

Gallium: Critical for Evolving Technologies

Uses & Applications

Gallium's properties make it indispensable in modern technology:

- Semiconductors
- 5G Technology
- Power Charging
- Green Technologies
- Telecommunications
- Medical Uses
- Radar Systems



Demand Breakdown by End Use

Semiconductors: 40-45% of global gallium demand is driven by the semiconductor industry, particularly for the production of gallium arsenide (GaAs) and gallium nitride (GaN) semiconductors used in smartphones, LED lights, and solar panels.

Telecommunications: 20-25% of demand comes from telecommunications, where GaN transistors are essential in 5G base station hardware and satellite communications, requiring high efficiency and thermal stability.

Power Devices and Consumer Electronics: 15-20% of demand is attributed to gallium's use in power devices and consumer electronics, such as chargers for smartphones, laptops, and electric vehicles, where GaN's efficiency and power density are critical.

Green Technologies: 10-15% of demand is associated with gallium's use in green technologies, including high-efficiency solar cells and electric vehicles, contributing to renewable energy solutions.

Radar and Aerospace Technologies: The remaining 5-10% of demand is driven by aerospace applications, where GaN-based radar systems and other electronics rely on gallium's high-performance characteristics.

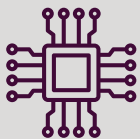
Unique Characteristics



Low melting point: (29.76°C) and ability to remain in liquid state near room temperature makes it ideal for specialized applications in electronics and semiconductors.



Non-Toxic and Biocompatible: non-toxic, allowing use in medical applications, including radiopharmaceuticals for imaging and targeted cancer therapies.



Wide Bandgap Semiconductor: when combined with other materials, can produce wide bandgap semiconductors chips can handle higher temperatures, voltages, and frequencies than conventional silicon chips. These smaller, faster, and more efficient chips are essential for advanced electronics and applications in the transition to green energy.

40-45%

20-25%

15-20%

10-15%

5-10%

Global Supply & Market Factors

Primary Sources:

Gallium is largely a by-product of processing bauxite, the primary ore for aluminum. Approximately 95% of the world's gallium supply comes from aluminum refining. The remaining 5% is recovered from sources such as zinc ore processing, coal fly ash, and recycling.

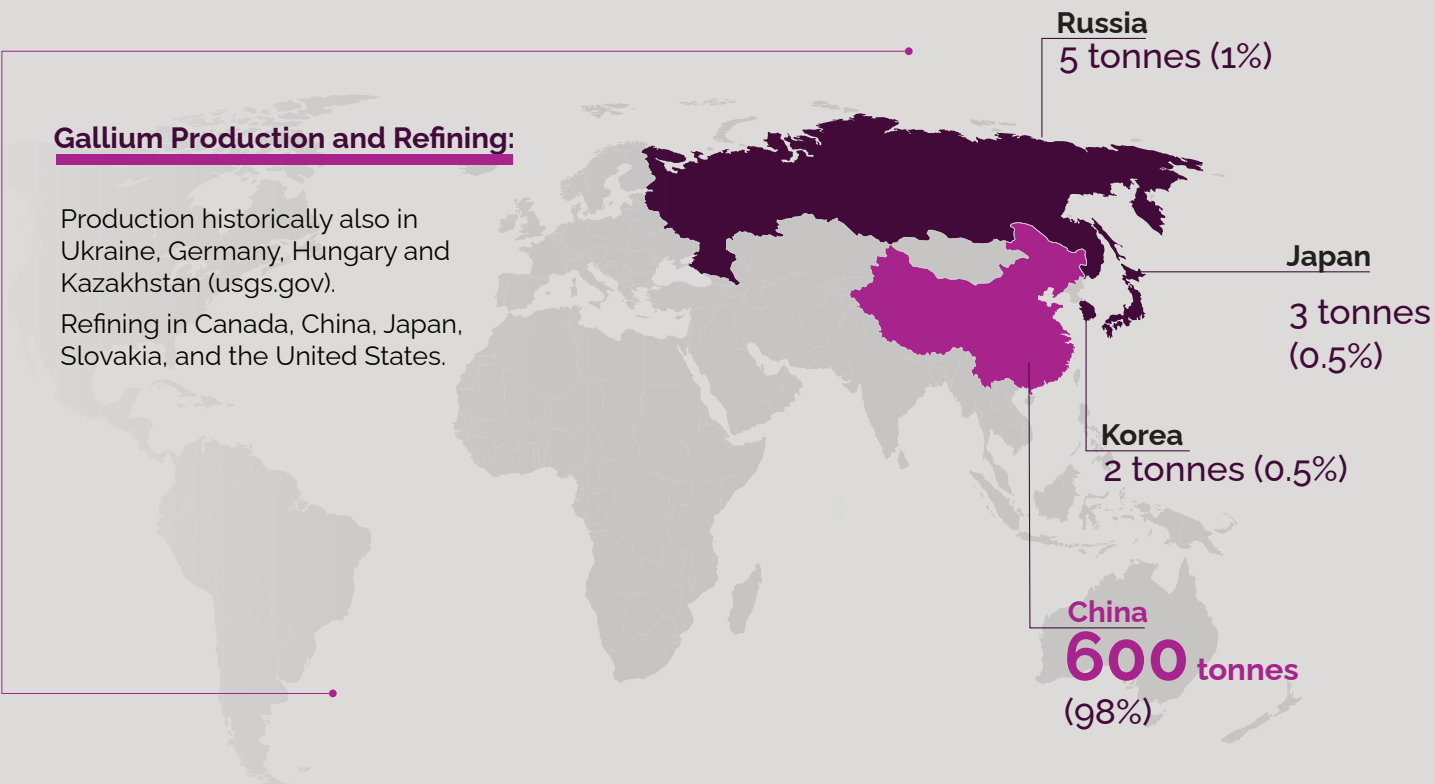
Strategic Importance:

Gallium is classified as a critical material by several countries, including Canada and the United States, due to its essential role in telecommunications, national security, and renewable energy technologies.

Gallium Production and Refining:

Production historically also in Ukraine, Germany, Hungary and Kazakhstan (usgs.gov).

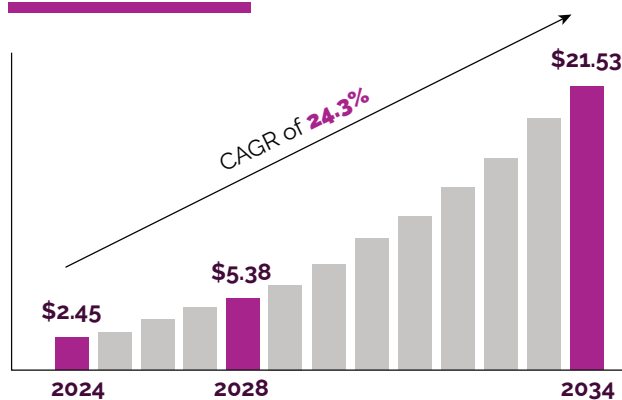
Refining in Canada, China, Japan, Slovakia, and the United States.



Outlook

The demand for gallium is expected to grow, driven by the expansion of 5G technology, renewable energy infrastructure, and advanced medical applications. However, the market faces uncertainty due to supply constraints from China's export controls, underscoring the metal's strategic importance in the global economy. The ongoing need to diversify supply chains and increase domestic production or recycling efforts will be critical in mitigating the risks associated with gallium's concentrated production (csis.org).

Global gallium market size projection (in USD Billion)



*Source: researchandmarkets.com