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China limiting exports of raw materials

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Why in News:

Recently as the country's retaliatory move in the 'chip war', the Chinese Ministry of Commerce announced that it would implement export controls on items related to gallium and germanium. It said that the controls were being imposed "in order to safeguard national security interests". The announcement led to a spike in the prices of essential raw materials with companies rushing to secure their supplies. The regulations will be enforced from August 1.

A Brief about Chip war

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".

China has used the same reasoning for its latest order. Directed primarily at semiconductor manufacturing items, the U.S. measures were announced to restrict China's ability to obtain advanced computing chips, develop and maintain supercomputers, and manufacture advanced semiconductors.

It said that Beijing was using the items and capabilities to produce advanced military systems including weapons of mass destruction, improving the speed and accuracy of its military decision making, planning and logistics alongside committing human rights abuses.

The statement also said that the threat environment was always changing and that the U.S. would continue its outreach and coordination with allies and partners.

Japan and the Netherlands followed suit this year. The Netherlands, home to the world's most important chip-making equipment manufacturer ASML, also held that the measure was necessary on "national security grounds".

About the curbs announced by China

The Chinese Ministry of Commerce, in a bid to restrict the export of the two raw materials, ordered that export operators would now have to acquire a specific licence.

The primary contention lies with the application process that requires operators to list the importers, end-users and end use.

They would also have to produce the export contract in the original. Exporting without permission would constitute a violation — calling for administrative penalties.

It would also be deemed a crime with the exporter being held "criminally responsible".

Curb on export: a matter of concern

Gallium is used to make gallium arsenide which forms the core substrate for semiconductors.

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They are used to manufacture semiconductor wafers utilised in integrated circuits, mobile and satellite communications (in chipsets), and LEDs (in displays).

It also used in automotives and lighting, and for sensors in avionic, space and defence systems.

According to the European industry body, Critical Raw Materials Alliance (CRMA), 80% of gallium production takes place in China.

The U.S. Geological Survey (USGS) had noted earlier, while talking about low-purity gallium production outside China, that producers have “most likely restricted output owing to China’s dominant production capacity”.

China also commands 60% of the total production of germanium.

The element is used in fibre-optic cables, infrared imaging devices (used by enforcement agencies for surveillance, target acquisition and reconnaissance, particularly in the dark) and optical devices (to improve the ability to operate weapon systems in harsh conditions).

They are also used in solar cells for their ability to withstand heat and higher energy conversion efficiency.

The European Commission, whose import dependency on China stands at 71% and 45% for gallium and germanium respectively, has recognised it as a ‘critical raw material’.

In India, the Ministry of Mines identified the two elements to be crucial for the country’s economic development and national security.

Impact on India

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 increased prices resulting from the export control order would affect the cost and availability of chips, potentially impacting India’s chip-making plans

However, the long-term consequences for India’s chip-making plans and industries will depend on several factors, including alternative supply sources, domestic semiconductor production capabilities, and strategic partnerships like the India-U.S. Initiative on Critical and Emerging Technology (iCET).

These factors would be crucial in ensuring a reliable supply chain for India’s semiconductor industry.

Opportunity for India

The scenario provides an opportunity for India, which is totally import-dependent for germanium and gallium

Pointing to the presence of the two critical minerals as by-products in the processing of zinc and alumina, efforts should be made to focus on waste recovery from zinc and alumina production. Additionally, moving attention towards available substitutes as indium and silicon could also be considered.

There is some good quality of silica feedstock available in India, but that has to be converted to metallurgical-grade silicon for which you would require lower power (rates)