Modified PLI for Semiconductors

Why in news?

The Union Cabinet has recently approved modifications in the Production-Linked Incentive (PLI) Scheme for manufacturing of semiconductor and display manufacturing ecosystem.

What is a semiconductor?

- Semiconductor is made of silicon and gives computational power to devices.
- They are building blocks of almost every modern electronic device.
- Semiconductors having higher nanometre value are applied in automobiles, consumer electronics, etc.
- Semiconductors having lower values are used in devices such as smartphones and laptops.

How is the Semiconductor industry so far?

- The chip-making process is complex and has multi-step supply chain.
- It involves chip-designing, development, software designing, patenting, making chip-fabrication machines; setting up fabs or factories; and ATMP (assembly, testing, marking and packaging).
- The big players in semiconductor industry are Taiwan, South Korea and the U.S.

90% of 5nm (nanometre) chips are produced in Taiwan

What is the need for strong semiconductor ecosystem in India?

- Several sectors, including auto, telecom, and medical technology suffered due to the scarcity of chips manufactured by only a few countries.
- The sudden surge in demand of chips and semiconductor components has underpinned the need to establish a robust semiconductor ecosystem in India.
- Other factors that led major economies to enter the chip-making sector with a renewed push includes:
    - The global chip shortage
    - U.S.-China tensions over Taiwan
    - The supply chain blockages owing to the Russia-Ukraine conflict

What are the changes to India's chip-making scheme?

PLI and DLI scheme

- In December 2021, India announced its roughly $10 billion dollar Production-Linked Incentive (PLI) scheme to encourage semiconductor and display manufacturing in the country.
- It also announced fiscal support for a Design-Linked Initiative (DLI) scheme to drive global and domestic investment related to design software, IP rights etc.

Modified scheme

- The new scheme encourages all areas of chip-making to create an integrated ecosystem in India.

Chip size	Previous version	Modified version
45nm to 65nm	30% funding	Uniform 50% fiscal support for all nodes
28nm to 45nm	40% funding	
28nm and below	50% funding	
		Provides 50% of capital expenditure for other steps of the process.

- The PLI and DLI schemes had attracted many global semiconductor players for setting up fabs in India.
- The modified scheme also emphasised the production of the 45nm chip, which is fairly less time-consuming and economical in terms of production.
- The technology nodes of 45nm and above have high demand, driven primarily by automotive, power and telecom applications and constitutes about 50% of the total semiconductor market.

What are the challenges?

- **Expensive** - Chip production is a resource-intensive and expensive process.
- **Shortage of funds** – The industry requires more funding than the scheme provides sufficient enough to cover all steps of the process.
- For example, setting up of one semiconductor fab requires an investment of anywhere between $3 and $7 billion and the scheme outlay remains $10 billion.
- **The initial funding** – It should focus on areas like design and R&D, for which India already has an established talent pool.
- **Water intensive** - Chip-making requires gallons of ultrapure water in a single day.
- **Stable power supply** - An uninterrupted supply of power is central to the process, with just seconds of fluctuations or spikes causing millions in losses.

References

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