Programme for Development of Semiconductors and Display Manufacturing Ecosystem

For Prelims: Production Linked Incentives, Self Reliance, Scheme for Promotion of Manufacturing of electronic Components and semiconductors, semiconductors and its use.

For mains: Significance of semiconducting device in Indian economy, Need of promoting electronic and semiconductor industry, role of electronic industry in making India self-reliant.

Why in News

Recently, the Ministry of Electronics and Information Technology (MeitY) has approved a comprehensive **Program for the Development of** Semiconductors **and Display Manufacturing Ecosystems** in the country.

- The government proposes to provide **incentives worth Rs 76,000 crore for the development of semiconductors and display manufacturing** ecosystems **over the next six years.**

Semiconductors

- Any of a class of crystalline solids **intermediate in electrical conductivity between a conductor and an insulator.**
- Semiconductors are employed in the manufacture of various kinds of electronic devices, **including diodes, transistors, and integrated circuits.** Such devices have found wide application **because of their compactness, reliability, power efficiency, and low cost.**
- As discrete components, **they have found use in power devices, optical sensors, and light emitters, including solid-state lasers.**

Key Points

- **Incentives Under the Programme**
  - **Semiconductor Fabs and Display Fabs:**
    - It would provide **fiscal support of up to 50% of the project cost** for setting up semiconductor and display fabrication units.
    - The Union government will work with the States to **set up high-tech clusters with the required infrastructure** such as land and semiconductor-grade water.
  - **Semi-conductor Laboratory (SCL):**
    - MeitY **will take requisite steps for modernization and commercialization of Semi-conductor Laboratory (SCL).**
    - MeitY will explore the possibility **for the Joint Venture of SCL with a commercial fab partner** to modernise the brownfield fab facility.
  - **Compound Semiconductors:**

        - It will support fiscal support **of 30% of capital expenditure to approved units.**
        - At Least **15 such units** of Compound Semiconductors and Semiconductor Packaging **are expected to be established** with Government support under this scheme.
    - **Semiconductor Design Companies:**
        - The **Design Linked Incentive (DLI) Scheme shall extend product design linked incentive of up to 50%** of eligible expenditure and product deployment linked incentive of 6% - 4% on net sales for five years.
        - **Support will be provided to 100 domestic companies** of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design.
    - **India Semiconductor Mission:**
        - In order to drive the long-term strategies for developing a sustainable semiconductors and display ecosystem, a **specialised and independent India Semiconductor Mission (ISM) will be set up.**
        - ISM will be **led by global experts in the semiconductor and display industry.** It will act as the nodal agency for efficient and smooth implementation of the schemes on Semiconductors and Display ecosystem.
    - **Production Linked Incentives:**
        - Incentive support to the tune of Rs.55,392 crore (7.5 billion USD) have been approved under **PLI** for Largest Scale Electronics Manufacturing, PLI for IT Hardware, SPECS Scheme and **Modified** Electronics Manufacturing Clusters **(EMC 2.0) Scheme.**
        - In addition, PLI incentives to the quantum of Rs.98,000 crore (USD 13 billion) are approved for allied **sectors comprising ACC battery, auto components, telecom & networking products, solar PV modules and white goods.**
- **Significance:**
    - **Strategic Importance**: In the current geopolitical scenario, **trusted sources of semiconductors and displays hold strategic importance** and are key to the security of critical information infrastructure.
    - **Employment:** It will also create **highly skilled employment opportunities** to harness the demographic dividend of the country.
    - **Multiplier Effect:** Development of the semiconductor and display ecosystem will have a multiplier effect across different sectors of the economy with deeper integration to the global value chain.
    - **Boost to Electronic Sector:** The program will **usher in a new era in electronics manufacturing** by providing a globally competitive incentive package to companies in semiconductors and display manufacturing as well as design.
    - **Self Reliance:** This shall **pave the way for India's technological leadership** in these areas of strategic importance and economic self-reliance.

Indian Electronic Sector

- **About:**
    - The Indian electronics sector is **tremendously growing** with the demand expected to cross **USD 400 billion by 2023-24.**
    - Domestic production has grown from USD 29 billion in 2014-15 to nearly **USD 70 billion in 2019-20 (**Compounded Annual Growth Rate **of 25%).**
    - Most of this production takes place in the final assembly units (last-mile industries) located in India and focussing on them will **help develop deep backward linkages, thus inducing industrialisation.**
- **Need:**
    - **National Security Considerations:**
        - Most of the chips, as well as components used in Indian communication and critical systems, are imported.
        - This **could hamper national security and sovereignty** as backdoors could be programmed in chips during manufacturing, which could compromise networks and **cyber-security.**
    - **Increasing Imports:**

        - It is expected that **electronics imports will soon overtake crude oil** as India's largest import commodity which will result in assembly units ending up as little more than mere packaging units.
    - **Increased Demand and Shortage Amid Covid:**
        - The **Covid-19 pandemic** and the subsequent **lockdowns** across the world that **forced shut crucial chip-making facilities in countries including Japan, South Korea, China and the US.**
        - Its shortage causes cascading effects, given that the first one creates pent-up demand that becomes the cause for the follow-up famine.
    - **Profiting from Anti-Chinese Sentiments:**
        - Due to the **USA's allegations on China** for worsening **Covid-19** **and** **India-China conflict** and **recent developments as a result of it**, numerous multinational companies (MNCs) are shifting their production out of China.
    - **Pushing Make in India:**
        - There is **a need to promote semiconductor manufacturing alongside assembly units** in India.
        - This will induce greater local production of components and also fuel the growth of the industry as a whole, making **Make in India** successful.
        - In 2019, the Union Cabinet gave its approval to the **National Policy on Electronics 2019** which envisions positioning India as a global hub for Electronics System Design and Manufacturing.
- **Challenges:**
    - **Missing Profits:**
        - Despite the impressive growth of electronic production in India, **the net value added by production units is very low.**
        - The net value addition ranges between 5% and 15%, as most components are imported rather than locally sourced.
        - It implies that local value addition is a mere USD 7-10 billion out of a global market of USD 2.1 trillion.
    - **Limited Indigenous Capability in Upstream Industries:**
        - In the era of **global supply chains**, the **value addition at the final stages of production is very low**, especially in electronics because the more complicated processes, involving greater value addition, occur prior to assembly, in 'upstream' industries.
        - These include the production of processors, display panels, memory chips, cameras, etc.
    - **Absence of Foundries:**
        - In the absence of **foundries (semiconductor fabrication plants where microchips are produced)**, India has to **rely on foreign contractors** to produce microchips.
        - Set-up of Foundries requires **massive capital expenditure** to the tune of USD 2 billion and more.
            - Foundries are also required to adopt newer technologies and processes almost every 18 months to ensure competitiveness which means high capital depreciation and often accounts for 50-60% of the production cost.

Way Forward

- Semiconductors and displays are the **foundation of modern electronics** driving the next phase of digital transformation under **Industry 4.0.**
- The new mission **should focus fiscal support**, at least for now, on other parts of the chip-making chain including design centres, testing facilities, packaging etc.
    - The total outlay of **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)** must be increased from the current Rs. 3300 crore, to attract the microchip giants.
- India's PSEs such as Bharat Electronics Ltd or Hindustan Aeronautics Ltd can be **used to set up a semiconductor fab foundry with the help of a global major.**
- India needs to drop the dream of swadeshi semiconductors. Instead, **it should aim to become a key player in a trusted, plurilateral semiconductor ecosystem** that keeps key adversaries

out.

- **Favourable trade policies** are critical for building a plurilateral semiconductor ecosystem.

Source: PIB