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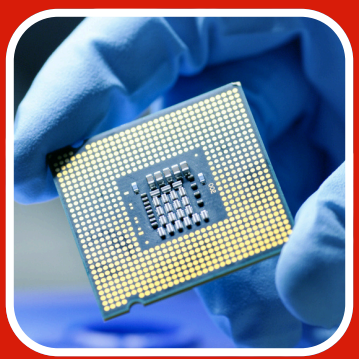

India Semiconductor Mission (ISM)

SEMICON India 2025

Global Semiconductor Market

$700-728 billion in 2025

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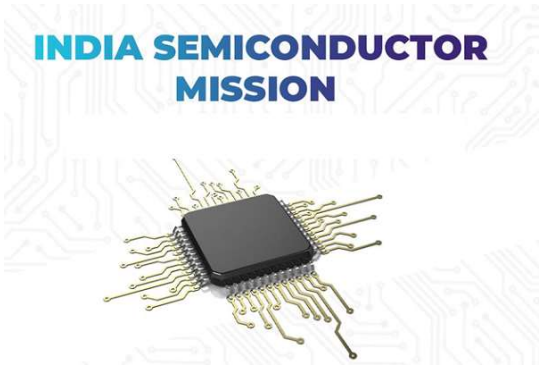
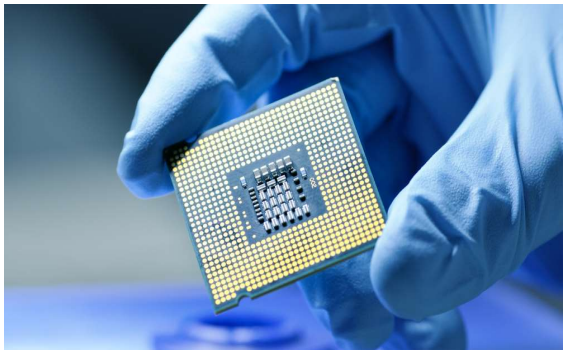
INDIA SEMICONDUCTOR MISSION (ISM)

The India Semiconductor Mission (ISM) is a flagship initiative launched in 2021 by the Government of India to develop a robust domestic semiconductor and display ecosystem, aiming to position India as a global electronics manufacturing and design hub.





Overview and Objectives

- ISM is an independent division under the Ministry of Electronics and Information Technology (MeitY), established within Digital India Corporation, and holds full administrative and financial powers to steer the program.
- The primary goal is to catalyze the growth of semiconductor manufacturing, packaging, and chip design in India to support technological self-reliance and reduce import dependence.
- ISM serves as the nodal agency for smooth, coherent, and efficient implementation of all semiconductor-related policies and projects in the country.

Key Features and Incentives

The original outlay for ISM was ₹76,000 crore (approx. $10 billion), making it one of the largest government-backed missions in the electronics and IT sector.

Major schemes under ISM:

- Semiconductor Fabs Scheme: Up to 50% fiscal support for semiconductor wafer fabrication plants.
- Display Fabs Scheme: Up to 50% of project costs for display manufacturing.
- Design Linked Incentive (DLI) Scheme: Support for semiconductor design startups and MSMEs at various product development stages.
- Modernization of the Semi-Conductor Laboratory (SCL) in Mohali as a brownfield fab.

Recent News and Milestones

- As of 2025, ten semiconductor projects have been approved across six states, including Odisha, Punjab, and Andhra Pradesh, with new projects boosting both manufacturing and R&D capabilities.
- SEMICON India 2025 recently brought together global technology leaders, policymakers, and investors to showcase India's advancements and fresh investment inflows in semiconductor manufacturing and design. It emphasized India's vision to become a trusted partner in the global chip supply chain.
- Partnerships with global industry leaders like Micron and Foxconn, as well as collaborations with the U.S. National Science Foundation, have marked important steps toward technology transfer and capacity building.

Economic and Strategic Significance

- India's semiconductor market is set to reach between $100-110 billion by 2030, and the global market is expected to hit $1 trillion, making this mission crucial for economic growth and technological leadership.
- The sector is projected to generate more than a million skilled jobs by 2030, with a focus on applications in automotive, defense, telecommunications, and clean energy.
- ISM also addresses supply chain risks and strategic dependencies by incentivizing local component, materials, and equipment manufacturing, as part of ISM 2.0.
- Leadership, Administration, and Schemes
- ISM has an advisory board with leading global semiconductor experts, ensuring industry-aligned policy and agile administration.
- The mission has already committed over ₹65,000 crore under the Production Linked Incentive (PLI) scheme, driving private investment and innovation.

Summary Table: India Semiconductor Mission (ISM)

Feature	Details
Launch Year	2021
Administered by	Ministry of Electronics and IT (MeitY)

Feature	Details
Initial Outlay	₹76,000 crore (~$10B)
Key Schemes	Fabs, Display Fabs, DLI
Strategic Goals	Self-reliance, global supply chain, job creation
Projects Approved (2025)	10 projects in 6 states
Major Events	SEMICON India 2025
Employment Target	Over 1 million jobs by 2030
Collaborations	Micron, Foxconn, U.S. NSF

India's ISM is a transformative step to create a competitive, innovation-driven, and resilient semiconductor sector aligned with India's broader economic and technological aspirations.

Semiconductors

Semiconductors are materials whose ability to conduct electricity lies between that of conductors (like metals) and insulators (like ceramics or plastics).

Key Properties

- Semiconductors' conductivity can be modified by adding impurities (doping) or changing temperature.
- The most common semiconductor materials are silicon and germanium; silicon dominates modern electronics.
- At low temperatures, semiconductors act as insulators, but as temperature increases, their conductivity improves due to the creation of free electrons and "holes" (positive charge carriers).
- Semiconductor devices can perform switching, amplification, energy conversion, and are sensitive to light, which is vital for sensors and photonics.

Types of Semiconductors

- **Intrinsic semiconductors**: Pure materials, like silicon or germanium, with equal numbers of electrons and holes as charge carriers.
- **Extrinsic semiconductors**: Doped with elements (for example, phosphorus or boron) to enhance conductivity, creating either more electrons (n-type) or more holes (p-type).

Applications

- Semiconductors are the foundation of modern electronics: they form the basis of transistors, diodes, integrated circuits (ICs), sensors, and most digital technologies.
- Found in computers, smartphones, home appliances, medical devices, vehicles, and industrial systems—the innovation behind digital communication, computing, and automation.
- Enable energy efficiency, miniaturization, and power modern technologies like AI, IoT, renewable energy systems, and smart manufacturing.

Industry Context

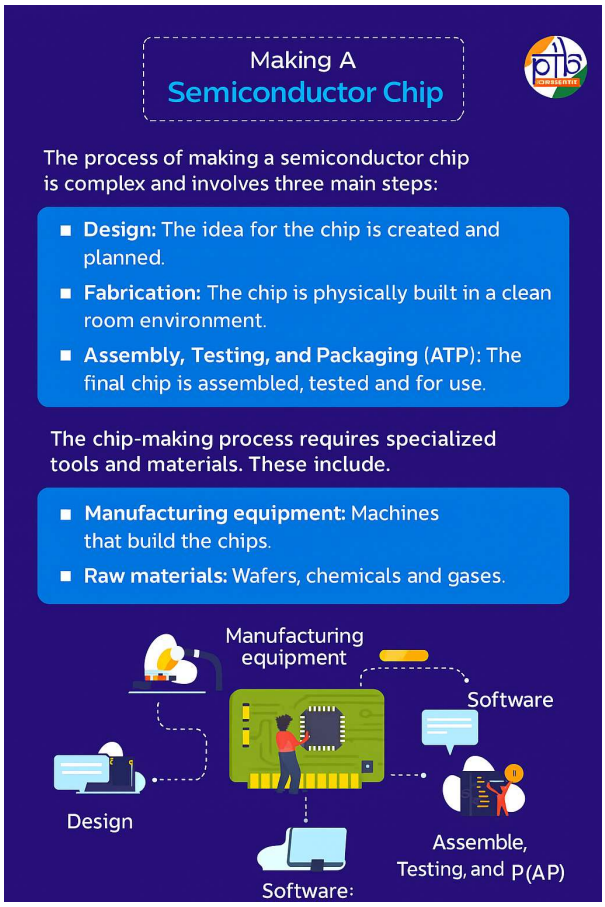
- Advanced semiconductors are primarily manufactured in highly specialized foundries, with Taiwan (TSMC) leading global production, especially for the most sophisticated chips.
- The Semiconductor Industry Association notes steady growth in global sales, underscoring their central role in economies and technology.

Historical Notes

- Silicon crystal, the most common semiconducting material in microelectronics and photovoltaics
- Early applications were basic diodes and radios; the invention of the transistor in 1947 revolutionized electronics by replacing bulky vacuum tubes.
- Continued advances have made semiconductors indispensable for progress in nearly every technology sector.
- Semiconductors' ability to control and modify electrical conductivity is what makes modern digital life possible, powering everything from microchips to renewable energy technology.

SEMICON India Programme

The SEMICON India Programme is a flagship initiative by the Indian government aimed at building a robust domestic semiconductor and display manufacturing ecosystem, with a total financial outlay of ₹76,000 crore (over US$10 billion) under the India Semiconductor Mission (ISM).



Key Features and Objectives

- **Investment Incentives**: The programme offers attractive incentives and capital support for companies engaged in establishing semiconductor fabs, display fabs, compound semiconductor production, packaging (ATMP/OSAT), and chip design.
- **Technology Collaboration**: It seeks to foster strategic partnerships with global industry leaders, policymakers, startups, and academia to advance research, talent development, and technological transfer.
- **Self-Reliance and Ecosystem Development**: The overarching aim is to reduce import dependency, develop a sustainable semiconductor supply chain, and support India's ambition to become a self-reliant semiconductor powerhouse.
- **Skill Development**: The programme plans to train 85,000 engineers and technicians over the next decade via collaborations with more than 100 educational and research institutions.
- **Research and Design Promotion**: Through initiatives like the Design Linked Incentive (DLI) scheme, the programme supports chip design startups and R&D, further integrating India into the global semiconductor value chain.

Recent Developments and Events

- **SEMICON India 2025**: Scheduled for 2–4 September 2025 in New Delhi (Yashobhoomi, Dwarka), this event is a major forum for industry networking, showcasing emerging technologies, and scaling up international collaboration.
- **Past Conferences**: Previous editions in Bangalore (2022), Gandhinagar (2023), and Greater Noida (2024) have seen participation from global leaders and reinforced India's stature in the international semiconductor industry.
- **Government Support**: The programme is driven by policy support from the Ministry of Electronics and Information Technology (MeitY) and coordinated by the India Semiconductor Mission (ISM), which oversees fiscal measures and infrastructure development.

Impact and Vision

- **Making India a Global Hub**: The SEMICON India Programme is integral to India's goal of expanding its electronics sector beyond US$500 billion by the decade's end and creating millions of job opportunities.
- **International Partnerships**: Active coordination with countries like the US, Japan, and Singapore—supported by initiatives such as the International Technology Security and

Innovation (ITSI) Fund—aims at strengthening supply chain resilience and technological capacity.

- **Holistic Ecosystem**: By supporting the entire value chain—design, fabrication, packaging, and workforce—the programme aspires to make India a competitive, innovation-driven semiconductor and display manufacturing destination.

In summary, SEMICON India is central to India's ambitions in high-tech manufacturing, with strong policy, financial, and industry support driving its efforts to become a global semiconductor leader.

Significance of the Semiconductor Industry

The semiconductor industry is of central importance to the modern world, powering technological progress, economic growth, and national security across the globe.

Backbone of Modern Technology

Semiconductors function as the "brains" of modern electronics, enabling everything from computers, smartphones, and communication devices to advanced military systems, healthcare equipment, and renewable energy platforms. Innovations in artificial intelligence (AI), the Internet of Things (IoT), robotics, automotive electronics (including electric and autonomous vehicles), and 5G/6G communication networks are fundamentally dependent on advances in semiconductor technology.

Economic Growth and Global Trade

- The industry contributes directly and indirectly to economic growth:
- The global semiconductor market is projected to reach $1 trillion by 2030.
- Major economies and exports depend on semiconductors, with the industry accounting for a significant share of global trade and high-value job creation.
- Each job in semiconductors creates nearly 5 additional jobs elsewhere, highlighting its multiplier effect.

Strategic and National Security Importance

Semiconductors are crucial for national security, as they power advanced military technologies, secure communication networks, and critical infrastructure. Nations are increasingly focused on securing their own semiconductor supply chains to ensure strategic autonomy and reduce vulnerability to global supply disruptions.

Driver of Innovation

Continuous innovation, characterized by Moore's Law, has allowed the industry to create more powerful, energy-efficient, and cost-effective chips, accelerating progress in every aspect of society—from healthcare to transportation.

Relevance for India

For India, developing a robust indigenous semiconductor ecosystem is key to self-reliance (Atmanirbhar Bharat), addressing supply shocks, boosting domestic electronics manufacturing, and capturing a share of a rapidly growing global market. It is expected to create tens of thousands of high-quality jobs and catalyze innovation that supports the country's economic and strategic goals.

In summary, the semiconductor industry is indispensable for technological advancement, economic development, strategic autonomy, and sustainable innovation worldwide.

Semiconductor Market and India as a Player

The global semiconductor market is projected to reach around $700 billion in 2025, driven by major growth in AI, data centers, advanced chip technologies, and next-gen computing. It is expected to grow further to $1 trillion by 2030. India is emerging as a significant player in this expanding global semiconductor ecosystem, transitioning from primarily a consumer to becoming a manufacturer and design hub.

Global Semiconductor Market Overview 2025

- The market is forecasted to grow to about $700-728 billion in 2025, an approximate 11%-15% year-over-year increase.
- Key drivers include AI infrastructure, advanced memory chips, generative AI, and data center expansions.
- Advanced packaging, smaller node technology, and AI-driven manufacturing enhancements are key technology trends.
- Leading regional contributors remain Asia Pacific (Taiwan, South Korea, China), the Americas, and Europe.

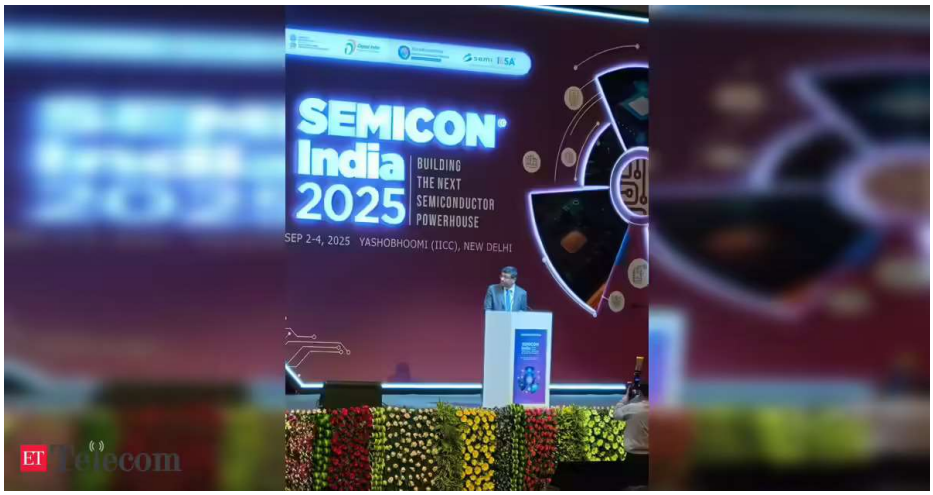
India's Role as a Semiconductor Player

- India plans commercial chip production by end of 2025, with "Made-in-India" chips built on 28-90 nm technology.

- The government has committed around ₹76,000 crore (~$10 billion) under the India Semiconductor Mission (ISM) and related incentives (PLI, DLI schemes) to develop semiconductor ecosystem infrastructure, fabs, design centers, and testing facilities.
- India is developing outsourced semiconductor assembly and testing (OSAT) facilities, semiconductor fabs, and talent development aiming to meet demand for 500,000 semiconductor professionals by 2030.
- Major private and multinational companies like CG Power, Kaynes, Micron, and Tata are actively setting up manufacturing, testing, and design centers.
- PM Narendra Modi emphasized India's strategy to become a major player in the global $1 trillion semiconductor market by expanding investments, building semiconductor fab ecosystems, and fostering R&D collaborations.
- SEMICON India 2025 brought together global semiconductor leaders showcasing India's emerging semiconductor manufacturing and technology ecosystem.
- India is still building capacity and supply chain resilience, with a focus on long-term growth and integration into the global semiconductor value chain.

India Semiconductor Mission (ISM)

The India Semiconductor Mission (ISM) is a transformative initiative launched by the Government of India in 2021 with a financial outlay of ₹76,000 crore. It aims to build a strong semiconductor and display ecosystem to position India as a global hub for electronics manufacturing and design. ISM functions as an independent business division under the Ministry of Electronics and IT (MeitY) and Digital India Corporation, serving as the nodal agency for efficient implementation of semiconductor and display schemes.



Key Components of ISM:

- Scheme for setting up Semiconductor Fabs: Provides up to 50% fiscal support for establishing semiconductor wafer fabrication facilities in India.
- Scheme for setting up Display Fabs: Offers up to 50% fiscal support for display fabrication units like TFT LCD and AMOLED.
- Scheme for Compound Semiconductors, Silicon Photonics, Sensors Fab, Semiconductor Assembly, Testing, Marking, and Packaging (ATMP/OSAT): Provides 30% capital expenditure support.
- Design Linked Incentive (DLI) Scheme: Supports semiconductor design startups and MSMEs with financial incentives and design infrastructure.

Objectives:

- To catalyze India's semiconductor ecosystem in manufacturing, packaging, and design.
- To reduce reliance on imports and develop a self-reliant electronics manufacturing ecosystem.
- To promote indigenous Intellectual Property (IP) generation and encourage Transfer of Technologies (ToT).
- To foster collaborations with global semiconductor industry experts and institutions.

Recent Developments:

- The government is preparing to roll out ISM 2.0, expected to broaden support within the semiconductor value chain, possibly with an increased outlay of around $20 billion.
- Ten major projects have been approved under ISM 1.0 across various states, including Odisha, Punjab, and Andhra Pradesh.
- ISM is expected to significantly enhance India's share in the global semiconductor market, which is projected to reach $100-110 billion by 2030.
- The mission is strategic for India's electronics and semiconductor industry growth, innovation, and integration into global supply chains, promoting economic and technological self-reliance.