

Balancing energy security and energy transition: 5 things to look for India

Wood Mackenzie

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Positioning India on the energy security and energy transition road map

What are 5 key things India should focus while driving the dual goals of energy security and energy transition?

Pre-cursor: Economic growth and energy dynamics

- 01 The energy security imperative: How will India navigate its fuel supply and value chain dependencies in today's uncertain world?**
- 02 The carbon cross roads: What is India's emission trajectory, transition scenarios and the linked investment shift?**
- 03 Powering prosperity: How can India scale green electricity to fuel economic expansion?**
- 04 The clean molecule frontier: Are hydrogen and CCUS ready to be true decarbonisation enablers?**
- 05 Decarbonising transportation: From electric vehicles to alternative fuels**

Way forward: Key recommendations

Energy transition trends

Energy security trends

Key takeaways

Will India be able to balance its energy trilemma of economic growth, security and transition?

India: Balancing energy security and transition at 6%+ growth

- **Legacy fuels: Import dependence persists**

Coal, crude oil and natural gas demand will remain robust through 2035, but import reliance stays high for oil and gas. Coal is the exception—domestic production gains will reduce import share over the next decade.

Signpost to watch out for:

Coal gasification strategy execution, upstream licensing reforms for crude production, market response to coal e-auctions for foreign investors, foreign participation in mining licenses and coal transport infrastructure investment will be crucial

- **New energy value chains: Partial localization**

Domestic manufacturing of batteries, solar wafers and cells will grow as a share of total demand, but full import independence remains unlikely. Battery cells, in particular, will require continued imports.

Signpost to watch-out for: Critical mineral security—government policy must balance supply chain resilience with transition goals.

- **Energy transition: US\$1.5 trillion investment decade ahead**

Capex concentrated in power generation, storage and grid infrastructure.

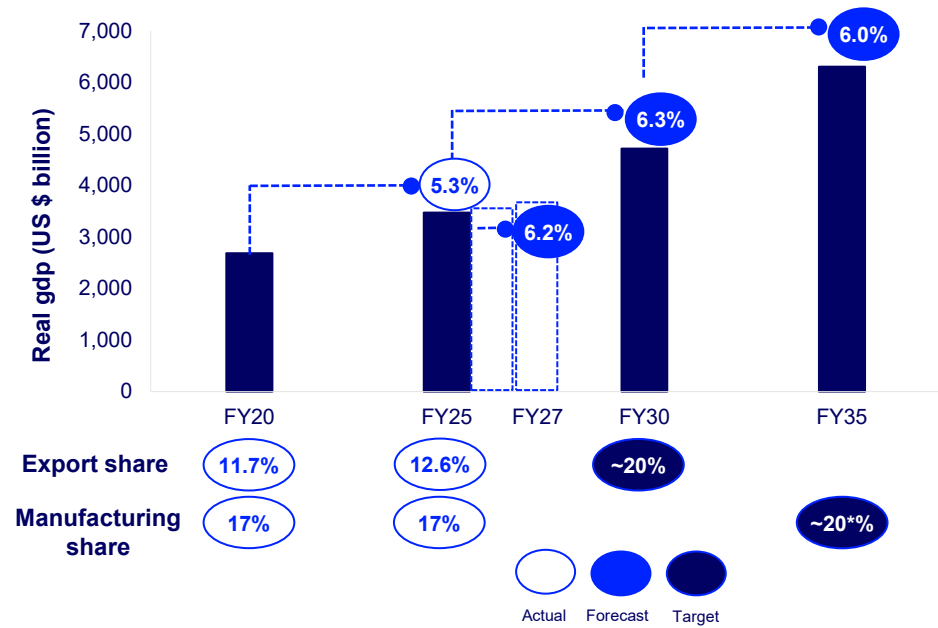
Renewable capacity targets are on track. Hydrogen, EVs and battery manufacturing are lagging expectations

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We estimate 6.2% GDP growth is on the cards for the fiscal year 2026-27

A growth champion position to continue in 2026, set for a differentiated growth trajectory until 2035

India's GDP growth



Focus on growth with a special effort to enhance share of exports and manufacturing will trigger demand for fuels and energy



Focus on supply chain integration – a key area to watch out – is a critical area to consolidate the country's position in energy security as in fuels



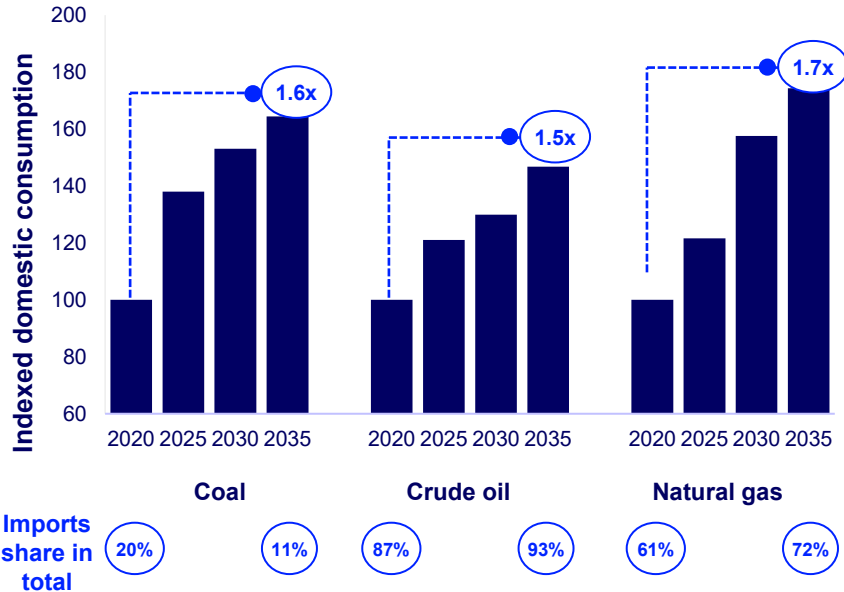
Trade deals, transition from erstwhile infrastructure schemes to shortlisting new infra hotspots, incentives to enable manufacturing competitiveness will remain challenges to address in 2026

Source: Wood Mackenzie
 Note: Numbers between periods represent CAGR growth, * Target for 2047 is 25%

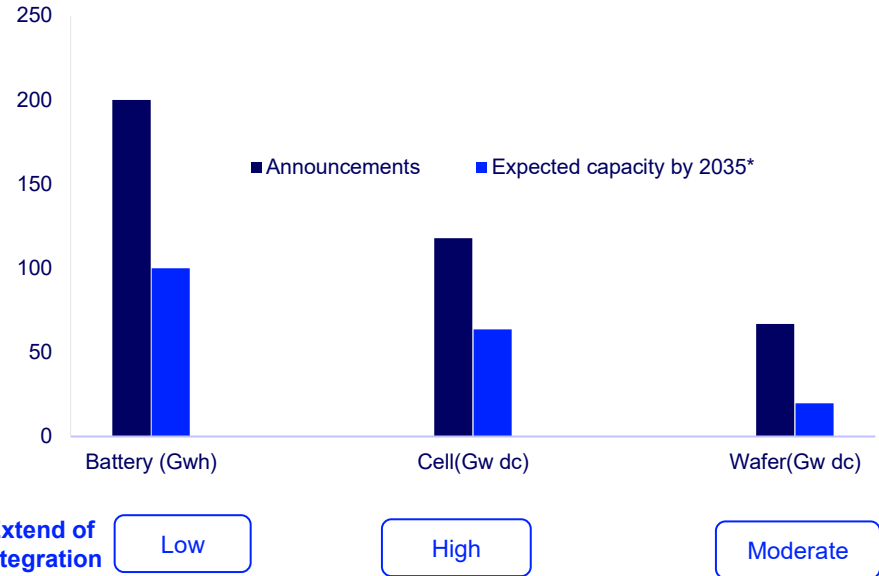
Balancing consumption growth and securing supply chains

Energy security takes centre stage in India's economic growth journey

Key fuel consumption metrics



Key value chain dependence metrics



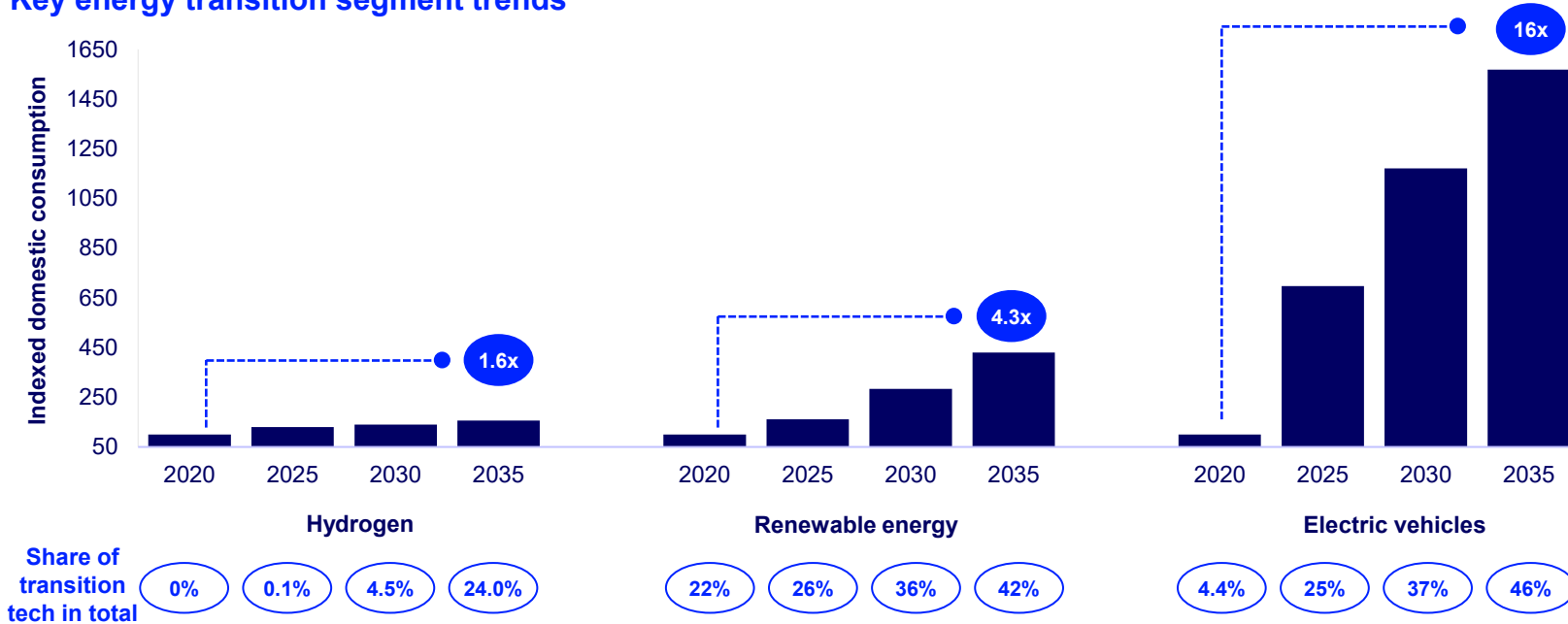
Source: Wood Mackenzie

Note: Coal imports share is only for thermal coal imports, the largest coal import category. Crude oil refers to refinery crude intake. Consumption of all commodities is index at 100 for 2020

Energy transition to enable a strong growth opportunity

Penetration levels may however lag country pledge needs

Key energy transition segment trends



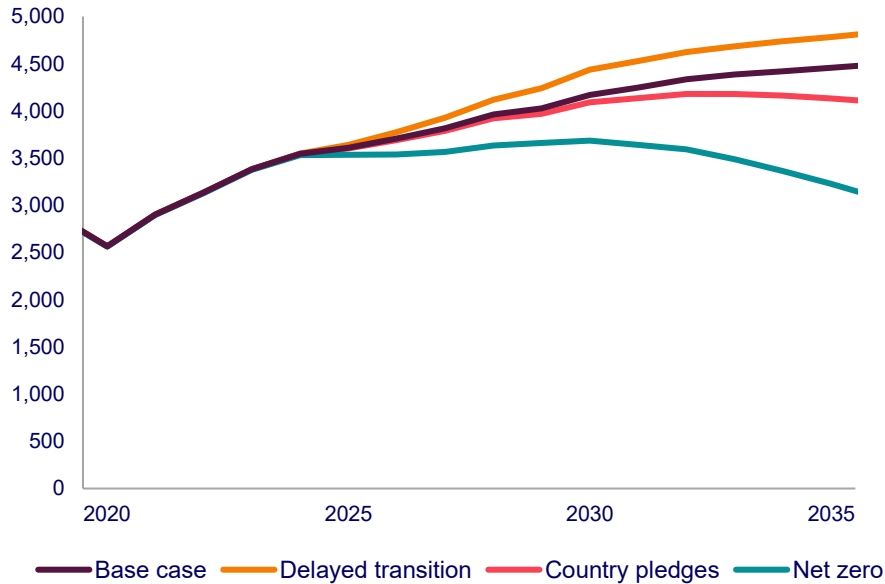
Source: Wood Mackenzie

Note: Electric vehicles refer to only passenger vehicles and its share in the total passenger vehicle sales. Hydrogen includes all forms of hydrogen and share of transition tech represent the total share of green hydrogen in total hydrogen consumption. Renewable energy includes (renewable excluding large hydro), and its share is share in total electricity generation

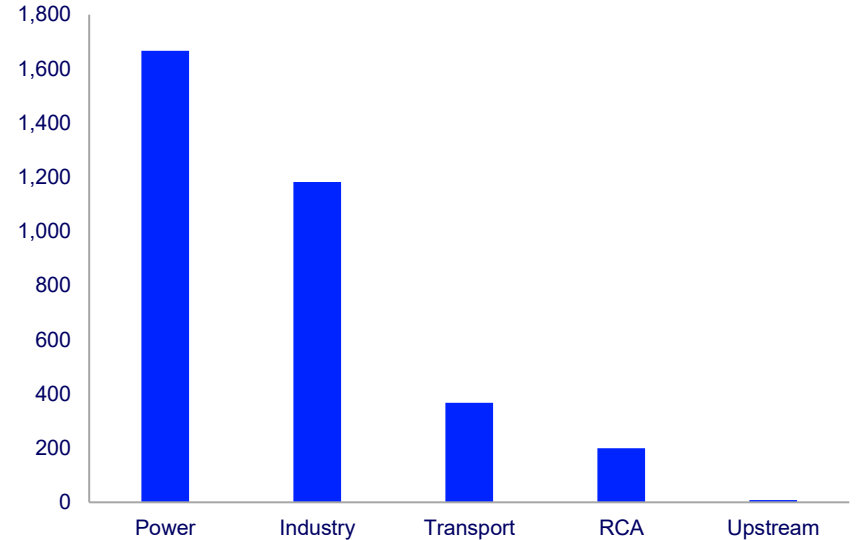
Emissions are likely to rise by around 25% of the current levels over the next 10 years

The next decade is decisive for India, as today's choices will either prevent or lock in carbon-intensive pathways

India's energy-related net CO₂ emissions, MtCO₂



Energy-related net CO₂ emissions by sector in 2025, MtCO₂



Note: RCA = residential. Commercial and agriculture energy use. Upstream sector refers to CO₂ emissions during fuel production or processing.

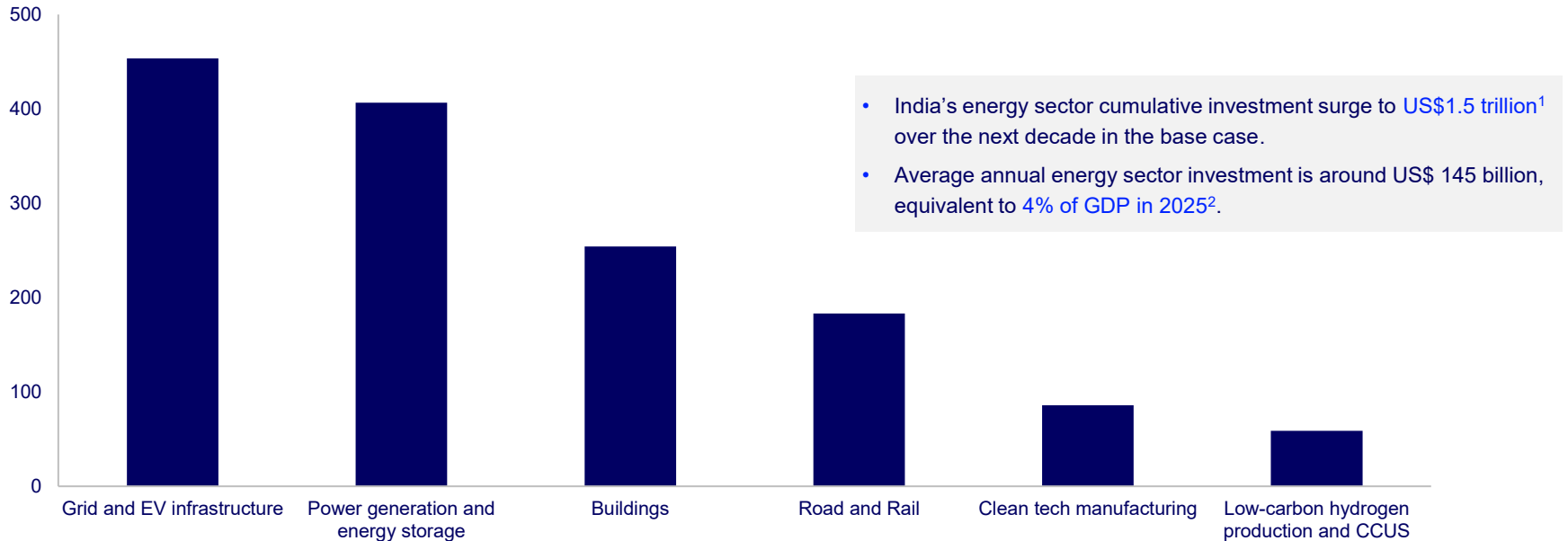
Source: Wood Mackenzie Lens ETS

Scenario definitions are provided in the Annexure. For more details on scenarios, please visit [Energy Transition Outlook page](#).

Investment over 10 years will be led by grid modernization and power investments

Early-decade scaling of demand-side decarbonisation is critical to shift from the base case to net zero pathways

Cumulative base case capex by sector from 2026 to 2035, US\$ billion



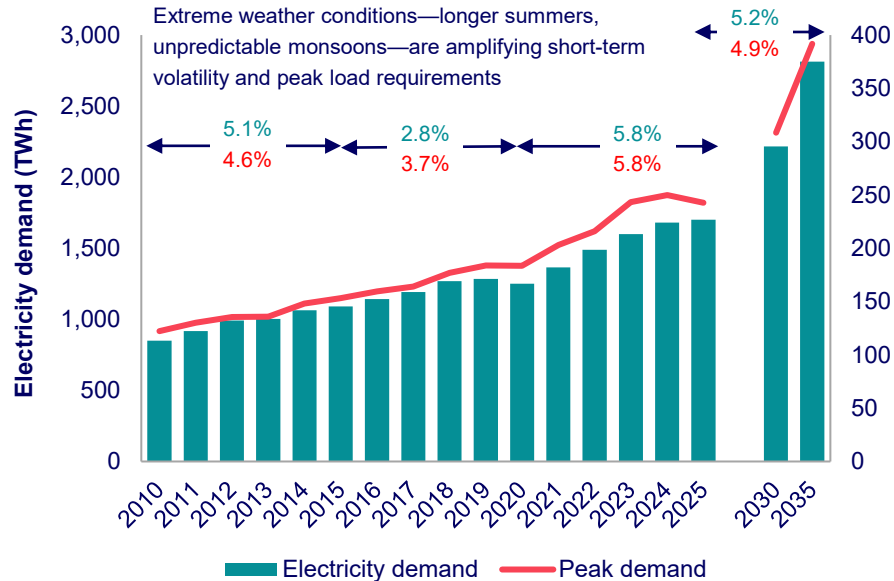
Source: Wood Mackenzie Lens ETS

Note: Buildings cover energy-efficiency improvement in existing stock, air-conditioning demand, and compliance with new building codes in new construction. Road includes vehicle costs. Clean-tech manufacturing covers renewable component manufacturing, batteries, green steel, and electrolyzers. ¹ The investment does not include upstream and mining sector. ² GDP is in 2015 prices

Power demand to remain robust, supported by weather drivers and structural factors; reliability, flexibility, and integration remains emerging challenges

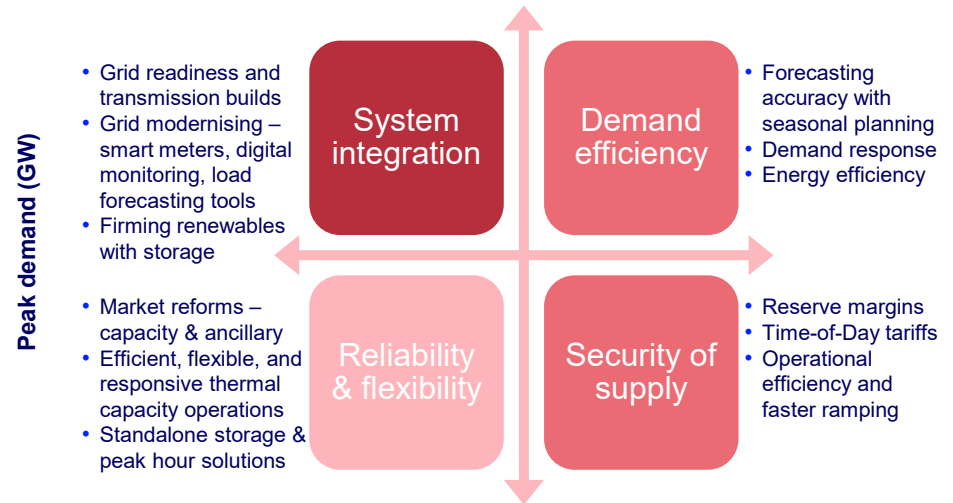
Transition is difficult — Fast-rising, volatile demand creates both urgency and constraints for India’s clean-energy

India electricity demand trends and projections



Source: CEA, Wood Mackenzie

Key themes shaping India’s ability to deliver both energy security and sustainable transition



As the energy system becomes larger, complex, more electrified, and renewable-heavy – the challenge is no longer just about meeting demand, it is meeting it reliably, efficiently, and flexibly

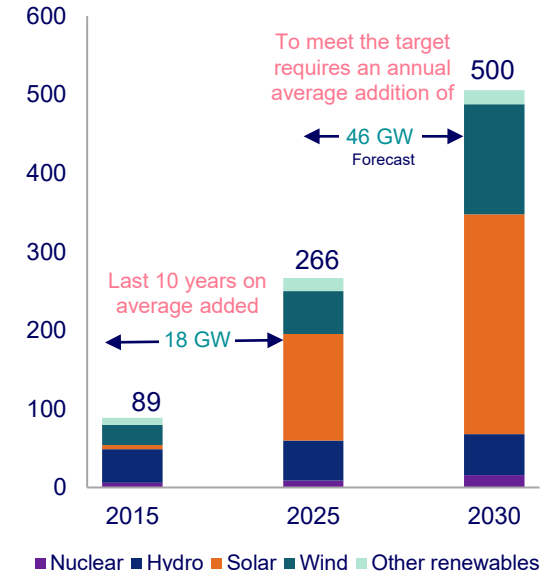
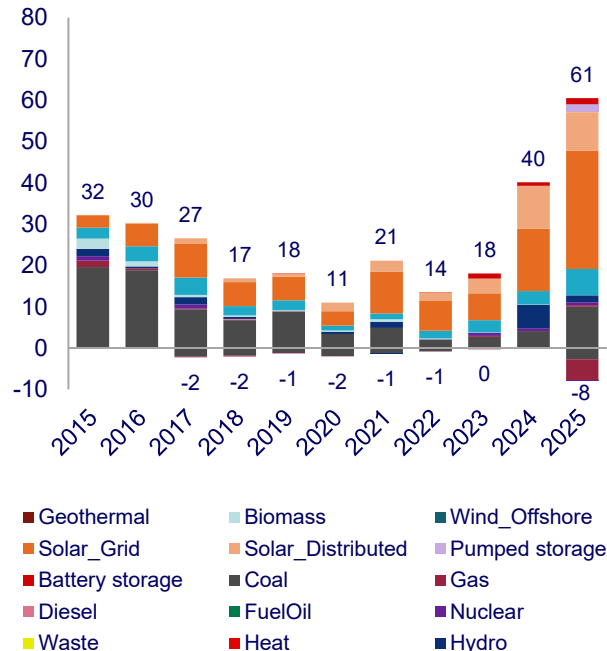
The renewables decade of growth positions India to achieve its ambitious targets

Renewables outpaced new coal additions driven by cost competitiveness, climate goals, and policy support

India's climate goals and achievements

- Reduce carbon emissions by 1 billion tonnes by 2030
- Target to reduce emissions intensity by 45% below 2005 levels
- Increase the share of non-fossil power capacity to 50% by 2030
- Create 500 GW of non-fossil fuel installed capacity by 2030
- Achieve net-zero emission by 2070

Incremental capacity addition and targets to achieve the climate goals (GW)

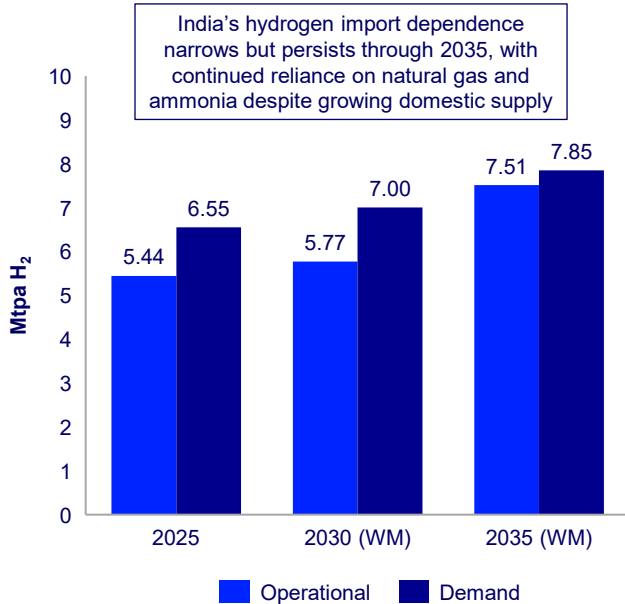


Source: Wood Mackenzie, CEA, MNRE

India's 5 Mtpa green hydrogen production target will not be met by 2030

Project pipeline exists but project maturity is insufficient; WoodMac forecast shows vast supply gap

H₂ domestic supply vs demand capacity

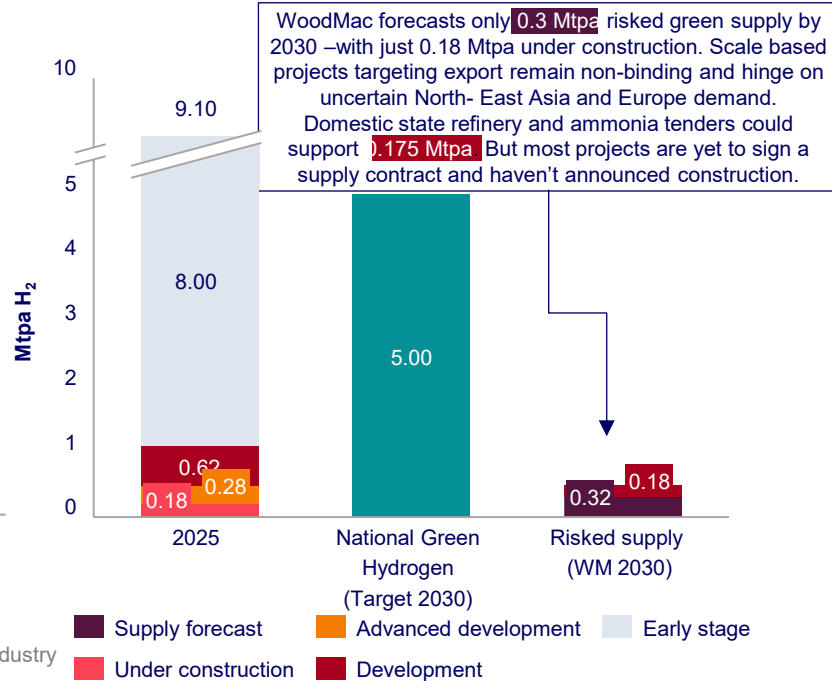


Source: Wood Mackenzie

Refers to total hydrogen consumed across refining, fertilizer industry



Green hydrogen supply 2025 vs 2030 forecast



Signpost to watch

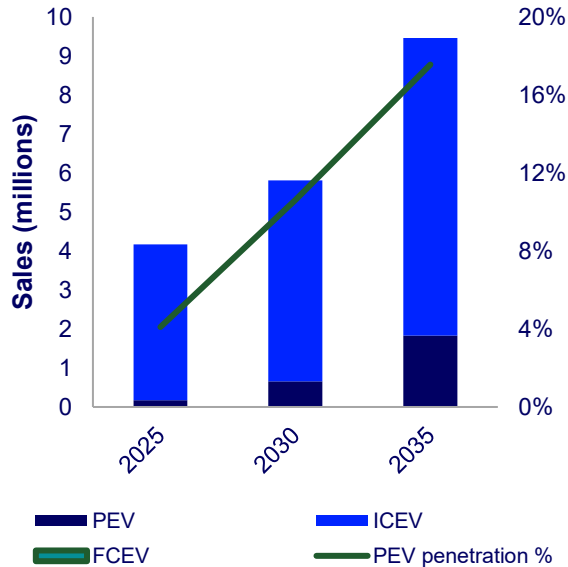
- **Policy & subsidies**
 - Availability, bankability of state-level CAPEX subsidies
 - Transparency
- **Power & cost discovery**
 - Evolving tenders for credible price discovery
 - Alignment of power procurement with hydrogen profile
- **Demand Creation**
 - Early traction from Hydrogen Purchase Obligations (HPO)

Transmission infrastructure

Indian passenger car market will achieve a PEV penetration rate of 18% by 2035

Even with 200 GWh of planned capacity by 2035, only half may come on stream

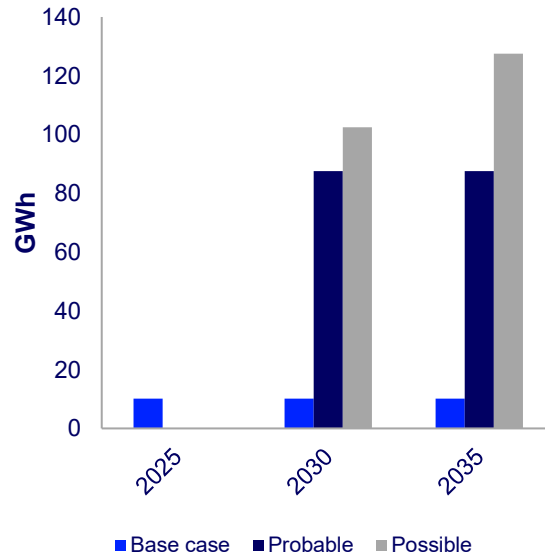
India powertrain forecast



Source: Wood Mackenzie

Note: Base and probable will add to total capacity in a time period

Battery production capacity in India



Critical mineral focus:

- **Background:** India relies heavily on imports for key battery raw materials. However, some opportunities exist, particularly for lithium
- **Rare earth auctions:** Exploration and development of domestic lithium deposits. Attract private investments for the auctioning of already available mineral blocks.
- **Strategic alliances-** Continued collaboration and partnerships with countries like Australia and Latin America (KABIL)

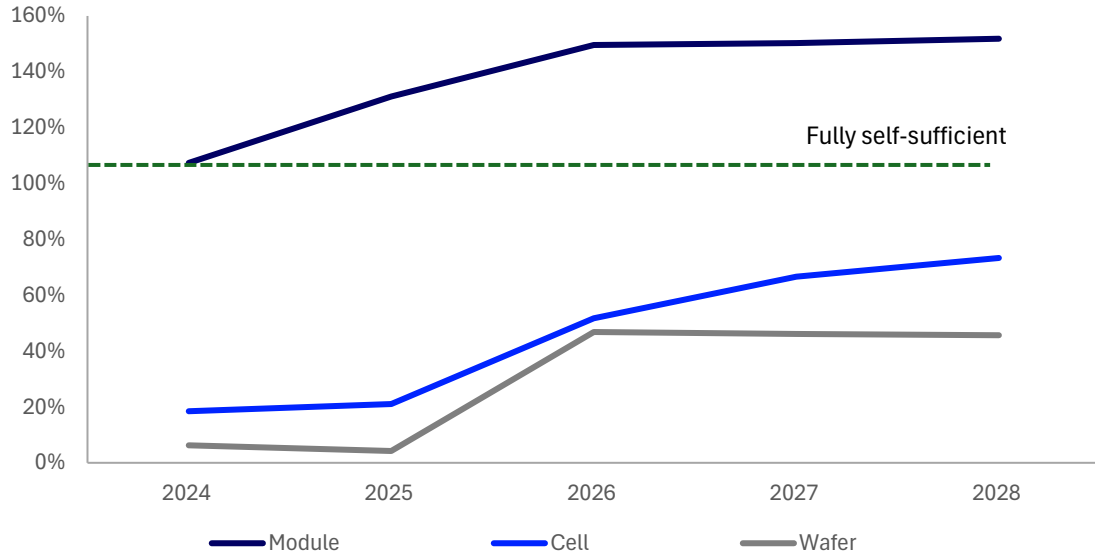
Other area of focus:

- **Tech investments-** Invest in R&D to develop battery recycling technologies. Improve extraction and processing technologies.
- **Policy support-** Incentives to companies involved in the exploration of mineral deposits. Custom duty exemptions on raw material imports to support domestic manufacturing

Renewables value chain indigenization, promoting local manufacturing of components

India secures its position as second-largest module manufacturer; however, cell and wafer capacity availability remains on watch

India's solar PV wafer, cell and module self-sufficiency outlook, 2024-2028



- India's average annual solar PV installation volume in the next three years is expected to range between 40 GW and 50 GW.
- India is pursuing strategic expansion to build local manufacturing to reduce import dependence across different nodes of the supply chain. The country has already achieved self-sufficiency in module manufacturing with an overcapacity situation. The vertical integration of the supply chain through cells and wafers is yet to be achieved.
- The impending implementation of domestic content requirement for cells from June 2026 onwards may put short term pressure on supply, with the constraints likely to be reduced through the end of the year as new cell manufacturing capacity of 24 GW get added.
- However, a low utilisation rate may keep the cell production levels low. Similarly, local wafer manufacturing will not scale sufficiently in the near future.

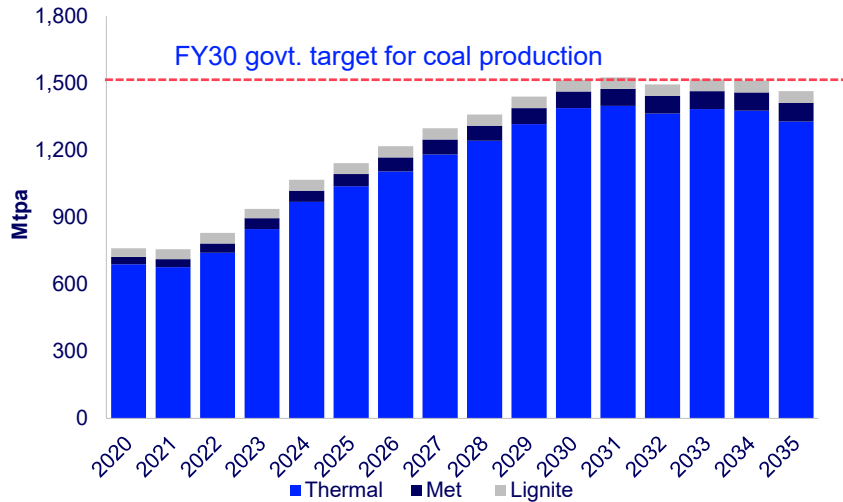
Source: Wood Mackenzie

Note: Self sufficiency represents the ratio of the total production capacity and the total local market installations for the year. For wafers, manufacturing capacity is considered as production data not available.

India is on track to reach 1.5 BT coal production by 2030

Weak domestic supplies drive higher met coal import dependence, thermal coal imports to drop

Domestic coal production



Source – Ministry of Coal, Wood Mackenzie

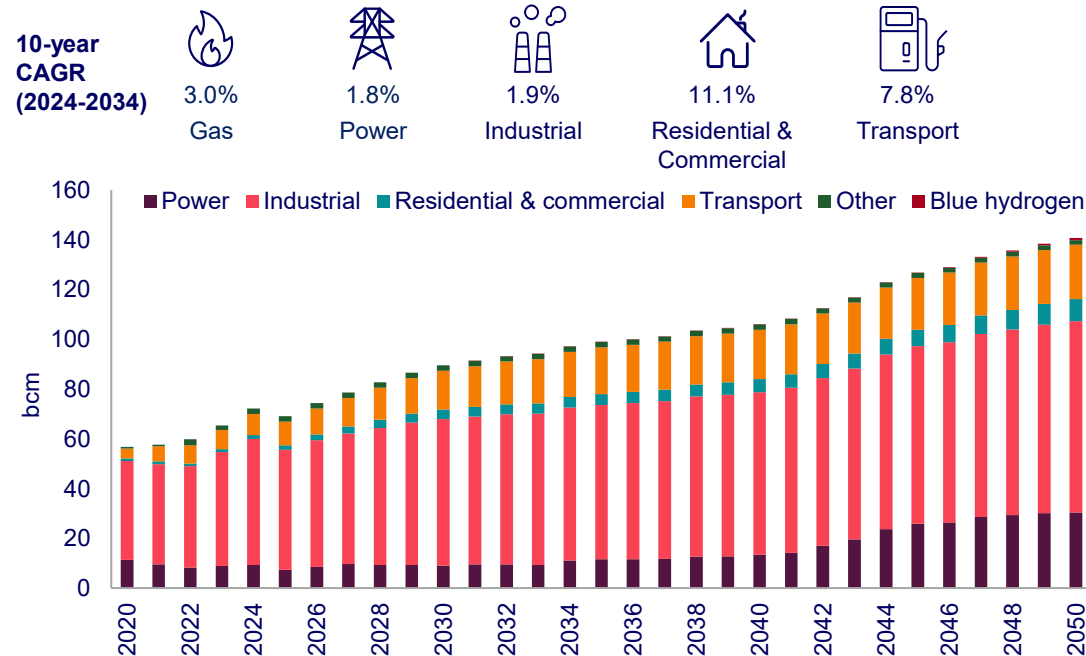
On the radar

- ✓ The government of India launched the National Coal Gasification Mission in January 2024 to enable energy security
 - » A target to gasify 100 Mtpa of coal by 2030. Incentive of INR 850 billion (US\$1 billion) as VGF to de-risk capex.
 - » As of October 2025, approvals were awarded to **seven projects across the three incentive categories**.
 - » Limited capacity can be supported through the fund, future direction to be clarified
- ✓ Other signpost include a watch on policy reforms critical to achieve 1.5 Billion tonnes of 2030 coal production targets
 - » Implementation of Coal SETU, launch of coal trading exchange on cards in 2026.
 - » Deployment of advanced technology like AI, digitization to boost infrastructure availability will be keenly looked at
 - » Participation of foreign players in e- auctions can enable better price recovery for market allocated coal, traction on this policy reform will be monitored

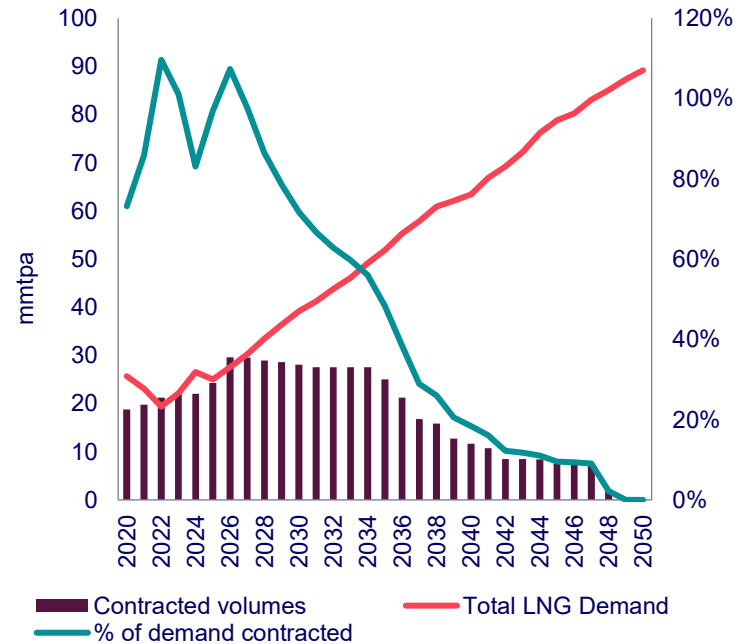
India's growing gas demand will be driving by the residential and commercial sector...

...and will necessitate more LNG import contracts to be signed

Gas demand by sector



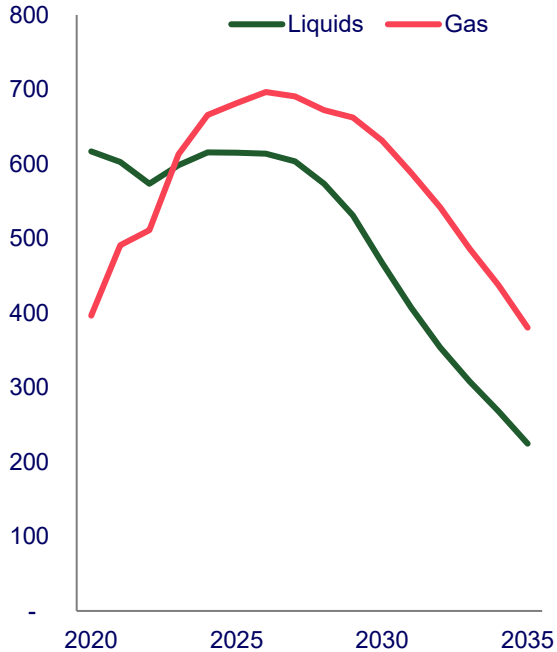
India LNG demand vs contracted volumes



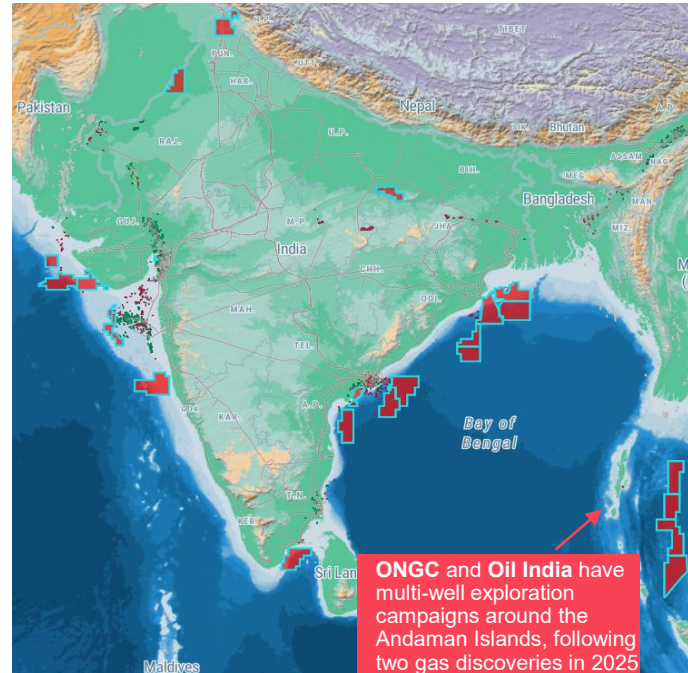
Can India deliver the much-sought licensing break-through for energy security?

Focus to shift on scale, pace of licencing and ability to woo world oil majors to turnaround the exploration story

India production (kboed)



Map: On-offer acreage in OALP X release



Exploration key issues

- Will enhanced fiscal incentives, seismic and amended ORDA Act be enough to bring the international Majors?
- We expect BP and ONGC to expand their partnership at Mumbai High into deepwater. But BP remains the only Major currently active in India upstream – will others be tempted to join?
- A key inclusion in OALP X bid round was frontier, unexplored acreage in the Andaman and Mahanadi basins. Current Andaman exploration by Oil India and ONGC being keenly watched by industry
- What new blocks will be released in the OALP-XI round?

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