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EDITORIAL ANALYSIS

From Packaging to Fabrication: India's Semiconductor Ascent

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THE LIFT LINE

India has decided to enter the chip business through the back door of the factory, not the front. The new packaging plant at Sanand will not etch a single transistor, yet it is exactly the right first step: you learn to assemble and test before you dare to fabricate.

WHY THIS EDITORIAL MATTERS FOR YOUR EXAM

Semiconductors sit at the centre of India's industrial, technology and strategic-autonomy ambitions, spanning the Economy and Science and Technology syllabus. The inauguration of the CG Semi OSAT facility at Sanand on July 4, 2026 makes it a fresh, citable case.

GS Paper 3: Indigenisation (<https://ujjyari.com/vocab/indigenisation/>) of technology and developing new technology; effects of liberalisation on the economy; changes in industrial policy; infrastructure; growth and development.

Prelims angle: India Semiconductor Mission (ISM); OSAT/ATMP (Outsourced Semiconductor Assembly and Test / Assembly, Testing, Marking and Packaging); CG Semi (CG Power with Renesas of Japan and Stars Microelectronics of Thailand); the Sanand cluster; Micron's ATMP unit; the design-linked incentive scheme.

Mains angle: Why India began with assembly and testing rather than fabrication, and how it can climb toward a full fab ecosystem.

BACKGROUND AND CONTEXT

On July 4, 2026, the CG Semi OSAT facility at Sanand, Gujarat, began commercial production. Built at a cost of about Rs 7,600 crore (roughly 870 million dollars) as a joint venture between CG Power and Industrial Solutions, Japan's Renesas Electronics and Thailand's Stars Microelectronics, it is one of India's first major

chip packaging plants and, by official accounts, the third semiconductor unit to enter operations in the country in 2026. The plant targets consumer electronics, automotive and industrial markets, starting at around 200 million chips a year with a stated ambition to scale substantially.

The facility is part of the India Semiconductor Mission, launched to reduce India's near-total dependence on imported chips. Crucially, India has chosen to begin at the back end of the semiconductor value chain, in OSAT and ATMP work, which involves assembling, testing, marking and packaging finished silicon, rather than at the front end of wafer fabrication, which is the most capital-intensive, technology-guarded and water- and power-hungry stage. Micron's ATMP unit in the same Sanand cluster and Kaynes Semicon reflect the same logic. The wager is that assembly and testing build the skills, supplier base and confidence that a fabrication ecosystem eventually needs, while capturing value and jobs sooner.

THE CORE ARGUMENT / ISSUE

The central argument is that starting with OSAT/ATMP is a deliberate (<https://ujivari.com/vocab/deliberate/>) and sound sequencing choice: it is faster, less capital-intensive and skill-building, positioning India to exploit the China-plus-one supply-chain shift and to work toward fabrication over time.

Why Back-End First

Fabrication requires tens of billions of dollars, cutting-edge lithography access, ultra-pure water and uninterrupted power. OSAT is an order of magnitude cheaper and quicker to stand up, and it lets India enter the value chain now rather than in a decade.

The China-Plus-One Opportunity

Global firms are diversifying assembly and testing away from a single-country concentration. India offers scale, a large domestic market and policy incentives, making it a natural China-plus-one destination for the back end.

Building Toward a Fab

A functioning OSAT base develops the trained workforce, precision-manufacturing culture, chemical and gas supply chains and vendor ecosystem that a future fab will depend on. Skills and suppliers, not just subsidies, decide whether fabrication succeeds.

STAGE	WHAT IT DOES	CAPITAL INTENSITY	INDIA'S STATUS
Design	Chip architecture (fabless)	Low to medium	Strong talent base
Fabrication	Etching wafers	Very high	Nascent (https://ujyari.com/vocab/nascent/), being pursued
ATMP / OSAT	Assembly, testing, packaging	Medium	The current entry point
Materials and gases	Inputs to the process	Medium	Developing supplier base

HOW TO THINK ABOUT THIS (ANALYTICAL FRAME)

Use the value-chain ladder. Semiconductors move from design to fabrication to assembly-testing-packaging. India is strong in design, weak in fabrication, and now building the assembly rung. The strategic question is not “why not a fab first” but “which rung gives the fastest, most durable foothold.” OSAT wins on speed, cost and skill-building. A second frame is supply-chain **resilience** (<https://ujyari.com/vocab/resilience/>) versus self-sufficiency: India does not need to make every chip domestically; it needs to reduce single-point dependence and secure critical supply. OSAT advances resilience even before fabrication does. Finally, apply the ecosystem test: chip fabs succeed where an ecosystem of skills, suppliers, power, water and logistics already exists, which is precisely what the back-end phase seeds.

THE DIAGRAM IN WORDS

India depends heavily on imported chips -> India Semiconductor Mission seeks self-reliance -> fabrication is too costly and complex to start with -> India enters at OSAT/ATMP (assembly, testing, packaging) -> CG Semi Sanand plant begins production, JV with Renesas and Stars Microelectronics -> back-end builds skills, suppliers and the China-plus-one foothold -> ecosystem matures -> the road toward a full fabrication capability.

WAY FORWARD

- 1 **Deepen the back end.** Expand OSAT/ATMP capacity and localise supporting materials, chemicals and specialty gases to build a genuine ecosystem, not isolated plants.
- 2 **Sequence toward fabrication.** Use back-end learning to prepare for fabs, ensuring assured power, ultra-pure water and lithography access before committing the largest capital.

- 3 **Invest in talent.** Scale semiconductor design, process-engineering and technician training through academia-industry partnerships to overcome the skills bottleneck.
- 4 **Secure the supply chain.** Diversify sources of wafers, equipment and critical inputs, and use trade and technology partnerships (Japan, US, Taiwan) to reduce chokepoints.

PYQ LINKAGE AND PRACTICE

UPSC has asked about indigenisation and technology missions (2020 on IT industries; questions on Make in India and manufacturing). This editorial connects the semiconductor push to industrial policy and **strategic autonomy** (<https://ujivari.com/terms/strategic-autonomy/>).

Practice question: “India’s semiconductor strategy of starting with assembly and testing before fabrication is a pragmatic (<https://ujivari.com/vocab/pragmatic/>) sequencing of ambition.” Examine the rationale and the road ahead to a full fab ecosystem. (15 marks, 250 words)

Sources: The Indian Express (<https://indianexpress.com/section/opinion/>)

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