

Qoncept

EXPLAINER

Can India Really Turn Coal Into Fertilizer, Gas, and Chemicals?

India’s energy story starts with a contradiction. It can **power itself but not fuel itself...**

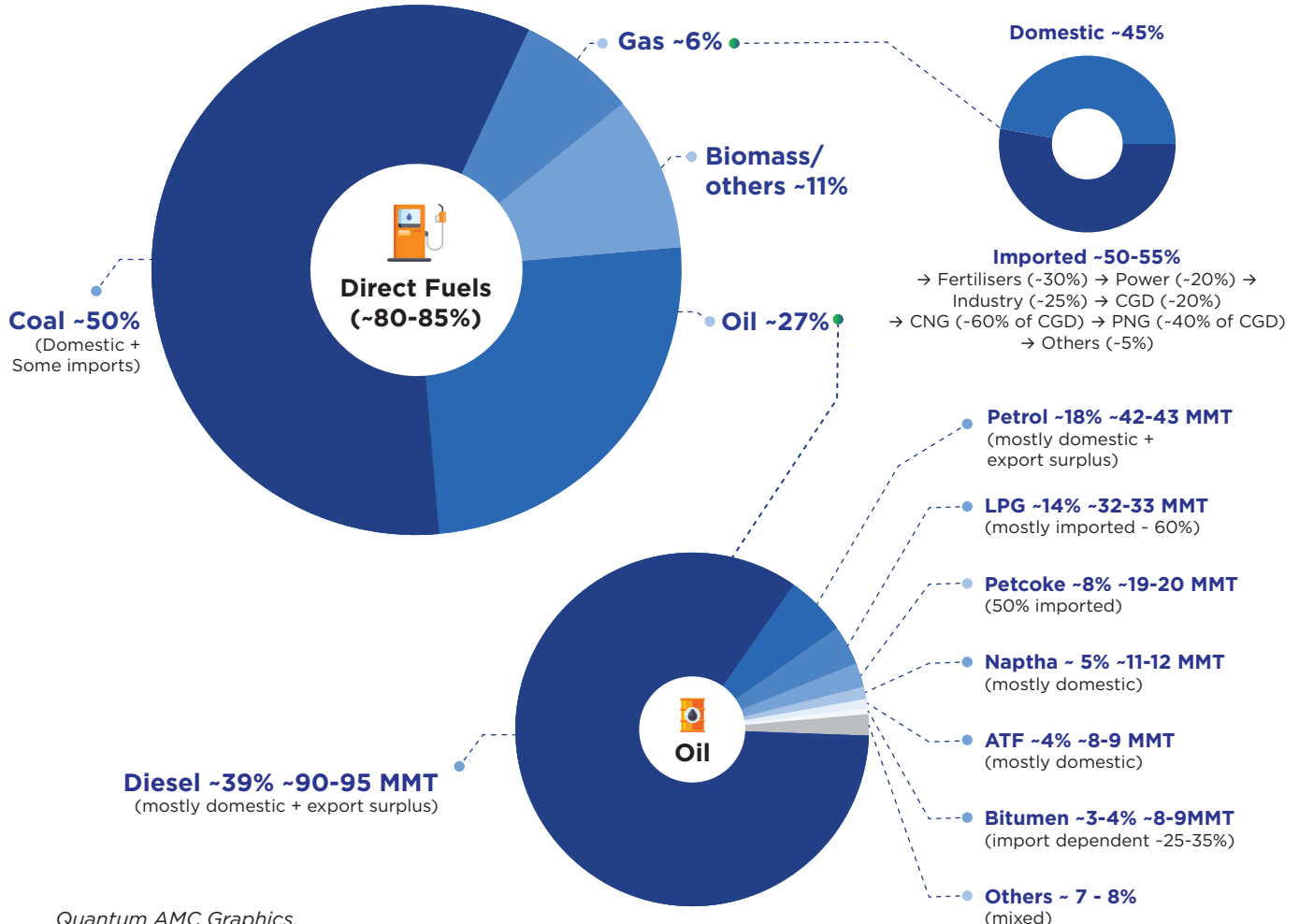
India’s total energy demand is ~ 9.32 lakh KTOE¹ (kilo tonnes of oil equivalent).

This can broadly be classified into two buckets: Direct fuels (coal, oil, gas, biomass) ~85% or Electricity (secondary energy) ~15%. On the grid, India is remarkably self-reliant. It meets **~256 GW of peak demand** largely using domestic sources: coal, hydro, solar, wind, nuclear.

But step outside the grid, and the equation turns. The fuels that actually drive the economy - **oil for transport, gas for industry, LPG for kitchens** are overwhelmingly imported by India.

India’s total energy demand

India’s total energy demand is ~ 9.32 lakh KTOE (kilo tonnes of oil equivalent) About 80-85% of it is met by Direct Fuels and ~ 12-15% by Electricity

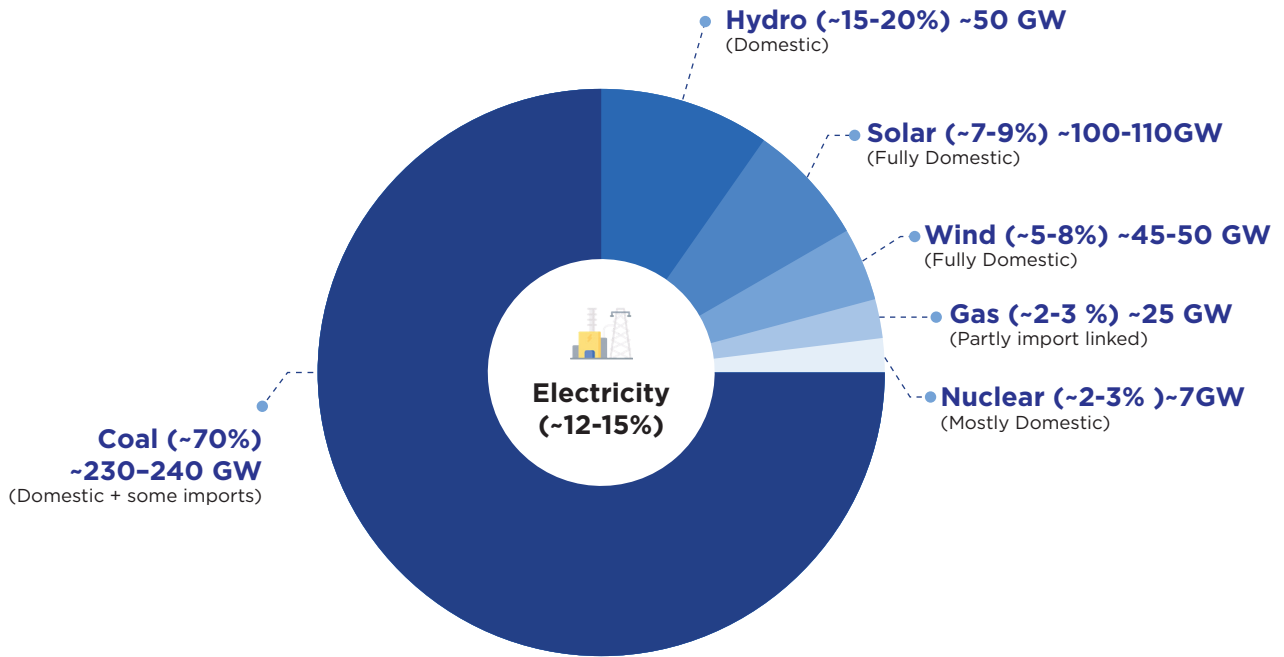


Quantum AMC Graphics.

Source: Data approximated for FY 25 and FY 26 provisional

Electricity (~12-15%)

- Generation: ~1,700–1,750 TWh
- Installed capacity: ~530–540 GW (FY25–26 level)

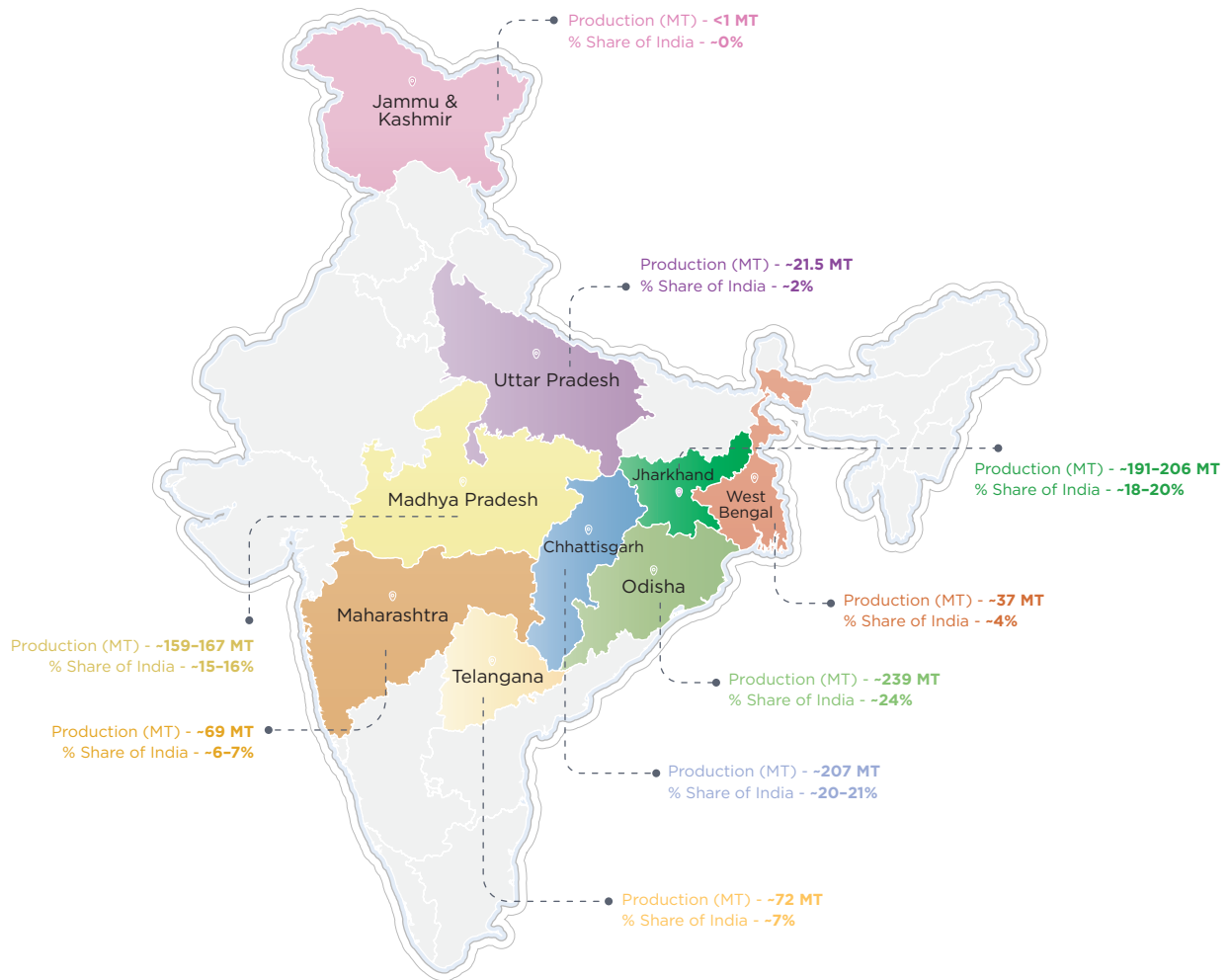


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Source: Data approximated for FY 25 and FY 26 provisional

Nearly two-thirds of electricity comes from Coal. It’s domestic, scalable, and most importantly reliable. The above chart shows that while solar has helped keep India powered during the day - when the sun sets and demand spikes - coal adds support. For all the talk of renewables, coal is what keeps the system standing.

India is already self-sufficient in coal, producing the bulk of what it consumes domestically. That very fact raises an important question: if the country can rely on coal to power its growth, why not leverage it more strategically for other purposes?



Total: ~998 MT (FY24) → >1,040 MT (FY25)

80%+ of India's coal comes from just 4 states →

- Odisha
- Chhattisgarh
- Jharkhand
- Madhya Pradesh

Quantum AMC Graphics.

Source: Coal India, IBEF. Data as of FY 2025. Above data marks the major states forming the core-belt of coal production in India and their capacity of Production as of FY 25

The answer lies in the paradox India faces coal is indispensable for rapid industrialization, yet its climate cost is undeniable. Under the Paris Agreement's NDC framework, India's mandate is clear: grow fast, but emit less per unit of GDP. That's a far tougher equation than simply cutting emissions outright.

So India hasn't chosen between coal and clean energy...it's chosen both. Renewables are scaling aggressively, but coal hasn't disappeared. Instead, the energy system is evolving in layers: coal → coal + renewables → eventually coal + renewables + storage.

The next shift isn't about using less coal. It's about using coal differently. Enter coal gasification a technology that transforms coal into cleaner fuels and chemical feedstocks, opening pathways for industrial use beyond just burning it for electricity.

Instead of burning coal, you convert it into **synthetic gas** - a mix of hydrogen, carbon monoxide, methane. That gas can then be turned into **fertilizers, chemicals, fuels even hydrogen**.

Think of it this way: that piece of coal sitting in Odisha doesn't just power a plant... it could end up as **urea in Punjab, gas in Kolkata, or chemicals in a refinery**.

That's the pivot India is starting to make.

But Why This Sudden Push?

Because our import bill is bleeding amid the ongoing West Asia War. In FY2025, India spent nearly ₹2.77 lakh crore² importing LNG, urea, ammonia, methanol, and coking coal combined.

Q Over **50% of LNG** is imported³

Q Nearly **all ammonia** is imported⁴

Q **80 - 90% of methanol** comes from abroad⁵

So, the question practically asks itself: **If India sits on one of the world's largest coal reserves, why are we still dependent on ships docking at our ports for products that coal can, at least in theory, help us make?**

The answer is both simple and complicated.

Simple, because the chemistry works... Coal can be turned into syngas and **syngas** into fertilizer, fuel, and chemicals.

Complicated, because the economics are brutal. Consider the numbers. Costs for urea factories saw a significant jump before commissioning in 2025. Producing one tonne of urea through coal gasification consumes 700 - 800 kg of coal⁶, plus significant amounts of oxygen and water. By contrast, gas-based urea is cheaper when LNG prices hover around \$8-10 per MMBtu. But when LNG spiked to \$40 per MMBtu in 2022⁷, coal-derived gas suddenly looked attractive.

That volatility is the heart of the problem. A coal-to-SNG facility could swing from profitable to loss-making depending entirely on global price cycles.

So, when we say the economics are brutal, it's not rhetoric - it's math. Every tonne of coal gasified carries not just the cost of coal, but the weight of billions in capital expenditure, volatile global price cycles, and the engineering challenge of handling ash-heavy coal

That's why the government's ₹37,500 crore⁸ push is not just about energy. It's about industrial security. It's about insulating India from geopolitical shocks, whether they come from a war in West Asia or a sudden LNG price spike.

But Isn't Coal Dirty?

Yes, coal is dirty when burnt in a power plant. But coal gasification is slightly different. Instead of burning coal away, it breaks coal down into syngas - a mix of hydrogen and carbon monoxide. That syngas is not the end product - It's the middle step.

From syngas, you can go in multiple directions. It can be turned into **ammonia**, which feeds into **urea fertilizers**. It can become **methanol**, which goes into **plastics, paints, and fuel blending**. It can be processed into **synthetic natural gas**, which can substitute part of the LNG we import. Or it can be converted into ammonium nitrate, the explosive that literally helps us mine more coal.

So coal gasification ideally means that we are moving coal up the value chain. Instead of a fuel that disappears in smoke, coal now becomes a raw material that feeds industries.

Sounds Perfect. Then What's the Catch?

The catch is geology. Indian coal is notoriously high in ash often 35 - 40%⁹. Global gasifiers choke on it. China's coal-to-chemicals model cannot be copy-pasted here. Indian coal carries 35 - 40% ash, as compared to 10 - 15%¹⁰ in Chinese reserves. That means higher cleaning costs, more downtime, and expensive technology adaptations.

That's why India is experimenting with fluidized-bed gasifiers, which can handle our high- ash coal. But this technology is still at a very early stage, and its ability to scale reliably remains unproven.

Isn't Coal Gasification Expensive?

Absolutely. Cost escalation shows why cheap coal doesn't mean cheap gasification. A coal-gasification plant is closer to a chemical refinery than a power station - it needs oxygen plants, gas cleaning systems, sulphur handling, water management, and carbon dioxide capture.

That's why the government is offering up to 20% support¹¹ for plant and machinery, capped at ₹5,000 crore per project. The idea is to ease the capital burden. But subsidies don't eliminate operating risk. Plants still face the volatility of global price cycles, the engineering challenge of handling coal with 35 - 40% ash, and the heavy costs of downtime and maintenance.

And What About Climate?

Here's the uncomfortable truth: coal gasification is still a fossil-carbon process. It may reduce local pollution compared to burning coal directly, but it doesn't solve the carbon problem. Unless **Carbon Capture, Utilisation, and Storage (CCUS)** becomes real at scale, these plants will face scrutiny in a carbon-constrained world.

So, Can India Really turn this 'black gold' into Fertilizer, Gas, and Chemicals ?

The chemistry is sound but the economics are shaky.

If India's coal-gasification experiments succeed, coal will no longer be just the fuel of thermal power - it will become a feedstock for fertilisers, gas, and chemicals. That could shrink parts of our ₹2.77 lakh crore import bill, especially in areas like LNG, ammonia, and methanol where dependence is most acute.

But if these projects stumble, the lesson will be equally clear: having coal under the ground is not the same as turning it into a competitive industrial product.

The real test is not whether coal can be turned into gas... It can!

But whether India can turn that gas into viable economics in a world of volatile energy prices, high-ash geology, and tightening carbon rules.

Source: *UNFCCC: United Nations Framework Convention on Climate Change 1/2/3/4/5/7/8/11: Bloomberg 6: Reuters 9/10: National Energy Technology Laboratory

Mutual Fund investments are subject to market risks, read all scheme related documents carefully.