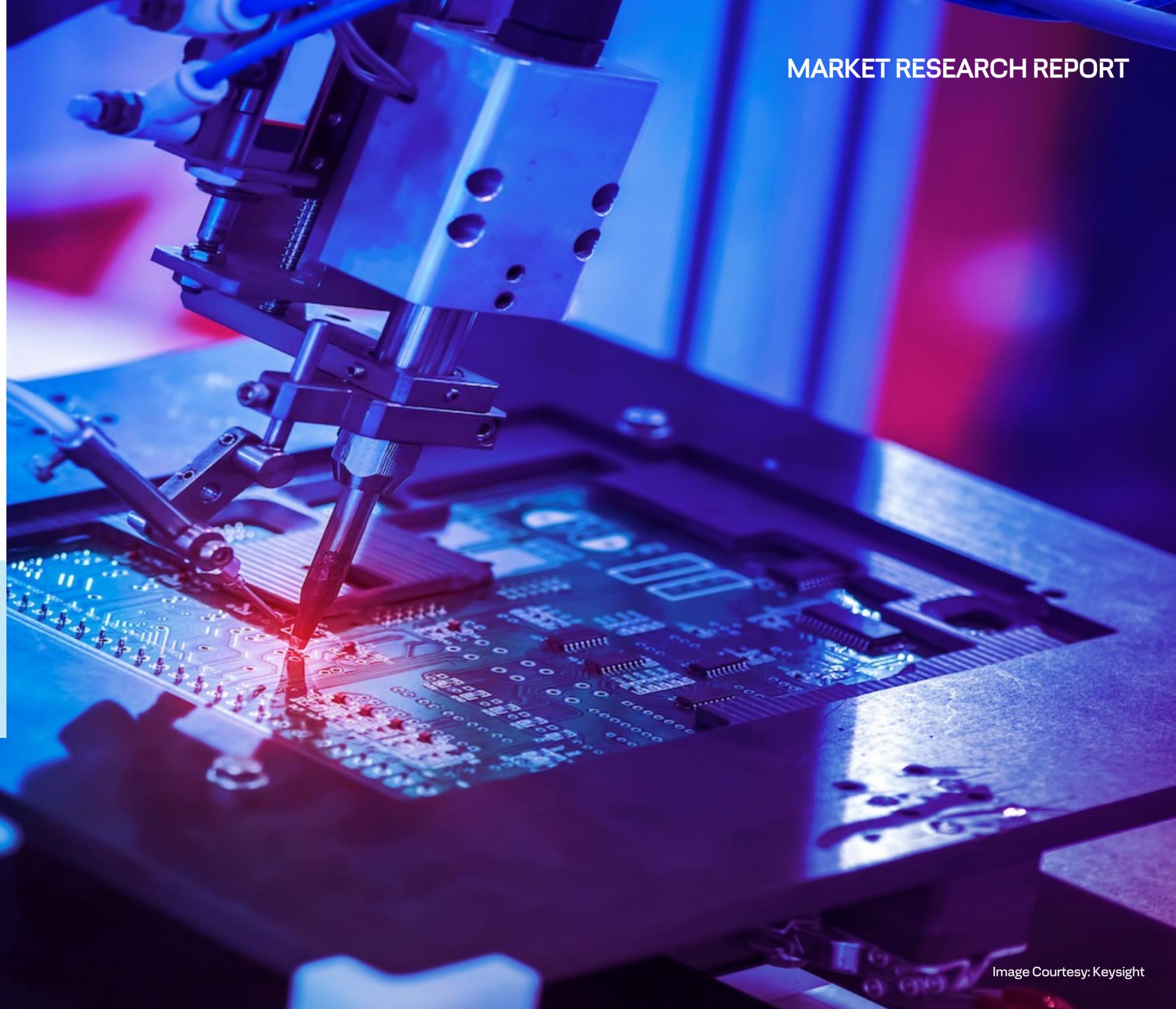


AUGMENTING VALUE

# INDIA'S SEMICONDUCTOR MANUFACTURING MARKET: UNLOCKING \$100 BILLION OPPORTUNITY THROUGH FAB INVESTMENTS, SUPPLY CHAIN EXPANSION & STRATEGIC ALLIANCES

**KEY QUERIES ANSWERED**

- Indexation of states for region wise manufacturing hub fitment analysis for semiconductors in India
- What would be the supply chain dynamics and what opportunity it will unfold till 2030?
- What would be the investment roadmap for the semiconductor fabrication players till 2030?
- What would be the investment roadmap for semiconductor assembly, testing, marking, & packaging till 2030?
- What would be the investment roadmap for semiconductor chip design till 2030?
- What would be the roadmap for India positioning as semiconductor exporter?
- What would be the end use industry wise regional demand till 2030 ?





## By 2030, India's semiconductor market is targeted to reach a market value of US\$ 100-110 Billion

- By 2029, India is expected to develop the capability to design and manufacture semiconductor chips meeting approximately 70-75% of domestic application demand. By 2035, the country aims to establish itself among the leading global semiconductor nations. For a data-driven perspective on state-level competitiveness and region-wise manufacturing hub fitment, refer to Eninrac's report, "Semiconductor Manufacturing in India: A \$100 Billion Pathway," featuring a structured indexation framework for investment decision support.

The global semiconductor industry is poised for unprecedented expansion, with companies worldwide planning investments of nearly USD 1 trillion in new fabrication plants (fabs) by 2030. Global annual industry revenues are also projected to exceed USD 1 trillion by the end of the decade, excluding the additional upside potential arising from the accelerated adoption of generative AI technologies. Beyond meeting rising demand, these large-scale investments are strengthening supply-chain resilience across the semiconductor value chain—an imperative underscored by recent global supply disruptions.

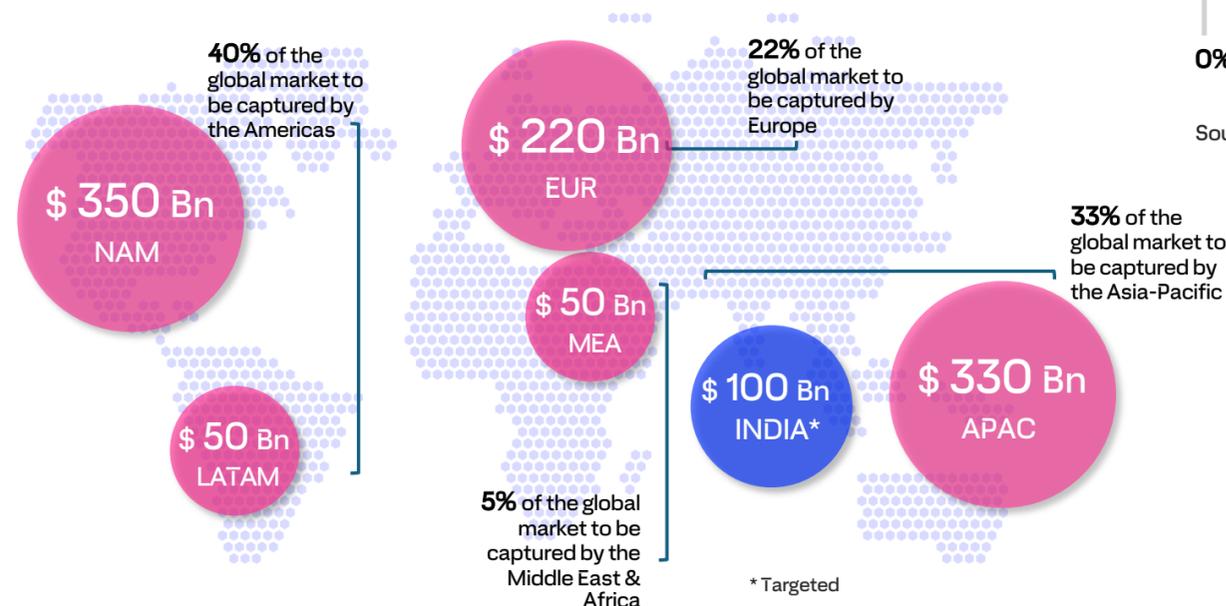
Over the past few years, semiconductor shortages disrupted production across sectors—from automobiles to consumer electronics—highlighting the strategic importance of chips to modern economies. In many ways, today's digital world is built on semiconductors. With demand expected to grow significantly over the next decade, semiconductor design and manufacturing companies must undertake a comprehensive assessment of long-term demand drivers, technology transitions, and geopolitical realignments shaping the industry.

Against this global backdrop, India is steadily positioning itself as a key player in the semiconductor ecosystem. Supported by strong policy push, capital commitments, and initiatives aligned with the national vision of *Make in India* and *Make for the World*, the country is building both domestic capabilities and export-oriented capacity. Large-scale investments, expanding manufacturing infrastructure, and industry platforms such as SEMICON India 2025 reflect growing global confidence in India's semiconductor ambition.

The Indian semiconductor market is witnessing robust growth. According to industry estimates, the domestic market was valued at approximately USD 38 billion in 2023, expanded to around USD 45-50 billion in 2024-25, and is targeted to reach **USD 100-110 billion by 2030**, boasting a size of 10% of global semiconductor market by 2030. Exhibit 01 indicates the anticipated market size of global semiconductors industry by 2030 for distinct international geographic regions. This rapid expansion positions India not only as a high-growth consumption market but also as an emerging manufacturing and design hub within the global semiconductor value chain.

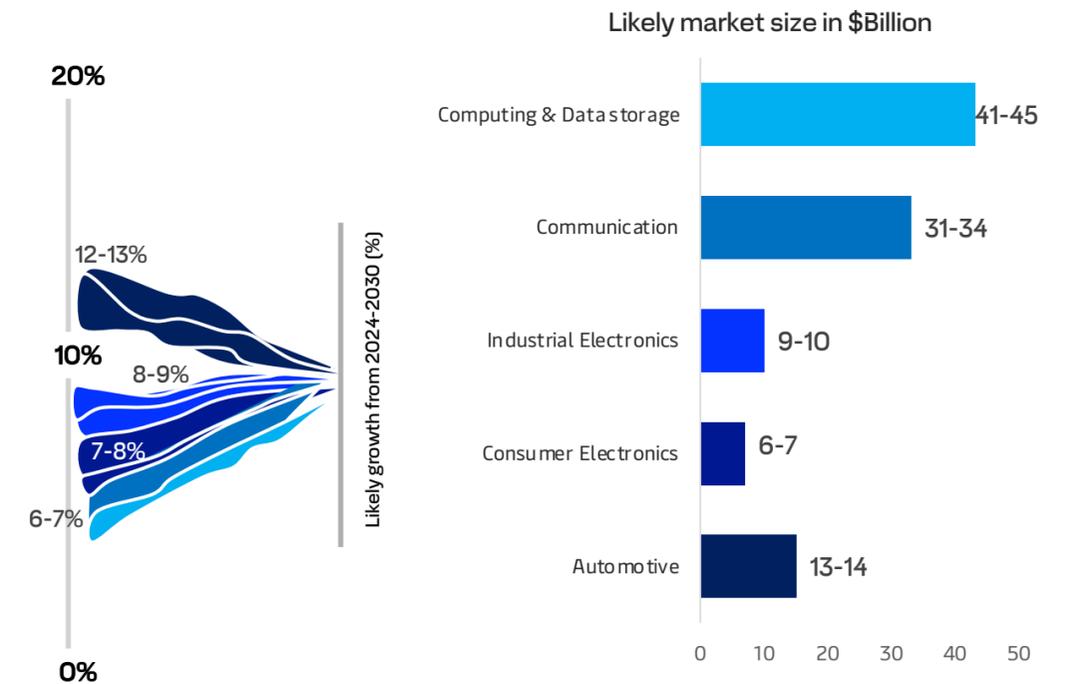
The overall growth in the semiconductor market in India would be driven by the automotive, data storage and communication segment and can be seen in Exhibit 02.

### Exhibit 01: Anticipated Semiconductor Market Size by 2030 for Distinct International Geographies



Source: Eninrac Consulting

### Exhibit 02: Anticipated Semiconductor Market Value in India by Industry Segments by 2030



Source: Eninrac Consulting

# \$ 18 Billion

worth projects for semiconductor manufacturing has been approved by the Government of India in December 2025

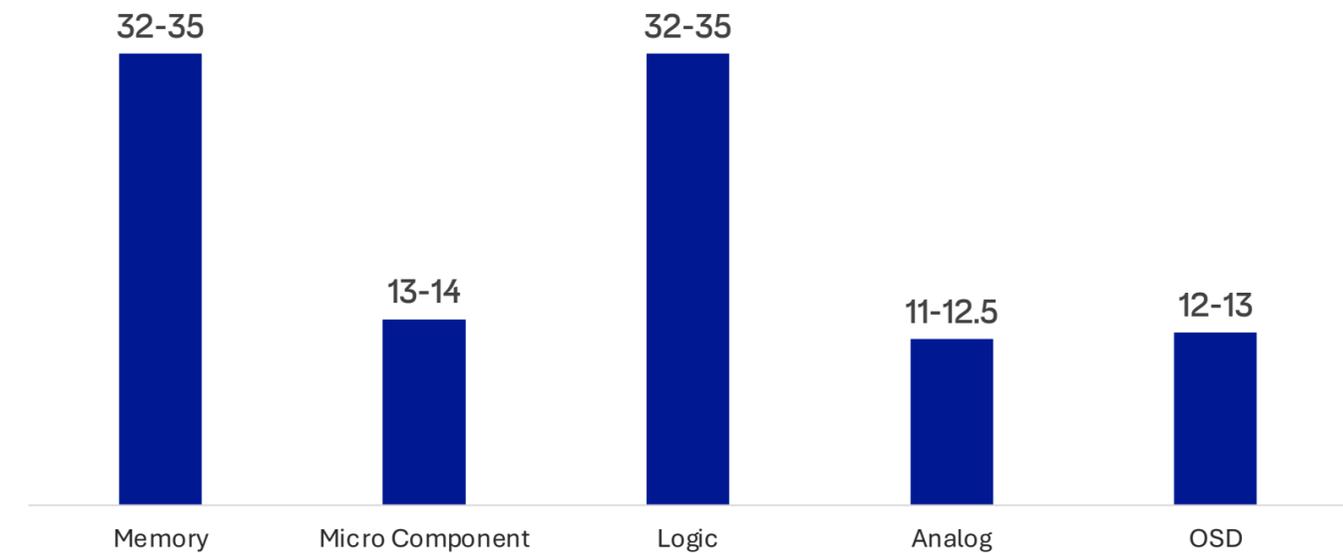


**Exhibit 03 : Approved Semiconductor Manufacturing Projects in India as of Dec 2025**

- 1** Micron Technology Inc.  
 Investment Tune: INR 225.16 Bn  
 Location: Gujarat  
 Facility Type: Assembly & Testing of DRAM & NAND  
 Production Cap: 14 Million/week
- 2** Tata Electronics Pvt Ltd  
 Investment Tune: INR 915.2 Bn  
 Location: Gujarat  
 Facility Type: FAB  
 Technology Partner: PSMC Taiwan  
 Production Cap: 50 Thousand wafers/month
- 3** Tata Electronics Pvt Ltd  
 Investment Tune: INR 271.2 Bn  
 Location: Assam  
 Facility Type: Semiconductor packaging  
 Production Cap: 48 Million/day
- 4** CG Power & Industrial Solutions Ltd  
 Investment Tune: INR 75.8 Bn  
 Location: Gujarat  
 Facility Type: Semiconductor manufacturing  
 Partnership: Renesas Electronics(USA), STARS Microelectronics (Thailand)
- 5** Kaynes Technology India Ltd  
 Investment Tune: INR 33.07 Bn  
 Location: Gujarat  
 Facility Type: Semiconductor chips  
 Production Cap: 6.33 Million/day
- 6** Vama Sundari Investments Pvt Ltd  
 Investment Tune: INR 37.06 Bn  
 Location: Uttar Pradesh  
 Facility Type: chips & wafers  
 Production Cap: 20 Thousand wafers/month, 36 Million chips/month
- 7** 3D Glass Solutions Inc.  
 Investment Tune: INR 19.43 Bn  
 Location: Odisha  
 Facility Type: Glass panel substrate, assembly & 3DHI  
 Production Cap: 5800 panels/month, 4.20 Million units/month to be assembled, 1100 units/month for 3DHI
- 8** SiCsem Pvt Ltd  
 Investment Tune: INR 20.66 Bn  
 Location: Odisha  
 Facility Type: wafers & packaging  
 Production Cap: 5000 wafers/month, 8 Million units of packing capacity/month
- 9** Continental Device India Pvt Ltd  
 Investment Tune: INR 1.17 Bn  
 Location: Punjab  
 Facility Type: High power discrete semiconductor devices  
 Production Cap: 158.38 Million units/annum
- 10** Advanced System in Packaged Technologies Pvt Ltd  
 Investment Tune: INR 4.8 Bn  
 Location: Andhra Pradesh  
 Facility Type: semiconductor manufacturing  
 Production Cap: 96 Million units/month

Source: Eninrac Consulting, PIB

**Exhibit 04 : Anticipated Semiconductor Market Value in India by Component Type by 2030 in US\$ Billion**



Source: Eninrac Consulting

The market participants in India's semiconductor industry will need to tame these barriers and convert them into a strategic edge and first mover advantage to fully realize the benefits from announced investments and others that may come.

**1. Barrier: High Greenfield Capital Expenditure (CapEx)**

**Strategic Edge: First-Mover Infrastructure Control.** Instead of viewing the high cost of building new infrastructure as a burden, first movers can build **captive, green energy-powered fabs** with dedicated power and water plants. This creates energy independence and insulates them from future grid volatility, turning a cost disadvantage into a reliability advantage that latecomers, reliant on strained public infrastructure, cannot easily replicate.



**2. Barrier: Lack of a "Fab-Ready" Skilled Workforce**

**Strategic Edge: Proprietary Talent Pipeline.** By establishing the first industry-led training academies and university partnerships, a first mover can capture India's demographic dividend. They secure the best engineering talent at a 30-40% cost advantage over the West while creating a loyal, specialized workforce. This becomes a moat, as competitors face a steep "training gap" when they arrive.

**3. Barrier: Dependence on Raw material imports**

**Strategic Edge: Captive Materials Production.** First movers can partner with global leaders to co-locate specialty chemical and gas plants within their fab ecosystems. This vertical integration slashes logistics costs and lead times, turning a supply chain vulnerability into a cost advantage and insulating the player from global export controls. India's global positioning in the raw material supplies for semiconductors can be seen in Exhibit 06. India possesses a significant, yet under-leveraged, position in the global raw material supply chain for semiconductors, how India can overcome this barrier in due course of time & what possible could be the strategic implications for the early market birds can be seen in Exhibit 07.

**4. Barrier: Multi-Year Qualification Cycles for New Materials**

**Strategic Edge: De Facto Market Standards.** The first player to qualify a portfolio of locally sourced materials owns the qualification data. They effectively set the standards for the Indian market. Latecomers must either duplicate the lengthy qualification process or accept the first mover's ecosystem as the baseline, creating a powerful customer lock-in effect.

**5. Barrier: Concentration of Advanced Packaging in East Asia**

**Strategic Edge: Integrated OSAT + Materials Hub.** By building an OSAT facility that is backward-integrated into local packaging substrate and lead frame production, a first mover can offer Indian automotive and industrial customers significantly reduced lead times and lower total cost compared to shipping dies to Taiwan for packaging and back.

**6. Barrier: Immature Logistics & Specialized Handling Infrastructure**

**Strategic Edge: Ownership of the Logistics Chokepoint.** A first mover can invest in dedicated semiconductor cargo terminals at key Indian ports/airports. By owning or exclusively controlling the only facilities with vibration-controlled, clean-room-grade handling, they create a physical asset that becomes a mandatory gateway for competitors, effectively monetizing a barrier to entry.

**7. Barrier: Long Lead Times for Critical Spares & Consumables**

**Strategic Edge: "Inventory-as-a-Service" Hub.** First movers can build bonded warehouses for high-risk, long-lead items. As the ecosystem grows, they can offer this buffer stock as a service to smaller fabs and OSATs, transforming a cost center into a regional profit center and becoming the critical "parts depot" for the entire Indian industry.

**Exhibit 05 : The Regionalization Imperative: 5 Material Segments that could lead to Logistical Success of Semiconductor FAB in India**

| Material Segments  | Why Regionalization is Critical in India   | Strategic Advantage for First Movers  |
|--|--|---|
| <b>Bulk &amp; Specialty Gases</b> (Nitrogen, NF <sub>3</sub> , WF <sub>6</sub> ) | Fabs consume gases continuously; cryogenic transport over Indian highways is risky, costly, and prone to monsoon disruptions. Hazardous nature requires strict compliance.                   | <b>On-Site Sovereignty:</b> Build captive generation plants or pipeline networks. Guarantee 100% uptime while insulating operations from future price volatility and import licensing delays.                             |
| <b>Wet Chemicals &amp; CMP Slurries</b>  | High purity degrades rapidly in Indian climate (heat, humidity). Long transit times from ports increase contamination risk and reduce bath life in fabs.                                     | <b>Quality Lock-In:</b> Establish local blending and purification hubs. Deliver "fresh" chemicals with extended life, reducing fab costs and ensuring process consistency that import-dependent competitors cannot match. |
| <b>Packaging Substrates &amp; Lead Frames</b>                                    | Bulky, custom, and supply-constrained globally. India's OSAT ambitions require localized production to cut logistics costs and lead times for domestic automotive and electronics customers. | <b>Integrated Ecosystem:</b> Build adjacent substrate manufacturing to serve your own OSAT. Slash customer lead times from months to weeks, capturing the "China Plus One" premium.                                       |
| <b>Precursors &amp; Photoresists</b>   | Ultra-high value, short shelf life, often pyrophoric or toxic. Import dependence creates vulnerability to global supply shocks and customs delays.   | <b>Resilience Hub:</b> Establish bonded, cold-chain warehouses with consignment stock. Offer "just-in-time" delivery to multiple fabs, becoming the critical regional supply node.  |
| <b>MRO Spares &amp; Consumables</b> (Quartzware, Pumps, Parts)                   | Fab downtime costs exceed \$100,000 per hour. Air-freighting spares from East Asia takes 3-5 days—too long for critical failures.  | <b>Downtime Prevention:</b> Build the first regional MRO hub with consignment inventory. Guarantee 4-hour response times, turning logistics into a customer acquisition tool for fab services.                            |

Source: Eninrac Consulting



**8. Barrier: Unpredictable Import Licensing (e.g., for high-silver materials)**

**Strategic Edge: Regulatory Fast-Track Partnership.** A first mover can work proactively with the Indian government to establish end-use certification systems and green-channel clearance for bona fide manufacturers. This turns a bureaucratic hurdle into a relationship-based advantage, where the pioneer helps shape the rules that latecomers must simply follow.

**9. Barrier: Opaque Global Supply Chains & Disruption Vulnerability**

**Strategic Edge: Predictive Supply Chain Intelligence.** Early movers can deploy digital twin technology to map their entire supply chain. This capability allows them to predict geopolitical or weather-related disruptions before competitors, securing alternative sources or activating buffer stocks preemptively. This intelligence becomes a core competency, allowing them to offer guaranteed delivery premiums to customers.

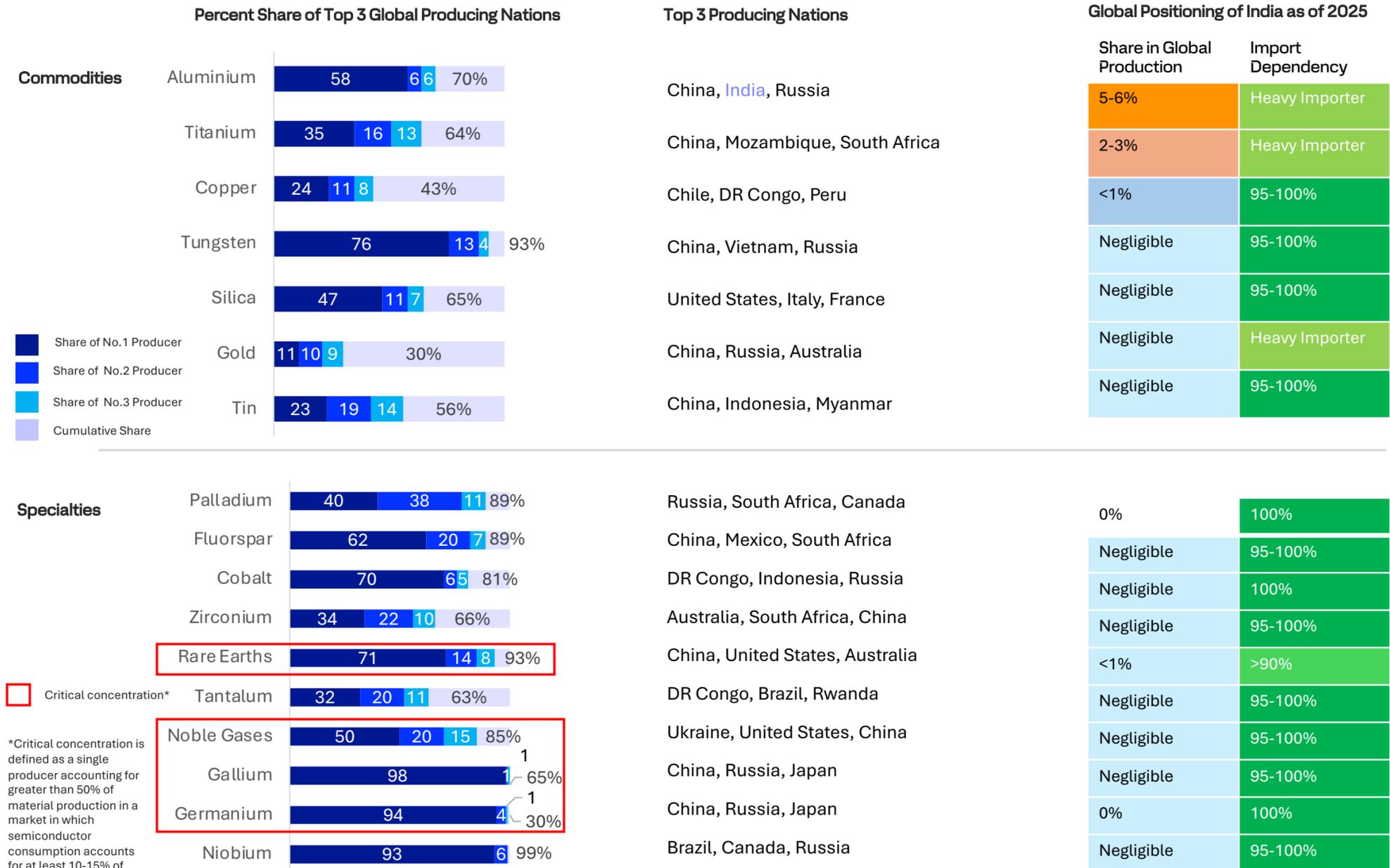
**10. Barrier: High Energy Costs & Volatility**

**Strategic Edge: Renewable Energy Sovereignty.** Unlike regions with subsidized but finite power, first movers in India can sign long-term power purchase agreements for solar/wind and pair them with battery storage. This locks in predictable, low-cost green energy for decades, turning a volatile operating cost into a stable, long-term competitive advantage as global carbon border taxes increase

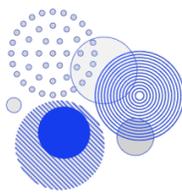
**11. Barrier: Complexity of Location Fitment Analysis Across Competing States**

**Strategic Edge: Location Arbitrage through Ecosystem Lock-In.** First movers can conduct a comprehensive, data-driven fitment analysis to identify states with sustainable advantages—power surplus, water availability, seismic stability, and logistics connectivity. By committing early, they negotiate exclusive incentive packages, secure the best-developed land parcels, and shape state-level policies to align with their needs. They also partner with state governments to transform local institutes into dedicated talent feeders, ensuring first access to trained graduates. This transforms a complex decision into a durable geographic moat, locking in preferential infrastructure and operational advantages that latecomers cannot replicate

**Exhibit O6: Limited Diversification of Critical Raw Material Sourcing Across Sub-Tier Component Suppliers & Positioning of India**

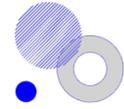


Source: McKinsey & Company, Eninrac Consulting



## Exhibit 07 : India's Critical Raw Material Advantage & Strategic Implications

| Critical Material   | India's Position   | Strategic Implications   |
|---|--|--|
| <b>Quartz &amp; High-Purity Silica</b>                    | India has abundant deposits of quartzite, a primary raw material for crucibles and quartzware used in crystal pulling furnaces.  | First movers can establish local quartz crushing, beneficiation, and crucible manufacturing units, reducing dependence on imports from Russia and the US |
| <b>Rare Earth Elements</b> (Lanthanum, Cerium, Neodymium) | India possesses ~6% of global rare earth reserves, with significant monazite deposits in coastal sands (Andhra Pradesh, Tamil Nadu, Odisha). Used in CMP slurries, phosphors, and specialty glasses. | Local processing and separation facilities can create a domestic supply chain for rare earth-based semiconductor materials, reducing China's dominance.  |
| <b>Copper &amp; Base Metals</b>                           | India is a major copper producer; high-purity copper is essential for lead frames, bonding wires, and interconnects.   | Local refining to semiconductor-grade purity (99.99%+) can support OSAT and packaging units with reduced import lead times.                              |
| <b>Specialty Gases</b> (Argon, Helium)                    | India has growing air separation capacity for argon. Helium, though limited, can be extracted from specific natural gas fields with appropriate investment.  | On-site or regional air separation units can supply bulk gases, while helium recovery and recycling systems reduce import dependency.                    |
| <b>Gallium &amp; Indium</b>                               | India has bauxite reserves containing gallium and zinc reserves containing indium—both critical for compound semiconductors (GaAs, GaN, ITO).  | Establishing recovery and refining capabilities positions India as a supplier for downstream compound semiconductor fabs.                                |



## Must Buy For

- Semiconductor Fabrication Companies (Foundries & IDMs)
- OSAT/ATMP Players (Assembly, Testing & Packaging Providers)
- Fabless Semiconductor Design Companies
- EDA Tool & Semiconductor IP Providers
- Semiconductor Equipment Manufacturers (Lithography, Deposition, Etching, Metrology)
- Specialty Chemical & Materials Suppliers (Wafers, Gases, Photoresists, CMP Slurries)
- Electronics Manufacturing Services (EMS) & OEMs (Consumer, Automotive, Industrial)
- Automotive & EV Manufacturers (ICE, EV, ADAS, Power Electronics)
- Telecom & 5G/6G Infrastructure Providers
- Consumer Electronics & Mobile Device Manufacturers
- Industrial Automation & IoT Solution Providers
- Data Centre & High-Performance Computing Infrastructure Players
- Defense & Aerospace Electronics Manufacturers
- Power Electronics & Renewable Energy Equipment Manufacturers
- Government Ministries & Semiconductor Mission Authorities
- State Industrial Development Corporations & Investment Promotion Agencies
- Infrastructure Developers (Industrial Parks, Semiconductor Clusters, Utility Providers)
- Investment Banks, Private Equity & Sovereign Funds
- Venture Capital Investors in Deep-Tech & Chip Design
- Development Finance Institutions (DFIs) & Export Credit Agencies
- Consulting, Strategy & Technical Advisory Firms (Policy, Feasibility, Ecosystem Development)



## Company Profiling

- Tata Electronics Pvt. Ltd.
- Micron Technology Inc. (India ATMP)
- CG Power & Industrial Solutions Ltd. (OSAT Venture)
- Kaynes Technology India Ltd. (Kaynes Semicon)
- Sahasra Semiconductors Pvt. Ltd.
- SPEL Semiconductor Ltd.
- Polymatech Electronics Pvt. Ltd.
- Vedanta Ltd. (Semiconductor Venture)
- Bharat Electronics Ltd.
- Dixon Technologies (India) Ltd.
- Intel Corporation
- NVIDIA Corporation
- Advanced Micro Devices (AMD)
- Qualcomm Incorporated
- NXP Semiconductors N.V.
- STMicroelectronics N.V.
- Infineon Technologies AG
- Texas Instruments Incorporated
- Applied Materials Inc.
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“ The life of a man consists not in seeing visions and in dreaming dreams, but in active charity and in willing service

- Henry Wadsworth Longfellow

## About Eninrac

Eninrac Consulting is a global market research and advisory firm that specializes in providing comprehensive insights and strategic solutions across various industries. Our services are designed to help businesses navigate market complexities, identify growth opportunities, and achieve sustainable success.

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