



Winning in the energy ecosystem: Drivers of growth opportunities

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Executive Summary

India's energy landscape is being reshaped by changes in consumption, infrastructure requirements, policy priorities and technology adoption. These shifts are unfolding differently across transportation, electricity and manufacturing, creating distinct implications for energy producers, infrastructure providers, industrial companies and technology participants.

This point-of-view report examines these developments through a 3×3 matrix covering three major consumption sectors – transportation, electricity and manufacturing – and three value lenses: core energy, new energy and new tech. The framework moves beyond the conventional supply-side view of oil and gas, power, renewables or hydrogen by focusing on how energy requirements and business opportunities are evolving at the point of consumption.

Each intersection of the matrix highlights a different set of priorities. Core energy captures the infrastructure and supply required to meet current demand; new energy covers emerging pathways such as electrification, biofuels, hydrogen, storage and nuclear; and new tech considers how digital platforms, AI, automation and analytics can improve performance across the system. The framework is intended to identify where stakeholders may need to strengthen existing capabilities, develop new offerings and build partnerships as the energy ecosystem evolves.

Introduction

India's energy landscape is evolving differently across transportation, electricity and manufacturing, creating distinct implications for energy producers, infrastructure providers, industrial companies and technology participants.

This point-of-view report examines these shifts through a 3×3 matrix covering three consumption sectors: transportation, electricity and manufacturing, and three value lenses, core energy, new energy and new tech.

Figure 1: A broad view of drivers in the energy landscape

Consumption sectors	Transportation O&G and auto	Electricity power, utilities, renewables	Manufacturing Heavy / process manufacturing plants
Core energy	▪ Peak oil demand ▪ Oil company diversifying into non-fuel retail ▪ Petrochemicals value-add	▪ Growing demand continues to require thermal plus new power sources	▪ Growth continues to rely on thermal plus new power sources for captive power
New energy	▪ EV, battery, LNG, H2 ▪ Global money pouring into upstream while seeking balance with new energy	▪ A growing push for renewables ▪ Funds continue to grow ▪ Grid integration	▪ AI data centers given push for renewables, H2, nuclear, green chemicals
New tech	▪ Customer focus via AI ▪ Operational excellence via digital/AI	▪ Smart metering, smart grid ▪ Operational excellence via AI ▪ Data centers	▪ Decarbonization (including energy efficiency) via AI



Why this lens is different?

Energy transition is often viewed through supply-side sectors such as oil and gas, power, renewables or hydrogen. However, the real shifts are playing out in consumption sectors, where demand growth, infrastructure build-out, customer behavior, capital allocation and operating models are changing simultaneously.

Why the opportunity is significant?

Each of the nine intersections in the matrix represents distinct growth opportunities. Core energy continues to expand because India's consumption demand remains structurally strong. At the same time, new energy solutions are scaling to meet future needs, while technology is improving

efficiency, reliability and value capture across the system.

What the matrix helps identify?

The framework helps connect today's energy requirements with tomorrow's growth options, benefiting stakeholders across the complete value chain. It highlights how conventional energy needs to be strengthened, new energy can be scaled, and digital and AI-led capabilities can reshape operations, customer propositions and investment choices.

Together, the 3×3 matrix provides an integrated view of India's energy agenda, not as a replacement story, but as a simultaneous build-out-of-core energy, new energy and technology-led transformation.



1 Fueling India's transportation sector

The transport sector in India is shifting from fuel consumption to energy platform participation, increasingly linked to power grids and digital ecosystems. Although reliance on liquid fuels will remain high, the EV transition is gaining momentum. The transport sector will continue to witness significant activity as it navigates this transition.

1.1 Core energy

India's transport energy mix will remain anchored in liquid fuels even as EVs and alternative fuels scale. Petrol demand may reach an inflection point around 2032, while high-speed diesel (HSD) is likely to dominate heavy mobility until 2040. Gas consumption is expected to rise from ~52 MTPA in 2025 to ~112 MTPA by 2040. Against this backdrop, below developments are likely to shape the evolution of India's downstream oil and gas sector:¹

- **Gas expands as a transition fuel:** CNG and LNG will play a growing bridge-fuel role across urban transport, freight and industrial-linked mobility. Pipeline expansion, CGD growth and compressed biogas integration can improve domestic availability and reduce import exposure.
- **Supply security reshapes fuel sourcing:** High import dependence and disruptions to Gulf energy flows have increased the need for

diversified crude, LNG and LPG sourcing, greater refinery feedstock flexibility and stronger strategic storage. India's crude oil import dependence exceeded 90% in FY26, increasing its exposure to global supply and price shocks.²

- **Domestic upstream investment regains urgency:** India approved the INR84,084 crore Samudra Manthan scheme in Jul'26 to accelerate deepwater and ultra-deepwater oil and gas exploration through FY31. Faster approvals, competitive fiscal terms and global technology partnerships will be critical to attracting investment and translating exploration into production.³
- **Fuel retail expands as multi-service hubs:** Fuel stations are evolving from refueling points into integrated mobility, convenience and energy-service hubs. OMCs can combine fuels, EV charging, CNG, food, retail, fleet services and digital payments to improve site economics.

Opportunity areas

These shifts are creating new avenues for growth, investment and value creation across the downstream oil and gas ecosystem. Key opportunity areas include:

- **Deepen core-to-adjacent integration:** Refiners and OMCs can protect future margins by

¹ <https://www.ceew.in/publications/how-will-fuel-demand-grow-with-changing-fuel-mix-in-different-vehicle-segments>
<https://www.usthadian.com/natural-gas-distribution-reform-push-2026/>

² https://www.ey.com/en_in/insights/tax/economy-watch/india-s-petroleum-economy-import-dependence-and-unanticipated-shocks

³ <https://energy.economictimes.indiatimes.com/news/oil-and-gas/samudra-manthan-scheme-84084-crore-investment-for-offshore-energy-exploration-in-india/132767115>

expanding petrochemicals, gas, lubricants and other non-fuel businesses.

- **Reimagine retail networks:** Fuel retailers can convert high-footfall sites into multi-energy and non-fuel revenue platforms.
- **Build transition-fuel corridors:** Gas players, OMCs and logistics companies can develop CNG/LNG corridors for buses, trucks and long-haul freight.
- **Strengthening sourcing and logistics resilience:** OMCs and gas players can diversify supplier portfolios, improve crude and product inventory planning, and secure access to shipping capacity and alternative import routes.
- **Accelerate domestic exploration:** Upstream players can leverage regulatory reforms, global partnerships and advanced subsurface technologies to enhance exploration success and monetize deep-water and difficult reserves.

Recent industry examples

Recent investments and strategic initiatives across the sector illustrate how companies and policymakers are responding to these emerging priorities. Examples include:

- **Large-scale petrochemical integration:** In April 2025, a state-owned refiner and fuel retailer signed an MoU with a state government for an INR61,077 crore petrochemical complex, representing its largest ever single-location investment.
- **Non-fuel diversification:** A major fuel retailer is targeting 20-30% of revenue from non-fuel businesses such as gas, petrochemicals, lubricants and renewables by 2030, up from ~10% currently. It also invited businesses to use available space across their locations for non-fuel activities.
- **Expansion of domestic shipping capacity:** In Apr'26, the government outlined plans to add 62 vessels during FY27, including crude tankers and LPG carriers, with a proposed investment of ~INR51,383 crore to strengthen critical supply chains.⁴
- **Strategic storage expansion:** A state-owned upstream producer approved the development of a 1.75 MMT oil-storage facility in Mangaluru, with half of the capacity proposed to support India's strategic requirements. The government is also progressing Phase II of the SPR programme, which envisages 6.5 MMT of additional capacity across Odisha and Karnataka.

1.2 New energy

New energy in transportation is scaling across EVs, hydrogen and biofuels, but infrastructure, economics and utilization remain key constraints. EV adoption is accelerating, while hydrogen and biofuels are emerging as longer-term pathways for heavy mobility and ICE decarbonization. The following developments are likely to shape the pace in the coming years:

- **EV adoption accelerates, but infrastructure remains uneven:** Charging networks are expanding rapidly, yet utilization and access remain concentrated around cities, highways and high-demand corridors. The opportunity is to shift from charger deployment to location intelligence, uptime, interoperability and fleet-led demand aggregation.
- **Hydrogen provides a pathway for heavy mobility:** Hydrogen can support long-distance freight, buses and other high-utilization
- **Biofuels extend the transition pathway for the ICE fleet:** Ethanol blending and advanced biofuels can reduce emissions and import dependence without waiting for full fleet turnover. India has notified specifications for E22, E25, E27 and E30 fuels, while a major domestic automaker launched India's first flex-fuel car in June'26. Wider adoption will depend on feedstock availability, distribution infrastructure, vehicle readiness and policy timelines.⁵
- **Domestic alternatives gain strategic value:** Volatility in imported fuel supply strengthens the case for EVs, biofuels, CBG and green hydrogen

⁴ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2256766®=48&lang=2>

⁵ <https://timesofindia.indiatimes.com/india/standards-for-fuel-blends-up-to-e30-notified/articleshow/131213383.cms>

as energy-security pathways. However, their ability to reduce geopolitical exposure will also depend on resilient domestic supply chains for batteries, critical minerals, electrolyzers and other clean-energy components.

Opportunities for stakeholders

Stakeholders across the value chain have opportunities to address adoption barriers, build enabling infrastructure and capture emerging growth areas. This includes:

- **OMCs and charge point operators:** Build commercially viable EV charging networks through corridor planning, fleet partnerships, uptime management and bundled retail services.
- **Auto OEMs and fleet operators:** Pilot EV, hydrogen and biofuel pathways by vehicle segment, duty cycle and total cost of ownership.
- **Hydrogen and infrastructure players:** Develop refueling pilots around freight corridors, ports, industrial clusters and high-utilization bus routes.
- **Biofuel ecosystem players:** Prepare for higher ethanol blends by expanding sustainable

1.3 New tech

New tech is reshaping the transportation energy ecosystem across customer engagement, logistics, upstream production and refinery operations. AI, digital twins, automation and data platforms are becoming central to improving asset productivity, reducing downtime and creating service-led business models. The following developments are likely to play a key role in shaping this transformation:

- **AI is reshaping mobility:** AI can improve routing, fleet utilization, predictive maintenance and demand forecasting across logistics and mobility networks. It also enables more personalized customer engagement across fuel retail, EV charging and fleet-service platforms.
- **Service-led ecosystems through digital:** Digital platforms are turning physical infrastructure into connected service ecosystems across highways, fuel stations, logistics hubs and customer touchpoints. The opportunity is to combine payments, loyalty, route planning, charging, fleet services and real-time asset visibility.
- **Digital platforms strengthen supply-chain visibility:** Real-time cargo tracking, inventory

feedstock networks, flexible production capacity and OMC-linked offtake, while scaling CBG and advanced biofuels.

Recent Industry examples

A number of investments, collaborations and technology deployments highlight how industry participants are positioning themselves for the next phase of growth:

- **EV manufacturing and battery assembly:** A major Indian automotive manufacturer unveiled a dedicated EV manufacturing and battery assembly facility in 2025, allocating INR4,500 crore from its planned INR16,000 crore FY22-FY27 EV investment cycle towards powertrain development, software, product development and manufacturing capacity.
- **LNG corridors for trucking:** A leading commercial-vehicle manufacturer and a city gas distribution player partnered in October 2025 to strengthen LNG refueling infrastructure for long-haul and heavy-duty trucking, with a focus on key freight corridors and logistics clusters.

analytics, route-risk monitoring and procurement control towers can help energy companies anticipate disruptions and respond more rapidly to changes in shipping routes, fuel availability and prices.

- **Upstream and refining operations are digitizing:** AI, digital twins, reservoir analytics and automation are helping improve recovery, optimize throughput and reduce emissions. These technologies are especially relevant for mature assets, refineries and integrated energy operations.

Opportunities for stakeholders

These trends create the following opportunities for stakeholders across the value chain:

- **O&G upstream players:** Use AI-led reservoir management, digital twins, advanced analytics to improve recovery from mature fields and boost domestic output.

- **OMCs and fuel retailers:** Build data-led retail platforms using loyalty, payments, customer analytics and predictive demand planning.
- **Logistics and fleet operators:** Deploy AI for route optimization, fuel efficiency, predictive maintenance and improved vehicle uptime.
- **Refiners and industrial operators:** Use digital twins, IoT and automation to improve yield, energy efficiency, safety and emissions performance.

Recent industry examples

Industry initiatives demonstrate how companies are applying digital technologies to improve efficiency, resilience and business outcomes:

- **Technology-led recovery from mature fields:** A state-owned upstream producer onboarded an international energy major as a technical services provider for India's largest offshore oil field, with a focus on subsurface modelling, system optimization and enhanced reservoir management.
- **GenAI-led operational efficiency:** A large private-sector oil and gas producer launched an in-house GenAI platform to improve business operations, knowledge access and decision-making efficiency.





India's relentless growth in electricity demand

Electricity has become the central nervous system of the energy economy, linking transport electrification, industrial decarbonization and digital infrastructure. As conventional and thermal power continues to support system reliability, renewable capacity is also expected to expand rapidly. The emergence of AI-enabled smart solutions and their proliferation signal the next generation of growth in the sector.

End-use electrification is also broadening electricity demand. Recent LPG supply disruptions have strengthened interest in electric cooking and decentralized biogas as complementary clean-cooking options. Wider adoption could reduce exposure to imported LPG, but will require affordable appliances, reliable distribution networks, consumer financing and domestic manufacturing of critical components.

2.1 Core energy

Electricity demand growth will keep coal and thermal power central to India's energy system, even as renewables scale. India's coal production crossed the 1-billion-ton mark for the second consecutive year in FY26, reflecting continued dependence on domestic coal for energy security and baseload power. The following developments are likely to shape the role of coal and thermal power in the evolving energy mix:⁶

- **Coal and thermal remain the reliability backbone:** Coal-based power continues to provide firm, dispatchable electricity for baseload and peak demand. Sustained coal output is supporting rising power demand and helping thermal plants maintain high inventory levels.
- **Thermal capacity will coexist with renewables:** Renewable growth will not immediately eliminate the need for thermal power. Coal will remain important for grid stability, intermittency management and industrial power security.
- **Diversified firm capacity strengthens system resilience:** A balanced portfolio of flexible

thermal generation, hydro, nuclear and storage can help maintain reliable power during external fuel-supply disruptions, reducing dependence on any single energy source.

- **Coal demand will peak before structural decline:** India's net-zero pathway implies a long transition, not an immediate phase-out. Under a net-zero scenario, coal consumption is projected to peak at 1.83 billion tons in 2050 before falling to 161 million tons by 2070.⁷

Opportunity areas

These trends create opportunities for stakeholders to enhance reliability, improve operational efficiency and support the transition to a more resilient power system:

- **Power generators:** Improve thermal fleet flexibility, efficiency and emissions performance as plants shift from base load-only to balancing roles.

⁶ https://coal.nic.in/sites/default/files/2026-04/Press_21mar26.pdf

⁷ <https://energy.economictimes.indiatimes.com/news/coal/india-will-use-more-coal-over-the-next-25-years-niti-aayog/128156111>

- **Coal and logistics players:** Strengthen mine-to-plant logistics, digital tracking and stockyard optimization to ensure reliable supply.
- **Utilities and grid operators:** Build planning capabilities to manage thermal-renewable coexistence, reserve margins and peak-demand events.
- **Technology providers:** Deploy AI, predictive maintenance, boiler optimization and emissions-control solutions across thermal assets.

Recent industry examples

Examples from across the sector illustrate ongoing efforts to strengthen generation capacity and support long-term energy security:

- **New ultra-supercritical thermal capacity:** A diversified private-sector power producer commenced construction of a 1,600 MW ultra-supercritical thermal power plant in West Bengal in Apr'25, involving investment of ~INR16,000 crore and backed by a 25-year power purchase agreement with the state distribution utility.
- **Large-scale thermal investment:** A major private-sector thermal power producer plans to establish a 3,200 MW greenfield ultra-supercritical power plant in Assam, with investment of ~INR48,000 crore. The project will use domestic coal linkage under the SHAKTI policy and is expected to be commissioned in phases from Dec'30.

2.2 New energy

Renewables are scaling rapidly, but the next phase of growth will depend on storage, grid flexibility and firm clean power. As solar and wind penetration rises, pumped hydro, battery storage, green hydrogen and nuclear will become critical to balancing intermittency and ensuring reliable power:

- **Renewables scale, but grid integration becomes the bottleneck:** Solar and wind growth will require parallel investments in transmission, storage and forecasting. The opportunity is shifting from pure renewable capacity addition to integrated renewable-plus-storage solutions.
- **Storage becomes central to power-system flexibility:** Pumped hydro and BESS will be needed to shift surplus renewable power to peak-demand periods. Pumped storage is especially relevant for long-duration grid balancing and round-the-clock renewable supply.
- **Hydrogen and nuclear add future flexibility:** Green hydrogen can create demand for renewable power and support hard-to-abate sectors, while nuclear provides stable, low-carbon baseload. India targets 5 MMT green H₂ production by 2030 and a long-term ambition of 100 GW nuclear capacity by 2047.⁸
- **The transition creates a new supply-chain imperative:** Renewables, storage and electrification can reduce exposure to recurring fossil-fuel imports, but concentrated dependence on imported solar cells, batteries,

critical minerals and power electronics creates new vulnerabilities. Domestic manufacturing, recycling and diversified international partnerships will therefore become increasingly important. Recent FTAs can support access to technology, investment and global value chains, while localization remains critical for strategically important clean-energy components.

Opportunity areas

The next phase of energy transition will create opportunities for stakeholders that can enable flexible, reliable and resilient clean-energy systems:

- **Renewable developers:** Move from standalone solar/wind projects to hybrid, storage-backed and round-the-clock clean power offerings.
- **Utilities and grid operators:** Invest in forecasting, flexible dispatch, grid automation and ancillary services to manage renewable intermittency.
- **Storage developers:** Build pumped hydro and BESS portfolios linked to peak power, industrial demand and renewable integration.
- **Hydrogen and nuclear ecosystem players:** Use green hydrogen hubs and nuclear partnerships to create firm, low-carbon energy pathways for industry and grids.

⁸ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2197199®=3&lang=1>

- **Clean-energy manufacturers:** Use localization, diversified sourcing, recycling and international trade partnerships to build more resilient supply chains across solar, batteries, electrolyzers and grid equipment.

Recent industry examples

Recent announcements highlight how companies and policymakers are responding to emerging requirements for storage, grid flexibility and reliable low-carbon power:

- **Pumped-hydro storage investment:** A leading integrated power company signed an MoU with a state government to develop 2,800 MW of pumped-hydro storage capacity across two projects, with proposed investment of ~INR13,000 crore.
- **Nuclear as firm clean power:** India's Nuclear Energy Mission targets scaling nuclear capacity from about 8.8 GW to 100 GW by 2047, with reforms proposed to enable private and foreign participation. Nuclear can complement renewables by providing stable, low-carbon power.⁹

2.3 New tech

New tech is redefining how electricity and utility systems are planned, operated and monetized. Smart meters, AI-led asset monitoring, predictive diagnostics and digital grid platforms are becoming critical to reduce losses, improve reliability and manage a more distributed, renewable-heavy power system. The following developments are likely to shape the next phase of India's clean-energy transition:

- **Smart grids and metering improve visibility:** Smart meters enable real-time consumption data, better billing accuracy, loss reduction. They create the digital foundation for demand response, energy management, renewable integration.
- **AI is improving system operations:** AI-led forecasting, predictive maintenance, and asset optimization can improve grid reliability and reduce operational costs. These tools are increasingly relevant for managing peak loads and aging infrastructure.
- **Technology becomes a resilience layer:** Cybersecurity, remote monitoring, drone-based inspection and AI-led disruption forecasting can strengthen the protection and continuity of grids, generation assets, substations and other critical energy infrastructure.
- **Power-sector policy is evolving for a more digital and resilient system:** The Draft National Electricity Policy 2026 combines resource-adequacy and distribution reforms with technology deployment, data sharing and

cybersecurity measures to support reliable and financially viable power supply.¹⁰

- **Digital utilities unlock efficiency beyond power:** Adjacent utility systems such as water pumping and municipal infrastructure show how AI can reduce energy consumption. These examples reinforce the broader role of digital operations in lowering electricity demand and emissions.

Opportunity areas

These trends create opportunities for stakeholders to strengthen grid reliability, improve system flexibility and capture value across emerging clean-energy ecosystems:

- **DISCOMs and utilities:** Use smart meters, Advanced Metering Infrastructure (AMI) and analytics to reduce Aggregate Technical and Commercial (AT&C) losses, improve billing, and strengthen consumer transparency.
- **Grid operators:** Deploy AI-led forecasting, grid automation and predictive diagnostics to manage renewable intermittency and peak demand.
- **Technology providers:** Scale solutions across smart metering, outage management, asset monitoring, cybersecurity and demand-side management.
- **Municipal and infrastructure utilities:** Use AI-led energy optimization for pumps, motors and distributed assets to reduce electricity costs and emissions.

⁹ <https://energy.economictimes.indiatimes.com/news/power/india-eyes-50-55-gw-hydro-pump-storage-by-2031-100-gw-nuclear-by-2047-cea/123820668>

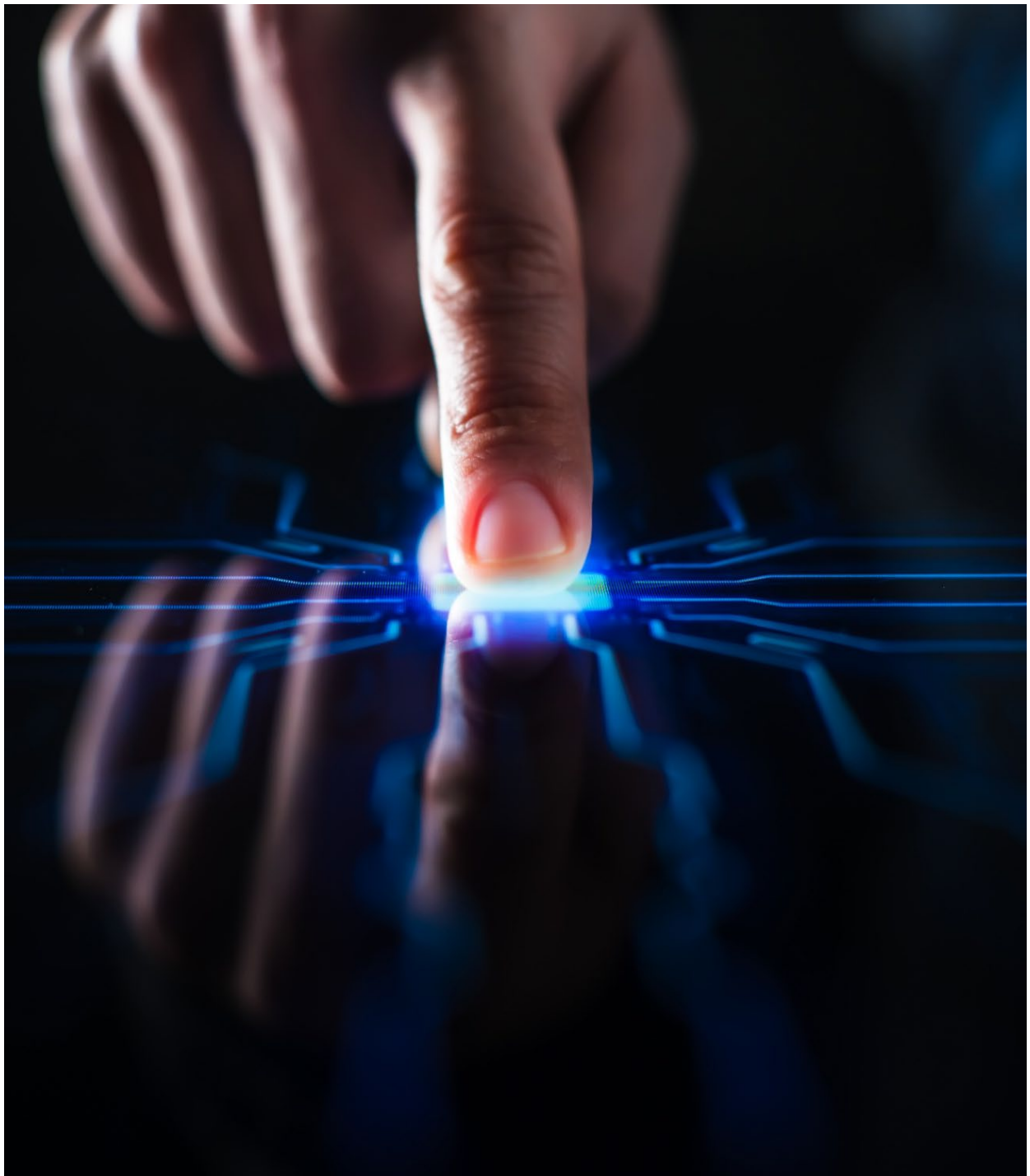
¹⁰ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2216661®=48&lang=2>

- **Infrastructure operators:** Strengthen cyber resilience, physical asset monitoring and business-continuity systems across critical power infrastructure.

Recent industry examples

Recent examples illustrate how digital infrastructure and AI-led solutions are improving visibility, operational efficiency and energy management across utilities:

- **Large-scale smart-meter rollout:** A domestic smart-metering solutions provider secured INR710 crore in financing from an international development finance institution in Apr'26 to support the deployment of over 22 lakh smart meters in West Bengal.
- **AI-led pump optimization:** A major urban water utility deployed AI-based pump-monitoring and optimization technology across 78 pumping stations, generating annual savings of INR40 crore.





Keeping up with India's manufacturing demand

India's primary energy demand is expected to nearly double by 2045, with manufacturing emerging as a major demand anchor across steel, cement, chemicals, textiles and other process industries. The

sector faces a dual challenge: securing reliable, cost-competitive energy today while preparing for lower-carbon production models tomorrow.¹¹

3.1 Core energy

Manufacturing will remain one of India's largest energy demand sinks, especially across steel, cement, chemicals, textiles and other process industries. These sectors are difficult to decarbonize because they rely on high-temperature heat, capital-intensive assets and deeply embedded fossil-fuel-based production systems. Even as green energy scales, thermal energy, captive power and petrochemicals will remain critical to reliability, competitiveness and industrial growth. Key developments include:

- **Thermal and captive power remain essential:** Heavy and process industries require continuous, reliable energy for high-temperature and continuous operations. Domestic coal output is expected to reach ~1.5 billion tons by 2029-30, reflecting the continued role of conventional energy in supporting industrial growth.¹²
- **Captive power supports reliability and cost control:** Industrial users continue to rely on captive power to manage grid reliability, tariff volatility and uninterrupted production requirements. India's captive power generation
- **Energy volatility becomes an industrial competitiveness risk:** Disruptions to crude, gas, LPG and maritime logistics can raise feedstock, freight and power costs across chemicals, fertilizers, metals, cement and other process industries. This increases the value of diversified fuel sourcing, captive energy options and structured energy-risk management.
- **CCUS gains policy backing for hard-to-abate sectors:** The Union Budget 2026-27 announced a five-year INR20,000 crore scheme to scale carbon capture across power, steel, cement, refineries and chemicals, expanding the decarbonization toolkit beyond fuel switching and efficiency.¹⁴
- **Petrochemicals drive manufacturing value-add:** Petrochemicals are foundational to downstream manufacturing sectors such as packaging, automobiles, electronics and consumer goods. India's chemicals and petrochemicals demand is

market was valued at ~INR1.18 trillion in 2024 and is expected to reach INR1.74 trillion by 2029.¹³

¹¹ <https://energy.economictimes.indiatimes.com/news/renewable/renewables-oil-to-drive-indias-doubling-energy-demand-by-2045/107805717>

¹² <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2149193®=48&lang=2>

¹³ <https://www.businesswire.com/news/home/20250403984166/en/India-Captive-Power-Generation-Industry-Report-2025-Industrial-Expansion-and-Rising-Energy-Security-Concerns-Fueling-Growth---ResearchAndMarkets.com>

¹⁴ <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=2221676®=6&lang=1>

expected to nearly triple and potentially reach US\$1 trillion by 2040.¹⁵

Opportunity areas

These trends create opportunities across the value chain, including:

- **Heavy industries:** Optimize captive and grid power mix to balance reliability, cost and emissions performance.
- **Power and fuel suppliers:** Build integrated offerings for industrial clusters combining thermal, renewables, storage and energy-management services.
- **Refiners and petrochemical players:** Expand petrochemical integration and specialty chemicals to capture higher-value manufacturing demand.
- **Industrial operators:** Improve energy productivity through fuel switching, waste-heat

recovery, digital monitoring and efficiency-led capex.

Recent industry examples

Examples from across the sector include:

- **Captive coal mines supporting industrial energy security:** The Ministry of Coal reviewed 79 captive and commercial coal mines in April 2025. Captive and commercial mines contributed about 20% of India's coal output in 2025, indicating continued industrial dependence on secured coal supply.¹⁶
- **Petrochemicals as a manufacturing growth engine:** India's petrochemicals sector is projected to attract over US\$87 billion in investments during 2025-35, accounting for more than 10% of global petrochemical growth, driven by domestic demand and downstream manufacturing linkages.¹⁷

3.2 New energy

Manufacturing will need new energy solutions to meet rising demand while reducing emissions, especially across heavy, process and digital infrastructure-led industries. Green hydrogen, renewable sourcing, storage-backed power and green data centers are emerging as key pathways for low-carbon industrial growth. The following developments will shape the transition:

- **Green hydrogen can decarbonize hard-to-abate processes:** Green H₂ can replace fossil fuels as feedstock or reducing agent in sectors such as refining, chemicals, steel and fertilizers. Scale will depend on renewable power availability, electrolyzer costs and offtake certainty.
- **Renewable sourcing may become a competitiveness lever:** Industrial consumers are increasingly using renewable power, open access and hybrid supply to manage energy costs and emissions. For large plants, captive or contracted renewable power can support both decarbonization and energy security.
- **Critical-mineral localization may be strategic:** India has announced dedicated rare-earth corridors across four states, alongside an

INR7,280 crore scheme targeting 6,000 MTPA of rare-earth permanent-magnet capacity, strengthening domestic supply chains for EVs, wind turbines and advanced manufacturing.¹⁸

- **Green digital infrastructure is a new demand center:** AI-ready data centers are emerging as large electricity consumers, creating demand for clean power, storage and grid-ready infrastructure. Their growth links manufacturing, power systems and digital infrastructure more closely.

Opportunity areas

For stakeholders, these trends create the following opportunities across the value chain:

- **Manufacturers:** Build decarbonization roadmaps using green H₂, renewable power, bioenergy and energy-efficiency levers.
- **Renewable developers:** Offer round-the-clock, hybrid and storage-backed power solutions for industrial clusters and data centres.

¹⁵ <https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2066135®=48&lang=2>

¹⁶ <https://energy.economictimes.indiatimes.com/news/coal/captive-and-commercial-coal-output-rises-30-to-190-95-mt-in-fy25/120188739>

¹⁷ <https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2066135®=48&lang=2>

¹⁸ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2222413®=48&lang=2>

- **Hydrogen ecosystem players:** Develop green H₂ and green ammonia projects around refineries, ports, chemicals and heavy industry hubs.
- **Data centre and infrastructure players:** Design AI-ready campuses with clean power sourcing, storage, efficient cooling and grid resilience.

Recent industry examples

Examples from across the sector include:

- **Green AI-ready data center:** A diversified engineering and infrastructure group signed an MoU with a state government in Feb'26 to explore a 250 MW green AI-ready hyperscale data-center campus, with proposed investment of INR25,000 crore.

3.3 New tech

New tech will be central to improving productivity, energy efficiency and emissions performance in manufacturing. AI, digital twins, predictive maintenance and industrial automation are helping heavy and process industries reduce downtime, optimize energy use and improve asset performance. Key developments include:

- **AI-driven efficiency is becoming a core lever:** AI can optimize yield, throughput, quality, energy use and maintenance across complex manufacturing assets. For energy-intensive sectors, this can directly reduce costs and emissions.
- **Digital twins enable smarter operations:** Digital replicas of plants, equipment and processes allow operators to simulate, monitor and optimize performance in real time, supporting faster commissioning, predictive maintenance, safer operations.
- **Digital tools support disruption preparedness:** Supply-chain mapping, commodity-price scenarios, digital twins and AI-led inventory planning can help manufacturers assess alternative fuels, feedstocks and production plans during energy-supply disruptions.
- **India is becoming a digital engineering hub:** Global energy and industrial companies are building India-based technology centres to scale engineering, AI and digital capabilities. These centres can support global operations while deepening India's role in industrial innovation.

- **Integrated green-fuels platform:** A state-owned refiner and an international renewable energy developer formed a joint venture in Apr'25 to explore opportunities across renewable energy, green hydrogen, green ammonia and other green fuels.
- **AI data center and green-energy infrastructure:** A large data-center infrastructure provider and a global technology major announced a partnership in Oct'25 to develop an AI data-center campus and associated green-energy infrastructure in Visakhapatnam, involving planned investment of ~US\$15 billion over 2026-2030.

Opportunity areas

Key opportunities include:

- **Heavy and process industries:** Deploy AI and digital twins for energy optimization, predictive maintenance and process control.
- **Industrial technology providers:** Build scalable solutions across asset monitoring, plant automation, digital twins and advanced analytics.
- **Plant operators:** Integrate real-time data, sensors and AI tools to reduce downtime, improve safety and enhance asset productivity.

Recent industry examples

Examples from across the sector include:

- **Digital engineering centre:** A global integrated energy company inaugurated a 312,000 sq. ft. engineering and innovation centre in Bengaluru in Oct'25 to support AI-powered solutions, robotics, digital twins, subsurface modelling and processing-facility performance.
- **AI adoption in steel manufacturing:** A leading steel manufacturer has developed more than 550 AI models since 2020 to improve yield, throughput, quality, productivity, safety and sustainability across its operations.
- **Sovereign AI infrastructure:** A major Indian engineering and infrastructure group partnered with a global computing technology company to build sovereign, gigawatt-scale AI-factory infrastructure supporting AI workloads across manufacturing, energy and infrastructure.



Conclusion

India's energy ecosystem is not moving through a simple replacement of conventional energy by clean energy; it is entering a phase where **core energy, new energy and new tech must scale together**. Consumption sectors will each create distinct growth opportunities, but the common imperative is to balance reliability, affordability, decarbonization and

competitiveness. Winning players will be those that optimize today's assets, build credible new energy options and use technology as the operating layer across the system. **The 3×3 matrix therefore becomes a practical lens to identify where to defend, where to build resilience, where to invest and where to transform.**

Figure 2: A transition path for India's energy consumption sectors

	Transportation	Electricity	Manufacturing
Stage 1: Strategy reset and optionalities	Define multi-energy mobility options (liquid fuels, EV, hydrogen, digital platforms)	Map thermal + renewables + grid flexibility options	Identify decarbonization levers (green hydrogen, bioenergy, efficiency)
Stage 2: Re-plan, pilot and partner	Pilot EV infrastructure, hydrogen mobility and digital ecosystems through targeted partnerships	Test smart grids, storage, and flexible load management	Pilot green fuels, electrification, and AI-enabled process optimization
Stage 3: Accelerate and reshape scale	Scale integrated mobility-energy platforms at the network level	Scale intelligent, flexible grids as the backbone of the energy system	Scale low-carbon industrial clusters and optimize supply chains

For the integrated energy landscape, winning means securing and optimizing today's energy system,

building resilient options for tomorrow, and enabling both through technology.

Authors



Gaurav Moda

Partner and
Energy Sector Leader,
EY-Parthenon India



Puneet Kumar

Partner,
Energy,
EY-Parthenon India

Our offices

Ahmedabad

22nd Floor, B Wing, Privilon
Ambli BRT Road, Behind Iskon Temple
Off SG Highway, Ahmedabad - 380 059
Tel: + 91 79 6608 3800

Gandhinagar

8th Floor, Building No. 14A
Block 14, Zone 1
Brigade International Financial Centre
GIFT City SEZ
Gandhinagar - 382 355
Tel: + 91 79 6608 3800

Bengaluru

12th & 13th Floor
"UB City", Canberra Block
No.24 Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 6727 5000

Ground & 1st Floor
11, 'A' wing
Divyasree Chambers
Langford Town
Bengaluru - 560 025
Tel: + 91 80 6727 5000

3rd & 4th Floor
MARKSQUARE
#61, St. Mark's Road
Shantala Nagar
Bengaluru - 560 001
Tel: + 91 80 6727 5000

1st & 8th Floor, Tower A
Prestige Shantiniketan
Mahadevapura Post
Whitefield, Bengaluru - 560 048
Tel: + 91 80 6727 5000

Ecospace
1st Floor, Campus 1C
Ecospace Business Park
Outer Ring Road,
Bellandur - Sarjapura Area, Varthur
Hobli,
Bengaluru Urban - 560103

Bhubaneswar

8th Floor, O-Hub, Tower A
Chandaka SEZ, Bhubaneswar - 751024
Tel: + 91 674 274 4490

Chandigarh

Elante offices, Unit No. B-613 & 614
6th Floor, Plot No- 178-178A
Industrial & Business Park, Phase-I
Chandigarh - 160 002
Tel: + 91 172 6717800

Chennai

6th & 7th Floor, A Block,
Tidel Park, No.4, Rajiv Gandhi Salai
Taramani, Chennai - 600 113
Tel: + 91 44 6654 8100

Delhi NCR

Aikyam
Ground Floor
67, Institutional Area
Sector 44, Gurugram - 122 003
Tel: + 91 124 443 4000

3rd & 6th Floor, Worldmark-1
IGI Airport Hospitality District
Aerocity, New Delhi - 110 037
Tel: + 91 11 4731 8000

4th & 5th Floor, Plot No 2B
Tower 2, Sector 126
Gautam Budh Nagar
Noida - 201 304
Tel: + 91 120 671 7000

Hyderabad

THE SKYVIEW 10
18th Floor, "SOUTH LOBBY"
Survey No 83/1, Raidurgam
Hyderabad - 500 032
Tel: + 91 40 6736 2000

THE SKYVIEW 20
2nd Floor, 201 & 202
Right Wing, Survey No 83/1
Raidurgam, Hyderabad - 500 032
Tel: + 91 40 6736 2000

Jaipur

9th floor, Jewel of India
Horizon Tower, JLN Marg
Opp Jaipur Stock Exchange
Jaipur - 302018
Tel: + 91 141 4618415

Kochi

7th Floor, ABAD Nucleus
NH-49, Maradu PO
Kochi - 682 304
Tel: + 91 484 433 4000

Kolkata

22 Camac Street
3rd Floor, Block 'C'
Kolkata - 700 016
Tel: + 91 33 6615 3400

6th floor, Sector V,
Building Omega, Bengal Intelligent Park,
Salt Lake Electronics Complex, Bidhan
Nagar
Kolkata - 700 091
Tel: + 91 33 6615 3400

Mumbai

14th Floor, The Ruby
29 Senapati Bapat Marg
Dadar (W), Mumbai - 400 028
Tel: + 91 22 6192 0000

5th Floor, Block B-2
Nirlon Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063
Tel: + 91 22 6192 0000

3rd Floor, Unit No.301
Building No.1, Mindspace-Gigaplex
IT Park, MIDC, Plot No. IT-5
Airoli Knowledge Park
Airoli West, Navi Mumbai - 400 708
Tel: + 91 22 6192 0003

18th Floor, Altimus
Pandurang Budhkar Marg
Worli, Mumbai - 400 018
Tel: + 91 22 6192 0503

Pune

C-401, 4th Floor
Panchshil Tech Park, Yerwada
(Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 4912 6000

10th Floor, Smartworks
M-Agile, Pan Card Club Road
Baner, Pune - 411 045
Tel: + 91 20 4912 6800



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