



## India-US Deal for Semiconductor Unit

**For Prelims:** [Semiconductor](#), [India's Semiconductor Mission](#), [PLI](#), [India's Self-Reliance](#), [SPECS](#), [DLI](#).

**For Mains:** India's Push for Semiconductor

### Why in News?

Recently, US-based Company - Micron Technology, has signed a **Memorandum of Understanding (MoU)** with the state government of **Gujarat** to establish a [Semiconductor Unit](#) worth **Rs 22,500 crore** near **Ahmedabad**.

- Earlier, [India and the US signed MoU](#) on establishing the [Semiconductor Supply chain](#) during [India-US 5th Commercial Dialogue 2023](#), which can help India realise its long-nurtured dream of becoming a hub for electronic goods.

### What is the Significance of the MoU?

- The MoU seeks to establish a collaborative mechanism on semiconductor supply chain resiliency and diversification in view of US's **CHIPS and Science Act, 2022** and [India's Semiconductor Mission](#).
- The project aims to create **5,000 direct jobs** and contribute to India's [Self-Reliance](#) in memory chip manufacturing.
- It aligns with govt's goal of promoting **domestic manufacturing and reducing import dependency** in the semiconductor sector and is expected to **bolster India's position as a global semiconductor manufacturer**.

### What are Semiconductor Chips?

- **About:**
  - Semiconductors are **materials which have a conductivity between conductors and insulators**. They can be pure elements - **silicon** and **germanium** or compounds - **gallium, arsenide** and **cadmium selenide**.
  - They are the basic building blocks that serve as the **heart and brain of all modern electronics** and information and communications technology products.
  - These chips are now an integral part of contemporary automobiles, household gadgets and essential medical devices such as ECG machines.
- **Significance:**
  - Semiconductors are essential to **almost all sectors of the economy** including aerospace, automobiles, communications, clean energy, information technology and medical devices etc.
  - The high demand for these critical components has **outstripped supply, creating a global chip shortage** and resulting in lost growth and jobs in the economy.
  - Semiconductors and displays are the foundation of modern electronics driving the next phase of **digital transformation under [Industry 4.0](#)**.

## Where does India Stand in the Semiconductor Market?

- Indian semiconductor industry in 2022 was USD 27 Billion, with over **90% being imported**, and therefore a significant external dependence for Indian chip consumers.
  - Countries exporting semiconductors to India include **China, Taiwan, the USA, Japan, etc.**
- The Indian semiconductor market is expected to reach **USD 55 Billion by 2026** with its own consumption of semiconductors expected to cross USD 80 billion by 2026 and to USD 110 billion by 2030.

## What are the Challenges Regarding Semiconductor Manufacturing in India?

- **Extremely Expensive Fab Setup:**
  - A semiconductor fabrication facility (or fab) can cost **multiples of a billion dollars to set up even on a relatively small** scale and lagging by a generation or two behind the latest in technology.
- **Higher Investment:**
  - Semiconductors and display manufacturing is a **very complex and technology-intensive** sector involving **huge capital** investments, high risk, long gestation and payback periods, and rapid changes in technology, which require significant and sustained investments.
- **Minimal Fiscal Support from Government:**
  - The level of fiscal support currently **envisioned is minuscule when one considers the scale** of investments typically required to set up manufacturing capacities in the various sub-sectors of the semiconductor industry.
- **Lack of Fabrication Capacities:**
  - India has a decent chip design talent but it never built-up chip fab capacity. The [ISRO](#) and the [DRDO](#) have their respective fab foundries but they are primarily for their own requirements and are also not as sophisticated as the latest in the world.
  - India has only one old fab which is located in Mohali, Punjab.
- **Resource Inefficient Sector:**
  - Chip fabs are also very **thirsty units requiring millions of litres of clean water**, an extremely stable power supply, a lot of land and a highly skilled workforce.

## What are the Initiatives Related to Semiconductors?

- In 2021, India announced its roughly USD 10 billion-dollar **[Production-Linked Incentive \(PLI\) scheme](#)** to encourage semiconductor and display manufacturing in the country.
  - In 2021, the MeitY also launched the **[Design Linked Incentive \(DLI\) Scheme](#)** to nurture at least 20 domestic companies involved in semiconductor design and facilitate them to achieve a turnover of more than Rs.1500 crore in the next 5 years.
- India has also launched the **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)** for manufacturing of electronics components and semiconductors.
- **[India's Semiconductor Mission](#)** was launched in 2021 with a total financial outlay of Rs 76,000 crore as a part of the comprehensive program for the development of sustainable semiconductors and display ecosystem in India. The components of the mission include:
  - **Scheme for setting up of Semiconductor Fabs in India**
  - **Scheme for setting up of Display Fabs in India** - fiscal support of up to 50% of Project Cost subject to a ceiling of INR 12,000 crore per Fab.
  - **Scheme for setting up of Compound Semiconductors / Silicon Photonics / Sensors Fab and Semiconductor ATMP/ OSAT facilities in India.**

## Way Forward

- Favourable trade policies are critical for building a plurilateral semiconductor ecosystem.
  - India must also improve **research and development** in this sector where it is currently lacking.
- There is a need for the **Indian government to connect related industries** in India to create the chip manufacturing ecosystem. National capability needs to be enhanced.
- Besides the US, India should also explore the similar opportunities to **collaborate with other countries such as Taiwan and Japan or other technologically advanced, friendly nations** to promote the Domestic manufacturing and **reduce import dependency** in the Semiconductor Sector.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### **Prelims:**

**Q. Which one of the following laser types is used in a laser printer? (2008)**

- (a) Dye laser
- (b) Gas laser
- (c) Semiconductor laser
- (d) Excimer laser

**Ans: (c)**

**Q. With reference to solar power production in India, consider the following statements: (2018)**

1. India is the third largest in the world in the manufacture of silicon wafers used in photovoltaic units.
2. The solar power tariffs are determined by the Solar Energy Corporation of India.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans: (d)**

**Source: IE**

