



GMDC
Gujarat Mineral
Development
Corporation Ltd.
(A Government of Gujarat Enterprise)

THE FUTURE IS **BLUE**

And we are paving
the way to Make it in India

EXPRESSION OF INTEREST

Inviting Expression of Interest from Potential Partners for
Underground Coal Gasification (UCG) in Odisha
and
Commercialization of Downstream Products.
EOI No. : GMDC/PP&D/001/24-25

Bringing New Energy 

Gujarat Mineral Development Corporation Ltd.
(A Government of Gujarat Enterprise)

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Throughout this document, ‘The UCG Project’ refers to the technical feasibility and later commercial operations of underground coal gasification (UCG) at GMDC’s Burapahar coal mines in Odisha and the downstream commercialisation of the SynGas.





1. GMDC - INTRODUCTION

Gujarat Mineral Development Corporation Ltd. (GMDC), a distinguished Government of Gujarat enterprise, has been at the forefront of the mining industry for over sixty years. As a pioneering force, GMDC plays a crucial role in meeting the mineral and solid fuel requirements of industries within Gujarat.

GMDC's extensive operations cover several key districts, including Kutch, Jamnagar, Bhavnagar, Chhota Udaipur, Panchmahal, Surat, and Banaskantha. GMDC is actively engaged in the extraction of a diverse range of minerals, including Lignite, Bauxite, Fluorspar, Ball Clay, Silica Sand, and Manganese.

GMDC today is India's largest merchant seller of lignite with its operating Lignite mines at Mata No Madh and Umarsar in Kutch, Rajpardi in Bharuch district, Tadkeshwar in Surat district and Surkha (N) in Bhavnagar district of Gujarat.

In addition to its mining activities, GMDC has made significant strides in generation of power. The corporation operates a 250 MW lignite-based thermal power station in Nanichher, Kutch, a 200.9 MW wind power facility distributed across multiple sites such as Maliya, Jodiya, Godsar, Bada, Varvala, Bhanvad, and Rojmal, and a 5 MW solar power plant at Panandhro Project. Through these initiatives, GMDC continues to contribute to sustainable energy solutions while reinforcing its leadership in the mining sector.

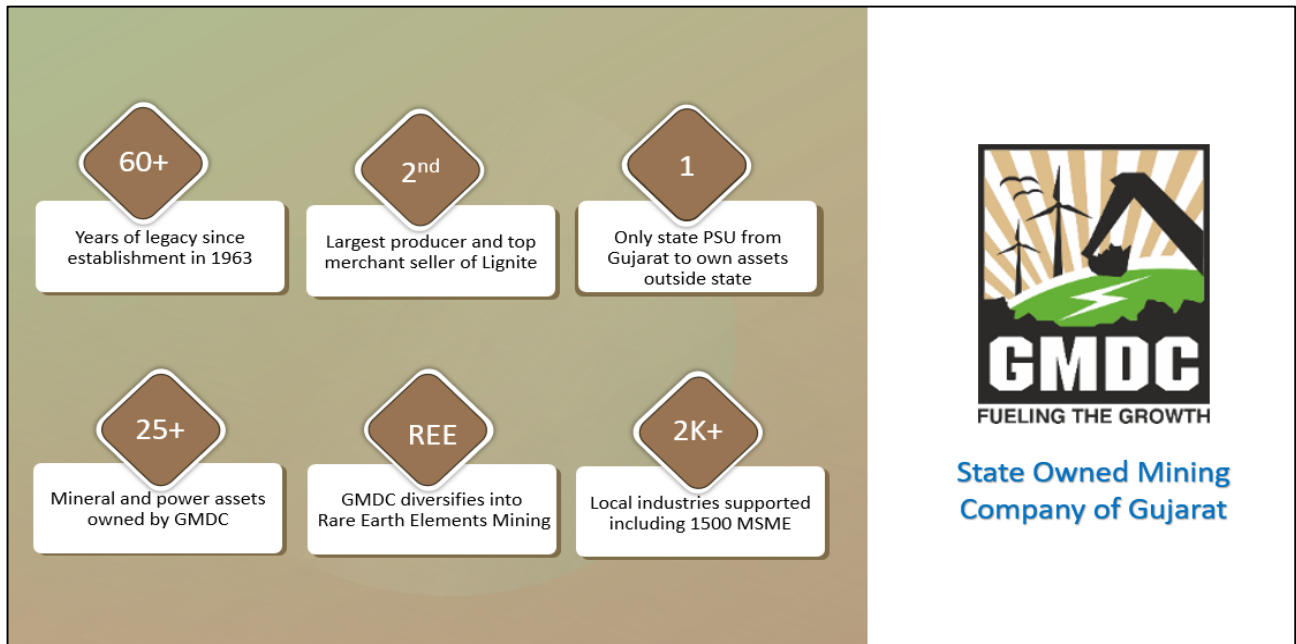


Figure 1. GMDC's track record over the years

In recent years, GMDC has experienced a remarkable transformation in both market capitalization and overall performance. Since the fiscal year 2021, GMDC's market capitalization has surged six-fold, reflecting the company's robust financial health and increased investor confidence. Concurrently, the corporation's revenue has nearly doubled, escalating from ₹1,400 crores to ₹2,700 crores. This substantial revenue growth underscores GMDC's successful expansion and its enhanced operational efficiency, highlighting the company's strong performance trajectory and its pivotal role in the industry.





INVITING EXPRESSION OF INTEREST FROM POTENTIAL PARTNERS FOR UNDERGROUND COAL GASIFICATION (UCG) IN ODISHA AND COMMERCIALIZATION OF DOWNSTREAM PRODUCTS.

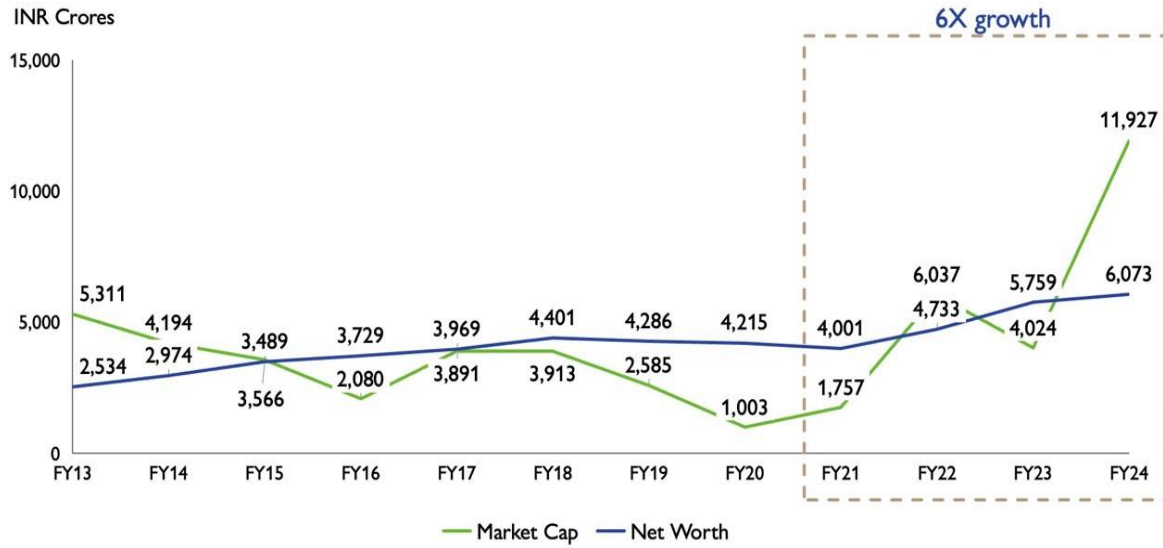


Figure 2. GMDC's market capital and net worth from FY13 to FY24

GMDC is poised for growth with expansion plans to initiate Six New Lignite Projects in the state of Gujarat. Additionally, the company is expanding its scope to include mining of other valuable resources, such as Limestone, Rare Earth elements, and multi-metal deposits.

As a part of strategic diversification, GMDC has recently secured two explored coal mines under the commercial coal mine auction route i.e. **“Baitarni West Coal Mine”** in Angul district and **“Buraphahar Coal Mine”** in Sundargarh district of Odisha with combined mineable reserves of more than 600 million tonnes. Recently, GMDC also secured a partially explored coal mine **“Kudanali Lubri”** in Angul district of Odisha.

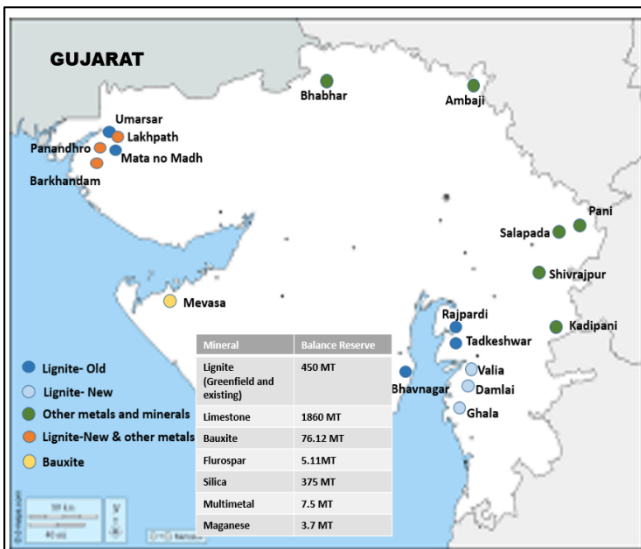


Figure 3. Various mineral sites and their balance reserve

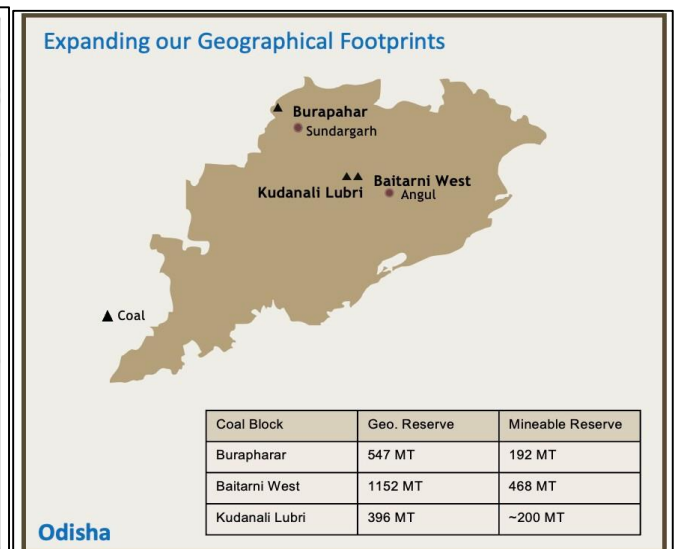


Figure 4. Coal reserves in Odisha



2. Coal Gasification – Indian Context

2.1. India’s Strategic Coal Gasification Mission

India is making significant strides toward a cleaner, more sustainable energy future, with a particular focus on balancing the country's energy needs with environmental goals. The Ministry of Coal, Government of India, is taking proactive measures to ensure that coal, which remains a primary source of energy in the country, is used in a way that reduces its environmental impact. A major component of this effort is the government’s clean coal initiative, particularly the Coal Gasification Mission, which is expected to play a key role in transforming the coal sector.

The Coal Gasification Mission is an ambitious program aimed at gasifying 100 million tonnes of coal by 2030. This approach focuses on converting coal into a cleaner form of energy—such as synthetic gas—that can be used for power generation, industrial applications, and even as a raw material for producing chemicals and fertilizers. Gasification of coal is seen as a more environmentally friendly alternative to traditional coal combustion, as it allows for more controlled emissions and can significantly reduce the carbon footprint compared to conventional coal-fired power plants. The case for Gasification in India is strengthened by multiple driving factors as seen in section to follow.

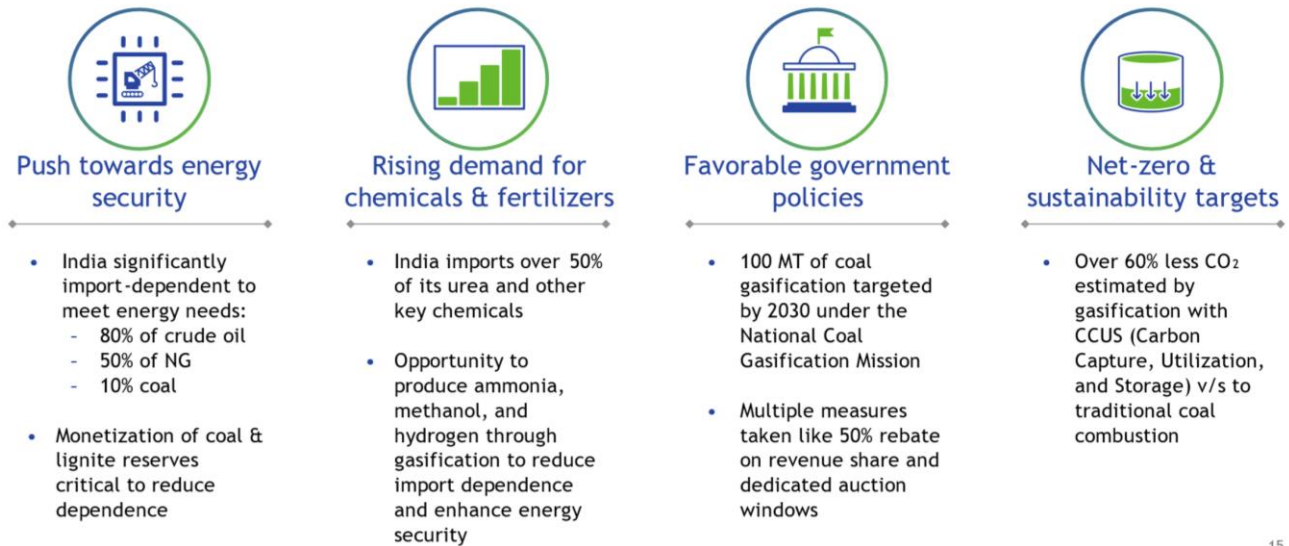


Figure 5. Coal Gasification Driving Factors

The mission has an overall financial outlay of Rs 8,500 crore, which underscores the government’s commitment to achieving these ambitious goals. To incentivize public and private sector participation, several supportive steps have been announced. These include proposals to waive the GST cess, reduce additional cess and duties, and provide tax holidays for companies involved in coal gasification projects. These fiscal incentives are designed to attract investment, encourage innovation, and create an enabling environment for the large-scale adoption of this technology.

In addition to these financial measures, India is also fostering strategic partnerships and collaborations that enhance the scope and effectiveness of its clean coal initiatives. For instance, recent Memorandums of Understanding (MOUs) have been signed between key players in the coal, energy, and infrastructure sectors. Notable partnerships include agreements between Bharat Heavy Electricals Limited (BHEL) and Coal India Limited (CIL), as well as between Indian Oil Corporation Limited (IOCL), Gas Authority of India Limited (GAIL), and CIL. These MOUs signal a commitment to sharing expertise, knowledge, and technology to advance coal gasification projects and ensure that they are executed efficiently and sustainably.

Furthermore, the Eastern Coalfields Limited (ECL), a subsidiary of Coal India, has initiated a pilot project for Underground Coal Gasification (UCG) at the Kasta coal block in Jharkhand. UCG is another promising

technology that allows for the gasification of coal underground, which can reduce the environmental impact associated with surface mining and coal extraction. This pilot project is part of a broader effort to test and refine cleaner technologies that can help reduce the environmental footprint of India's coal sector while ensuring energy security.

Carbon Capture, Utilization, and Storage (CCUS) plays a crucial role in the clean energy transition by reducing carbon emissions from fossil fuel use. Underground Coal Gasification (UCG) which converts coal into gas while it remains underground, avoiding the need for traditional mining, is a key technology in this shift. This process produces hydrogen and other useful gases with less damage to land and water. When paired with CCUS, the carbon dioxide (CO₂) released is captured and either stored safely underground or used in industries like oil recovery and chemical production. Compared to mining and burning coal for energy, UCG with CCUS is a much cleaner option, cutting emissions and improving fuel efficiency. By adopting these technologies, coal-rich countries, like India, can move toward low-carbon energy while making better use of their resources.



Figure 6. CG Projects in India

The following table presents several undergoing projects (commercial and pilot) on Coal Gasification in India.

Table 1. Undergoing coal gasification projects in India

Company	Type	Type	Capacity	Location
CIL-BHEL JV	SCG	Coal to Ammonium Nitrate	0.66 MTPA	Lakhanpur, Odisha
CIL-GAIL JV	SCG	Coal to Synthetic Natural Gas	1.83 MMSCMD	Sonepur Bazari, Raniganj, West Bengal
UCG Pilot Project	UCG	Coal to Methane, SynGas	Pilot	Kasta Coal Block, Jharkhand
JSPL	SCG	Coal to SynGas for Direct Reduced Iron Plant	2 MTPA	Angul, Odisha



JSPL	SCG	Coal to SynGas for Direct Reduced Iron Plant	2 MMTPA	Raigarh, Chattisgarh
CIL-SAIL JV Plant	SCG	Coal to SynGas for Direct Reduced Iron	NA	Durgapur Steel Plant, West Bengal
NLC	SCG	Lignite to Methanol	0.4 MMTPA	Nevyeli, Tamil Nadu
WCL	SCG	Coal to Ammonium Nitrate Project	0.66 MMTPA	Western, Coal Fields, Maharashtra

Note: SCG - Surface Coal Gasification, UCG - Underground Coal Gasification

Collectively, these initiatives demonstrate India’s commitment to transitioning towards cleaner energy solutions while still leveraging its domestic coal resources. Through innovative technologies like coal gasification and UCG, combined with strategic collaborations and supportive government policies, the country is laying the groundwork for a more sustainable energy future.

2.2. SynGas and Its Industry Applications

The gasification process converts coal into synthesis gas, commonly known as SynGas. This gas, primarily composed of hydrogen and carbon monoxide is an energy carrier just like Natural Gas and is an extremely versatile product with a wide range of applications. Harnessing the potential of SynGas can reduce import dependency, optimize resource utilization, and expand industrial capabilities across various sectors.

Blue Hydrogen

Blue hydrogen from SynGas is produced using carbon capture, utilization, and storage (CCUS), which prevents CO₂ emissions by storing it underground or repurposing it in industries like oil recovery and chemical production. This process reduces emissions, making hydrogen a cleaner alternative. Hydrogen is widely used in refining, chemicals, steel production, and other specialized industries. Hydrogen demand in India is driven by refineries for crude oil desulfurization, ammonia synthesis, and industries like steel, chemicals, and glass.

The expansion of refineries, coupled with rising demand for ammonia, methanol, and steel, will drive the need for greater hydrogen availability. Additionally, blending 20% hydrogen into natural gas pipelines is expected to further increase demand. By leveraging SynGas for blue hydrogen production, large-scale, low-carbon hydrogen can be generated, supporting industrial decarbonization and hydrogen-powered transportation. As the nation moves toward a hydrogen-based economy, SynGas can play a pivotal role in accelerating the growth of hydrogen adoption.

Industrial and Chemical Applications

SynGas plays a crucial role in the production of wide variety of chemicals that are fundamental to modern industry. For instance, it can be transformed into essential chemicals like **Methanol**, which is a key raw material used in the production of plastics, solvents and other synthetic materials. SynGas can be used in various process industries, such as chemicals, ceramic, textiles and pharmaceutical sector to produce several downstream products. Beyond chemicals, SynGas can be converted into Synthetic natural gas (SNG), which can serve as an alternative to natural gas thereby reducing dependence on imported natural gas.

Metallurgical Uses

In the metallurgical sector, SynGas is employed as a reducing agent in processes like the DRI (Direct Reduced Iron) based production of Iron and Steel. It serves as an environmentally friendly alternative to coke, which is traditionally used in these processes. By utilizing SynGas in this capacity, industries can lower emissions and improve energy efficiency.





Fertilizer Production and Agricultural Benefits

Another important application of SynGas is in the production of fertilizers, particularly through the Haber process, where SynGas is used to produce **Ammonia**. This ammonia is used to produce nitrogenous fertilizers like urea, a key input for food security in the agricultural sector. SynGas also supports agricultural productivity by enhancing fertilizer availability alongside its role as an energy source.

The major fertilizer units around Odisha are presented in the map below:

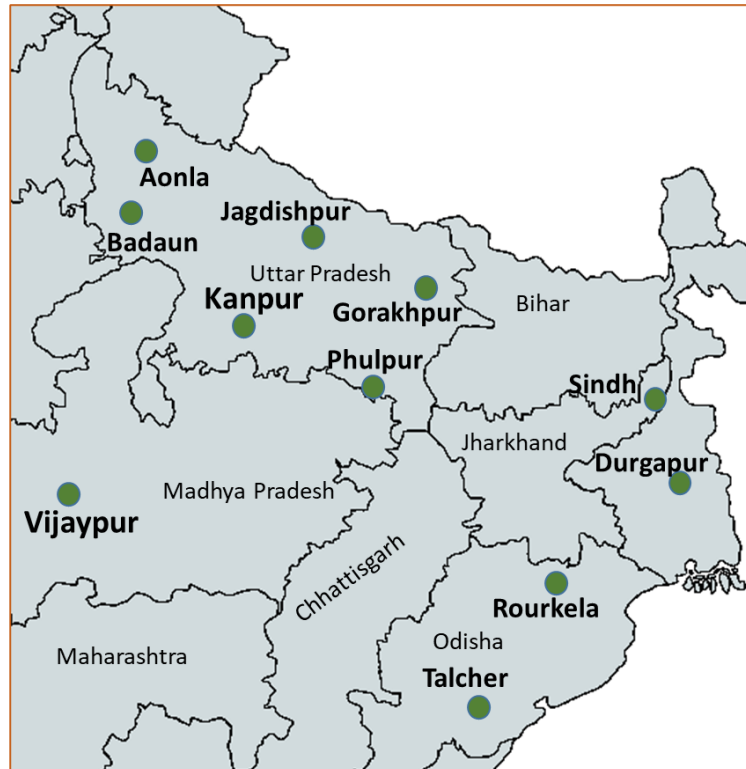


Figure 7. Major fertilizer units around Odisha

Gaseous and Liquid Fuels

The flexibility of SynGas extends to the creation of both gaseous and liquid fuels. It can be processed into hydrogen, a clean energy carrier with applications in fuel cells and as a transportation fuel. SynGas can also be transformed into Di-Methyl Ether (DME), a potential clean alternative to liquefied petroleum gas (LPG). SynGas can emerge as an energy source alternative for industries using NG/Propane as primary fuel.

Petrochemicals and Power Generation

The chemical derivatives of SynGas, such as methanol derivatives, olefins, and propylene, are critical in the production of petrochemicals used for plastics, synthetic rubbers, and other essential products. Additionally, SynGas can be directly used for power generation, providing an efficient and cleaner alternative to traditional coal combustion. Competitive pricing of SynGas with minimal plant retrofit investments and positive policy action can lead to the adoption of SynGas at CCGT power plants.

SynGas thus serves as a versatile and valuable resource for a variety of industrial and energy applications, from chemicals and fertilizers to fuels and power generation.

2.3. Reliance on Imports for Key Chemicals/Fuels and Role of SynGas in Reducing Dependency

India is one of the world's fastest-growing economies and its industrial and energy sectors are essential to sustaining this growth. However, despite this progress, the country faces a major challenge, i.e. its





dependence on imports to meet the demand for key chemicals, fuels, and raw materials that are integral to various industries. Amongst these, methanol, natural gas, ammonia, and several other chemicals are crucial inputs in sectors ranging from agriculture and energy to manufacturing and transportation.

Many of these products can be produced more sustainably and efficiently using SynGas, a versatile energy carrier and feedstock. The continued reliance on imports for these essential products creates not only supply chain vulnerabilities but also places significant pressure on the country's foreign exchange reserves. However, by leveraging domestic resources to produce these products from SynGas, India has the potential to reduce its import dependency, enhance self-sufficiency, and stimulate economic growth. This section examines the market landscape, import dependence, and the potential of SynGas in overcoming these challenges.

Methanol

Methanol is an essential chemical with a wide range of applications in the production of biofuels, plastics, solvents, and other chemicals. Methanol is a critical raw material for the production of plastics, fertilizers, paints and solvents. India's annual methanol demand was **2.55 million tonnes¹ in 2021-22**, but domestic production is much lower. In 2021-22, India produced around **0.17² million tonnes** of methanol, with the remainder—around **2.4 million tonnes³**—being imported, primarily from countries like Saudi Arabia, Iran, and Qatar. This dependency on imports creates a significant cost burden and affects the domestic availability and pricing of methanol-based products.

“SynGas can be used to produce methanol through a process known as gas-to-liquid (GTL) technology. India has considerable reserves of coal, one of the primary feedstocks for SynGas production. The use of indigenous coal resources to generate SynGas for methanol production would reduce the dependency on imports and stabilize domestic supply chains.”

Ammonia and Fertilizer Production

Ammonia is a key component in the production of nitrogenous fertilizers, such as **Urea**. India is the world's largest importer of urea, importing nearly **8 million tonnes⁴** annually, with a cost of approximately **\$2.5 billion**. Despite having a large fertilizer industry, domestic production of ammonia is insufficient to meet the demand for urea, leading to significant import dependency.

India's ammonia production largely relies on natural gas as a feedstock, and the rising cost of imported LNG has made ammonia production increasingly expensive. In 2022-23, India's domestic ammonia production was around **17.73⁵million tonnes**, while the shortfall was filled through imports. The country's reliance on imported ammonia is further complicated by fluctuations in global LNG prices, which have seen sharp increases in recent years. By utilizing SynGas, produced from indigenous coal or other carbon-based resources, India could reduce its dependence on imported ammonia, stabilize fertilizer prices, and ensure a steady supply of this crucial agricultural input. In 2023, Urea's demand in the country was 35 million MT with import of ~7.0 million MT (Fig. 6).

¹ Source: <https://dst.gov.in/sites/default/files/Final%20Survey%20Report%20DME%20Utilisation%20Sept%20202.pdf>

² Source: DCPC, Fig 28, https://beeindia.gov.in/sites/default/files/India_Energy_Scenario_for_the_Year_2023-24.pdf

³ Source: https://beeindia.gov.in/sites/default/files/India_Energy_Scenario_for_the_Year_2023-24.pdf

⁴ Source: https://sansad.in/getFile/loksabhaquestions/annex/182/AU3214_MVr0QE.pdf?source=pqals

⁵ Source: <https://www.faidelhi.org/member/AR-22-23.pdf>

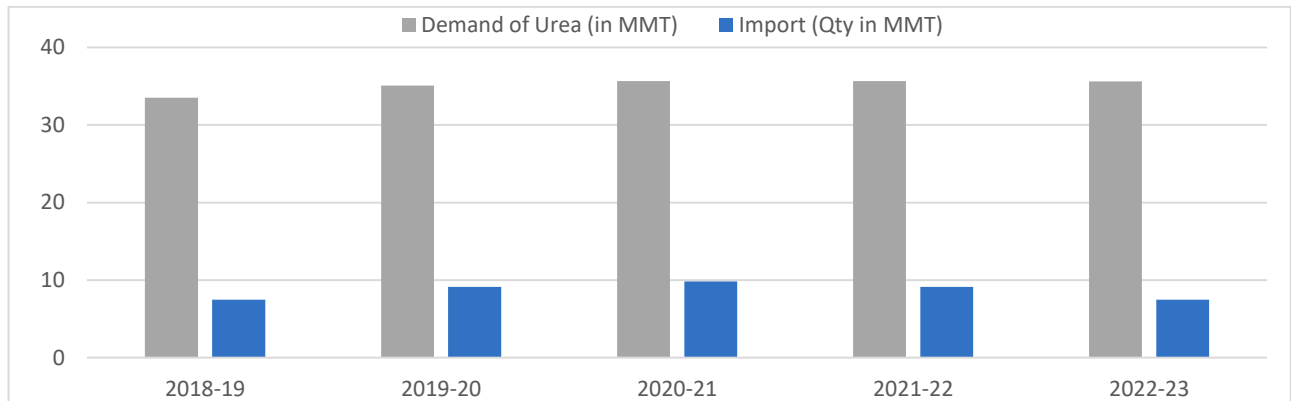


Figure 8. Demand and Import of Urea in India

Natural Gas

India’s growing energy demands are met in part by **natural gas**, which is used in power generation, industrial processes, and as a transportation fuel. Natural gas is also a critical feedstock to produce chemicals like ammonia and methanol. However, India is heavily dependent on imports to meet its natural gas needs.

India's natural gas consumption in 2024 was approximately **67.5 billion cubic meters (bcm)**⁶, with around **36 bcm** being met through domestic production, primarily from fields in the Krishna Godavari Basin, and the remaining **31 bcm** imported in the form of liquefied natural gas (LNG). The country’s reliance on imported LNG has been rising, as domestic production has failed to keep pace with demand. In 2023-24, India imported around **24 MMt**⁷ of LNG, making it the fourth-largest LNG importer in the world. The cost of LNG imports adds a significant burden to India’s energy bills, particularly as global gas prices remain volatile due to geopolitical tensions and supply chain disruptions.

The following chart represents the Demand, Domestic production and Import of the LNG. The imports have almost been equivalent to the domestic production and there is huge potential for SynGas to substitute some of the demand being met through imports.

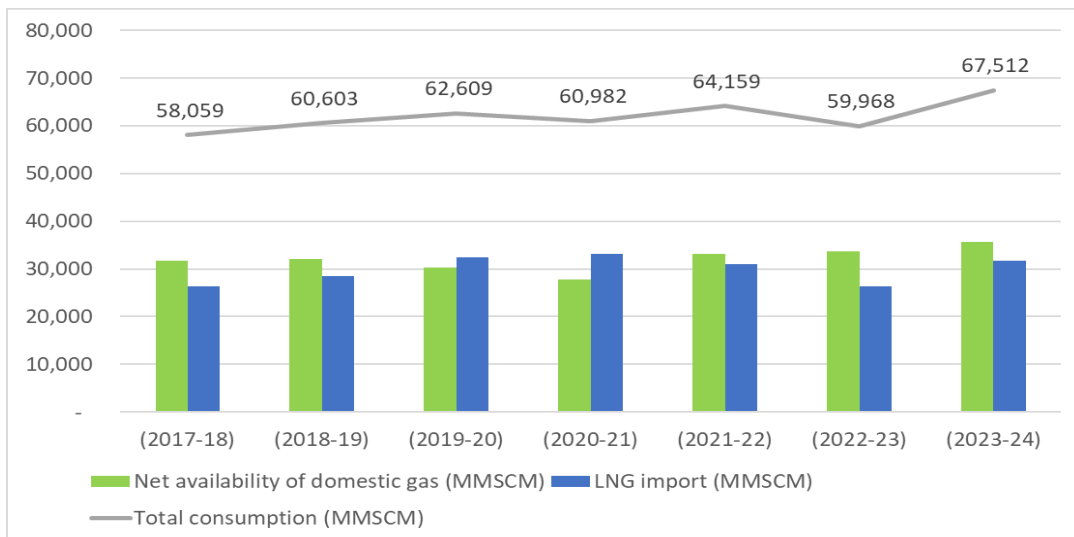


Figure 9. Net availability of domestic gas, LNG Import and its total consumption (Source: Petroleum Planning and Analysis Cell, GoI)

The rising demand for natural gas for power generation and industrial applications places additional

⁶ Source: <https://ppac.gov.in/import-export>

⁷ Source: <https://tradedstat.commerce.gov.in/eidb/default.asp>



pressure on India’s import requirements. For instance, in the power sector, natural gas accounts for around **6-7%** of the total installed capacity but is currently used to meet peak electricity demand. To ensure the availability of natural gas at competitive prices, India can diversify its sources and explore alternative domestic production methods, such as **SynGas**. By developing SNG from SynGas, India can reduce its reliance on imported LNG and improve utilization of gas based assets which are currently stranded. SynGas has significant potential as an energy carrier, measured in MMBtu (Million British Thermal Units), and can be used in both industrial and residential heating systems.

While natural gas, primarily composed of methane (CH₄), is chemically stable and does not readily participate in many industrial processes, it is often reformed into SynGas for various applications. This is because methane's stability limits its direct use in chemical processes. In contrast, SynGas, a mixture of hydrogen and carbon monoxide, is much more reactive and versatile, making it an ideal feedstock for a wide range of chemical processes. Given its reactivity and versatility, the direct application of SynGas, without the need for reforming natural gas, holds significant promise and offers substantial advantages in various industrial applications.

The following table briefly presents the demand and imports of above discussed key chemicals:

Table 2. Demand and Imports of Key Chemicals in India

	Product	Indian Demand in 2024	Gap Met by Imports in 2024	Projected Indian Demand in 2030
1	Natural Gas	200 MMSCMD (55 mtpa)	43% (24 mtpa)	380 MMSCMD (105 mtpa)
2	Methanol	2.95 mtpa	95% (2.82 mtpa)	4.5 mtpa
3	Acetic Acid	1.25 mtpa	90% (1.09 mtpa)	1.79 mtpa

India’s import dependency for key chemicals and fuels such as methanol, natural gas, ammonia, and others presents significant economic challenges. However, by investing in SynGas production and its applications, India can reduce this reliance, optimize its use of indigenous resources, and promote self-sufficiency.

2.4. SynGas Untapped Potential: GMDC’s Strategic Position in Harnessing Coal Reserves

The potential of SynGas to transform key industries and reduce import dependencies is vast, representing an untapped market. By tapping into SynGas production, there’s a tremendous opportunity to create a more resilient and self-sufficient economy, by the production of critical chemicals and fuels such as methanol, ammonia, and synthetic natural gas (SNG). These chemicals, for which India is currently heavily reliant on imports, can be produced domestically, unlocking a new frontier for growth across several sectors.

With vast coal reserves and emerging technologies like Underground Coal Gasification (UCG), there is significant potential to convert indigenous coal resources into SynGas, offering a cost-effective and environmentally cleaner alternative to traditional methods of energy production and chemical synthesis. This positions GMDC as one of the best-placed entities to capitalize on this growing market, given their access to abundant coal resources.

This market is on the brink of substantial growth, presenting significant opportunities for early movers. The expansion of SynGas production offers the chance to reduce reliance on costly imports, and support critical sectors like agriculture, manufacturing, and energy. The next few years are crucial, and the market for SynGas-based products is set to become a driving force in global industrial economies.



3. Underground Coal Gasification Project at Burapahar Coal mine

The Burapahar Coal Mine is one of the significant coal reserves located in Odisha, known for its high-quality coal deposits suitable for both thermal and industrial applications. This mine holds substantial untapped reserves, with coal grades suitable for commercial exploitation. The coal from Burapahar is strategically positioned for downstream monetization through technologies like coal gasification and other value-added processes.

With the government’s increasing focus on coal-based energy solutions, such as Coal Gasification, Burapahar presents a valuable asset for exploration, particularly for underground coal gasification (UCG). This mine offers significant opportunities for maximizing revenue, reducing funds outflow for imports, contributing to energy security, and addressing the growing domestic demand for SynGas products. Burapahar Coal mine is located in Odisha, as seen in the picture below:



Figure 10. Location of Burapahar Coal Mine

Further technical studies and investment are required to make it a key asset for long-term commercial development and revenue generation from UCG.

The Burapahar Coal block summary is presented in Table 3 as below:

Table 3. Basic Details of Burapahar Coal Mine

No.	Features	Details
1	Location	
	Coal Block	Burapahar Block
	Latitude	22° 3' 40" N-22° 5' 9" N (Provisional)
	Longitude	83° 34' 52" E-83° 37' 26" E (Provisional)
	Topo Sheet No.	F44L12
	Coalfield	IB Valley Coalfield
	Villages	Jharpalam, part of Bhograkachhar and Rengalpani
	Tehsil/Taluka	Hemagir





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No.	Features	Details
	District	Sundargarh
	State	Odisha
2.	Connectivity with Block	
	Nearest Rail Head	Kanika Railway Station
	Road	Raigarh-Sundargarh Road
	Airport	Jharsuguda
3.	Area	
	Geological Block Area	6.06 sq km
	Forest Area	2.21 sq km (As per FSI map)
	Non-Forest Area	3.85 sq km
4.	Climate and Topography	
	Average Annual Rainfall	1500mm average rainfall
	Temperature (Min. — Max.)	9°C to 47°C
	Local Surface Drainage Channels	Undulating terrain, drainage of the area is controlled by Khurusalega Nala, Aibaljhor nala and Barajharia Nala.
5.	Exploration	
	Status	Explored
	Exploration Agency	CMPDI
	General Dip of Seams	3° to 7° Southwest
	General Strike Direction	Northwest to Southeast
	Faults	2 no of faults
6.	Coal Reserve	
	Depth (m)	0 - 50 m 50 – 100 m 100 – 150 m > 150 m
	Reserve	0.08 mt 17.15 mt 72.52 mt 458.14 mt
	Total Reserve	547.89 mt
7.	Surface Constraints	Undulating terrain
8.	Grade of coal	G12 (Provisional) based on weighted average grade as per grade-wise data available in Draft GR.
9.	Decision Support System (DSS) Analysis	Wildlife info: The polygon touches Wildlife Habitat(s), Sloth Bear
10.	Eco Sensitive Zone (ESZ)	Southern boundary of the block is approx. 35 km from the boundary of ESZ of Debrigarh. SE boundary of the block is approx. 45 km from the boundary of ESZ of Sambalpur Elephant Region and NW boundary of the block is approx. 50 km from the boundary of buffer zone of unnotified Lemru Elephant Reserve.

Note: Above summary is compiled from “Geological Report on Coal Exploration Burapahar Block, IB Valley Coalfield, District-Sundargarh (Odisha), January-2021” By CMPDIL.





GMDC intends to undertake underground coal gasification (UCG) at its Burapahar Coal Mines in Odisha as shown in the picture below:

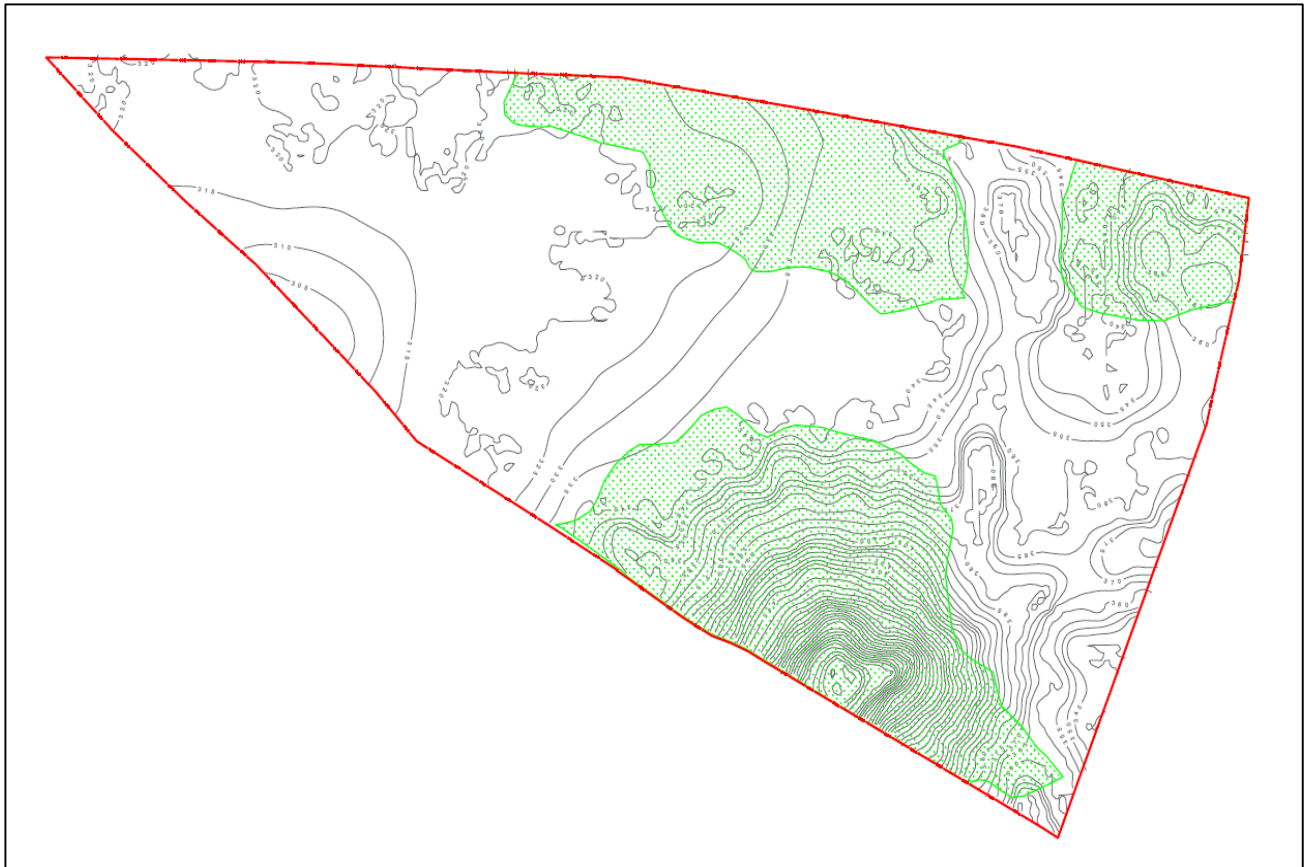


Figure 11. GMDC's Burapahar Coal Mine at Odisha

The estimated SynGas potential from the Burapahar Coal mines, ranging between 2500-3900 million MMBtu, presents a significant opportunity to address India's growing energy needs. With the potential for significant profit margins, SynGas offers a cost-effective alternative to expensive imported natural gas. This innovative solution reduces dependence on costly imports while supporting a wide range of industries.

Given the substantial cost savings and the increasing demand for energy, investing in Underground Coal Gasification (UCG) at Burapahar Coal mine becomes a highly attractive proposition where businesses can capitalize on a profitable venture while contributing to economic growth.

The UCG Project involves a phased approach, starting with a techno-commercial feasibility assessment/pilot project. Upon successful completion of the pilot, it will advance to full-scale commercial Underground Coal Gasification (UCG) and downstream integration.

The project aims to ensure a structured transition from assessment to commercial execution. Thus, the investment in UCG at Burapahar Coal mine presents both a financially rewarding opportunity and a strategic move toward reducing dependency on expensive energy imports.

4. DETAILS OF EXPRESSION OF INTEREST (EOI)

4.1. OVERVIEW OF THE EOI PROCESS

The applications received through the Eoi process will be evaluated by GMDC, and participants will be shortlisted based on the strength of their application and presentation.

Based on the response to the Eoi, an RFP will be issued for the selection of the entity. Provided further that GMDC reserves the right to adopt a suitable mechanism, mutually agreed upon, in place of RFP.

The entity selected for the techno-commercial feasibility studies and pilot project will have the Right of First Refusal to proceed with the commercial-scale project, subject to mutually negotiated and finalized commercial agreements. If the selected entity declines to proceed with the commercial-scale project after completing the pilot phase, GMDC reserves the right to engage alternative partners for downstream commercialization through RFP.

Furthermore, for the purpose of this Eoi, interested parties are required to collaborate with an international technology provider possessing proven expertise in UCG technology, ensuring a high-efficiency and safe gasification process.

4.2. OBJECTIVE

A successful Underground Coal Gasification (UCG) project necessitates the convergence of multiple critical elements. GMDC, with its ownership of coal blocks containing suitable reserves, mining expertise, regulatory compliance knowledge, and local logistics capabilities, is seeking a strategic partner to collaborate on this initiative. The ideal partner would typically be a manufacturer of chemicals or a developer of power plants, with market access to commercialize downstream SynGas products.

While it is preferred that the partner possesses direct experience in directional drilling techniques (such as horizontal and lateral drilling) and operational expertise in monitoring complex automation and virtual operations, it is acceptable for the partner to demonstrate the ability to meet these requirements through collaboration with a qualified technology provider. Specifically, the partner must have a relationship with an international technology provider specializing in UCG technology.

Through this Expression of Interest, GMDC intends to identify a Partner who:

- Has end-use requirements for SynGas and the capability and intent to monetize downstream products such as chemicals and power.
- Is willing to invest in the exploration and development of the Project.
- Possesses the capability to engage with the government on policy matters and contribute to the development of policy guidelines for this emerging UCG sector.
- Possesses expertise in safe storage and the transport of gases and chemicals.
- Possesses at least 5 years of experience in exploration of minerals and hydrocarbons.
- Has expertise in environmental impact monitoring and mitigation for underground operations and is committed to preventing adverse environmental effects, including aquifer contamination, soil subsidence, and other ecological risks.

Subject to the initial activities being viable and agreement on commercial arrangement, the initial activities will ultimately be followed by commercial scale UCG and downstream integration by the Partner agency.

The Partner should be willing to invest in underground coal gasification at the Burapahar mine for their captive requirements or other commercial purposes. GMDC will provide access to its Burapahar Coal mine for exploratory studies. This EOI seeks organizations committed to techno-commercial studies, which will form the foundation for the UCG development of the Burapahar Coal Mine in the subsequent phase. Interested entities are encouraged to submit the EOI to jointly pursue studies assessing the feasibility of underground coal gasification and downstream integration at the Burapahar Coal Mine.



GMDC has incurred expenses on pre-development activities, including geological reports, initial clearances, land acquisition costs etc. These costs will be shared with the selected agency, with the modalities for recovery to be mutually decided at the stage of commercial-scale downstream integration.

4.3. BASIS FOR SELECTION AND EMPANELMENT OF PARTNERS

- i. Entities wishing to participate in this process are required to submit their Technical and Financial details, along with the necessary information in the specified forms including the information Questionnaire.
- ii. Participants will be evaluated based on their overall responsiveness to GMDC's requirements, technical and financial capabilities, and their willingness to invest in the initiatives outlined within the scope of this engagement.
- iii. The commercial-scale production of SynGas through Underground Coal Gasification (UCG) and its downstream commercialization will require substantial investment. Therefore, the selected partner must have the financial capacity and willingness to support these investments.
- iv. GMDC will assess the submitted responses based on factors such as technical competence in coal gasification processes, financial strength, SynGas requirements, overall responsiveness on the information questionnaire, and business presentation.
- v. The entities shortlisted basis the above evaluation will be allowed to participate in the two part RFP – Part One being the technical feasibility / Pilot and Part Two being the commercial scale project. GMDC reserves the exclusive right to decide on the shortlisting of the applicants. GMDC also reserves the right to enter into agreements with partners for other sites. At Burapahar, there will be only one partner for this Project.
- vi. Both GMDC and the partner selected after the RFP will collaborate closely, with clearly defined roles and responsibilities, to develop and finalize the full roadmap for both the parts of this project. Part One - the detailed technical feasibility / pilot is expected to last approximately 24 months, followed by Part Two – commercial scale project subject to signing of mutually negotiated suitable commercial agreements.

4.4. SCOPE OF WORK AND RESPONSIBILITY MATRIX FOR PARTNER AGENCY

Broadly, the expectations from the Partnering entity and GMDC are summarized below:

A. Partnering Entity

- Provide or arrange technical capabilities for mapping underground geophysics and the reserves of coal.
- Provide or arrange for technical personnel with expertise in coal gasification or similar technologies to oversee the project, ensuring adherence to timelines and requirements for making a go/no-go decision regarding UCG at Burapahar.
- Ensure no adverse environmental impact.
- Conduct techno-commercial studies and pre-commercial pilot demonstrations to assess the viability of coal gasification at Burapahar or other sites, along with downstream integration.
- Develop the necessary infrastructure for UCG and the downstream products generated from gasification.
- Collaborate with GMDC to organize and participate in discussions with relevant stakeholders to clarify regulatory jurisdiction and policies concerning UCG.
- Prepare the Prefeasibility Report and Detailed Project Report, thoroughly considering capital expenditures (CAPEX), operational expenditures (OPEX), and the mode of utilization of coal gasification products for large-scale commercial operations.



Develop commercial arrangements with GMDC for UCG at Burapahar as per appropriate relevant benchmarked/market parameters. Such mutual agreement shall form a prerequisite before investments into commercial scale projects.

B. GMDC

- Provide access to the premises and coal mine for conducting physical surveys and geological data.
- Allocate space for plant and equipment, and grant access to the underground coal reserves in the area jointly selected for testing.
- Assign a dedicated team to collaborate on the project, ensuring the provision of necessary resources, data, and expertise from GMDC as required.
- Share knowledge, insights, and the results of any prior studies or work related to gasification.
- Work as part of the joint team, collaborating with the selected technology partner at various stages of the project.
- Assist in identifying and earmarking space for the commercial-scale gasification and downstream product(s) plant at or near the coal mine.
- Oversee the management of mine operations, including adjustments to the mine plan, leading regulatory approvals, and ensuring compliance with all relevant regulations.
- Leverage GMDC's operational capabilities that are pertinent to the success of the project.

The matrix defined above is non-exhaustive and the parties will jointly decide the contours at such later stage post selection of the Partner Agency.

4.5. MODE OF ENGAGEMENT

This EOI will be available for download from GMDC's official website "<https://www.gmdcltd.com>" where all relevant details and documents will be made available. Participants are required to regularly check the website for amendments, updates and additional information. For further queries, participants can contact the following persons:

1. Swagat Ray, General Manager - Project Planning and Development
Gujarat Mineral Development Corporation Limited,
2nd Floor, Khanij Bhavan, 132 Feet Ring Road,
Near Gujarat University Ground, Vastrapur,
Ahmedabad, Gujarat – 380052
Mobile: +91 9727792696
Email: ssray@gmdcltd.co.in
2. Anupam Jalote, Head – Strategic Partnerships and CEO - iCEM
Gujarat Mineral Development Corporation Limited,
8th Floor, Khanij Bhavan, 132 Feet Ring Road,
Near Gujarat University Ground, Vastrapur,
Ahmedabad, Gujarat – 380052
Mobile: +91 9810710310
Email: ajalote@gmdcltd.co.in





4.6. SELECTION PROCESS:

4.6.1 EOI Submission Requirements

- a) **Technical Capability Statement of the Organization:** Interested entities are invited to submit their technical competence under the applicable categories as detailed below:
- i. In case the entity is the owner of a gas based generating station requiring SynGas; the details expected in the EOI are summarised below:
 - Technical details of the Plant, Installed capacity, location, gas pipeline connectivity.
 - Overall gas requirement and current supply sources, gas pipeline connectivity
 - Potential requirement of SynGas and purity requirements
 - Plan for utilisation of SynGas produced from Underground Coal Gasification of Burapahar Coal Block.
 - Any other details as deemed necessary.

Note: Captive generation shall be of not less than 100 MW installed capacity. Further, it is expected that the downstream set up of the entity shall be sizeable enough to absorb the end products of coal gasification from UCG Designated area of Burapahar Coal Block in its entirety or in partnership with other applicants. GMDC will evaluate the submissions made by the potential applicants in the said regard.
 - ii. In case the entity is a manufacturer of Fertilizer/downstream chemical/ petrochemical units, they should submit the following details:
 - Detailed description of the overall scale of operations.
 - Details of input feedstock used to produce those chemicals.
 - Projected demand for SynGas as input.
 - Quality parameters of SynGas like Calorific Value, Hydrogen and Carbon Monoxide Composition.
 - Any other relevant details as deemed necessary.
 - iii. Applying Entity should provide details of its specialization in directional drilling, including horizontal and lateral drilling along with the following details:
 - Technical expertise in directional drilling, including past projects and operational capabilities.
 - Experience in handling and monitoring complex automation and virtual operations in drilling.
 - Available technologies, equipment, and methodologies used for directional drilling.
 - Safety measures and best practices implemented in past operations.
 - Any other relevant details as deemed necessary.
 - iv. Applying entity must provide details of their and their partners' experience in various aspects of the Underground Coal Gasification process, along with information on the current technology and proposed methodologies to ensure the smooth operation of underground coal gasification with the specified coal:
 - They shall demonstrate their understanding/tie-up for Underground Coal Gasification technology utilizing Indian standard thermal coal and producing effective SynGas of H₂ + CO as on the date of EOI submission. The maturity of the technology shall be detailed along with details of the projects where such technology has been operated successfully.
 - v. Applying Entity should also demonstrate understanding/tie-up for converting SynGas into it selected downstream products



- vi. The applying entity must possess expertise in gas and chemical handling, logistics, and maintain a strong safety record in past operations.
 - vii. GMDC's decision regarding assessment of an applicant's access to such technologies based on the submission of the applicant shall be final and binding
- b) Details of Technical Manpower** - Interested entities are requested to outline the expertise and experience their team brings to this project in the field of underground coal gasification and relevant downstream areas. The response should highlight the team's capabilities, particularly in alignment with the specified categories. Preference will be given to personnel who are part of the entity's core team. If any contractual personnel are included, an appropriate undertaking should be provided, confirming their commitment to supporting the entity in meeting the technical requirements.
- c) Financial Capability:** Interested entities shall provide details of Annual Turnover and Net-worth for the last 3 years (FY 2021-22, FY 2022-23, FY 2023-24) along with a certificate from the Chartered Account. Response from an Entity with negative net worth shall be rejected. Average Annual Turnover of Applicant for the last financial year should be more than Rs. 10,000 Cr as per Audited Accounts. Net worth of Applicant should be more than Rs. 15,000 Cr as per last audited financial year.

4.6.2 Authentication of Documents

At the time of submission of the EOI, the Applicants must submit the information on their letterheads duly signed by the Authorized representative of the company. During the evaluation stage, GMDC may ask for the documents to be duly certified/ attested by Chartered Engineer and notary public with legible stamp.

4.6.3 Other General Conditions

- a) The Applicant must not have been debarred / blacklisted by any Govt. Department, Agency, PSUs / Institution. The Applicant shall submit a self-certification by an authorized person to this effect.
- b) Please note that traders, acting solely as intermediaries or resellers without direct involvement in the technical, financial, or operational aspects of the coal gasification process or its downstream processes, will not be considered eligible for participation in this Expression of Interest (EOI). The EOI is specifically intended for organizations with access to technical expertise, operational capability, and long-term investment commitment necessary to engage in the development, implementation, and commercialization of Underground Coal Gasification (UCG) and downstream SynGas utilization.
- c) The applicant should not be under liquidation, court receivership or similar proceedings. The Applicant shall submit a self-certification by an authorized person to this effect.
- d) GMDC shall not be responsible for any costs or expenses incurred by the Applicant in connection with preparation or delivery of EOI.
- e) GMDC reserves the right to reject any or all EOIs received without assigning any reason.
- f) The Language of submission of response to this EOI shall be in English. In case of Foreign Applicant, if any of the documents in support of meeting EOI are not in English language, then the original document along with English translation of the same duly certified, stamped and signed by Local Chamber of Commerce or respective Embassy shall be furnished.
- g) Applicants must use the prescribed format provided in Annexures for submitting their EOI responses. Responses shall be submitted via email to (i) ssray@gmdcltd.co.in and (ii) ajalote@gmdcltd.co.in
- h) GMDC reserves the right to disqualify the participant in case of any mis-declaration or incorrect statements.



- i) Interested entities can request for site visit which will be coordinated by GMDC. Such visits may be organized for individual interested entity and/or jointly with other interested entities. The costs of visit shall be borne by the Applicant.
- j) GMDC may at its own discretion increase / extend the validity period including the date for submission of Expression of Interest.
- k) GMDC will endeavour (but is under no obligation) to notify the interested entities for any amendments / changes / updates with respect to the EOI. Interested entities are requested to check the website for regular updates.
- l) GMDC reserves the sole right to accept late submissions under genuine circumstances.
- m) In case of any dispute, decision of MD GMDC will prevail unopposed.

4.6.4 Evaluation and Selection Criteria

- a) **Technical Qualification:** Responses will first be assessed for technical qualifications based on the evaluation criteria. Bidders must provide proper documentation to demonstrate their capability to meet technical requirements.
- b) **Financial Qualification:** Average Annual Turnover of Applicant for the last financial year should be more than Rs. 10,000 Cr as per Audited Accounts. Net worth of Applicant should be more than Rs. 15,000 Cr as per the audited accounts of last financial year.
- c) **Elimination of Applicants:** Non-technically / non-financially qualified responses will be eliminated based on the evaluation including the internal criteria(s) set by GMDC.
- d) **Initial Selection:** Only those entities that meet the necessary qualification criteria and comply with the submission requirements will be invited to make a technical presentation covering the following aspects:
 - Understanding of GMDC's requirements by the entity.
 - Historical experience of the entity in similar projects or areas.
 - Business presentation (please elaborate—include proposed commercial arrangements, strategies, and the approach that GMDC and the entity would adopt to pursue this initiative).
 - Estimated timelines and associated costs involved in the project.
- e) **Final Selection:** After the presentations, selection of the technically qualified shortlisted participant will be undertaken based on internal criteria(s) set by GMDC.



5. INFORMATION REQUIRED FROM BIDDERS

Interested entities are required to furnish the information in specified formats as requested in the EOI document.

- a) Information Questionnaire (Annexure 1)
- b) Covering letter (Annexure 2).
- c) Technical details of the company and its business activities (Annexure 3).
- d) Audited financial statements – Annual Turnover and Net-worth of the organization certified by the auditor for the last 3 financial years. (Annexure 4)
- e) Details of manpower available with the entity
- f) Authority letter for authorized signatory
- g) Undertakings (as applicable) under General/other terms and conditions mentioned





6. PROPOSED SCHEDULE OF EVENTS

Particular	Description
Download EOI Document (Publication of EOI)	EOI document may be downloaded till 31/03/2025 up to 1800 hrs IST from GMDC Website: https://www.gmdcltd.com/
Pre EOI submission meeting with Interested Entities	To be communicated
Site Visit	Entities interested in site visits will have to intimate GMDC by 31/03/2025 by email to ssray@gmdcltd.co.in and ajalote@gmdcltd.co.in
Queries by Email	Queries if any may be sent by email to ssray@gmdcltd.co.in and ajalote@gmdcltd.co.in by 31/03/2025 up to 1800 hrs IST
Mode of Submission	Three hard copies, along with a soft copy of the submission.
Due Date for EOI Submission (i.e Last Date for EOI submission)	Email to ssray@gmdcltd.co.in and ajalote@gmdcltd.co.in (Hard copies should be couriered along with a soft copy.) Last date for receipt – 07/04/2025
Intimation to Shortlisted Entities for Presentation	To be communicated





Annexure – 1: Information Questionnaire

SN	Area of Interest	Power Generation	Chemicals	Blue Hydrogen	CCUS	Others
1	What is your area of expertise and interest? Please specify (select one or more options)					
2	What is your vision for downstream commercialization of the SynGas produced from Commercial scale UCG at Burapahar?					
	(i) Provide year-wise estimates of MMBtu utilization of SynGas as per your preferred downstream product(s)					
3	Experience in underground drilling/CBM				Yes/ No	
	(i) Do you have experience in Directional Drilling? Please also include any experience related to Coalbed Methane (CBM).					
	(ii) Please elaborate on and provide details regarding relevant experience and credentials.					
4	(a) Experience in monitoring complex automation and virtual operation of projects				Yes/ No	
	<ul style="list-style-type: none"> ▪ Do you have experience in monitoring complex automations and virtual operation of projects/ directional drilling operations? 					
	<ul style="list-style-type: none"> ▪ Please elaborate on and provide details regarding relevant experience and credentials. 					
	(b) Experience in exploration of minerals and Oil & Gas					
	<ul style="list-style-type: none"> ▪ Please elaborate on and provide details regarding relevant experience and credentials. 					
	(c) Experience in safe storage and transportation of gases and chemicals					
	<ul style="list-style-type: none"> ▪ Please elaborate on and provide details regarding relevant experience and credentials. 					
5	Proposed Collaboration Model and Business Plan - Please describe the collaboration model you are proposing with GMDC.					
	(a) Pilot Studies:					
	(i) Are you willing to invest in conducting pilot studies to evaluate UCG technology?				Yes/ No	
	a. If yes, what is the expected financial outlay for the pilot study? (Provide an estimate in INR Crores)					





INVITING EXPRESSION OF INTEREST FROM POTENTIAL PARTNERS FOR UNDERGROUND COAL GASIFICATION (UCG) IN ODISHA AND COMMERCIALIZATION OF DOWNSTREAM PRODUCTS.



	b. What percentage of the pilot study outlay are you willing to contribute? (Provide a percentage from 0% to 100%)	
	(b) Future Commercialization Model	
	(i) What model do you envision for the future commercialization of UCG-produced SynGas? Please elaborate and select one or more of the following: <ul style="list-style-type: none"> ▪ Equity Participation ▪ Royalty-based model ▪ Other (please specify) 	
	(ii) Kindly elaborate on the vision for the downstream utilization of SynGas and provide insights into the expected unit economics.	
6	Financial and Operational Commitment:	
	(i) What is your anticipated financial contribution towards the commercialization of the UCG project at scale?	
	(ii) What level of operational involvement do you foresee in the future? (e.g., full ownership, operational partner, technology provider, etc.) - please provide details	
7	Technology Provider	
	(i) Kindly provide details of your preferred technology providers, along with a brief overview of their credentials. For the technology, please share confirmation or assurance from the technology provider.	
8	Investment Readiness	
	(i) Please provide an overview of your organization's financial strength and ability to invest in long-term projects related to the UCG Project.	
	(ii) What is the maximum investment your organization is prepared to commit for the pilot study and subsequent commercialization stages spread over the coming years/decades?	
9	Risk and Commercial Viability	
	(i) What risk mitigation strategies does your organization propose in relation to the exploratory and commercial stages of the UCG project?	
	(ii) What are your expectations regarding the commercial viability and return on investment (ROI) for SynGas production from UCG? Please outline your projected timelines and performance indicators.	
10	Support from GMDC - What specific support would you expect from GMDC in the following stages:	





	i. Pilot Study Phase	
	ii. Commercial Scale Operation	
11	Environmental and Social Impact Considerations	
	(i) How does your organization plan to address environmental and regulatory considerations associated with the UCG Project?	
	(ii) Please provide an outline of the measures you will take to ensure compliance with relevant environmental laws and sustainability practices.	
	(iii) Given that safety is a non-negotiable requirement for this UCG Pilot and subsequent commercialization efforts, how do you intend to achieve and maintain a high-efficiency UCG reaction at scale both during the pilot phase and in the long term?	
	(iv) What is your strategy to ensure that your International Technology Collaborator consistently adheres to the highest safety standards, implementing best and next-generation practices on an ongoing basis?	
12	Timeline and Milestones	
	(i) What is the proposed timeline for each phase of the project, from pilot studies to commercialization? Please provide a high-level roadmap, including key milestones and timelines.	
	(ii) What are the key performance indicators (KPIs) you intend to use to measure progress during the exploratory and commercial phases?	
13	Additional Information	
	(i) Is there any additional information you believe is important for GMDC to consider in evaluating your EoI? Please share details. (e.g., technical capabilities, case studies, relevant industry partnerships, etc.)	

Note: For standardization purposes, all information related to the quantity and price of SynGas in this questionnaire must be provided in MMBtu, except where specific units of measurement are indicated.





**Annexure - 2: Covering Letter
(On Company's Letter Head)**

To,
Mr. Swagat Ray,
General Manager,
Gujarat Mineral Development Corporation,
3rd Floor "Khanij Bhavan" 132 Ft, Ring Road,
Near University Ground, Vastrapur, Ahmedabad – 52, Gujarat
Email: ssray@gmdcltd.co.in

Sub: EOI for Partnership in Exploring Techno-commercial Feasibility of Underground Coal Gasification at Burapahar, Odisha and Downstream Integration

Dear Sir,

We hereby submit our EOI in response to your public advertisement in.....
(Insert the names of the newspaper and/or website) on.....(Insert date of the advertisement) inviting **"Partners for Pursuing Development of Underground Coal Gasification at GMDC's Burapahar coal mines in Odisha and Downstream Integration"**.

We are attaching herewith the required details as per the requested format in the annexures. We further confirm that the information furnished by us is true, correct, and accurate to the best of our knowledge.

We will be pleased to share any further details / documents required by GMDC for the evaluation process.

Sincerely yours,

Signature of Authorized Signatory (with official seal)

Name:

Designation:

Address:

Telephone/Mobile Number:

E-mail Address:





**Annexure – 3: Technical Details of the Applicant
(On Letter Head)**

1. Name and Address

- a) Name of the Firm/Company/Organization:
- b) Legal status of the Applicant (Proprietor / Partnership / LLP / Pvt Ltd / Public Ltd)
- c) Registered Address:
- d) Contact No. and Website

2. Key Contact Person:

- a) Name:
- b) Designation:
- c) Contact No. / Mobile No and Email id
- d) Authorization from Directors for Signatory submitting the EOI – Attach Separately

3. Applicants Profile:

- a) Country of Incorporation
- b) Ownership – Government or Private
- c) Shareholding pattern

4. Applicants to provide details of the following

Entities are requested to make detailed submissions highlighting their capabilities in relevant areas.

- Details of the Applicant – areas of operations - industry, plant locations and its capacity
- Experience in the downstream value chain or related products produced from coal gasification covering the following details:
 - Location and Address of the facilities/power generation unit
 - Process details and chemical requirement in the value chain/details of gas-based generation facility
 - Quantum of SynGas required to meet the requirements
 - Existing sources of supply of gas/chemicals
 - Current rate of procurement of gas/chemicals
 - Approach and methodology to be adopted for exploring coal gasification for meeting the captive requirements.
 - Technical Details of Underground Coal Gasification technology that the Applicant has access to along with Documentary evidence certifying the access.

Signature of Authorized Signatory (with official seal)

Name:

Designation:



Annexure – 4: Financial Details of the Applicants

Format of Turnover and Networth Certificate

We confirm that the annual turnover and Net worth of M/s [Applicant] as per the audited books of accounts is as under: -

Sl. No.	Financial Year	Turnover amount (In Applicants Currency)	Turnover (In Rs Crore)	Exchange Rate as on seven (7) days prior to Last date of submission of EOI
1	FY 2021-22			
2	FY 2022-23			
3	FY 2023-24			
4	Average Last 3 years			

Sl. No.	Financial Year	Net worth (In Applicants Currency)	Net worth (In Rs Crore)	Exchange Rate as on seven (7) days prior to Last date of submission of EOI
1	FY 2021-22			
2	FY 2022-23			
3	FY 2023-24			
4	Average Last 3 years			

Name of Audit Firm:
Chartered Accountant/CPA
Date:

[Signature of Authorized Signatory]
Name:
Designation:

UDIN _____

Instructions for Format:

1. The financial year would be the same as the one normally followed by the applicant for its Annual Report.
2. For the purpose of this Tender document:
 - (i) **Net Worth** shall be Paid up share capital plus Free Reserves and Surplus less accumulated losses, deferred expenditure and miscellaneous expenditure not written off, if any.
3. **The above figures shall be calculated after considering the qualification, if any, made by the statutory auditor on the audited financial statements of the applicant including quantified financial implication.**
4. This certificate is to be submitted on the letter head of Chartered Accountant/CPA.