China’s export control measures for raw material

Why in news?

The Chinese Ministry of Commerce announced that it would implement export controls on items related to gallium and germanium which led to a spike in the prices of essential raw materials.

What are the curbs announced by China?

- According to China, the regulations were being imposed ‘in order to safeguard national security interests’.
- These control measures will be enforced from August 1, 2023.
- **Impacts -** China’s controls will apply to 8 gallium-related products and 6 germanium products.
- The export operators of gallium and germanium would now have to acquire a specific export licence.
- The application process requires operators to list the importers, end-users and end use.
- **Crime -** Exporting without permission will invite administrative penalties and the exporter will be held ‘criminally responsible’.

Why China imposed export controls?

- **Geopolitical backdrop -** China and the U.S. have been locked in a technology trade war that has been escalating since 2019.
- In October 2022, the U.S. Department of Commerce had implemented a series of export control measures to protect its ‘national security and foreign policy interests’.
- These measures restrict China’s ability to obtain advanced computing chips, develop and maintain supercomputers, and manufacture advanced semiconductors.
- The U.S. accused China that it was using the items and capabilities to produce advanced military systems.
- **Others -** Japan and the Netherlands followed suit this year and held that the measure was necessary on ‘national security grounds’.
- **China** has used the same reasoning of ‘safeguarding national security interests’ for its latest order.

The Netherlands is the home to the world’s most important chip-making equipment manufacturer ASML.

Why is it a matter of concern?

- China is the world's leading producer of both germanium and gallium.
- China produces 60% of the world's germanium 0 and 80% of gallium, according to the Critical Raw Materials Alliance.
- Germanium and gallium are key to the production of semiconductors and other high-tech products.
- Now semiconductors have become a flashpoint between the West and China in the ongoing chip-war.

Countries' response

- The European Commission has recognised it as a '*critical raw material*'.
- The Commission's import dependency on China stands at 71% and 45% for gallium and germanium respectively.
- In India, the Ministry of Mines identified the two elements to be crucial for the country's economic development and national security.
- The U.S. has firmly opposed the export controls of China.

How does China look at these allegations?

- **Chip war -** Few see these control measures as China's countermeasures to the U.S's decoupling through hegemonism.
- But, China has denied the assertions that the export measures were targeted at a specific country.
- China has stressed that it is fair, reasonable and non-discriminatory export control measures.

How will India be affected?

- The restriction of the export of gallium and germanium will impact semiconductor manufacturing across the globe but the impact is limited.
- The Chinese export controls are expected to have a short-term impact on India and its industries due to the disruption in immediate supply chains.
- The price hike resulting from the export control order would affect the cost and availability of chips, potentially impacting India's chip-making plans.

India is totally import-dependent for germanium and gallium.

What is the way ahead for India's Semiconductor industry?

- To ensure a reliable supply chain and long-term consequences for India's semiconductor industry few other factors has to be considered such as -
    - Alternative supply sources
    - Domestic semiconductor production capabilities
    - Strategic partnerships like the India-U.S. Initiative on Critical and Emerging Technology (iCET)

- **Opportunity -** India can see this scenario as an opportunity to move from import-dependent.
- India can focus on waste recovery from zinc and alumina production to produce the 2 critical minerals which are by-products of the two elements.
- Substitutes as indium and silicon could also be considered.

Quick Facts

Gallium
• Gallium is a soft, silvery metal that is in a liquid state near room temperature.
• It has a low melting point which helps in the production of semiconductors and electronic components.
• Gallium is used to make gallium arsenide which forms the core substrate for semiconductors.
• It is used in the manufacture of integrated circuits, light-emitting diodes (LEDs), and solar cells.
• It also used in automotives and lighting, and for sensors in avionic, space and defence systems.
• There are some Gallium-based compounds which also have medical applications, including the treatment of certain types of cancers.

Germanium
• Germanium is a soft, silvery semi-metal found as a by-product of processing bauxite and zinc ores.
• The semi-metal is a good element for use as semiconductors.
• It is used in a variety of applications, including fibre-optics, infrared optics (night vision goggles), and solar cell technologies, and infrared sensors.
• Germanium has also been found to have some medicinal uses and is sometimes used as a dietary supplement.

References

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