S&P Global
Energy

# Gallium Market Report

Gallium (Ga)

August 2026

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# Preamble

This draft **Gallium Market Report** aims to increase transparency within the gallium supply chain, helping public and private stakeholders make more informed investment decisions across the commodity lifecycle. It briefly outlines current supply chain bottlenecks, resiliency issues, and the market signals needed to support a more robust and diverse supply base.

S&P Global conducted a bottom-up, asset-level analysis of production costs for low purity gallium from alumina and zinc recovery processes. These production cost curves provide an independent view of supply economics and identify the marginal supplier in a structurally tight market. The analysis excludes assets located in Russia, China, and North Korea, as well as any assets worldwide that are majority-owned by Chinese companies.

This analysis reflects a multi-year effort combining bottom-up asset modelling, proprietary market intelligence, extensive research, expert assumptions, and industry consultation to overcome significant data limitations across the opaque mineral value chain.

The market values in this report represent a fundamentals-based assessment of the cost and the break-even range required for gallium production sources to remain economically viable and meet sufficient G7+Australia demand. This enhanced cost transparency can facilitate better-informed offtake agreements and investments throughout the supply chain. However, actual transactions also factor in inventory levels, broader market conditions, global trade dynamics, and other variables not included in this analysis.

These values are different to the spot market price assessments published by Platts, part of S&P Global Energy (link).

Given the limited availability of public data, this report is based on S&P Global's proprietary market and mineral intelligence and our analysis of company disclosures, and market information. We welcome input from market participants to support the ongoing refinement of future editions.

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## Key Takeaways

- S&P Global estimates that the gallium primary refinery assets require a structural cost of $620-700/ kg Ga in 2028 to sustain at least five projects in the pipeline. This structural cost will likely differ from spot-market prices and is higher than domestic Chinese prices (~US$300/ kg)
- Gallium demand is expected to grow by ~12% per year between 2026 and 2030, driven by rapid growth in both semiconductor and permanent magnet applications
- Supply outside of China is currently limited to ~5 t (metric tons). An additional ~381 t from eight announced projects, including Wagerup (Australia) and Clarksville (U.S.), could expand ex-China supply to 386 t by 2030, although the current pipeline remains insufficient to support an independent ex-China supply chain

# Introduction

Gallium is a technology metal whose unique electronic properties make replacement challenging in next-generation semiconductors. Gallium-based compounds outperform silicon in electron mobility and support higher operating temperatures, voltages, and power-conversion efficiency. This ability to form high-performance compounds has cemented its position as an enabler of the burgeoning data center space, as well as a substitute for heavy rare earths in permanent magnets by improving coercivity and thermal stability.

The primary bottleneck for gallium is that it is not mined directly but recovered from side streams generated during alumina refining (and, to a lesser extent, zinc processing) before being further refined into metal. This ties its supply directly to the existing value chain for aluminum. China accounts for ~99% of global primary low purity gallium production, creating an extreme concentration of supply that exposes global technology and defense sectors to significant disruption.

Further down the value chain, the supply chain is less concentrated, where China accounts for close to 60% of total high purity refining capacity. But as those facilities are dependent on the feedstock, control over prices and supply is similar.

China's control of supply alongside gallium's relevance have placed it at the center of trade and technology disputes. China has placed export blocks on the U.S., Japan and Europe starting in 2023. China's December 2024 export ban to the U.S. drove gallium prices to around US$2,100/kg in 2026, roughly seven times 2023 levels under the prior export-control regime.

### Gallium's Properties

**Melting Point:**

29.8 °C

Gallium turns liquid at hand temperature

**Boiling Point:**

2,400 °C

Gallium remains liquid at an extremely high temperature range

**Chemical Compatibility:**

6x electron speed vs silicon

It's ability to bond with arsenic and nitrogen enables semiconductors to be faster and more heat resistant

Sources: S&P Global; USGS

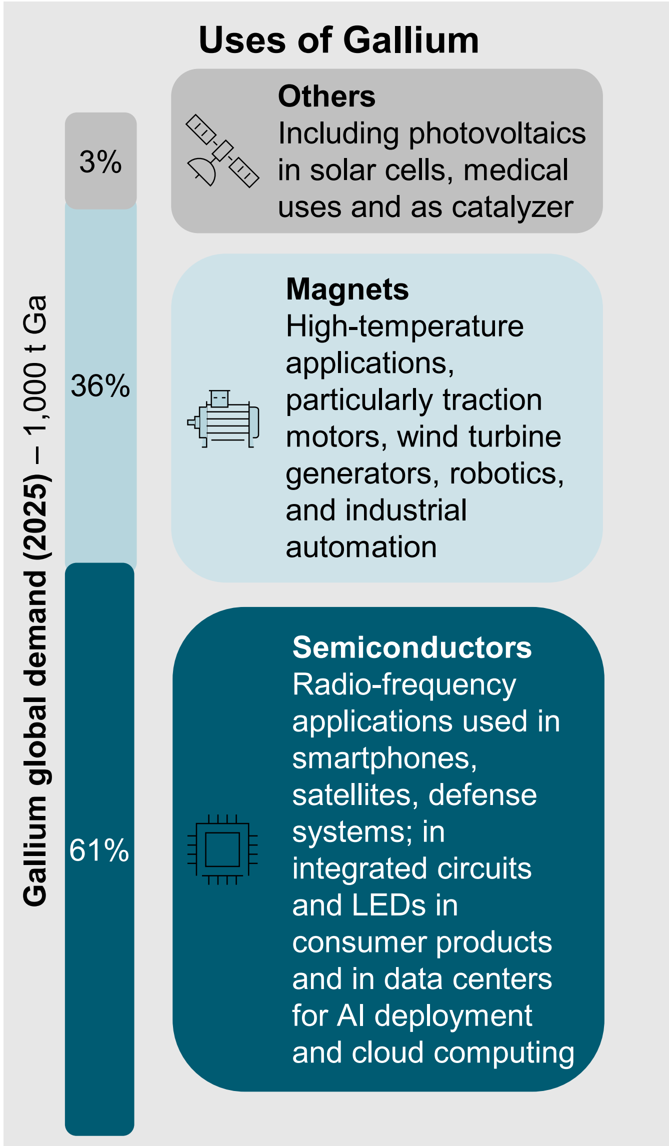
# Gallium demand

Gallium is a strategically important critical mineral due to its role in semiconductors, high-performance magnet applications and photovoltaics among other uses. Gallium is used in materials such as gallium arsenide (GaAs) and gallium nitride (GaN) used extensively in circuits, solar cells and wafers; while its oxide and metal alloy forms are used across other semiconductor, photovoltaics, and magnet uses.

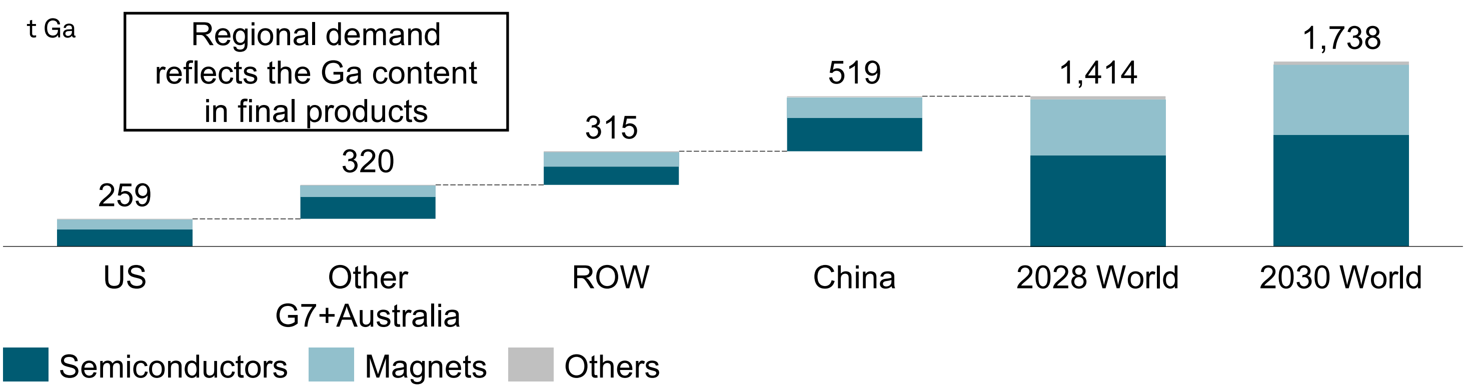
Demand is driven by performance, making it less sensitive to price. Substitution is possible in some applications, particularly through alternative magnet chemistries or the use of heavy rare earth element but often involves performance or cost trade-offs.

Global demand reached approximately 1,000 t (tons) Ga contained in 2025 and is projected to grow to 1,738 t by 2030. Semiconductor applications account for ~61% of demand and are expected to drive most growth, supported by expanding AI infrastructure and telecommunications equipment. Magnets represent 36% and the remaining 3% is distributed among others like photovoltaics, medical applications and catalyzers.

Semiconductor supply chains involve multiple manufacturing stages before products reach end users, while ~90% of global NdFeB magnet production is concentrated in China and exported as semi-finished or finished products. To better reflect ultimate consumption, regional demand throughout this report is presented on an end-use basis. As a result, China accounts for ~37% of global end-use gallium demand.




**Gallium end-use demand outlook 2028 - 2030**




1. Based on the gallium content in final products

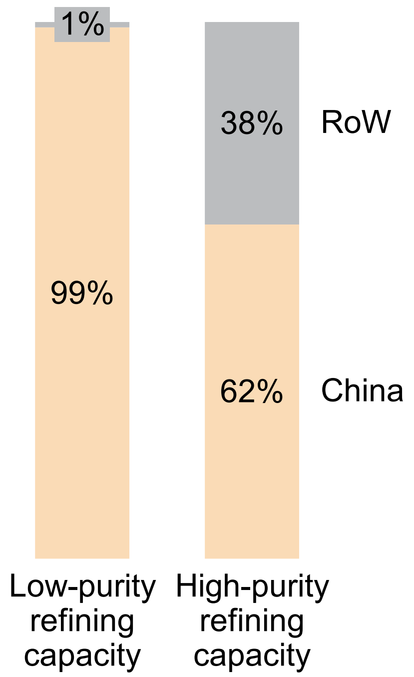
Sources: S&P Global Analysis

# Gallium supply

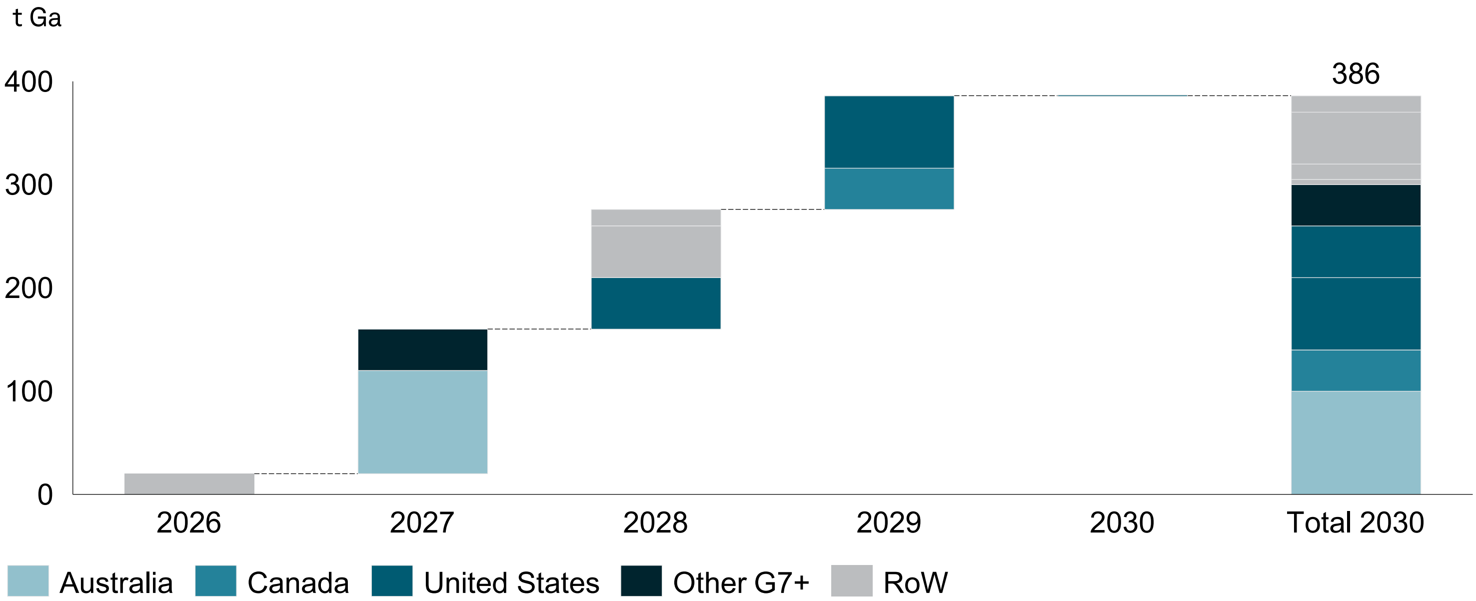
The primary bottleneck in the gallium supply chain lies in the initial recovery of gallium from alumina and zinc refining. While many alumina and zinc refineries process ores containing gallium, most facilities do not recover it. Historically, alumina refineries in Hungary, Kazakhstan and Ukraine have recovered gallium but stopped processing for economic reasons. Currently, only the Iijima facility in Japan produces ~5t. As a result, 99% of low-purity gallium refining capacity is nowadays concentrated in China. This contrasts with high-purity gallium production, where existing ex-China capacity stands at approximately 250 t Ga, representing around 38% of global high-purity supply.

A significant expansion pipeline is emerging, with eight projects outside China expected to add nearly 381 t Ga of production capacity by 2030. If existing ex-China alumina and zinc refineries were to implement gallium recovery, potential supply could exceed three times current global gallium production, highlighting that resource availability is not the main constraint. However, portions of the supply chain could remain dependent on Chinese ion-exchange resins, also under export controls, being cost-competitive; although existing small-scale capacity in the US and Europe could be expanded with additional investment.

**Market Structure[1]**




**Gallium production potential (primary metal) ex-China capacity**



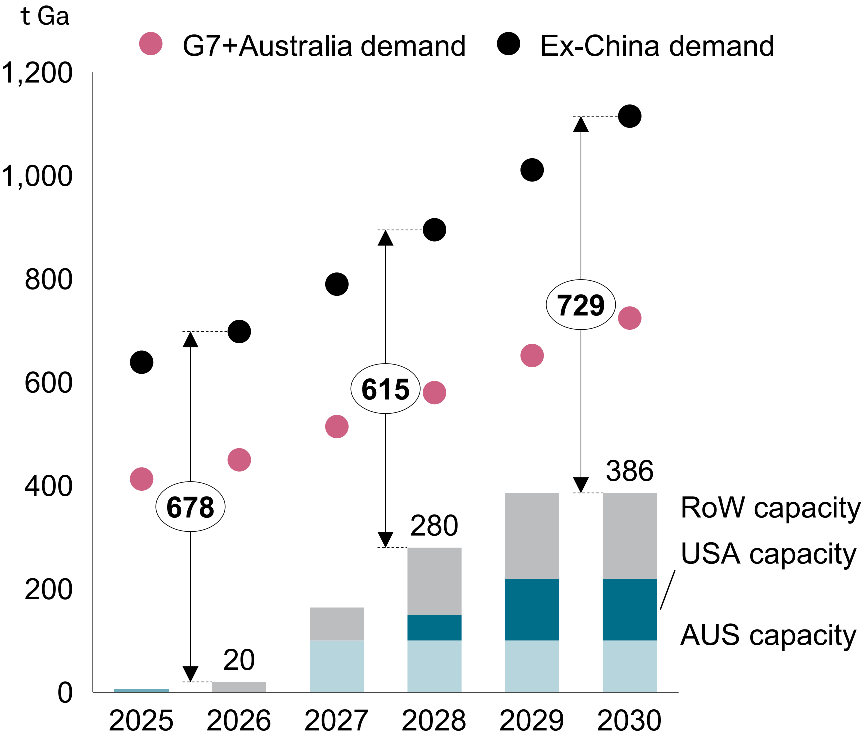

**The supply chart represents potential risked supply pipeline based on company announcements**

Note: Despite new scrap, the end-of-life recycling industry is almost non-existent, so the semiconductor sector is largely reliant on the primary extraction volumes.
1. Low-purity refining data is for 2025, high-purity refining data is for 2024.
2. Arvida announced a 4pa pilot starting operations in 2027, expanding to full-scale operations with 40t capacity by 2029

Sources: S&P Global, USGS (Gallium 2026 Commodity Summary).

# Supply demand balance

## Supply demand balance outside of China and Russia




- By the end of 2026, available ex-China supply capacity will be just 20 t Ga, leaving a supply gap of ~678 t Ga
- By 2028, ex-China gallium capacity could reach approximately 280 t, reducing the supply-demand gap to around 615 t
- By 2030, even if all announced projects are delivered and ramp up as planned, getting to a total of 386 t of ex-China gallium capacity, the market would still face a 729 t gap to end-use demand. This would represent a 114 t increase in the deficit relative to 2028.

## Recent market events

- Metlen signed an offtake agreement covering 25% of output from its planned 50 t gallium facility, part of a €300 million EU-backed project targeting production by 2028. [Platts, July 2026]
- Alcoa approved a 100 t gallium plant at Wagerup site in Australia, backed by up to $200 million in concessional financing, with first production targeted for Q4 2026. [Platts, July 2026]
- Canada committed up to C$281.7 million to support Teck's Trail site expansion, targeting production of gallium, germanium, and antimony. [Platts, July 2026]
- Korea Zinc received $25 million from the U.S. Department of Defense to expand domestic gallium and germanium refining capacity at its Indiana recycling facility. [Platts, July 2026]
- The Government of Canada has conditionally approved a non-repayable contribution of up to C$18.95 million for a Rio Tinto / Indium Corporation gallium pilot plant. [Rio Tinto, March 2026]
- Atalco received $150 million in US government equity investment — alongside $300 million in private capital from Pinnacle Asset Management — to build the first large-scale gallium refinery in the US at its Gramercy, Louisiana alumina facility. [Platts, January 2026]

Sources: S&P Global Analysis

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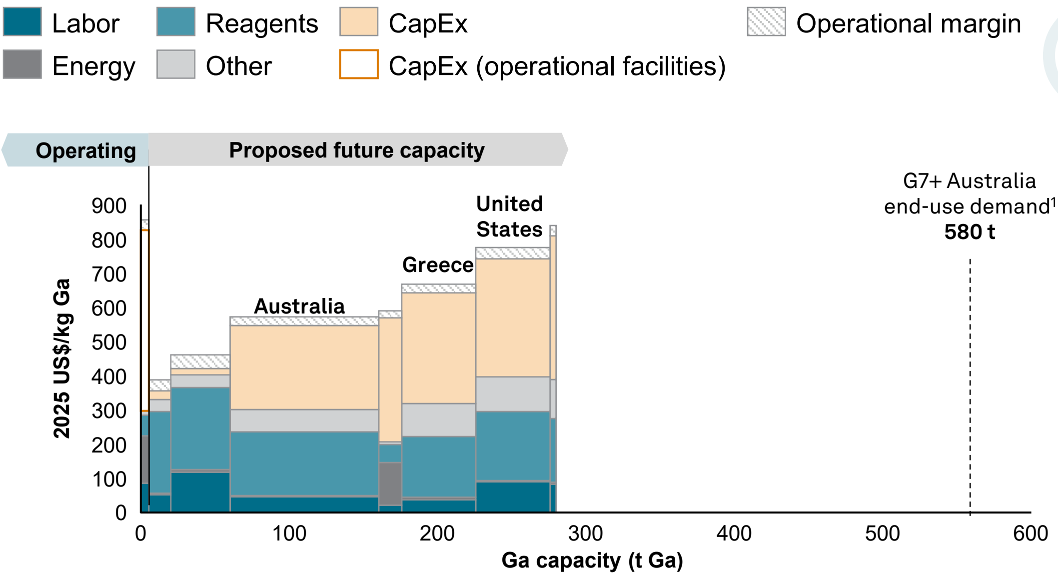
# Gallium structural cost

## 2028 Gallium metal production structural cost curve




**Structural Cost:** Represents the full cost required for an asset to achieve its target return on investment, assuming projects are developed in line with announced timelines and operate at capacity. This cost considers an unrisked projection subject to normal industry attrition and delays

## Structural cost - Findings

- S&P Global CERA estimates that a structural cost range of between **$620/kg and $700/kg** would support more than 200 t of the gallium production pipeline. Excluding CapEx, a cost range between **$420/kg to $460/kg** would be sufficient to sustain operation of these projects once commissioned
- Gallium structural costs in 2028 are expected to range from ~$390/kg to ~$860/kg. Variation is mostly driven by CapEx, typically, the largest cost component. Reactivated facilities benefit from lower assumed CapEx and tend to sit at the lower end of the cost curve. Other differences are related to location and scale
- Beyond CapEx for new projects, ion-exchange resins used as reagents for gallium separation is the major cost driver at alumina refineries
- Under the assumed price environment, zinc-based refineries exhibit lower unit costs due to cost allocation to germanium

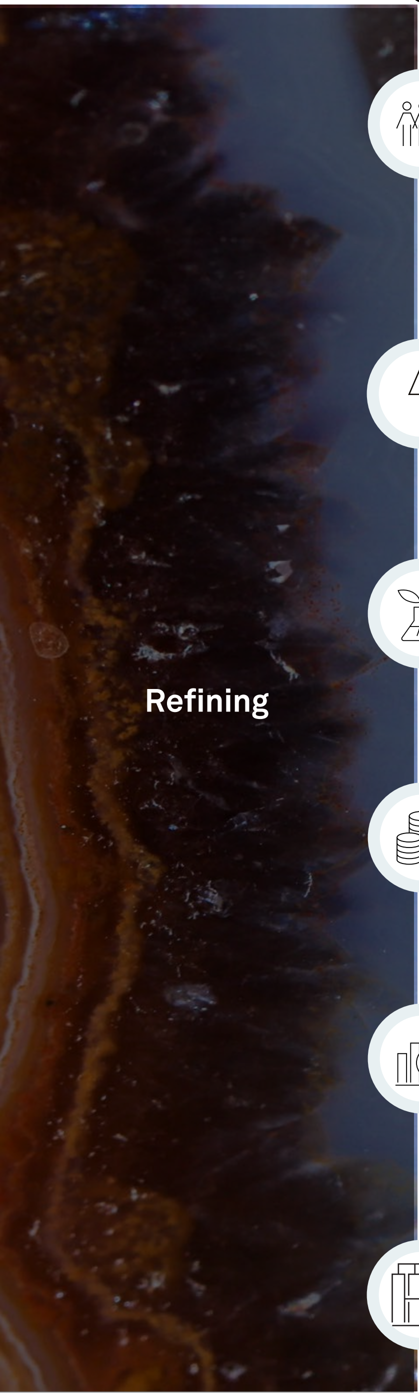
## Structural cost - Approach

- Reflects Market Complexity: Built on extensive research and bottom-up modelling, incorporating asset-level data, industry consultation, benchmarking, and expert assumptions to navigate a highly opaque supply chain
- Targets the Marginal Supplier: The 80th-90th percentile identifies the highest-cost producers. Long-term commodity prices naturally gravitate toward the cost of the last unit needed to meet demand. This percentile filters out extreme outliers while capturing the true marginal cost
- Incentivizes Supply Resiliency ex-China: It establishes a long-term structural benchmark - not a short-term forecast - capturing the full asset economics
- Feedstock costs were not considered because gallium is recovered from side streams generated during alumina refining and zinc processing

1. End-use demand reflects the geography of ultimate consumption, rather than first-use demand, which is based on the location of initial material transformation

Sources: S&P Global Analysis; Long term price assumptions were sourced from Project Blue

# Challenge of cost components and methodological approach




**Labor:** Labor costs were estimated by combining the number of full-time equivalent employees (FTEs), regional processing/refining wage rates[1], and a regional multiplier to account for additional mining and refining labor costs. FTE requirements were estimated using an S-curve relationship between plant capacity and workforce size, calibrated with available industry data.

**Energy**: Power and utility costs were estimated based on the electricity consumption required per ton of production and the local wholesale electricity price.

**Reagents:** Reagent costs were estimated using chemical consumption rates per ton of production and corresponding regional prices. Estimates were based on a combination of reagent-specific consumption data and reported overall reagent costs. Reagents used exclusively in gallium refining were fully allocated to gallium.

**Operational margin:** A 10% operational margin was applied to facility OPEX costs to represent facility-level profitability. This adjustment shifts the curve from a cost basis to a price-like basis.

**CAPEX:** Includes levelized initial CAPEX, allocated to each facility and recovered over a 20-year project life using a 7% discount rate to reflect the time value of money, as well as sustaining CAPEX representing ongoing investments required to maintain operations and productive capacity, estimated as 2% of initial CAPEX.

**Feedstock:** Feedstock costs were not included because gallium is recovered from side streams generated during alumina refining and zinc processing, with the associated feedstock costs allocated to the primary metals.

**All cost components were estimated at the facility level and converted to a unit cost based on annual capacity.**

**Co-product cost allocation: For refineries producing both gallium and germanium, shared costs were allocated based on each product's share of expected revenue[1], while costs attributable to mineral-specific processes were assigned entirely to the corresponding mineral. Expected revenue was estimated as production volume multiplied by expected prices of gallium and germanium. Values are preliminary and will be refined through further S&P Global analysis, data review, industry consultation and stakeholder review.**

1. Price assumptions were based on Project Blue price outlooks.

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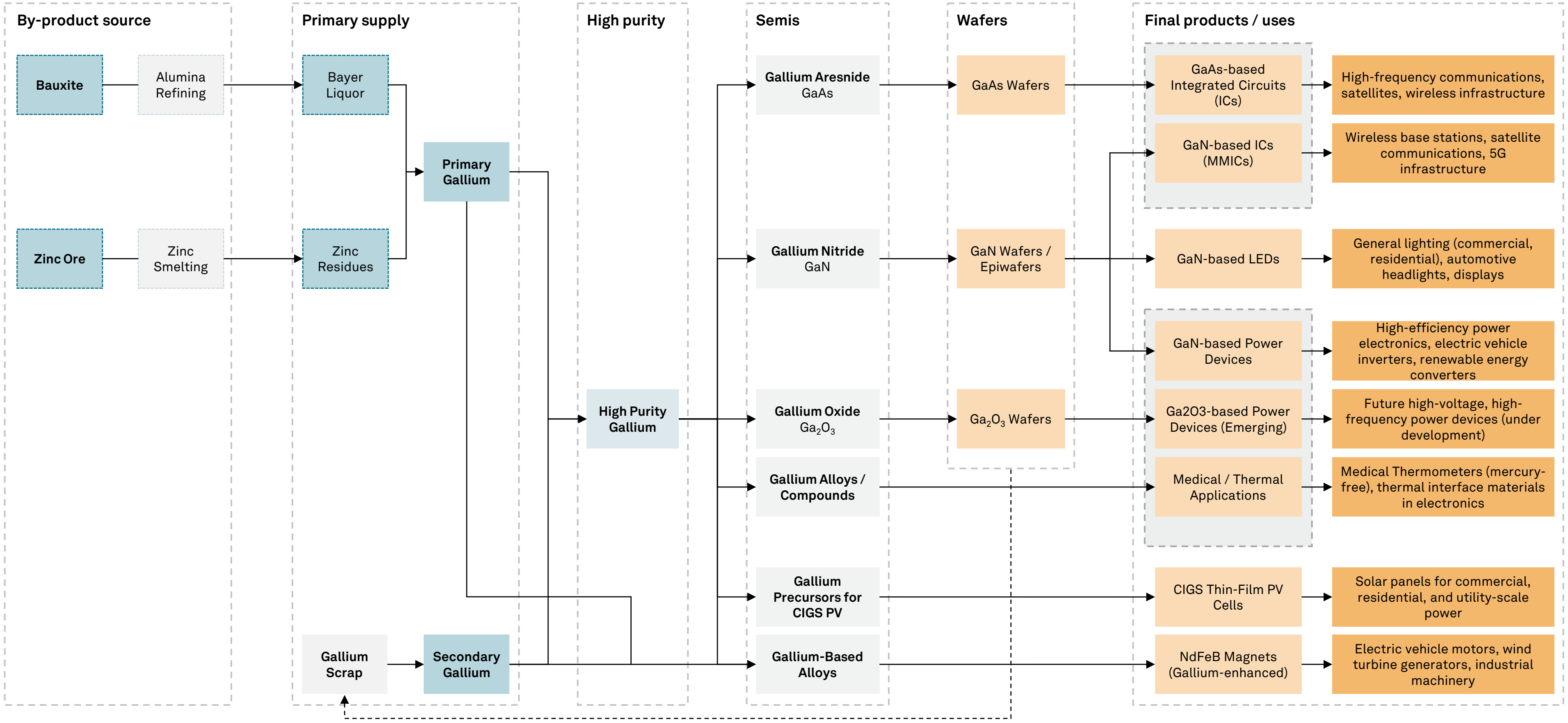
## Ga value chain



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