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# India's First Coal-to-Ammonium-Nitrate Plant (BCGCL): Coal Gasification and Energy Security

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# India's First Coal-to-Ammonium-Nitrate Plant (BCGCL): Coal Gasification and Energy Security

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Source: [ujjyari.com](https://ujjyari.com) — researched, fact-checked & UPSC-mapped

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## WHY IN NEWS

*On June 20, 2026, President Droupadi Murmu and Prime Minister Narendra Modi laid the foundation (virtually) for India's first commercial coal-to-ammonium-nitrate project at Lakhanpur, Jharsuguda, Odisha, to be executed by Bharat Coal Gasification and Chemicals Limited (BCGCL).*

The project marks a strategic shift in how India uses its abundant coal: not merely to burn for power, but to convert (gasify) into high-value chemicals, reducing import dependence and adding value to a domestic resource.

## PROJECT SNAPSHOT

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| PARAMETER         | DETAIL  |
|-------------------|---|
| Project           | India's first commercial coal-to-ammonium-nitrate plant |
| Executing entity  | Bharat Coal Gasification and Chemicals Ltd (BCGCL)      |
| Joint venture     | Coal India Limited (51%) and BHEL (49%)                 |
| Location          | Lakhanpur, Jharsuguda, Odisha                           |
| Coal source       | Mahanadi Coalfields Limited (MCL)                       |
| Investment        | Rs 25,016 crore   |
| Output            | Around 0.66 MTPA technical-grade ammonium nitrate       |
| Target completion | 2029  |
| Technology        | Indigenous coal gasification                            |

BCGCL is a **joint venture between Coal India Limited (51%) and BHEL (49%)**, drawing land and coal from Mahanadi Coalfields. The plant will produce roughly **0.66 million tonnes per annum (MTPA)** of **technical-grade ammonium nitrate**, an input for mining and infrastructure explosives, much of which India currently imports.

## WHAT IS COAL GASIFICATION?

**Coal gasification** is a thermo-chemical process that converts solid coal into **syngas** (a mixture of carbon monoxide, hydrogen, methane and other gases) by reacting it with controlled amounts of oxygen and steam at high temperature. The syngas can then be processed into a range of chemicals such as ammonia, methanol, urea, and (as here) ammonium nitrate.

## Why Gasification over Combustion?

| COMBUSTION (BURNING)            | GASIFICATION                                |
|---------------------------------|---|
| Produces heat/power             | Produces syngas for chemicals               |
| Low value-addition              | High value-addition                         |
| Hard to capture CO <sub>2</sub> | Easier point-source CO <sub>2</sub> capture |

Gasification enables **value-addition** and, importantly, makes **carbon capture** more feasible because CO<sub>2</sub> is produced as a concentrated stream.

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## STRATEGIC SIGNIFICANCE

### Energy Security and Import Substitution

India has very large coal reserves but imports a range of coal-derived chemicals and fertiliser inputs. Converting domestic coal into ammonium nitrate **substitutes imports** and builds a strategic chemicals base. This fits the broader **Coal Gasification Mission**, which targets a substantial volume of coal to be routed to gasification by 2030 through incentives.

### Atmanirbhar and Regional Development

- **Self-reliance:** Reduces dependence on imported technical-grade ammonium nitrate.
- **Eastern India development:** Anchors industrial activity and jobs in Odisha's coal belt.
- **Technology:** Uses indigenous gasification know-how, building domestic capability.

## THE ENVIRONMENTAL TRADE-OFF

Coal gasification is **more carbon-intensive than using natural gas** as a feedstock (<https://ujivari.com/vocab/feedstock/>), and water use is significant. The environmental credibility of such projects depends on:

- Deploying **Carbon Capture, Utilisation and Storage (CCUS)**.
- Efficient water recycling and zero-liquid-discharge practices.
- Managing ash and waste responsibly.

The project therefore sits at the intersection of **energy security** (<https://ujivari.com/terms/energy-security/>) and **climate commitments** (India's net-zero-by-2070 goal), making CCUS integration central to its long-term sustainability.

## ANALYSIS AND WAY FORWARD

- **Pair with CCUS:** Gasification's climate footprint must be addressed from the design stage.
- **Scale the mission:** Replicate value-added gasification for methanol and fertilisers to maximise the resource.
- **Water stewardship:** Adopt strict water-efficiency norms given Odisha's competing demands.

## UPSC RELEVANCE

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- **GS Paper 3 (Economy / Energy / Environment):** Coal gasification, energy security, import substitution, industrial policy and the energy-climate trade-off.
- **Prelims:** BCGCL (CIL 51% + BHEL 49%), Coal Gasification Mission, Mahanadi Coalfields, what syngas is.
- **Mains:** “Coal gasification offers value-addition and energy security but raises climate concerns. Critically examine.”

## FACTS CORNER

### ★ FACTS CORNER — KNOWLEDGEPEDIA

**Project:** India's first commercial coal-to-ammonium-nitrate plant at Lakhanpur, Jharsuguda, Odisha.

**Entity:** BCGCL, a JV of Coal India Limited (51%) and BHEL (49%).

**Investment:** Rs 25,016 crore; output around 0.66 MTPA technical-grade ammonium nitrate; target 2029.

**Coal source:** Mahanadi Coalfields Limited.

**Process:** Coal gasification converts coal into syngas for chemicals.

**Policy:** Part of India's Coal Gasification Mission.

**Sources:** *Ministry of Coal* (<https://coal.nic.in>), *Press Information Bureau* (<https://pib.gov.in>), *LiveMint* (<https://www.livemint.com>)

Source: India's First Coal-to-Ammonium-Nitrate Plant (BCGCL): Coal Gasification and Energy Security –  
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