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Commentary

Semiconductor Manufacturing in India

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DESCRIPTION

Smart phone prices shoot-up, booking cars late for delivery late delivery of gaming consoles and PlayStation. They are interconnected by a common player called small computer chips. These shortage have great impact than anything because, these computer drive the world (Figure 1).

Figure 1: A semiconductor chip.

As US President Biden describes silicon made semiconductors as the "21 centuries horse shoe nail". US and China already in the race with each other. In 2020, over 35 million dollar cash flow to china through a primary and secondary market, a stunning increase demand rose to 407% increase from previous year. Most experts said that India has good designing skills, processing skill but, they don't have great history in semiconductor manufacturing. But, India enters the game with a clean cover drive by formulating India Semiconductor Mission (ISM).since India is the second largest mobile manufacturer after china. Sand is the raw material for the manufacturing. It is the second most abundant in the earth crust, but it is available as mixture of oxygen (silica, silicon dioxide). High complex chemical and physical process are required to ensure the high production standards that apply to chips to convert silica sand to silica, the sand is contained with carbon and healed to remove the oxygen (Figure 2). High purity is required at the ratio of 1 to 10 million silicon atom to impurities. Dust free environment and stable temperature is needed to maintain strictly. Precision is important in the entire process. India has the great platform for chip makers. Since the government encourages the domestic companies to have joint venture with the Taiwanese companies with top the semiconductor production in the world. India has a great platform for the chip makers since the every part of semiconductor industries is testing and packaging (Figure 3).

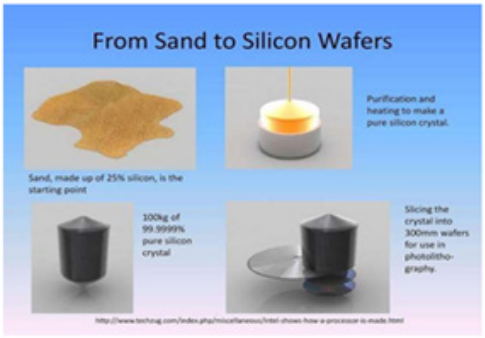

Figure 2: Sand particles are not any kind of sand or even beach sand. The particles are specifically mined, heated to thousands of degree temperature and purified to produce an ultimately flawless cylinder of silicon. The silicon is then sliced into wafers which are then polished.

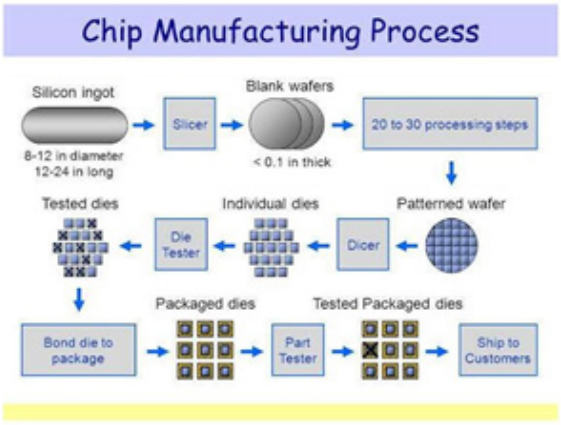

Figure 3: Layout of chip manufacturing process is shown .

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INDIA SEMICONDUCTOR MISSION

Government of India approves programme for development of semiconductor and display manufacturing ecosystem in India. In furtherance of the vision of make in India (Aatmanirbhar bharat) and positioning India as the global hub for electronic system design and manufacturing by Indian government has approved the comprehensive program for this development of sustainable semiconductor and display ecosystem in India (Figure 4). Semiconductors and displays are the foundation of modern electronics drive the next phase of digital transformation under industry 4.0. The programme aims to provide attractive incentive support to company that are engaged in silicon semiconductors fabs, display fabs, compound semiconductors, silicon phonetics, sensor(including MSME) fabs, semiconductor packaging and design.

Figure 4: Government of India promoting ISM through social media.

SEMICONDUCTOR AND DISPLAY FABS

The Scheme for Setting up of Semiconductor Fabs and Display Fabs in India shall extend fiscal support of up to 50% of project cost on pari-passu basis to applicants who are found eligible and have the technology as well as capacity to execute such highly capital intensive and resource incentive projects. Government of India will work closely with the State Governments establish High-Tech Clusters with requisite infrastructure in terms of land, semiconductor grade water, high quality power, logistics and research ecosystem to approve applications for setting up at least two greenfield Semiconductor Fabs and two Display Fabs in the country.

Semi-Conductor Laboratory (SCL)

Union Cabinet has also approved that Ministry of Electronics and Information Technology will take requisite steps for modernization and commercialization of Semi-conductor Laboratory (SCL). It will explore the possibility for the Joint Venture of SCL with a commercial fab partner to modernize the brownfield fab (Microchip Manufacturing Plant) facility.

SEMICONDUTOR DESIGN COMPANIES

The design linked incentive scheme shall extend product design linked incentive of up to 50% of eligible expenditure and product deployment linked incentive of 6%-4% on the net sales for five years. Support will give to 100 domestic companies. In total, government of India has committed support of 2,30,000 crores to position India as a global hub for electronics manufacturing with semiconductors as the foundational building block. Development of semiconductors and display ecosystem will a multiplier effect across different sectors of the economy with deeper integration to the global value chain. The program will promote higher domestic value addition in electronics. It will contribute significantly to achieving a USD 1 Trillion digital economy and a USD 5 trillion GDP by 2025.

CONCLUSION

ISM's vision is to create a thriving semiconductor and display design and innovation ecosystem that would allow India to emerge as a global centre for electronics manufacture and design. The India Semiconductor Mission (ISM) is critical for organising efforts to promote the semiconductor and display industries in a more structured, targeted, and comprehensive manner.