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## Orion Resource Equities

TUNGSTEN: COME AND HAVE A GO IF YOU THINK YOU'RE HARD ENOUGH

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# Orion Resource Equities Strategy

## Tungsten: Come And Have a Go If You Think You're Hard Enough

In a world increasingly defined by geopolitical tension, technological rearmament, and the remapping of supply chains, tungsten stands out as one of the most strategically significant but underappreciated metals. There are two industrially important tungsten minerals which are mined, processed and used as concentrate: scheelite (calcium tungstate) and wolframite (iron manganese tungstate). Known for its extraordinary hardness, high melting point, and vital industrial applications, tungsten is indispensable to both military and civilian applications. In this insights piece, we examine the compelling investment thesis for tungsten — a critical metal facing structural supply risk amid a robust demand outlook.

### Background

Tungsten is a small market — only about 120-125kt of annual demand — but highly sensitive to disruptions. Its opacity, strategic value, and lack of institutional investment create an asymmetric opportunity, particularly in listed developers outside China.

Tungsten was declared critical by the US, long before the recent surge in supply chain awareness. It is an essential material in bunker busting bombs, armour-piercing munitions, aerospace, machining tools, and the energy transition — with no known substitutes in many of its applications. During World War 2 the price of tungsten skyrocketed and the metal was subject to trade sanctions and smuggling as the Allied Forces sought to control exports to Nazi Germany from Francoist Spain.

With a melting point of over 3,400°C — the highest of any metal — and unmatched density, tungsten is used in high-temperature, high-stress environments. For decades, China has dominated global tungsten supply, being the largest consumer and accounting for over 80% of primary production. Additionally, China has an expanding downstream sector focused on value-added intermediates, such as tungsten powders and bars. This dominance has led to strategic hoarding, price manipulation, and opaque trade practices that leave Western nations increasingly exposed.

Despite being a priority for stockpiling and classified as “essential to national defence”, tungsten has received little investment interest. Exploration has stagnated and production outside China is limited and highly fragmented.

### Investment thesis

The investment case for tungsten hinges on three factors:

**01**

#### Strategic Supply Risk

China dominates production and has restricted exports in the past. In 2020, it classified tungsten as a “protected resource” and implemented quotas. In 2025, tungsten faced a licensing wall.

**02**

#### Rising Western Demand

Defence rearmament, domestic reshoring of advanced manufacturing, and a renewed focus on strategic autonomy are all increasing demand in the West.

**03**

#### Lack of New Projects

Few large-scale tungsten mines exist outside China. Financing and permitting hurdles have slowed new developments despite rising prices.

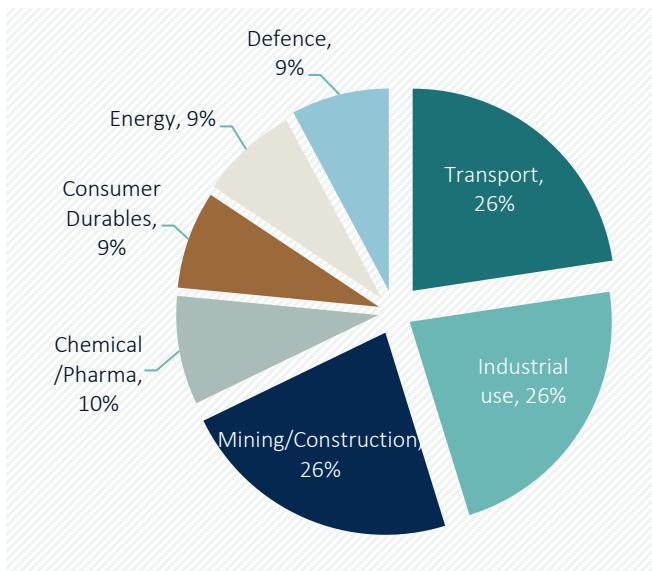
## Demand

Tungsten demand is projected to grow steadily, driven by:

- **Hardmetals and Tooling (60% of demand):** Tungsten carbide tools are essential in aerospace, automotive, energy, and construction industries. No other material matches their wear resistance and durability. To protect against supply shocks, machine-tool manufacturers in Germany, Sweden, and Japan are paying premiums to secure tungsten from outside of China.
- **Defence and Aerospace:** Tungsten is used in kinetic energy penetrators, aircraft counterweights, turbine blades, and electronics shielding. With increasing military budgets globally, tungsten is experiencing a renaissance in relevance: the US Department of Defense is supporting new non-Chinese sources and setting new regulations prohibiting Chinese tungsten after 2027, a ban that is effectively in place since China also imposed export restrictions and has not issued any licenses for exports. Meanwhile, NATO allies agreed to increase defense spending target to 5% GDP and Europe's defence sector has secured long-term offtake agreements to reduce dependency on Chinese tungsten.
- **EVs and Renewables:** Tungsten's role in heat sinks, e-motors, and advanced electronics supports the electrification trend. As renewable power generation scales, so too does demand for components with extreme thermal tolerance.
- **Emerging Uses:** Additive manufacturing (3D printing) and nuclear fusion R&D have spotlighted tungsten as a metal of the future. Its performance in extreme environments makes it a prime candidate for next-gen materials science.

Demand growth of 3–5% annually is expected through 2030, with upside from geopolitical realignment and substitution of Chinese-origin material.

Figure 1. Demand for Tungsten by End User Market, 2024



Source: Core Consultants

Figure 2. Tungsten APT 88.5%  $\text{WO}_3$ , \$/mtu



Source: Bloomberg, 21 Oct 2005 - 30 Jun 2025. 1 mtu = 10kg  $\text{WO}_3$

## Supply

Despite bullish pricing, the global tungsten project pipeline remains thin. The 2011–2015 price collapse shuttered many projects and deterred exploration investments.

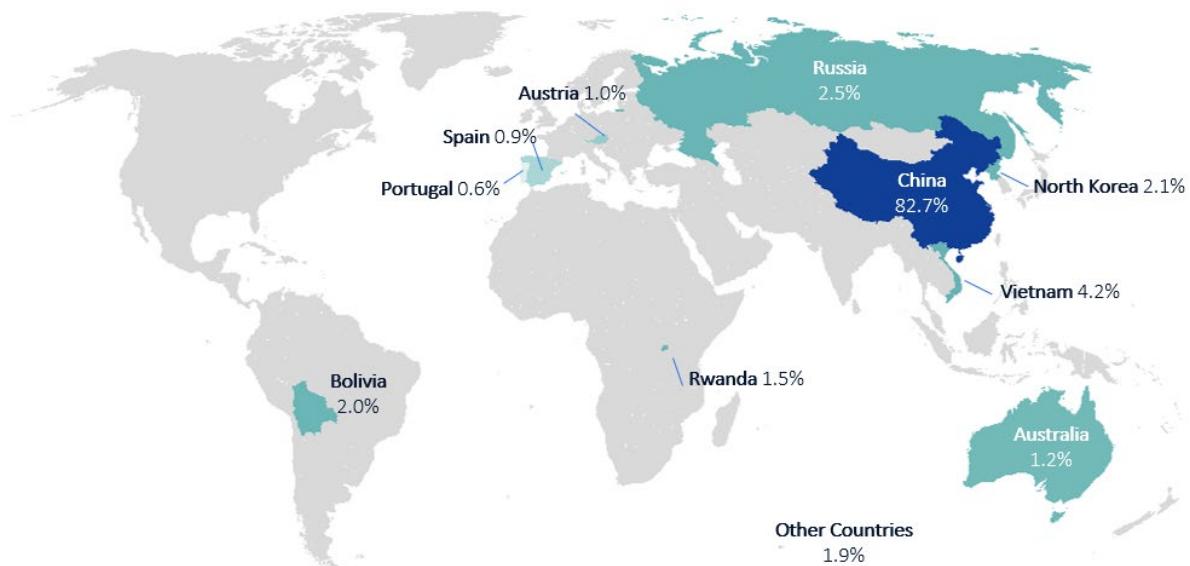
Global tungsten supply is highly concentrated and geopolitically fragile:

- **China (~82% of mine production):** Production quotas, environmental shutdowns, and rising internal demand have reduced export availability. China has previously embargoed tungsten exports and is tightening control via the Rare Earths-like quota system. However, Chinese mines have been depleting and achieving significantly lower grades, with very limited new capacity coming online.
- **Russia (~2%):** Sanctions and reputational risk make Russian material undesirable in Western markets.
- **Non-Chinese Supply (~15%):** Comes from Vietnam, Australia, Austria, Portugal, Spain, Rwanda, Bolivia and limited new entrants. However, these jurisdictions are unable to fill the strategic gap quickly. Additionally, some of these sources depend on artisanal and small-scale mining (ASM), which is inherently limited and lacks scalability.

With the global tungsten market already in a structural deficit, and Western governments seeking secure sources, the spotlight is on a small set of new Western-led development projects — many of which are undervalued or unknown.

A key development is unfolding in South Korea, where Almonty Industries began ore extraction at the Sangdong Tungsten Mine in September 2024, with first production expected in 2025. With an estimated 50 million tons of resources and with an average ore grade approximately 0.43%, Sangdong is positioned to become a major non-Chinese supplier. Once fully operational, the mine is expected to meet up to 7% of global tungsten demand.

Figure 3. World Tungsten Mine Production by Country, 2024 (% of global supply)



Source: U.S. Geological Survey, 2024

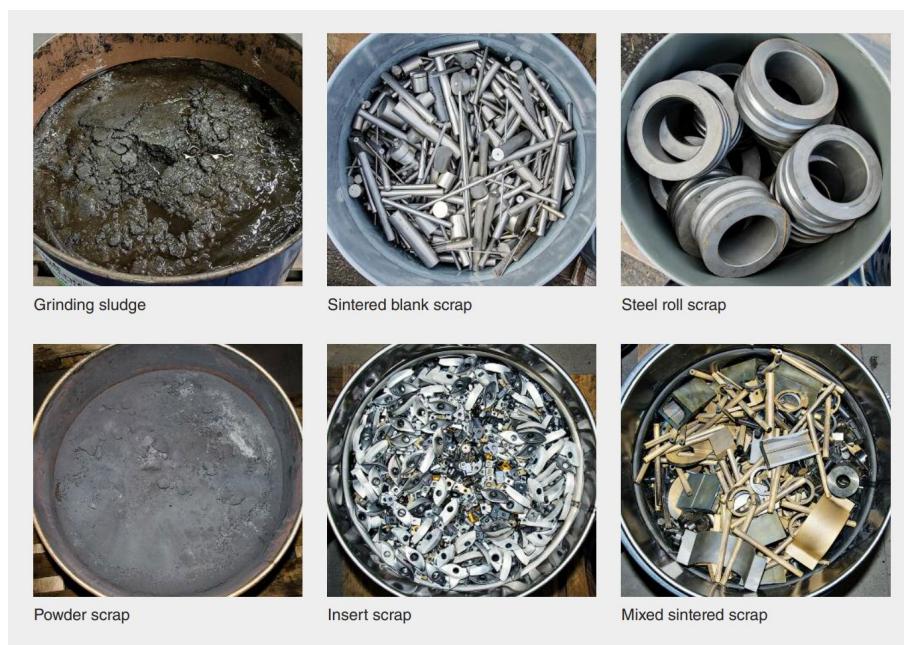
## Recycling

The overall global recycling input rate for tungsten is around 35%<sup>1</sup>, particularly from cemented carbide scrap, but:

- **High-Grade Scrap Is Competitive:** Industrial users tightly control scrap streams for internal recycling. In 2025, exports of tungsten waste and scrap from China rose by 5.56% yoy<sup>2</sup>, while exports of raw and intermediate tungsten materials declined sharply due to new licensing and quota systems. This reflects a clear pivot: China is restricting the flow of upstream materials while promoting higher-value finished exports. The West is left competing for a shrinking pool of accessible scrap or overpaying for Chinese-made, value-added tungsten products—further underscoring the urgency to develop new, independent supply chains.
- **Low-Grade Recovery Is Costly:** Recovering tungsten from low-concentration end-of-life products, such as mixed metal scraps and low-grade ores, is uneconomic at current prices.
- **Supply Tightness Persists:** Recycling can reduce the pressure but cannot replace the need for new mine supply.

There clearly exists potential for future improvement, as sustainability mandates evolve, but it is unlikely to materially offset the shortfall from underinvestment in mining.

Figure 4: Examples of tungsten carbide new scrap, also called primary or production scrap<sup>1</sup>



<sup>1</sup> International Tungsten Industry Association | May 2024

<sup>2</sup> China's Tungsten Products Exports from January to May 2025 | China Tungsten Industry News Center

## Conclusion

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Tungsten's criticality is not new — what's new is the urgency with which governments and industries are seeking alternatives to Chinese supply given the restrictions of exports. For investors, this presents a rare opportunity to enter an underinvested market with structural upside and strategic tailwinds.

We are invested in several tungsten producers, and we see a robust near-term outlook for those companies and the tungsten price. We are well aware though that the cure for high commodity prices is high commodity prices and expect to see more projects come to the market over the next 12-18 months.

We are also attuned to the fact the Chinese will want to maintain their market dominance and may well flood the market again to push prices back down and discourage new entrants. It is worth noting however that despite the recent run up that prices still remain below levels when we started investing in this area back in 2011, so it is not an expensive market.

As always, we focus on identifying high-quality established and revenue generating companies that are on the verge of a re-rating through a new mine build or significant expansion. With few options in the public markets and a looming supply gap, we believe tungsten will emerge as a breakout commodity of the strategic metals cycle.

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