S&P Global
Energy

Tungsten Market Report

Tungsten (W)

August 2026

Preamble

This draft **Tungsten Market Report** aims to increase transparency within the tungsten supply chain, helping public and private stakeholders make more informed investment decisions across the commodity lifecycle. It 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 tungsten mines and ammonium paratungstate (APT). 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 break-even range required for tungsten 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 a 2028 structural cost of $36-48/kg WO_3 would sustain the tungsten supply chain through APT refining and support at least eleven accessible current and future mine projects. This structural cost will likely differ from spot-market traded prices
- Tungsten demand is expected to grow 10% between 2026 and 2030
- Concentration of mining and refining capacity in China makes tungsten sourcing vulnerable to geopolitical and supply chain risks
- In 2025, ex-China mining capacity covered ~37% of demand. While eleven announced mining projects could theoretically reduce the 2030 supply gap to 16 thousand metric tons (kt), this represents an unrisked projection subject to normal industry attrition from financing and permitting delays.

Introduction

Tungsten is a specialty and strategic metal, whose physical properties make it well suited to industrial machinery and defense applications. Its top tier hardness has cemented tungsten's position as a high value component of military armor and munitions. In today's geopolitical environment, China's control of supply alongside tungsten's military importance have placed it at the center of active trade and geopolitical disputes. As a result, tungsten APT CIF prices have more than quadrupled since the start of the year, from $83/kg WO_3 in January to 340 $/kg WO_3 in July 2026.

Beginning January 1, 2027, U.S. defense procurement rules will prohibit defense contractors from sourcing tungsten metal powder and heavy alloys from China and other designated countries. This will increase demand for traceable alternative supply.

China holds about half of reported global tungsten ore reserves but accounts for approximately ~80% of current mine production, recently prompting governments to incentivize alternative supply sources. More diversified supply is beginning to emerge, led by Sangdong in South Korea, the Hemerdon restart in the UK, and projects in Canada and Australia. However, much of this future supply remains subject to execution risk, making the timing of commissioning uncertain despite government support and offtake agreements.

Further downstream, ammonium paratungstate (APT) is the standard intermediate product. China accounts for ~85% of APT production. Secondary tungsten recovery also plays a vital role, supplying approximately 35% of global demand.

Tungsten's Properties

Density:
19.3 g/cm^3

Amongst the densest elements (top 10%)

Melting Point:
3,422 °C

Highest melting point of all metals

Hardness:
8-9 Mohs Scale

Just below diamonds and higher than steel

Sources: S&P Global Analysis with supporting data from Project Blue and USGS, Tungsten APT CIF price is from LSEG.

Tungsten demand

Tungsten's properties make it essential for cutting, drilling and wear-resistant applications. Cemented carbides, hard composite materials used in tools and industrial components, account for nearly two-thirds of demand, linking consumption to manufacturing, mining and construction. Mill products, steels and alloys support additional uses in industrial equipment, aerospace and energy.

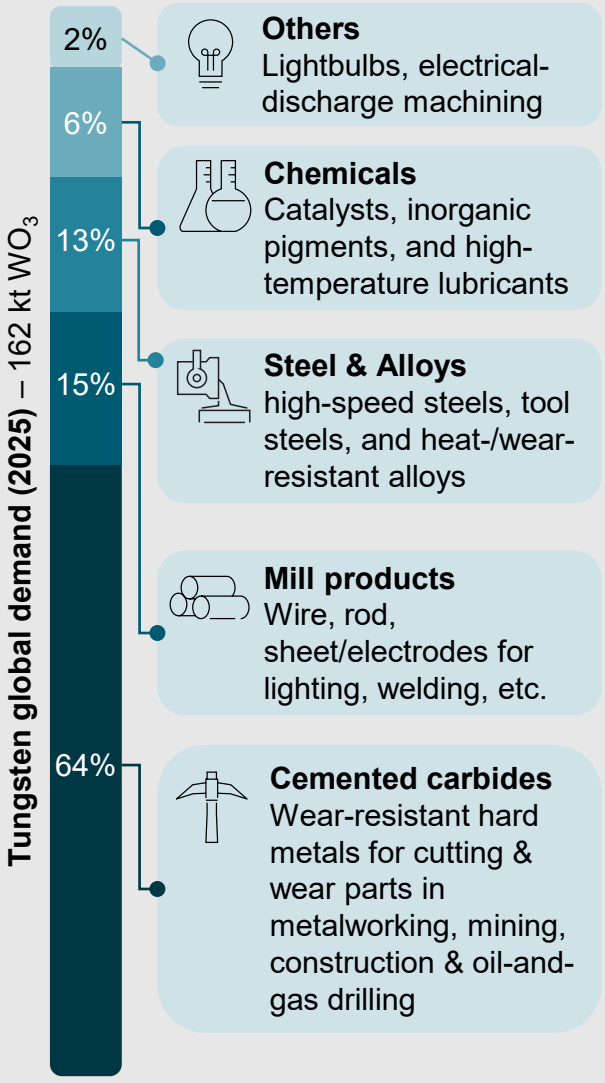
Defense and semiconductor applications consume smaller volumes but contribute to tungsten's criticality. Its density and heat resistance support munitions and missile components, alongside its low electrical resistivity enables semiconductor interconnects.

Global first use demand reached approximately 162 kt WO_3[1] in 2025 and is projected to grow by ~2% per year, reaching 180 kt WO_3 by 2030 and 202 kt WO_3 by 2035. Cemented carbides are expected to drive most of the increase as manufacturing, mining and construction raise demand for cutting tools, drill bits and wear-resistant components. Aerospace, defense and semiconductors provide smaller but strategically important sources of demand.

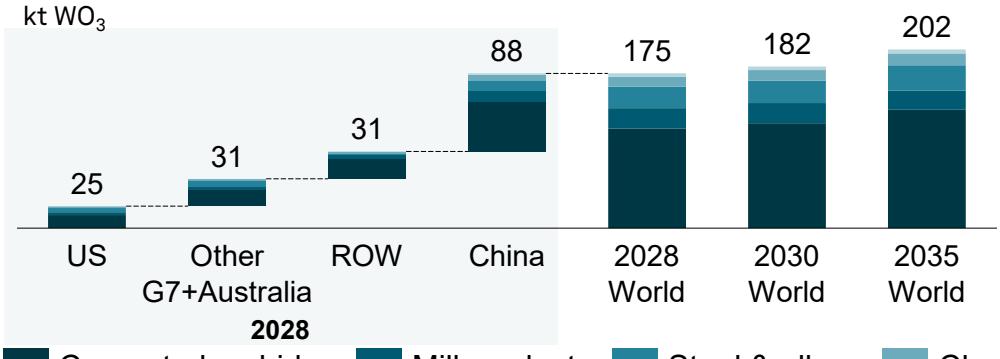
China accounts for half of global consumption, reflecting the scale of its manufacturing and tungsten-processing industries.

Substitution remains difficult in cemented carbides and high-performance applications, but is more feasible in some mill products, steels and alloys, where alternative carbides, molybdenum and titanium can be used.

Uses of Tungsten



Tungsten first-use demand outlook 2028 - 2035



China is a major exporter of semifinished and finished tungsten products, which may not fully capture end use demand for other regions

1. WO_3: tungsten trioxide, the standard unit used to express tungsten content and volumes.

Sources: Demand volumes are S&P Global Analysis based on Project Blue data – Project Blue data was used for global, regional and sectoral demand split

Tungsten supply

China accounts for 79% of global tungsten mining capacity and 85% of APT refining capacity. Ex-China, refining capacity[4] of ~42 kt WO_3 exceeds current operating mine production, creating structural dependence on imported refined products and recycled material. China's refining sector also relies on imported feedstock, importing ~30%[1] of its total concentrate. China's mining share has declined by ~6% between 2016 and 2025 and is expected to continue falling due to declining ore grades and production quotas.

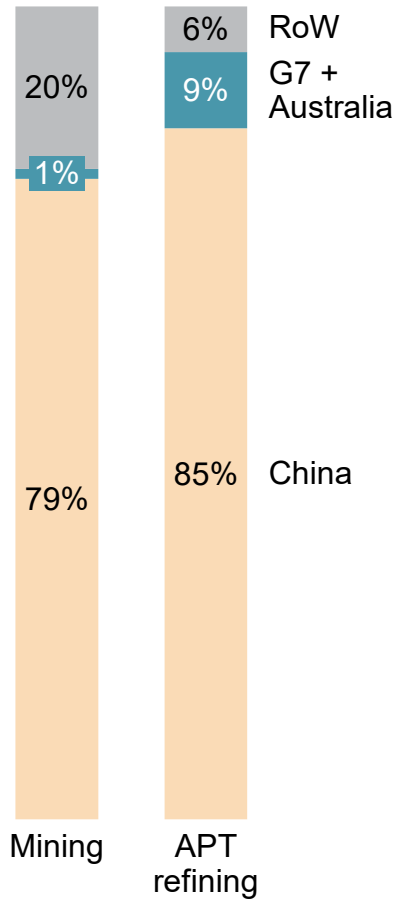
As a result, ex-China refiners increasingly rely on scrap, which is estimated to account for ~60% of total ex-China output. While recycling diversifies supply beyond mined concentrate, quality scrap can be difficult to secure and faces growing competition from China.

Part of the primary concentrate is either retained within vertically integrated operations or secured through offtake agreements, such as Almonty's 21-year commitment of 90% of its Sangdong phase 1 production to GTP. Therefore, open market availability is smaller than nameplate capacity implies.

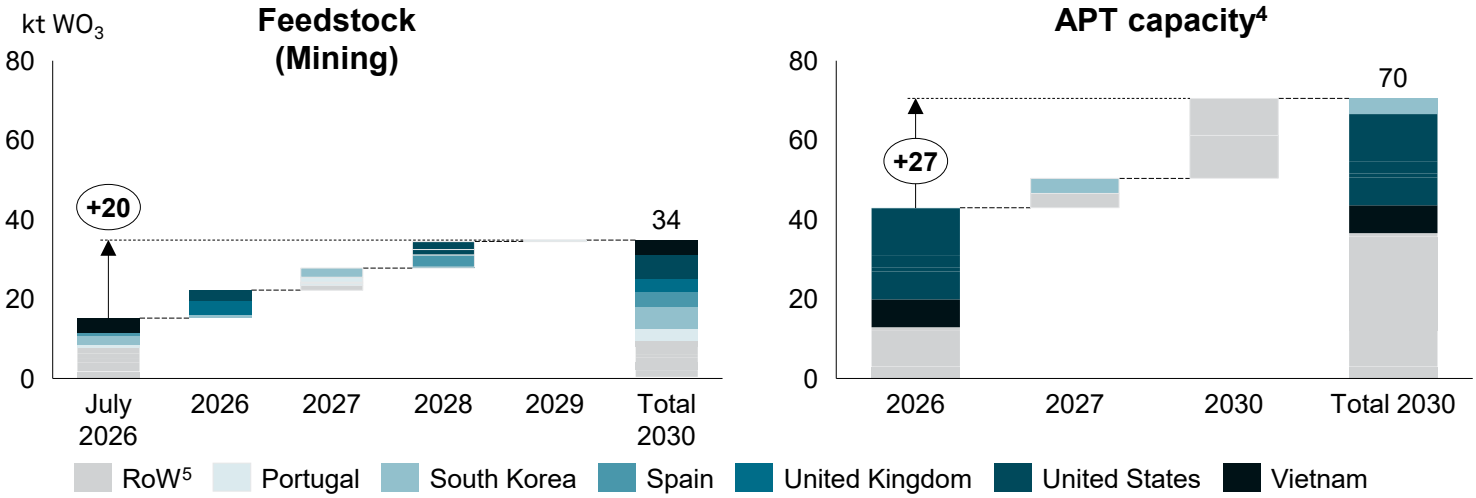
By 2030, eleven projects outside China could add nearly 20 kt WO_3 of mine production capacity, increasing total ex-China mine capacity to ~34 kt WO_3. On top of the 34 kt WO_3, additional announced capacity of ~20 kt[2] is stalled by economic or permitting challenges.

On the refining side, four projects could add up to 27 kt WO_3 of APT capacity outside China by 2030, increasing total ex-China APT capacity to approximately 70 kt WO_3. Most announced refining projects are integrated with new mines and are intended to secure feedstock while expanding downstream processing capacity.

Market Structure (2025)



Tungsten ex-China and ex-Russia supply potential[3]

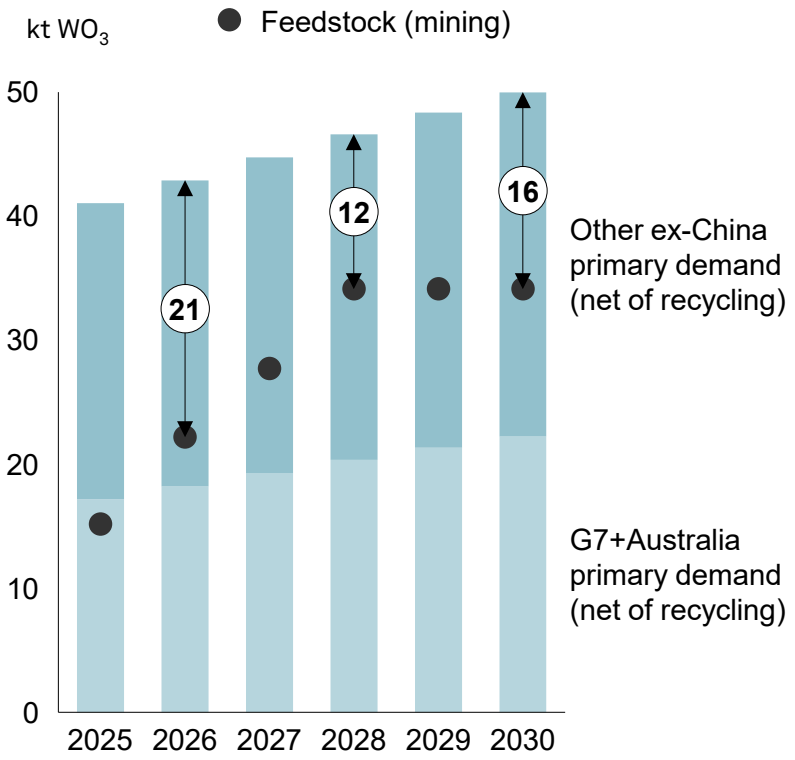


The supply chart represents potential risked supply pipeline based on company announcements

1. S&P Global Trade Analytics and China Tungsten Industry Association, Ministry of Natural Resources of the PRC. 2. The 20 kt is not included on the supply potential chart 3.The analysis excludes assets located in Russia, China, and North Korea, as well as any assets worldwide that are majority-owned by Chinese companies, 4. Refineries may process both primary feedstock and recycled material (scrap); 5. RoW = rest of the world
Sources: S&P Global, USGS (Tungsten 2026 Commodity Summary), CSIS, Recycling volumes were based on Project Blue data

Supply demand balance

Supply demand balance outside of China[1]



- In 2026, with the delivery of four announced projects, available ex-China mine production totals at 22 kt WO_3, leaving a supply gap of ~21 kt WO_3.
- By 2028, if all announced projects are delivered and ramp up as planned, the addition of ~13 kt WO_3 from seven proposed projects reduces the gap to ~12 kt WO_3.
- By 2030, with no further mine additions and continuous demand growth, the gap between ex-China APT capacity and demand gradually grows to ~16 kt WO_3.
- Meeting announced concentrate project pipeline would require ex-China mine capacity to more than double within two years.

Recent market events

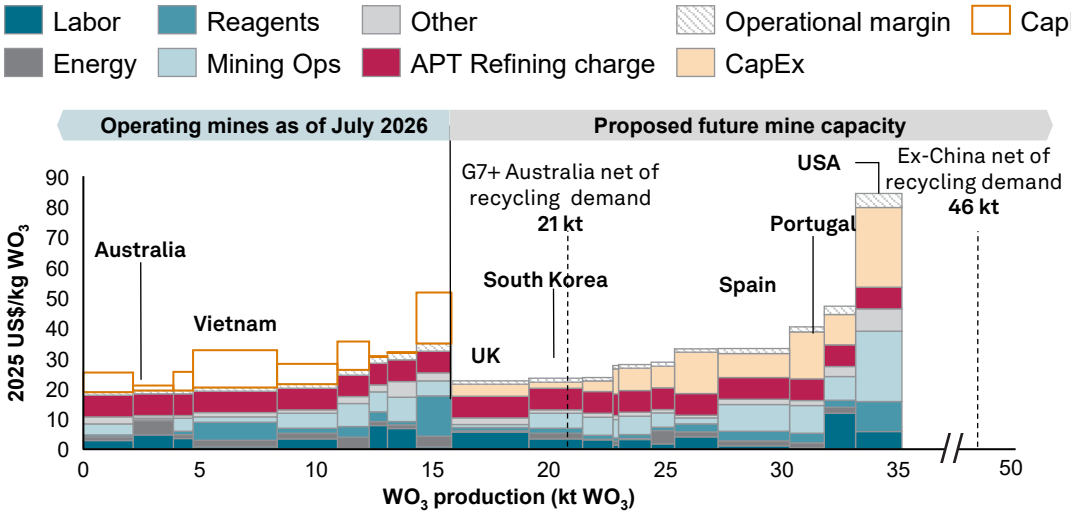
- Almonty commenced processing operations at the Sangdong Mine in South Korea in July 2026, expected to produce ~2.3 kt of tungsten concentrate under Phase I. Almonty has expanded its offtake agreement with Global Tungsten & Powders from 15 to 21 years [Platts, July 2026].
- EQ Resources approved a A$39 million expansion of its Australian Mt Carbine mine and acquired six nearby exploration permits, supporting growth across its Australian and Spanish operations. EQ targets 1.6 kt and 1.75 kt from their Spanish and Autralian mines [Platts, June 2026].
- Tungsten West began phased commissioning of the Hemerdon mine in the UK in July 2026, with full commissioning expected in Q1 2027. The mine has a projected production of 3.32 kt of contained WO_3 [Platts, July 2026].
- The US Export-Import (EXIM) Bank issued Tungsten West a non-binding letter of interest for up to $95 million to support the Hemerdon restart [Platts, August 2025].
- The $1.1 billion Northern Katpar and Upper Kairakty projects in Kazakhstan received a US EXIM letter of interest for up to $900 million, supporting development of a major new ex-China tungsten source. [Platts, November 2025].

1. The supply analysis excludes assets located in Russia, China, and North Korea, as well as any assets worldwide that are majority-owned by Chinese companies; 2. Refineries in some cases are supplied by scrap, so potentially

Sources: S&P Global Analysis for proposed projects; S&P Global Analysis based on Project Blue data for demand and recycling.

APT structural cost

2028 APT ex-China primary[1] 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 **$36/kg and $48/kg** for APT in 2028 would support over 85%, or 30 kt WO_3, of current and future announced projects. A structural cost of $90/kg could support all identified projects in the pipeline. Excluding CapEx, a cost range between **$26/kg to $34/kg** would be sufficient to sustain operation of these projects once commissioned.
- Tungsten mine structural costs in 2028 are expected to have a wide range, from ~$15/kg to ~$75/kg WO_3: differences are due to ore grade, scale, by-product credits, life of mine, location, with costs mostly driven by chemicals and explosives consumption, and labor costs.
- Beyond cost of capital, mining operations are the largest cost driver, reflecting the cost of drilling, blasting, stoping and other mine-site activities, followed by APT refining charges.
- APT refining conversion costs, are comparatively narrow, typically ranging from ~$6.5-11.0/kg WO_3[2].

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.
- The methodology anchors on the mining cost curve's marginal producer, adding a processing conversion cost range ($6.5-11.0/kg WO_3) to complete the structural profile.

Note: The analysis excludes assets located in Russia, China, and North Korea, as well as any assets worldwide that are majority-owned by Chinese companies.
1. Primary production excludes scrap and demand volumes shown are net of recycling 2. Excluding feedstock costs
Sources: S&P Global, Tungsten demand was based on S&P Global analysis of Project Blue data

Challenge of cost components and methodological approach

Mining & Concentration OPEX

Mining ops: Includes all other asset-level mining costs not captured within the other cost categories listed below, such as stoping, backfill, explosives, contingency, and consumables.

Labor: Labor costs were estimated by combining the number of full-time equivalent employees (FTEs), regional processing/refining wage rates, 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: Includes fuel, power, and utility costs estimated from asset archetypes and adjusted for country-specific energy prices. Power costs are based on archetype electricity consumption and local wholesale electricity prices.

Reagents: Reagent costs were estimated using asset archetype reagent costs and adjusted for regional differences in reagent prices.

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.

Mining & Concentration CAPEX

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 a percentage of initial CAPEX.

Refining

APT Refining charge: The refining charge represents the cost of converting tungsten concentrate into APT. It includes operating costs (e.g., labor, power, and reagents), capital costs, and an allowance for facility profitability. Charges were estimated at the asset level and aggregated into a capacity-weighted average.

Structural cost variability is based on the range of total refining costs observed across facilities, reflecting differences in plant maturity, scale, sunk capital, and location-specific cost advantages. The low-end of the range $36/kg WO_3, derived from modeling that applies conversion costs of ~ $7/kg WO_3 added to the marginal mining supplier cost of $29/kg WO_3, representing large-scale, modern assets in low-cost refining jurisdictions. The upper-end, $48/kg WO_3, reflects higher-cost operations with less favorable cost structures. Values are preliminary and will be refined through further S&P Global analysis, data review, industry consultation and stakeholder review.

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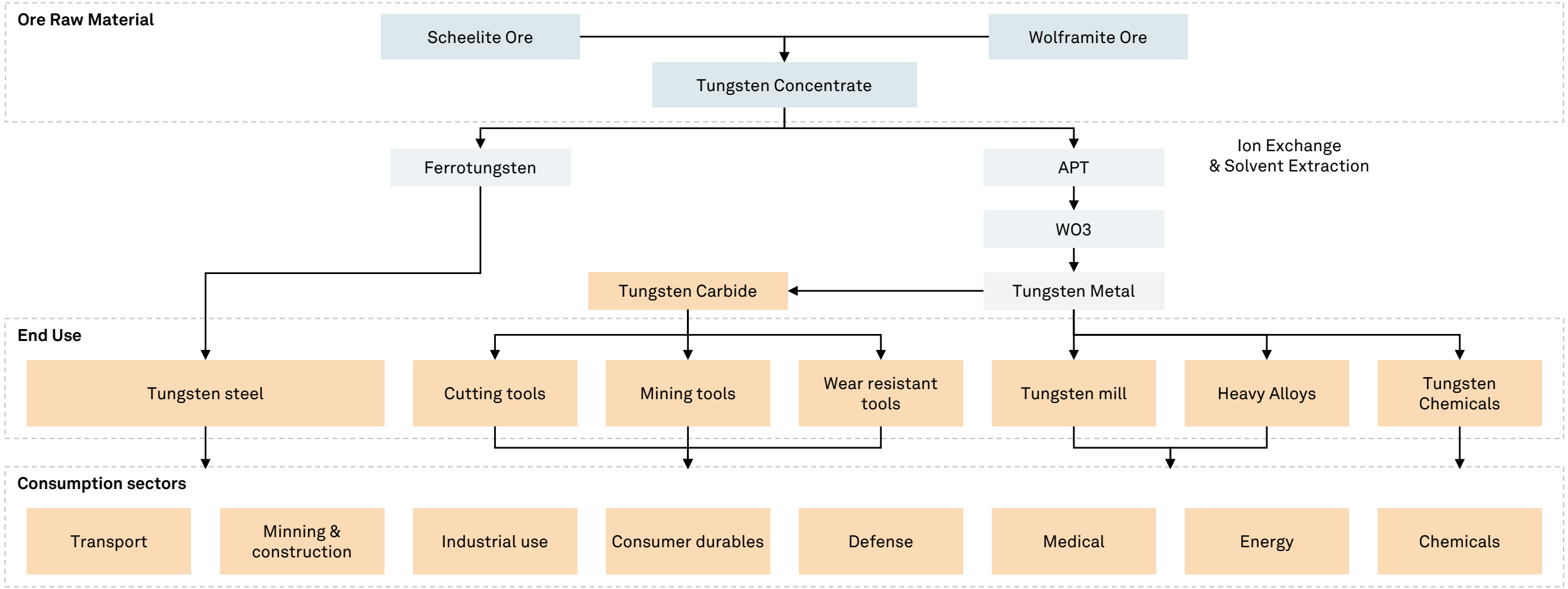
Tungsten flowsheet



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