participating in this EOI.

Pro forma of Integrity Pact (IP) of IndianOil, BPCL, HPCL has been uploaded as integrity pact (IP) form. APPLICANT shall be required to download and print it such that it is legible. All pages of the printed copy of IP should be duly signed by the authorized signatory and stamped all the pages, with two witnesses name, address & signature and place & date. Thereafter, that copy should be scanned and uploaded by APPLICANT along with other EOI documents. This document is essential and binding.

V. **GRIEVANCE REDRESSAL MECHANISM**

Any dispute arising out of this EOI shall be resolved amicably through discussions in good faith with a view to expeditiously resolve such dispute. In the event the dispute persists, the Parties agree to resolve the dispute by conciliation in accordance with provisions of Indian Oil Conciliation Rules, if applicable. In the event of non-resolution of dispute by Conciliation within a period of 60 days or non-applicability of IndianOil Conciliation Rules, the Parties agree to settle the dispute by arbitration in accordance with the Rules of SCOPE Forum of Conciliation and Arbitration (SFCA) The venue for arbitration shall be New Delhi and the language of arbitration shall be English. The arbitrator shall pass a reasoned award and the award of arbitrator shall be final and binding on the Parties.

VI. **QUERIES AND CLARIFICATIONS**

Applicants to note that any queries related with EOI of the concerned OMC are to be submitted online only at sites mentioned below against the respective OMCs. Queries/clarifications received in any other form are liable to be unanswered. A written reply from the concerned OMC will be given on the same site and that answer / clarification shall be visible to all the Applicants except confidential information.

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Hindustan Petroleum Corporation Ltd.

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Bharat Petroleum Corporation Ltd.

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VII. GOVERNING LAWS

The laws of Union of India shall govern all matters concerning the EOI. Any issue arising related to the EOI or the selection process shall be adjudged by the courts in New Delhi, India alone.

IndianOil/BPCL/HPCL reserves the right to accept or reject, any or all EOIs received at its absolute discretion without assigning any reason whatsoever.

VIII. SUBMISSION OF EOI

The APPLICANT must provide a Cover letter on his official stationery (letter head) along with their EOI in the format provided as Annexure-A with the "FORMAT FOR SUBMISSION OF EOI". The same shall be submitted online on and no physical copy of the EOI documents shall be accepted.

IX. LAST DATE/TIME OF SUBMISSION OF EOI

1. The EOI should be uploaded to the following portal of respective OMC as per timelines in the NIT document, as mentioned below
2. Due to technical issues related to problem of keeping the e-tender open for six months and mid-term evaluation of applications submitted, six separate EOIs shall be uploaded, one every calendar month starting from 1.10.2018 to 1.3.2019. Each of the six EOIs shall get closed at the end of the month, in which they have been uploaded. The EOI uploaded on 1.10.2018 will get closed on 31.10.2018. The evaluation of the EOI which closed on 31.10.2018 shall be initiated from 1.11.2018. Also on 1.11.2018, a fresh EOI for the month shall be floated and subsequently the same process shall continue till the EOI period.
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Bharat Petroleum Corporation Ltd.	https://bpcleproc.in/

X. IMPORTANT NOTE

This advertisement does not constitute and will not be deemed to constitute any commitment on part of OMCs to off-take CBG.

OMCs has the sole discretion to qualify or accept the EOI and reject the proposal without assigning any reason whatsoever.

Furthermore, this advertisement neither confirms the right nor an expectation on any party to participate in the proposed EOI.

White Paper
on

Compressed Bio Gas (CBG)
The Fuel of the Future

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I. Introduction

1. India is among the fastest growing economy in the world and its energy consumption is slated to increase rapidly. According to the Ministry of Petroleum and Natural Gas (MoP&NG) estimates, India has a total reserve of 763 Million Metric Ton (MMT) of crude oil and 1,488 Billion Cubic Meter (BCM) of natural gas. The country currently imports nearly 77% of its crude oil requirements and about 50% of natural gas requirement, leading the Government of India to set a target of reducing this import by at least 10% by 2022. Further, it has set a target of increasing the contribution of gas in India's energy mix from existing 6.5% (global average is 23.5%) to 15% by 2022.
2. Hon'ble Prime Minister has given the following four pillars of our vision of India's energy future – energy access, energy efficiency, energy sustainability and energy security. The Government of India has also set a target of – 'Doubling Farmers Income by 2022'.
3. Waste / Bio-mass sources like agricultural residue, cattle dung, sugarcane press mud, municipal solid waste and sewage treatment plant waste, etc. produce bio-gas through the process of anaerobic decomposition. The bio-gas is purified to remove hydrogen sulfide (H_2S), carbon dioxide (CO_2), water vapor and compressed as Compressed Bio Gas (CBG), which has methane (CH_4) content of more than 90%.

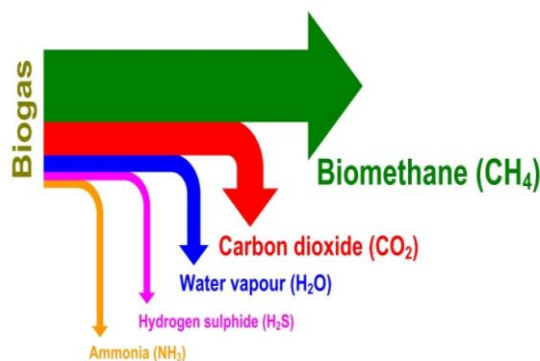


Fig. 1 : Components of biogas

4. CBG has calorific value and other properties similar to CNG and hence can be utilized as green renewable automotive fuel. Thus it can replace CNG in automotive, industrial and commercial areas, given the abundance biomass availability within the country.
5. Conversion of agricultural residue, cattle dung and municipal solid waste (MSW) into CBG in a commercial scale is expected to have the following benefits
 - Import reduction of natural gas and crude.
 - Utilization of agricultural residue, cattle dung and MSW for the production of CBG and thus to achieve reduction in emissions and pollution.
 - A boost towards fulfillment of National commitments in achieving climate change goals.

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- Providing a buffer against energy security concerns and crude/gas price fluctuations.
- Contribution towards Swachh Bharat Mission through responsible waste management
- Lowering pollution and carbon emission.
- Providing additional source of revenue to the farmers, rural employment and amelioration of the rural economy

II. Global Initiatives

1. Countries such as Germany, Italy, UK, France and Switzerland are promoting bio-gas usage promoted by supporting legal frameworks, education schemes and the availability of technology. Biogas produced in European countries is mostly fed into local natural gas grids and used for power generation. Grid injection is most common in European states followed by vehicles fuelled with biogas (either pure or in blend with natural gas) and biogas is also used for heating purposes either directly or blended to natural gas.
2. The number of bio-gas plants in Germany has doubled to nearly 9,000 plants from 4,136 plants in 2010. The total bio-gas production capacity of the plants is 8.98 Billion Cubic Meter (BCM) equivalent to 6.6 Million Metric Ton (MMT). They are primarily operated by farmer co-operatives, and utilize crops like maize or turnips as feedstock in their plants.

III. Policy Support

1. Government of India has released the National Policy on Bio-Fuels 2018 vide gazette notification no. 33004/99 dated 8.6.2018. The policy emphasizes on promotion of advanced Bio-fuels including CBG.
2. The Galvanizing Organic Bio-Agro Resources Dhan (GOBAR-DHAN) scheme was launched by Government of India to convert cattle dung and solid waste in farms to Bio-CNG (CBG) and compost. GOBAR-DHAN scheme proposes to cover 700 projects across the country in 2018-19.
3. Ministry of New and Renewable Energy has notified Central Financial Assistance (CFA) for Bio-CNG.

IV. Compressed Bio Gas (CBG) in India

1. The estimated CBG potential from various sources in India is nearly 62 MMT with bio-manure generation capacity of 370 MMT. CBG is envisaged to be produced from various bio-mass / waste sources including agricultural residue, municipal solid waste, sugarcane press mud, distillery spent wash, cattle dung and sewage treatment plant waste.
2. The other waste streams viz. rotten potatoes from cold storage, rotten vegetables, dairy plants, chicken/ poultry litter, food waste, horticulture waste, forestry residues and industrial Effluent Treatment Plants (ETPs) treating organic waste can be used in the generation of biogas.
3. The biogas produced contains approximately 55% to 60% methane, 40% to 45% carbon dioxide and trace amounts of hydrogen sulphide. Biogas is purified to remove carbon dioxide and hydrogen sulphide gases to prepare CBG. The CBG can be transported through cylinder cascades or pipelines to retail outlets.
4. Vide Gazette Notification no. 395 dated 16th June 2015, Ministry of Road Transport and Highways, Government of India had permitted usage of bio-compressed natural gas (bio-CNG) for motor vehicles as an alternate composition of the compressed natural gas (CNG).
5. Compressed Bio Gas (CBG) to be supplied shall meet IS 16087:2016 specifications of BIS (detailed below) and any other further revisions in the said specifications.

Table 1 : Composition of CBG

IS 16087 : 2016 Standard		
S No.	Characteristic	Requirement
1	Methane percentage (CH ₄), minimum	90.0 %
2	Only Carbon Dioxide percentage (CO ₂),, maximum	4%
3	Carbon Dioxide (CO ₂)+ Nitrogen (N ₂)+ Oxygen (O ₂) percentage maximum	10%
4	Oxygen (O ₂) percentage maximum	0.5%
5	Total sulphur (including H ₂ S) mg/m ³ , maximum	20 mg/m ³
6	Moisture mg/m ³ , maximum	5 mg/m ³

6. Also as per the IS 16087:2016 specifications, the following shall also be met
- iv. CBG shall be free from liquids over the entire range of temperature and pressure encountered in storage and dispensing system
 - v. The CBG shall be free from particulate matter such as dirt, dust, etc.
 - vi. CBG delivered shall be odorized similar to a level found in local distribution (ref. IS 15319)
7. The CBG is to be compressed at 250 Bar and supplied through Cascades to the Oil Company Retail Outlets as mentioned in the EOI document.

V. CBG Production Technology

1. Biogas is a product from the process of degradation of organic matter by anaerobic bacteria. The biogas generation process consists of four subsequent chemical and biochemical reactions i.e. Hydrolysis reaction, Acidogenesis reaction, Acetogenesis reaction and Methanogenesis reaction.
2. Hydrolysis reaction decomposes organic molecule such as carbohydrates, proteins and fats into glucose, amino acids and fatty acids, respectively. Acidogenesis converts those generated small organic molecules to volatile organic acids with help from bacteria. During the Acetogenesis process, bacteria in the acetic group digests volatile organic acids and releases acetic acid. Lastly, anaerobic bacteria in the methanogenic producing bacteria group will complete the Methanogenesis process by converting acetic acid to methane gas and other gases like carbon dioxide and hydrogen sulfide.
3. Hydrogen sulfide is a corrosive gas. Presence of carbon-dioxide in the bio-gas reduces its calorific value. Hence the bio-gas needs to be purified. Various technologies are used for removal of hydrogen sulfide, as detailed below:

Table 2 : Comparative analysis of technologies to remove Hydrogen Sulphide

Method	Efficiency	Cap Cost	O&M	Complexity
Biological Fixation	Moderate	Moderate	Low	Moderate
Iron chloride dosing	Moderate	Low	Moderate	Low
Water scrubbing	High	High	Moderate	High
Activated Carbon	High	High	Moderate	Moderate

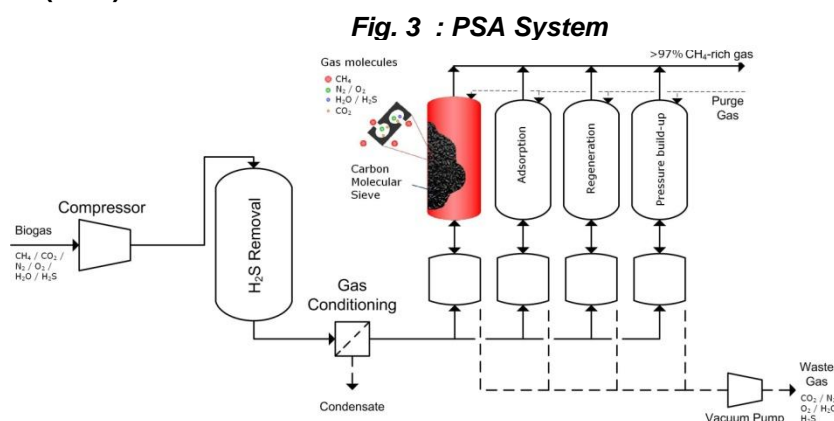
Iron Hydroxide or Oxide	High	Moderate	Moderate	Moderate
Sodium Hydroxide	High	Moderate	High	Moderate

4. For removal of carbon dioxide, the following technologies are used

- **Pressure Swing Adsorption (PSA)**

This technology is most prevalent for large bio-gas systems in India. With this technique, carbon dioxide is separated from the biogas by adsorption on a surface under elevated pressure. The adsorbing material,

usually activated carbon or zeolites, is regenerated by a sequential decrease in pressure before the column is reloaded again, hence the name of the technique. Hydrogen sulphide and water needs to be removed before the PSA-column. There is significant loss of methane (20-30%) in this process.



- **Water scrubbing**

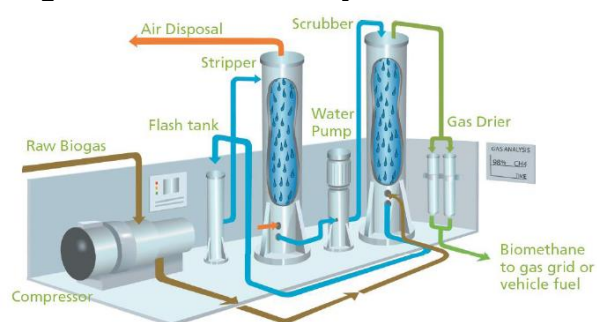
Carbon dioxide has a higher solubility in water than methane. Carbon dioxide will therefore be dissolved to a higher extent than methane, particularly at lower temperatures. In the scrubber column carbon dioxide is dissolved in the water, while the methane concentration in the gas phase increases. The gas leaving the scrubber has therefore an increased concentration of methane.

There are technologies available through which 97% purity of methane can be achieved with minimal (<5%) methane loss.

- **Membrane Separation**

Dry membranes for biogas upgrading are made of materials that are permeable to carbon dioxide, water and ammonia. Hydrogen sulphide, and oxygen permeate through the membrane to some extent while nitrogen and methane only pass to a very low extent. Usually membranes are in the form of hollow fibers bundled together.

Fig. 4 : Water Scrubber System



- **Chemical scrubbing - Monoethylamine (MEA) system**

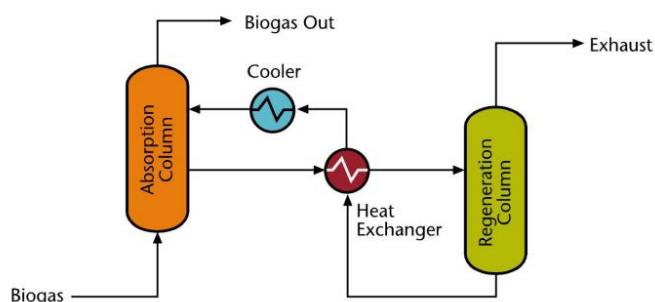
This is one of the best systems for bio-gas purification achieving 99.9% purity with negligible loss of methane. The systems are being extensively used in Germany for purification of bio-gas. Carbon dioxide is not only absorbed in the liquid, but also reacts chemically with the amine in the liquid. Since the chemical reaction is strongly selective, the methane loss might be as low as <0.1%.

Apart from the above, there are also developing technologies like Cryogenic upgrading. A comparison of the available technologies is as under:

Table 3 : Comparative analysis of technologies to remove Carbon Dioxide

Parameter	PSA	Water Scrubber	Mono-ethylamine (MEA) system
Pre- H₂S removal required	Yes	No	Yes
Working pressure (bar)	4-7	4-7	No pressure
Methane loss	20-30%	5-10%	<0.1%
Methane content in upgraded gas	>96%	>97%	>99%
Electricity consumption (kWh/m³)	0.25	<0.25	<0.15

Fig. 5 : MEA System



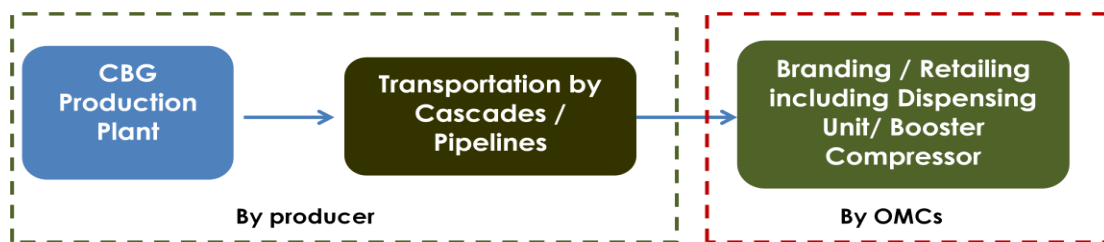
VI. Envisaged Business Model for Oil Marketing Companies (OMCs)

1. The CBG Plants shall be set up by mainly through independent Entrepreneurs and in few specific cases OMCs may consider setting up of CBG plant. The marketing of all the CBG produced through such plants will be through OMC network, under their respective brand names.

Producer(s) / Seller(s) (Party/Entrepreneur) shall deliver CBG (within 25 Km, an indicative maximum distance), at Public sector Oil Marketing Companies' existing or new Retail Outlet / Stand alone Selling Point, through Cascades. The equipment for

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dispensing CBG at Public sector Oil Marketing Companies' existing or new Retail Outlet / Stand alone Selling Point shall be installed and maintained by Public sector Oil Marketing Companies', however, the CBG nozzles shall be manned and operated by RO Dealer. Electricity expenses towards dispensing of CBG through sale point shall be reimbursed to the Party who is actually bearing the costs. The outlet flange of the Cascade / Inlet Flange of Compressor at the Retail Outlet shall be the Point of Sale for CBG. The cascade to remain connected to the compressor at retail outlet till the dispensation is operationally feasible.



Pricing Framework of CBG

(To be retailed through OMCs / Fixed for three years from 1.10.2018 / The price will be reviewed at the end of 3 years.)

Item	Unit	Price
Basic Price of CBG meeting IS 16087 : 2016 standard, compressed at 250 bar and delivered at OMC Retail Outlet in cascades	Rs./kg	46.00
GST at 5%	Rs./kg	2.30
Total supply price (incl. GST) to be paid to party	Rs./kg	48.30

Additionally, an element of Rs. 2 per kg of CBG towards cost of setting up of infrastructure e.g. booster compressor, dispensing unit, etc. at retail outlet and Rs. 0.50 per kg of CBG towards electricity charges for operation of booster compressor, dispensing unit, etc at retail outlet, shall be provided to OMC or APPLICANT, as per whosoever sets up infrastructure at retail outlet.

ANNEXURE – II

FORMAT FOR SUBMISSION OF EOI

(to be printed on the official stationery / letterhead of the APPLICANT)

To,
(Name & Address of respective OMC as applicable)

Dear Sir,

Subject: Submission of Expression of Interest for “**Production & supply of Compressed Bio Gas (CBG)**”.

With reference to your EOI inviting notice Ref. No: CBG01 dated 1.10.2018 and after examining the detailed documents, selection criteria and other details mentioned in the EOI document for “**Production & supply of Compressed Bio Gas (CBG)**”, I/We hereby offer to submit my / our Expression of Interest in providing technology / partnering the said project.

1. All the schedules and documents necessary in this connection are enclosed hereto. All the documents/ photocopies of the documents have been self-attested by me/us and OMCs is free to reject our candidature if any of the documents/photocopies of the documents is/are found to be false or forged.
2. I/we, hereby also declare(s) that my/our organisation/firm is not debarred/ blacklisted by any Central/State Govt. department, agency, PSUs/ Institution/ Agencies/ Autonomous organization.
3. The information sought from me as per the EOI notice is enclosed in **Annexure-A** to this letter.

Yours Faithfully,

(Signature & Stamp of Authorised Signatory)

Designation:

Date:

Place:

EOI No: CBG01, dated 1st October 2018 System ID 46978

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

Annexure – A

Name of the Project	Production & supply of Compressed Bio Gas (CBG)	
1.0 General Information		
Name of the APPLICANT submitting EOI		
Nature or legal status of the APPLICANT		
Structure of the APPLICANT	Entrepreneurs / Sole Proprietorships / Partnerships / Limited Liability Partnerships / Companies/ Cooperative Societies / Technology Providers	
Name and address of associated companies to be involved in the project with relationship and role, if any		
Details of Registration document of the APPLICANT <i>(provide details & submit copy of the company / organisation's registration)</i>		
Registered Address of APPLICANT		
Name, Designation and address of authorized Contact person: Mobile Number Landline number Fax Number		
Email (of individual and common e-mail of APPLICANT, if available)		
Name, Designation and address of authorized Signatory		
PAN Details (copy to be attached)		
GST Number (copy to be attached)		
CIN Number (if applicable)		
Turnover of the APPLICANT during last three financial years (Please enclose copy of audited Balance Sheet & Profit & Loss Statements)	Year	Turn Over (Rs Crore)
	2017-18	
	2016-17	
	2015-16	
In case APPLICANT is a subsidiary company, indicate the role of parent company		

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EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

Has APPLICANT have ever been debarred or blacklisted? If so, please provide details.

2.0 Technology & Experience Information

2.1 Past Experience in preceding 10 years (Sep 2008 – Sep 2018) of project execution including supply, installation, commissioning of Facilities to produce biogas or past experience in any other project work in energy/ healthcare / social welfare/ infrastructure / power / biomass/ transport

*Insert additional rows for additional projects
Documentary evidence Work Orders/
Completion Certificate / any other document in
support of execution of the Plant to be
submitted alongside*

Name of Project

Type of Project

Location of Project Site

Client Name

Date of Award of Work Order/LOA or Date of initiation of Work

Date of Commissioning

Value of Work executed (INR in crore)

2.2 Technology available with APPLICANT

APPLICANT to submit relevant technical documents including documents proving in-house technology

Digester

Purification system

Compressor

2.3 Technology tie-ups of APPLICANT

APPLICANT to submit relevant technical documents including documents proving technology tie-ups like MOUs, Commercial Agreements, etc.

Digester

Purification system

Compressor

Total nos. of CBG plants owned / has provided technology/ services / license by the APPLICANT with capacity

Demo/Pilot

Commercial

Details of existing/planned individual Plants from which CBG is to be supplied to OMCs

Name of plant

Type of plant (demo / pilot / commercial)

Type of ownership

Own

Others
(only technology provided)

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

Plant Location (Town/City, State, Country)				
Operational, since (date of commissioning in DD/MM/YYYY format)				
Plant Capacity	Installed: Operational: Average working days per year:			
Brief details on Technology deployed				
Feedstock used				
Annual Capacity: <ul style="list-style-type: none"> Biomass/waste processed CBG Other by-products (ton per day)(ton per day)(ton per day)			
Total plant area (in Acre)				
Min. Commercial Scale Plant CapacityMT/day of biomass processed			
Details on Technology to be used	<ul style="list-style-type: none"> Process Flow Diagram Feedstock which may be used Main products & by-products Utilization of by-products Recycling of water Effluent discharge yield and its treatment / Zero liquid discharge/ water reuse Whether technology is flexible to scale up Energy efficiency initiatives Overall material balance (@ 1 tonne of biomass processed) Other significant information			
<p>The prospective APPLICANTS shall clearly specify Plant-wise the name of the concerned OMC viz. IndianOil, BPCL & HPCL through which they choose to market the CBG and CBG generation per Plant</p> <p>However, the APPLICANTS can choose to apply to different OMCs for marketing their CBG produced from different Plants located at different locations.</p> <p>(for more than 4 CBG Plants, additional lines should be added detailing their location and the CBG quantity to be produced in tonnes)</p>	S. N o.	CBG Plant Location	Name of OMC through which CBG will be retailed	CBG Quantity (in tonnes per day)
	1			
	2			
	3			
4				

EOI No: CBG01, dated 1st October 2018 System ID 46978

EOI FOR PRODUCTION & SUPPLY OF COMPRESSED BIO GAS (CBG)

Authorized Signatory

Designation

Stamp

Date

Telephone/ email of authorized signatory

Note:

1. The APPLICANT must submit all relevant documentary evidence with reference to above.
2. **All the documents to be submitted by the APPLICANT should be self attested.**
3. Please provide the description in details for clear understanding. Attach separate sheets, if required.

Annexure III

(On APPLICANTS letterhead)

AFFIDAVIT

I _____, the *Director / Proprietor / Partner / Authorized signatory of _____ (mention name of firm/company and its complete address) do here by solemnly affirm and declare as under:-

1. That our Firm / company i.e. _____ (mention name of *firm/ company) is registered vide Registration No. _____ under the provisions of _____ (mention the name of the Act).
2. That our Firm / company i.e. _____ (mention name of *firm/ company) has applied in response to the Expression of Interest for Production & supply of Compressed Bio Gas (CBG) to Oil Marketing Companies (OMCs) across India.
3. That _____ (mention name of firm/company) is eligible to submit the aforesaid application as it not is under liquidation, court receivership or similar proceedings.
4. That all the information, documents and declarations submitted in/with our application are correct to the best of our knowledge and understanding.
5. That if any information, document or declaration submitted in/with our application, is found to be incorrect at a later date, we indemnify _____ (OMCs name) against any loss due to this and _____ (OMCs name) may take any action as deemed fit.

Place:
Date:

(Sign. & Seal of Authorized Signatory)