

Coal Gasification in India

Enabling Industrial Feedstock Resilience

Report launch, 2026

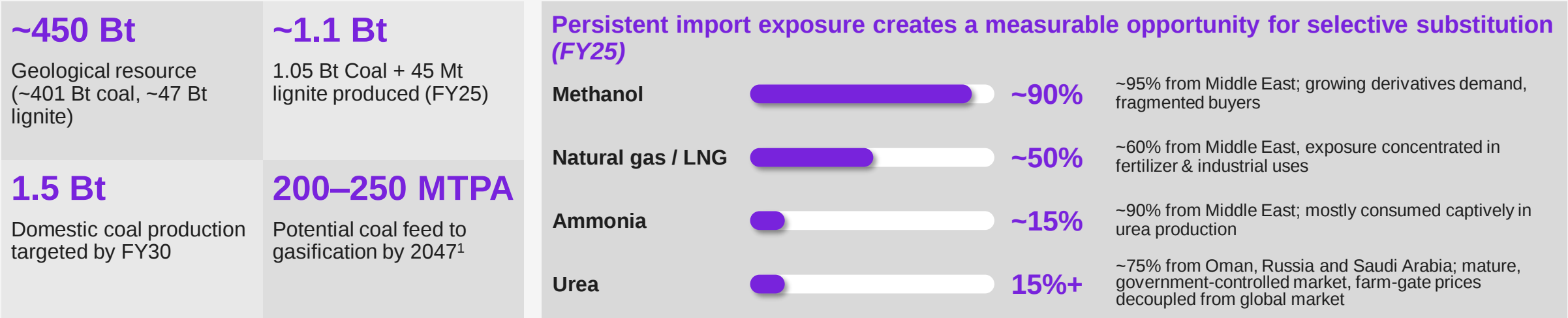
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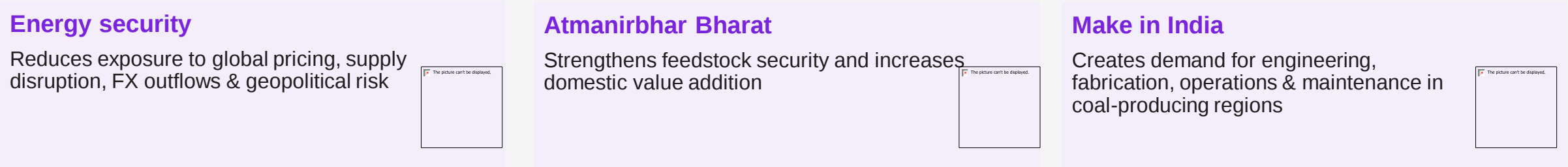


India produces coal at world scale, yet imports critical industrial feedstock; coal gasification can address part of this exposure

India’s coal base can potentially become an industrial feedstock resilience lever through syngas



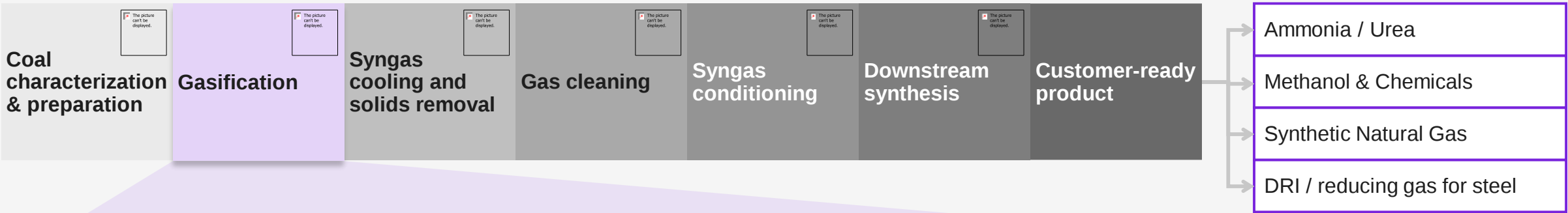
Fit with national industrial and energy-security objectives



Manufacturability alone is insufficient, strategic case depends on value at the final product level, where domestic production competes with incumbent supply after costs, specifications and contract terms.

Coal gasification is an integrated production system; technology selection must be matched to the complete coal-to-product chain

Each element in the product delivery system depends on final downstream product & coal



Prevalent gasifier families solve different feed and scale problems

Technology	Feed / Ash regime	Principal strengths	Principal constraints
Fixed / moving bed	Coarse lump coal; limited fines	Strong internal heat recovery; established global references	Feed-size control; tar treatment; multiple units at large scale
Bubbling / circulating fluidized bed	Small dry particles; high fines tolerance; generally non-slagging	Good mixing; feed flexibility; potential fit with high-ash, high-fines coal	Agglomeration, erosion, solids circulation, scale-up & hot-gas cleanup
Entrained flow	Pulverized dry coal or coal-water slurry; molten slag	Large single-train scale; broad international coal-to-chemicals experience	Oxygen demand, fine grinding, refractory or membrane-wall duty, slag chemistry and high-ash throughput
Underground coal gasification	Coal remains in seam	Potential access to deep or difficult-to-mine resources	Groundwater, subsidence, gas leakage, cavity control and closure

Higher relevance given high ash content India coal (35-40%), but mine specific testing remains necessary

Indian coal properties vary by coalfield, mine, seam and mining phase; technology selection & plant design to reflect end-to-end coal envelope and downstream product specification

Urea, contract-backed ammonia & captive DRI are Priority 1 pathways – large demand, identifiable customers, existing receiving infrastructure

End-use pathway prioritization

Product	Market use	Market scale	Policy support	Implementation maturity	Priority
Ammonia platform					
Urea	Fertilizer	4	4	4	Priority 1
Contract-backed ammonia	Merchant / feedstock	4	2	4	Priority 1
Ammonium nitrate	Fertilizer / explosives	2	2	2	Priority 3
Methanol platform					
Methanol	Fuel / chemical feedstock	4	2	4	Priority 2
DME	LPG blending / fuel	0	2	4	Priority 3
Methanol to Olefins	Chemical	4	2	0	Priority 3
Natural-gas platform					
SNG	Pipeline / industrial gas	4	2	2	Priority 2
Direct industrial use					
DRI	Steel reducing gas	4	2	4	Priority 1
Fischer-Tropsch liquids					
Diesel / Gasoline / ATF	Transport fuel	4	2	2	Priority 2



Priority 1

Detailed diligence now

Warrant detailed financial, customer & configuration diligence



Priority 2

Proceed with conditions

Requires additional commercial arrangements or infrastructure



Priority 3

Selective / captive only

Weaker standalone markets, greater downstream complexity or disproportionate regulatory burden.

India has built a multi-layer policy framework for coal gasification – but bankability still depends on how these instruments work together at project level

100 MTPA by 2030

Ministry of Coal's 2021 National Coal Gasification Mission target

₹46,000 crore

Combined support across the two capital schemes

30 years

Coal linkage tenure under the dedicated Non-Regulated Sector sub-sector created for syngas production

What policy now retires — and what still sits with the sponsor

Lever	Instruments in place	What policy addresses	What still needs closing
 Capital	₹8,500 crore + ₹37,500 crore central schemes, state layers may supplement subject to eligibility	 Material share of eligible capex supported	Upfront funding before any reimbursement, limited clarity on MoC scheme stacking treatment
 Feedstock	Dedicated NRS sub-sector, linkage tenure to 30 years, commercial-mining incentives (50% revenue-share rebate)	 Tenure and access addressed	Clear quality envelope; FSA terms covering specs, processes, remediation, and escalation
 Demand and revenue	Urea alone has a notified MRP and recognized subsidy architecture, limited / indirect support for other products	 Strongest demand-side framework exists for urea	Each product needs revenue analysis per market & ministry (even for urea, project-specific treatment to be confirmed)
 Permitting	Integrated industrial complex approvals required, depending on downstream activity, site & associated facilities	 Instruments exist, process is defined	Classification and timelines remain configuration-specific; EC and product approvals can sit on the critical path
 Localization	Preference to Make in India applicable for public procurement (Class I, II limits specified)	 Clear scope & applicability	Localize where packages can be delivered, serviced and warranted without weakening guarantees

India now has the core policy instruments required for a first commercial wave; its effectiveness depends on project selection, contract execution and transparent operating evidence.

A viable location minimizes cost and operating risk across the entire value chain

Key elements for identifying plant location

 Coal supply Uncommitted, contractually defined supply of suitable quality at mine and seam level.	 Customer access Delivery point, receiving infrastructure and product evacuation	 Utilities Firm O2/air, water, power, steam, cooling, chemicals and catalysts, for range of operating conditions
 Logistics A defined loading, rail or conveyor route, with identified spare capacity at selected mine	 Environmental capacity Water access, residue absorption, air quality, hazardous-material handling & major-accident risk	 Workforce availability Operator capability, laboratory and maintenance skills, with training beginning before commissioning

Potential siting models: Physical configuration

Mine-mouth

Reduces inbound flow, shifts logistics downstream. Viable only where uncommitted coal, water, utilities and a practical product route exist

Demand-centre

Improves customer integration but lengthens the coal supply chain

Brownfield industrial

Balances the trade-off by combining established utilities and product infrastructure with manageable coal logistics

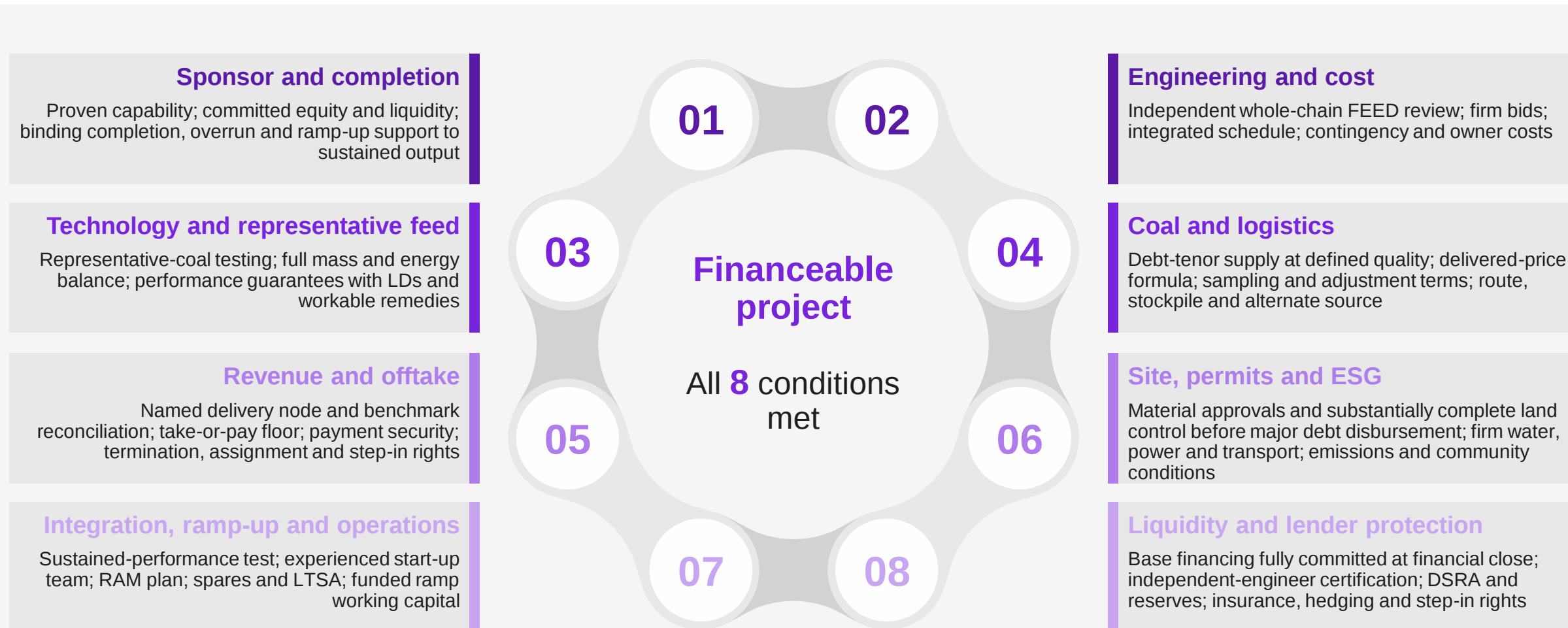
Coal gasification cluster archetype: Primary revenue model

Captive industrial	Integrated industrial facility consuming syngas / downstream products on-site (e.g., reducing gas, DRI)
Subsidy-linked fertilizer	Integrated fertilizer producer under regulated revenue framework (e.g., urea, integrated ammonia –urea etc.)
Merchant chemical	Named chemical, fertilizer, mining group linked via storage, & offtake infra (e.g., methanol, AN, etc.)
Network gas	Existing / committed gas pipeline, CGD network or industrial-gas distribution system

Clusters should follow reliable anchor projects; shared infrastructure should expand only after capacity rights, tariffs and outage priorities are contractually defined.

Project bankability rests on delivered-product competitiveness, enforceable offtake and evidence backed execution

Eight requirements underpin a financeable project



Environmental & social license must be proven at product, site & community level

1. Emissions profile & claims

Cleaned syngas can improve control of local pollutants vs. direct coal use, but lifecycle GHG may exceed natural gas or lower-carbon alternatives. Claims must be specific & state boundary, comparator and measured outcome.

2. Site-level resource / pollution / safety

Resource availability & environmental capacity are site-selection criteria, not downstream mitigation; demonstrate water, residue, air, effluent, hazmat, HAZOP/QRA, and emergency response across normal and abnormal operations

Coal gasification is not inherently clean; the environmental case depends on the configuration, alternative being displaced, full lifecycle boundary and operating evidence.

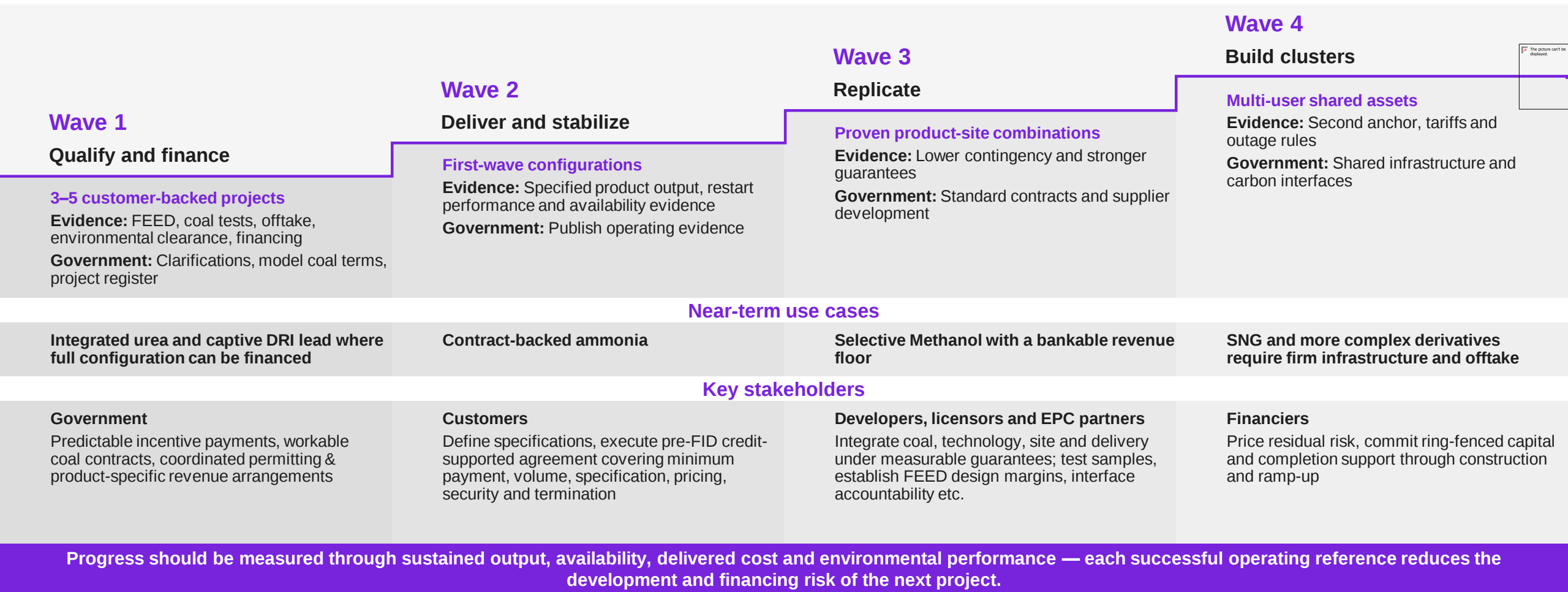
3. Carbon capture readiness

Capture is only credible with purification, compression, transport, storage, MRV and uptime, product choice determines potential carbon capture scope. **Carbon-management requirements should be locked pre-FID**, even if implementation is phased

4. Jobs and regional development

Coal gasification can broaden the industrial base of coal-producing regions. Development should remain demand-led, outcomes should be measured through regional value added, qualified suppliers, and durable capability

Coal-to-gas presents a clear roadmap to scale from ambition to evidence in four waves



Thank you



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Partner, India



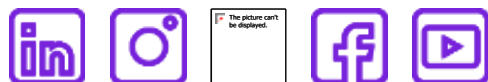
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