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India's Energy Security

From Import Dependence to Energy Resilience

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From Energy Fragility to a Policy-Backed Resilience Buildout

India is the world's fastest-growing major economy, yet it remains structurally dependent on imported hydrocarbons, approximately 90% for crude oil and 47% for natural gas, exposing the nation to geopolitical shocks, commodity price shocks, currency pressure, inflationary risks, and external account vulnerabilities, making energy security a critical strategic priority.

In his 2022 Independence Day address, the Prime Minister of India articulated a vision of achieving energy self-reliance (Aatmanirbharta) by 2047, positioning energy security as a key pillar of India's long-term economic and strategic agenda. In pursuit of this objective, India is undertaking a multi-layered transition focused on expanding domestic energy production, strengthening strategic reserves, diversifying supply routes, and accelerating investments in renewable energy, green hydrogen, advanced nuclear power, and Carbon Capture, Utilisation and Storage (CCUS). These efforts are complemented by demand-side initiatives, including energy-efficiency measures, smart metering, and transport electrification, aimed at reducing dependence on imported fossil fuels.

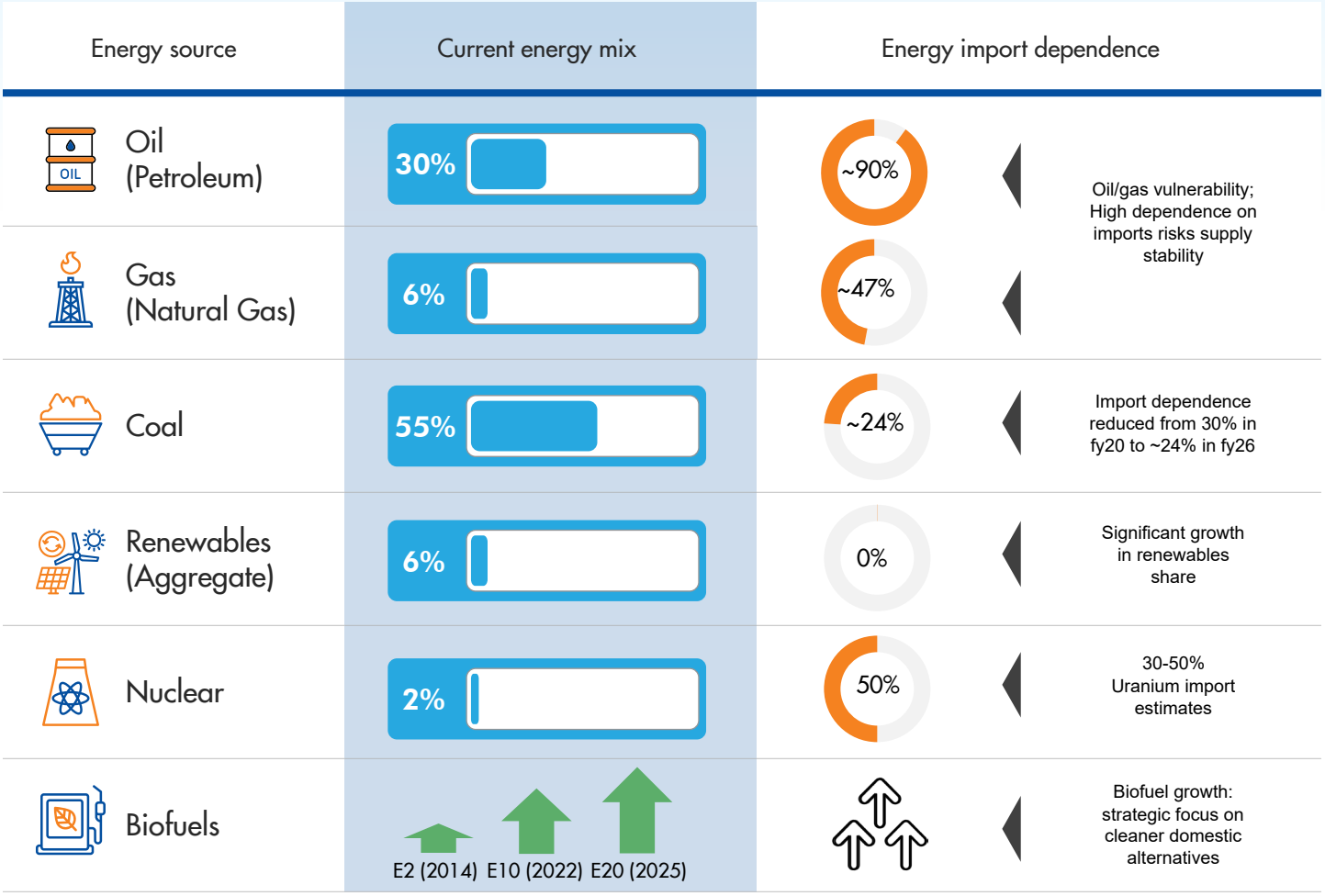
Together, these initiatives represent more than an energy transition; they constitute a strategic effort to enhance economic resilience and strengthen energy sovereignty while catalysing a multi-year infrastructure, manufacturing, and technology transformation.

1 India's Energy Landscape: Current Mix, Import Dependence, and Core Vulnerabilities

India's baseline energy security challenge stems from its fossil-fuel-intensive energy mix and significant import dependence. The country's total primary energy supply reached 903 Million Tonnes of Oil Equivalent (MTOE) in FY2023-24, reflecting the demands of a fast-growing economy with an expanding industrial base and rising per-capita consumption.

Fossil fuels continue to dominate the energy landscape, with coal accounting for nearly 55% of primary energy supply, crude oil around 30%, and natural gas about 6%. While renewable-energy capacity has expanded rapidly, its share in overall primary energy consumption remains relatively modest, highlighting both the magnitude of India's decarbonisation challenge and the opportunity to enhance long-term energy security through greater domestic and clean-energy adoption.

India's Energy Mix and Import Dependence



Source: Ministry of Petroleum and Natural Gas (MoPNG), Government of India (GoI), Crisil Intelligence

Critical Risks Defining India's Energy-Security Challenge

Chokepoint Risk — The Hormuz Concentration

The Strait of Hormuz represents India's single biggest energy vulnerability, serving as a conduit for roughly half of crude imports, 55-60% of Liquefied Natural Gas (LNG), and nearly 90% of Liquefied Petroleum Gas (LPG) imports. Any disruption along this corridor, whether from geopolitical escalation, military conflict, or piracy, could rapidly translate into supply shortages, price shocks, and macro pressure.

The proposed USD 4.3 billion undersea gas pipeline linking Oman/UAE to Gujarat directly addresses this chokepoint by bypassing the Strait of Hormuz, connecting the Gulf region to India's largest industrial and refining hub via an alternative corridor.

Inadequate Strategic Buffers

India's Strategic Petroleum Reserve (SPR) covers approximately 9.5 days of net oil imports, significantly below the 90-day oil-stock benchmark followed by International Energy Agency (IEA) member countries, and far short of estimated Japan's 254 days and South Korea's 200 days of oil supply. The combined SPR and industry stocks provide roughly 77 days of cover, still 13 days short of the IEA mandate. Furthermore, the absence of a dedicated strategic natural gas reserve adds further vulnerability for fertilisers, power, and city gas distribution.

2 Evolution of India's Energy Strategy (2015–2026): Pivot to a 'Resilience Stack'

Between 2015 and 2026, India's energy strategy evolved from reactive supply management to a layered 'resilience stack' – a multi-pronged architecture designed to reduce vulnerability simultaneously at storage, sourcing, technology and demand levels. These policy-backed initiatives represent not only a strategic imperative but also create a large-scale capital expenditure opportunity with long-duration relevance.

India's Energy Security Evolution – Key Milestones (2015 – 2026)

2015

CRITICAL RELIANCE ON ENERGY IMPORTS
- High dependence on global oil & gas markets
- Vulnerable to price shocks and supply disruptions

2018

SPR PHASE I & II EXPANSIONS
- Critical for emergency supply disruptions
- Phase I completed; phase II expansion planned

THREE PHASES

MAJOR LONG-TERM LNG CONTRACTS
- 1999–2004: Foundational contracts
- 2015-2018: Diversification
- 2023-2026: Major renewal & expansion for long-term energy security

2023

NATIONAL GREEN HYDROGEN MISSION
- Mission to position India as a global leader in green hydrogen production
- Will reduce dependence on fossil fuel

2025

NUCLEAR ENERGY BILL INTRODUCED
- Acceleration of nuclear capacities through Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act

2025

RECORD RENEWABLE ENERGY SHARE
- Achieved milestone of meeting >50% electricity demand by renewables

Source: Ministry of Power, Ministry of New and Renewable Energy (MNRE), GoI, NITI Aayog Reports, Crisil Intelligence

Physical Shock Absorbers

After operationalizing SPR Phase I, creating about 39 million barrels of crude storage, India is now advancing SPR Phase II. The cumulative ambition is to bring net coverage closer to 20–25 days of imports by FY31, a meaningful improvement though still short of IEA norms.

Contracting and Corridor Diversification

India has systematically diversified its crude sourcing beyond Gulf countries to regions like Russia, Latin America, and Africa. Russia now accounts for an estimated 38-50% of crude imports (up from near zero in 2021), while the Gulf's share has reduced. India is also broadening LNG supply through long-term contracts with Qatar and the US, reducing spot market exposure. The India-Middle East-Europe Economic Corridor (IMEC) and the proposed Oman-India undersea pipeline are core logistics de-risking initiatives.

Upstream Reforms

The Oilfields (Regulation & Development) Amendment Act, 2025 and new Petroleum & Natural Gas Rules, 2025 have updated the licensing and fiscal framework. Under Hydrocarbon Exploration and Licensing Policy (HELP) and Open Acreage Licensing Policy (OALP), blocks covering over 3.78 lakh sq km have been awarded, attracting committed investments of about USD 4.36 billion. The government has introduced pricing flexibility, lower royalty rates for difficult basins (5% for first seven years for deep and ultra-deepwater blocks vs 16.66% and 12.5% in pre-NELP and NELP blocks respectively), and a revenue-sharing model. However, significant structural challenges persist: the Standing Committee on Public Undertakings (2025-26) noted no significant new oil discoveries despite increased exploration, attributing this to long development lead times and ageing fields.

Deep-Tech push

Beyond addressing near-term supply vulnerabilities, India is investing in next-generation energy technologies, including green hydrogen, advanced nuclear power, and CCUS, to reshape its long-term energy architecture. These technologies have the potential to reduce import dependence, support industrial decarbonisation, and enhance energy sovereignty, while creating new avenues for innovation, manufacturing, and infrastructure investment.

Gas Infrastructure Buildout

India targets raising natural gas's share of primary energy from 6-7% to 15% by 2030. Successive City Gas Distribution bidding rounds have expanded coverage to 307 geographical areas. Compressed Natural Gas (CNG) stations have grown from under 1,000 in FY15 to over 8,800. Household Piped Natural Gas (PNG) connections have expanded from 2.5 million to 16.5 million. Supporting this growth, LNG regasification capacity has grown from ~25 MTPA to ~52 MTPA, while the gas pipeline network has expanded from ~16,000 km to over 26,000 km, with a target to reach 33,500 km by 2030.

Alongside physical infrastructure buildout, India is implementing market reforms aimed at creating a more integrated and efficient gas ecosystem. Measures such as unified pipeline tariffs and open-access provisions are reducing regional transportation disparities, improving network accessibility, and enhancing market efficiency. Together, these initiatives are supporting wider adoption of natural gas across sectors, while strengthening the country's long-term energy security.

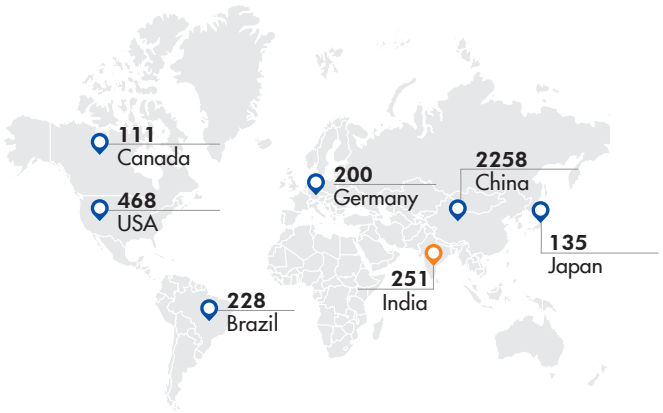
3 Energy Transition Opportunities: Roadmap and Opportunities

India's overall energy transition roadmap is not a unidimensional theme. Rather, it represents a diversified portfolio of complementary themes aimed at strengthening energy security, reducing import dependence, and building long-term system resilience.

Renewables Expansion and Grid Modernisation

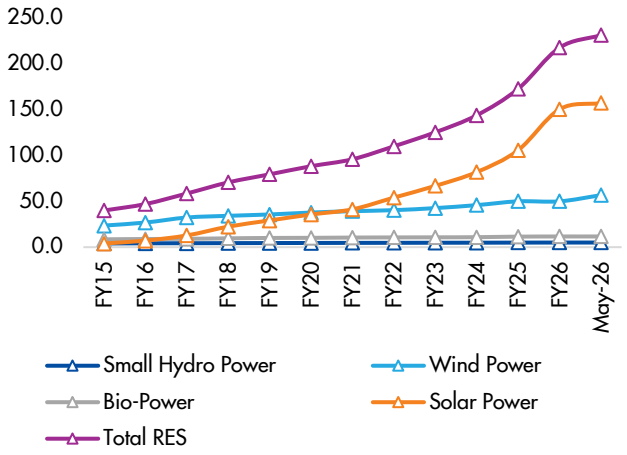
India ranks third globally in renewable energy installed capacity and achieved 50% of cumulative installed power capacity from non-fossil fuel sources in 2025, five years ahead of its 2030 Nationally Determined Contribution (NDC) target under the Paris Agreement. As of May 2026, non-fossil sources accounted for approximately 291 GW of installed capacity, representing ~54% of India's total installed power base. Looking ahead, the government targets 500 GW of non-fossil capacity by 2030. As renewable deployment accelerates, the challenge is increasingly shifting from capacity addition to grid integration, requiring around USD 25-30 billion in additional transmission infrastructure, energy storage, and grid modernisation to ensure stability and maximise renewable utilisation.

Total Renewable Energy Installed Capacity (GW)



Source: Press Information Bureau (PIB), MNRE

Renewable Energy Resources Cumulative Installed Capacity (GW)



Note: Cumulative achievements till May 2026 excluding large hydro and nuclear power capacity. RES - Renewable Energy Resources.
Source: MNRE

Battery Energy Storage Systems (BESS): The Grid Insurance Layer

India's cumulative BESS capacity crossed 1 GWh in 2025, with a strong growth pipeline supported by government procurement mandates and integrated storage requirements for renewable projects. BESS infrastructure serves multiple strategic functions: managing peak demand, reducing reliance on thermal generation, improving renewable integration, and lowering fossil-fuel consumption at the margin, thereby supporting a more resilient and renewable-intensive power system.

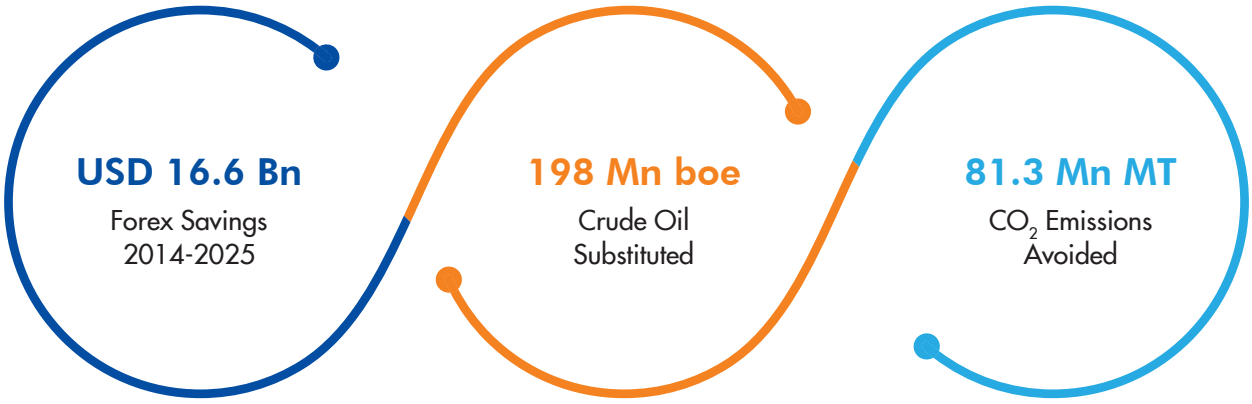
Natural Gas: The Bridge Fuel of the Transition

Natural gas remains India's critical transition fuel — cleaner than coal, more dispatchable than wind and solar, and already embedded in the industrial supply chain. The government's objective of increasing gas penetration from 6-7% to 15% by 2030 drives investment across LNG terminals, transmission pipelines, city gas distribution networks, and associated midstream infrastructure. Market reforms including unified pipeline tariffs and open-access provisions are improving network utilisation and the economic case for broader gas adoption.

Biofuels: Farm-to-Fuel Strategic Autonomy

Biofuels represent India's most immediately tangible source of import substitution, with measurable impact already evidenced across foreign exchange savings, crude oil displacement, and carbon emission reductions.

India Biofuel Blending Programme – Cumulative Impact (2014-2025)



Source: PIB, MoPNG

India achieved E20 (20% ethanol blending in petrol) in late 2025, five years ahead of the original 2030 target. Looking ahead, continued expansion of ethanol, compressed biogas (CBG), and sustainable aviation fuels (SAF) could generate additional cumulative savings of USD 21-26 billion over the next five years.

Renewable Energy Supply Chains: Strengthening Domestic Capabilities

India is increasingly localising renewable-energy supply chains as part of its broader energy-security strategy. The wind sector is already largely supported by domestic manufacturing, while the solar industry is rapidly building local capabilities through policy support and customs barriers. Although segments such as batteries, inverters, and power electronics remain partly import-dependent, investments in domestic manufacturing are accelerating. Greater localisation is expected to reduce supply-chain vulnerabilities, enhance energy security, and create new industrial and employment opportunities.

Green Hydrogen: Replacing Imported Molecules

The National Green Hydrogen Mission aims to produce 5 MMT of green hydrogen annually by 2030, replacing grey hydrogen in refining, fertilisers, and steel. Early-stage export potential to Japan, South Korea, and Europe provides an additional demand dimension. Near-term cost competitiveness remains a material challenge; however, the cost trajectory is improving as electrolyser manufacturing scales.

Nuclear: Clean Baseload for Grid Stability

India's Civil Nuclear Liability (Amendment) Act, 2025 and revised nuclear bill authorises a tripling of nuclear capacity to 22,480 MW by 2032. Nuclear provides reliable, dispatchable, carbon-free baseload power that complements intermittent renewables and reduces structural dependence on thermal generation, with a direct impact on LNG import demand in the power sector.

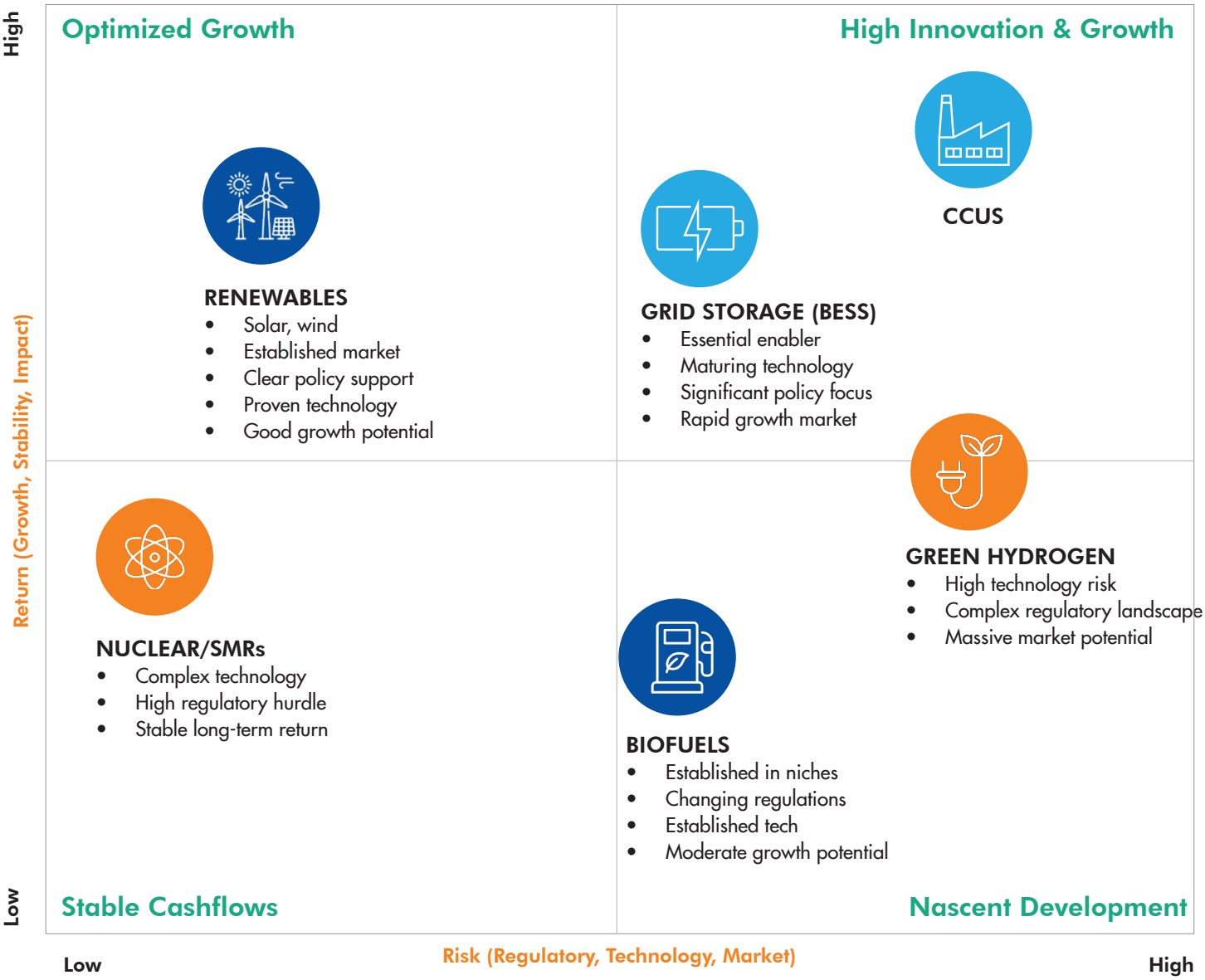
Coal Gasification: A Pragmatic Near-Term Lever

India targets gasifying 100 million tonnes of coal by 2030, supported by a USD 4.05 billion government incentive scheme for aiding projects through viability gap funding. Converting this volume would yield approximately 30 million tonnes of syngas, equivalent to roughly half India's current natural gas consumption, primarily substituting LNG imports in the fertiliser and chemical sectors. Though cost economics remain challenging versus alternatives, this provides a domestically controlled supply source.

CCUS: Industrial Decarbonisation plus 'Make in India' Boost

India's Union Budget 2026-27 allocated approximately USD 2.1 billion for Carbon Capture, Utilisation and Storage, targeting decarbonisation of hard-to-abate industries including cement, steel, and chemicals. Beyond the direct environmental benefit, CCUS investments serve as a competitive hedge against the EU Carbon Border Adjustment Mechanism (CBAM), while also creating local supply-chain opportunities. Execution risk remains high given technology and cost challenges.

Risk-Return Quadrant – Major Energy Investment Themes in India for Overseas Investors



SMR-Small Modular Reactor
Source: S&P Global, Crisil Intelligence

The Road Ahead | Potential Impact on Energy Security and Import Dependence

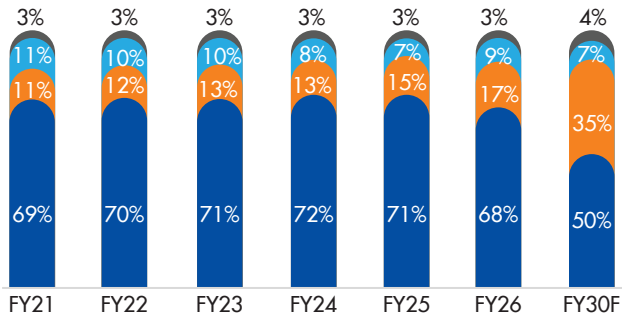
While India is likely to remain a net energy importer for the foreseeable future, the cumulative effect of ongoing investments has the potential to materially strengthen energy security and moderate the trajectory of import dependence.

Given the country's strong economic growth and rising per-capita energy demand, the primary objective is reducing vulnerability to external shocks and structurally lowering the intensity of energy imports.

Power Sector: The Fossil-to-Renewable Transition

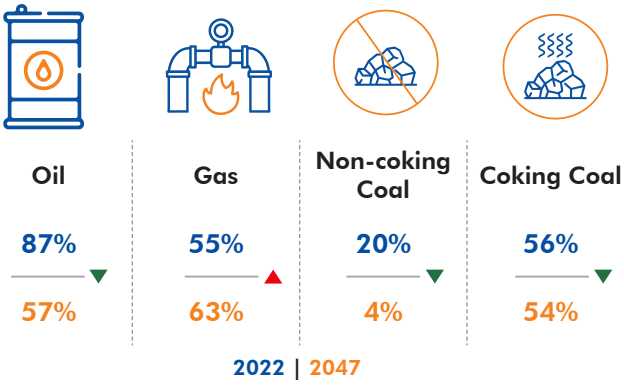
The contribution of coal and other fossil fuels in India's electricity generation mix is projected to decline from approximately 75% in FY25 to around 53% by FY30, driven by continued renewable energy capacity additions. This transition has the potential to moderate demand for imported thermal coal and reduce exposure to global fuel-price volatility. While the magnitude of import savings will remain sensitive to international coal prices, renewable energy deployment is expected to result in meaningful foreign-exchange savings while strengthening energy security.

Power Sector Transition



F - Forecasted
Source: Central Electricity Authority (CEA), National Power Portal (NPP), Crisil Intelligence

India's Import Dependence: 2022 vs 2047



Source: NITI Aayog Reports

Import Substitution — Key Projected Outcomes

Initiative	Metric	Projected Outcome / Timeframe
Biofuel Blending (Ethanol, CBG, SAF)	Forex Savings	USD 21-26B over next 5 years
Renewables (Power Sector Displacement)	Fossil Share in Generation	75% (FY25) to ~53% (FY30F)
Coal Gasification	Syngas Production	~30 MT syngas from 100 MT coal by 2030
Green Hydrogen Mission	Annual Production Target	5 MMT per annum by 2030
Nuclear Capacity Expansion	Installed Nuclear Capacity	~7,500 MW (current) to 22,480 MW (2032)
SPR Phase II	Reserve Coverage	~9.5 days SPR (current) to 20-25 days by FY31

Source: PIB, CEA, NPP, MNRE, Crisil Intelligence

India's energy import bill is a significant driver of current account dynamics. A structural reduction in the energy import intensity, even if absolute volumes continue to grow, would ease current account pressure, support rupee stability, and reduce pass-through inflation from global commodity price cycles.

Key Takeaway

India's energy transition is ultimately a story of strategic resilience rather than complete energy independence. The energy security buildout represents a rare convergence of strategic necessity, policy commitment, and large-scale infrastructure transformation. This combination of domestic production, electrification, renewable energy, biofuels, storage, and emerging technologies has the potential to materially reduce external vulnerabilities and strengthen long-term energy security.

The success of this transition will be measured not only by lower emissions, but also by the extent to which India can build a more diversified, resilient, and self-reliant energy system capable of sustaining its economic ambitions through 2047 and beyond.

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