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Antimony Policy Brief

Prepared by the East Asian Bureau of Economic Research

Eli Hayes, Alyssa Yuan, Jason Tabarias

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Summary

- Australia is highly dependent on a narrow range of importers for its' supply of phosphates, a critical input into Australian agriculture.
- 80% of global phosphate exports come from 4 countries: Saudi Arabia, China, Morocco, and Russia.
- There are real risks of phosphorus supply shocks. The Australian government should consider mechanisms for managing supply shocks, including establishing a stockpiling program for phosphates.

Introduction

Critical and strategic minerals and materials are an extremely diverse group of resources with a wide variety of applications, market sizes and structures, and key risks. As Australia now has 36 officially designated critical and strategic minerals, ranging from copper to scandium, there are few recommendations or analyses that apply cleanly to the entire space. Given their variety, governments have a range of rationales for declaring minerals as critical, as well as many different policy instruments and responses.

The East Asian Bureau of Economic Research has conducted a scenario analysis of antimony, a mineral listed as critical in Australia, China, the United States, and several partner countries and recently placed under export controls by China.

Antimony: An Overview

Antimony, typically mined as stibnite, is a material with a global market of around US$1-3 billion per annum, depending on prevailing prices, split between metallic and non-metallic uses, primarily in the form of antimony trioxide. Globally, metallic uses account for 40-45% of global demand, while non-metallic uses account for the remainder. Metallic uses are primarily in the form of alloys, typically lead, where antimony is used to harden other metals. Practical applications for this include lead-acid batteries, the most important metallic application, and military ammunition. Non-metallic usages require antimony metal to be smelted into a powder. The main powder form, antimony trioxide (ATO) is used as a key ingredient in fire retardant.

Both antimony supply and demand is concentrated in China, accounting for 50% of mined production, and almost 80% of smelting globally. Tajikistan, the second-most important country in the market, has recently reduced exports of concentrates as the country's two antimony mines are establishing or expanding their on-site smelter capacity, seeking to produce intermediate metals and trioxide. Russia is also a significant concentrate producer, but much of its' output comes from the large Olimpiada mine, which is rapidly exhausting its stock of antimony-rich ore.

Importantly, antimony metal as used in lead-acid batteries is easily recycled, and recycling constitutes around 15-20% of global supply each year. However, much of this is re-consumed by the battery industry, meaning it has little impact on broader antimony consumers, such as those in the defence industries.

Antimony as a Critical Mineral

Antimony's criticality is derived from its applications in the defence manufacturing industry. Apart from the previously mentioned use of antimony alloys in ammunition, antimony powder is used in combination with indium (also listed as a critical mineral) in a range of infrared systems. While antimony can be substituted in lead-antimony alloys for batteries, it is unclear that it could also be substituted in ammunition in the short term. There is no known substitute yet for its use with indium in infrared systems. However, defence applications make up a relatively small percentage of applications, likely no more than 15% of global demand. Importantly, defence manufacturing using antimony occurs outside Australia. While Australia would be indirectly affected by any defence-industrial shock, the actual end-use consumption of antimony in Australia is extremely low (see below).

Antimony in Australia

At present, Australia is a minor participant in the global antimony industry. Decline at the only active antimony mine - Costerfield - and the closure of the Hillgrove mine has reduced Australia's mined output and as a result Australia's share of global production has fallen from 3.5% a decade ago to around 2% today. Australia's share would be even lower, but non-Australian production also contracted over the same period. Australia is a small consumer of antimony, using around 300 tonnes per annum with the vast majority being antimony trioxide.[1] Australia does not presently possess any domestic smelting capability, nor any ability to convert antimony metal into antimony trioxide.

Australian antimony mine operations are similar to most operations globally in that they are primarily gold mines, with antimony as a secondary product. Costerfield and Hillgrove have antimony grades of around 1.85% and 1.2% respectively. In terms of cash flow, Costerfield generates around 20% of its revenue at current prices from antimony. Hillgrove has higher leverage to the antimony price, due to its lower gold production, and will draw more than 50% of its revenue from antimony.[2]

The Australian government has funded Nyrstar, owner of the Port Pirie lead smelter and refinery, to support the production of antimony metal, with the smelter having produced its first metal in November 2025. A key issue is where the feedstock for Port Pirie's antimony production comes from. While antimony is often present as a trace element in lead concentrates, a dependence on trace elements limits the potential scale of production. For example, while details on all concentrates utilised at Port Pirie are not publicly disclosed, the Rasp and Pinnacles mines are known suppliers to Port Pirie and have not declared any antimony in their reserves or resources. A second option is that Port Pirie has been refitted to utilise antimony concentrates. In that case, it would mean that Pirie would be importing concentrates from abroad. As a result, it would not be contributing to global concentrate supply and demand, but instead directly competing with smelters from both partner and non-partner countries. Antimony often co-occurs in lead concentrates, though it is not significant to earnings at lead mines. If Port Pirie were to produce refined antimony, volumes would be dependent on the lead market and the volume of antimony in the lead concentrate.

Australian Policy Drivers

There is a range of policy drivers as to why Australian governments might wish to support antimony refinement capacity within Australia. These include:

Industry development — providing financial and other supports might bridge the gap between current prices and future prices such that domestic refinement capacity can eventually compete in global markets without government support and provide ongoing value to the Australian economy and population through sustained, commercial exports.

Regional and workforce development — providing support might sustain or build workforce and regional economies in areas where there are limited alternatives for a time-limited period until the operations become globally competitive. Smelters could also become "hubs" for

[1] Our analysis suggests that Australia imports antimony products at a premium to the rest of the world on a unit basis. There are several possible explanations for this, including premiums for relatively small volumes, logistics costs, or quality differences.
[2] Estimates based on a US$3,500/oz gold price and a US$55,000/t antimony price.

regional mineral production networks, potentially encouraging other developments that would not have occurred without the smelter's investment.

Strategic resiliency — providing support to Australian antimony refinement might materially add to the global supply of antimony and buffer against global supply shocks, ensuring continuity of supply to Australian alliance partners globally.

Defence spending and alliance commitments — Australia might be under external pressure to raise its spending on defence sector and wish to do so in a way that provides the highest security, economic and social benefits to Australians; investment in antimony production and smelting might be seen as one of those highest-value options.

Data Insights

We modelled a number of stylised scenarios reflecting shocks to the global antimony production system. Our database was built with a combination of bottom-up facility data and estimates, and top-down global supply and demand balances and trade flows. For our antimony scenarios, we focused on supply shocks emanating from tightened export controls in China and assumed that 15% of production in several key Western industrial countries was linked to defence output. We've also assumed that, in the event of a severe supply shortage, that governments will direct available supply towards defence applications first.

From an economic perspective, we do not find a compelling case for financing either mining or smelting. While there is likely to be a tight market for antimony concentrates outside China, it is unlikely that there will be a *critical* shortage. Importantly, there is little financial rationale to support antimony mines; because antimony co-occurs with gold operations, and our modelling and public data shows that mines are highly profitable due to the strong performance of both gold and antimony. In smelters, Australia has no comparative advantage in antimony smelting operations. In addition, Australian antimony mines are producers of a gold-antimony concentrate, while Port Pirie is a lead smelter. Port Pirie requires specific feedstocks with little synergy to existing Australian mines.

From a security perspective, the rationale for direct support is limited. Australian mines will have little impact on concentrate supply and demand balances. While total Western antimony smelting capacity is not capable of fully replacing exports from China, it is sufficient to meet the most critical defence needs. There is already enough smelting capacity in Western nations to meet defence needs. The limitations of Port Pirie's capability mean that smelting at that facility would be competing for feedstock with smelters in locations like Korea and the United States, rather than adding to partner capacity. In addition, Port Pirie's poor financial performance has been spotlighted by the news of additional write-downs to the smelter. Port Pirie has experienced near-continuous write-downs since Nyrstar was acquired by Trafigura, and the most recent one comes despite the support package pledged by the government.

Policy Recommendations

Our analysis shows no compelling rationale for support of either mining or smelting of antimony in Australia. Support for mining may be justified if there is a major downturn in the price of gold and antimony, rendering Australian production uneconomic, but this rationale

should be weighed against the fact that Costerfield is coming to a natural end-of-life and that Hillgrove has been a historically sporadic asset. We do not see any situation where smelting represents a sound economic or strategic investment for Australia.