

Statement for the Record before the US-China Economic and Security Review  
Commission

Hearing on “China’s Stockpiling and Mobilization Measures for Competition and  
Conflict”

June 13, 2024

Gregory D. Wischer\*

*Founder and Principal, Dei Gratia Minerals<sup>+</sup>*

**Overview**

The Chinese central government stockpiling minerals is one potential indicator that it may be preparing to invade Taiwan. The National Food and Strategic Reserves Administration oversees China’s stockpile, which reportedly contains large volumes of minerals like aluminum, cobalt, and copper. Three specific indicators that China may be stockpiling for strategic reasons, like an invasion of Taiwan, are (1) stockpiling when domestic mineral producers do not face profitability issues, (2) high apparent mineral consumption relative to real mineral consumption, and (3) spiking mineral imports. Indicators 2 and 3 also assess Germany’s mineral stockpiling activities before it invaded Poland in September 1939.

**How China’s Mineral Stockpiling Could Indicate It Is Preparing to Invade Taiwan**

Mineral stockpiling is one indicator that a hostile state may be preparing to launch a military attack.<sup>1</sup> A mineral stockpile can indicate a capability to attack because minerals are necessary to manufacture military platforms and munitions before and during a conflict. Mineral stockpiling, therefore, can indicate an intent to attack because a mineral stockpile is a capability that states may seek before launching an attack.

For example, Germany stockpiled significant copper volumes in 1938 and 1939,<sup>2</sup> and when it invaded Poland in September 1939, Germany had enough copper stocks to cover almost

---

\* I would like to thank Morgan Bazilian, Jack Little, and David Wischer for their insightful feedback.

+ Wischer is also a non-resident fellow at the Payne Institute for Public Policy at the Colorado School of Mines and a non-resident fellow at the Northern Australia Strategic Policy Centre at the Australian Strategic Policy Institute.

<sup>1</sup> Cynthia Grabo defines an indicator as “a known or theoretical step which the enemy should or may take in preparation for hostilities.” See Cynthia M. Grabo, *A Handbook of Warning Intelligence* 1 (Washington, DC: Defense Intelligence Agency, July 1972), 2–3,

<https://www.cia.gov/readingroom/docs/CIA-RDP80B00829A000800040001-6.pdf>.

<sup>2</sup> T.H. Miller, H.M. Meyer, and Allan F. Matthew, “Copper,” in *Minerals Yearbook Review of 1940*, ed. H.D. Keiser (Washington, DC: US Government Printing Office, 1941), 88,

<https://search.library.wisc.edu/digital/ANL3GAHUQMHTGL8Q/pages/AOSZXJZPAW2JOV9D>.

nine months of estimated wartime consumption.<sup>3</sup> Similarly, Japan began stockpiling minerals like tin after 1936,<sup>4</sup> and when it launched attacks across the Pacific in December 1941, Japan had accumulated significant mineral stockpiles, including enough bauxite stocks to cover nine months of Japanese demand at 1941 consumption levels.<sup>5</sup>

During the Cold War too, mineral stockpiling by the Soviet Union and Warsaw Pact states was an indicator of possible preparation for a military attack. In 1979, the RAND Corporation said that the Soviet Union's preparation for war could include mineral stockpiling by both the military and industry, as well as spiking mineral imports.<sup>6</sup> Likewise, a US National Intelligence Estimate in 1984 said that Warsaw Pact states' preparations for war could include mineral stockpiling, noting that "stockpiling in unusual quantities" could be a "particularly salient" indicator.<sup>7</sup> Thus, China's central government stockpiling minerals could be one indicator that China is preparing to invade Taiwan.

### China's Mineral Stockpile

China's central government maintains a mineral stockpile.<sup>8</sup> The National Food and Strategic Reserves Administration, more commonly known as the State Reserves Bureau, oversees China's mineral stockpile and sits under China's powerful National Development and Reform Commission.<sup>9</sup> China does not disclose the list and quantity of minerals

---

<sup>3</sup> Jonas Scherner, "Preparing for the Next Blockade: Non-ferrous Metals and the Strategic Economic Policy of the Third Reich," *The English Historical Review* 137, no. 585 (April 2022): 496, <https://academic.oup.com/ehr/article/137/585/475/6576229>.

<sup>4</sup> Louis Morton, *Strategy and Command: The First Two Years* (Washington, DC: Center of Military History, US Army, 1962), 55–56, [https://history.army.mil/html/books/005/5-1/CMH\\_Pub\\_5-1.pdf](https://history.army.mil/html/books/005/5-1/CMH_Pub_5-1.pdf); and E.W. Pehrson and J.B. Umhau, "Tin," in *Minerals Yearbook 1941*, ed. F.M. Shore (Washington, DC: US Government Printing Office, 1943), 728, <https://search.library.wisc.edu/digital/AVZLKWT7LNXCK39B/pages/AGACFAKE6N4G7Q9C>.

<sup>5</sup> Jerome B. Cohen, "The Japanese War Economy: 1940–1945," *Far Eastern Survey* 15, no. 24 (1946): 362, <https://doi.org/10.2307/3021956>.

<sup>6</sup> Edmund Brunner, Jr., "Perception and Strategic Warning," RAND Corporation, prepared for the US Air Force, November 1979, 6–7, <https://apps.dtic.mil/sti/tr/pdf/ADA080448.pdf>.

<sup>7</sup> Director of Central Intelligence, "Warning of War in Europe," National Intelligence Estimate, April 1, 1984, 47, 66, <https://nsarchive.gwu.edu/sites/default/files/documents/5028377/Document-21-Warning-of-War-In-Europe-National.pdf>.

<sup>8</sup> Notably, China has the world's largest producer and consumer mineral stockpiles. See David R. Wilburn, Donald I. Bleiwas, and Nick A. Karl, "Global Stocks of Selected Mineral-Based Commodities," US Geological Survey, 2016, 7, <https://pubs.usgs.gov/sir/2016/5152/sir20165152.pdf>.

<sup>9</sup> Mark Burton et al., "US Bid to Loosen China's Grip on Key Metals for EVs Is Stalling," *Bloomberg*, February 19, 2024, <https://www.bloomberg.com/news/features/2024-02-20/us-china-washington-ramps-up-hunt-for-ev-metals-to-secure-its-own-supplies>; and Min Zhang and Tom Daly, "Explainer: What We Know about China's Metals Reserves Release," *Reuters*, June 17, 2021, <https://www.reuters.com/world/china/what-we-know-about-chinas-metals-reserves-release-2021-06-17/>.

The National Development and Reform Commission is arguably the most powerful economic agency in China's government, exercising control and planning over China's economy including its five-year plans. See "Main Functions of the NDRC," National Development and Reform Commission (NDRC), People's Republic of China, accessed May 13, 2024, <https://en.ndrc.gov.cn/aboutndrc/mainfunctions/>; and "China

stockpiled, but its stockpile reportedly includes aluminum, antimony, cadmium, cobalt, copper, gallium, germanium, indium, molybdenum, rare earth elements, tantalum, tin, tungsten, zinc, and zirconium.<sup>10</sup> The stockpile may contain up to 2 million metric tons of copper, 900,000 metric tons of aluminum, 400,000 metric tons of zinc, and 7,000 metric tons of cobalt.<sup>11</sup> See Figure 1 for estimated stockpiled volumes of selected minerals.

<b>Mineral</b>	<b>Metric tons</b>	<b>Year</b>
Aluminum (ingots)	800,000–900,000	2021
Cobalt (metal)	7,000	2021
Copper (refined)	1,500,000–2,000,000	2021
Indium	100	2016
Molybdenum (oxide)	22,300	2016
Nickel (refined)	20,000–50,000	2016
Rare earth elements	40,000	2015
Tungsten (concentrate)	30,000	2016
Zinc (refined)	250,000–400,000	2021

**Figure 1: China’s estimated stockpile volumes for selected minerals.**

Source for 2015 and 2016 numbers: David R. Wilburn, Donald I. Bleiwas, and Nick A. Karl, “Global Stocks of Selected Mineral-Based Commodities,” table 6, <https://doi.org/10.3133/sir20165152>. Source for 2021 numbers: Tom Daly and Shivani Singh, “Explainer: What China Keeps in Its Secretive Commodity Reserves,” *Reuters*, August 4, 2021, <https://www.reuters.com/world/china/what-china-keeps-its-secretive-commodity-reserves-2021-08-05/>.

Regarding the purchasing process for the mineral stockpile, the NFRSA usually issues a tender to purchase Chinese-branded metal from state-owned enterprises.<sup>12</sup> The NFRSA coordinates such actions with the state-owned enterprises and hosts meetings with the industry participants.<sup>13</sup> The Chinese government then purchases minerals from the

---

Puts Most Powerful Agency in Charge of Climate Policies,” *Bloomberg*, July 6, 2021, <https://www.bloomberg.com/news/articles/2021-07-06/china-puts-most-powerful-agency-in-charge-of-climate-policies>.

<sup>10</sup> David R. Wilburn, Donald I. Bleiwas, and Nick A. Karl, “Global Stocks of Selected Mineral-Based Commodities,” US Geological Survey, 2016, 6–7, <https://pubs.usgs.gov/sir/2016/5152/sir20165152.pdf>.

<sup>11</sup> Shivani Singh, “Explainer: What China Keeps in Its Secretive Commodity Reserves,” *Reuters*, August 4, 2021, <https://www.reuters.com/world/china/what-china-keeps-its-secretive-commodity-reserves-2021-08-05/>.

<sup>12</sup> Julian Luk, Justin Yang, and Alexander Cook, “Potential China SRB Tender Helps Stabilize Falling Rotterdam Cobalt Prices,” *Fastmarkets*, August 9, 2022, <https://www.fastmarkets.com/insights/potential-china-srb-tender-helps-stabilize-falling-rotterdam-cobalt-prices/>.

<sup>13</sup> James T. Areddy, “China Moves to Strengthen Grip Over Supply of Rare-Earth Metals,” *Wall Street Journal*, February 7, 2011, <https://www.wsj.com/articles/SB10001424052748704124504576117511251161274>; Nabeel A. Mancheri et al., “Effect of Chinese Policies on Rare Earth Supply Chain Resilience,” *Resources, Conservation and Recycling* 142 (2019): 108–109, <https://doi.org/10.1016/j.resconrec.2018.11.017>; Risk & Policy Analysts, “Stockpiling of Non-energy Raw Materials,” prepared for the European Commission, March 2012, 11, [https://www.mmta.co.uk/wp-content/uploads/2017/02/stockpiling-report\\_EU-DG-Enterprise-and-Industry-Mar-2012.pdf](https://www.mmta.co.uk/wp-content/uploads/2017/02/stockpiling-report_EU-DG-Enterprise-and-Industry-Mar-2012.pdf); and Julian Luk, Justin Yang, and Alexander Cook, “Potential China SRB Tender

producers and transfers them to government storage facilities or facilities owned by state-owned enterprises like Baotou Steel, which reportedly stockpiles rare earth elements.<sup>14</sup> Local and provincial Chinese governments also stockpile minerals, but they stockpile for economic—not strategic—reasons like supporting domestic mineral producers.<sup>15</sup> When they stockpile, they purchase the minerals and have mineral producers store the minerals at their facilities, rather than transferring the minerals to government storage facilities.<sup>16</sup>

Notably, the Chinese central government’s mineral stockpile is a capability that could support a Chinese military invasion of Taiwan and a subsequent war, including against the United States and its allies. According to US government officials, Chinese President Xi Jinping has directed the Chinese military leadership to be prepared to invade Taiwan by 2027.<sup>17</sup> Ostensibly, China should have a mineral stockpile by 2027 to support such an invasion; however, China’s actual military preparedness timeline could be different, and China could have a different deadline to meet a mineral stockpile target. Still, a mineral stockpile is likely a capability that China would seek to attain before invading Taiwan.

Therefore, mineral stockpiling could indicate that China is seeking to attain a mineral stockpile that could support its invasion of Taiwan.<sup>18</sup> Importantly, China’s mineral stockpiling serves both an economic *and* strategic purpose: it influences prices to ensure Chinese mineral producers and consumers remain operational, and it accumulates minerals

---

Helps Stabilize Falling Rotterdam Cobalt Prices,” Fastmarkets, August 9, 2022, <https://www.fastmarkets.com/insights/potential-china-srb-tender-helps-stabilize-falling-rotterdam-cobalt-prices/>.

<sup>14</sup> Pui-Kwan Tse, “The Mineral Industry of China,” US Geological Survey, February 2015, 8.8, <https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/mineral-pubs/country/2008/myb3-2008-ch.pdf>; James T. Areddy, “China Moves to Strengthen Grip Over Supply of Rare-Earth Metals,” *Wall Street Journal*, February 7, 2011, <https://www.wsj.com/articles/SB10001424052748704124504576117511251161274>; and Nabeel A. Mancheri et al., “Effect of Chinese Policies on Rare Earth Supply Chain Resilience,” *Resources, Conservation and Recycling* 142 (2019): 108, <https://doi.org/10.1016/j.resconrec.2018.11.017>.

<sup>15</sup> Andy Home, “Column: A Brief History of China’s Metals Stockpiling Programmes,” *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>.

<sup>16</sup> Pui-Kwan Tse, “The Mineral Industry of China,” US Geological Survey, February 2015, 8.8, <https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/mineral-pubs/country/2008/myb3-2008-ch.pdf>.

<sup>17</sup> Hope Yen, “CIA Chief: China Has Some Doubt on Ability to Invade Taiwan,” *AP*, February 26, 2024, <https://apnews.com/article/russia-ukraine-taiwan-politics-united-states-government-eaf869eb617c6c356b2708607ed15759>; and Roxana Tiron, “China on Track to Be Ready to Invade Taiwan by 2027, US Says,” *Bloomberg*, March 20, 2024, <https://www.bloomberg.com/news/articles/2024-03-20/china-on-track-to-be-ready-for-taiwan-invasion-by-2027-us-says>.

<sup>18</sup> Gerard DiPippo, “Economic Indicators of Chinese Military Action against Taiwan,” Center for Strategic and International Studies, August 16, 2022, <https://www.csis.org/analysis/economic-indicators-chinese-military-action-against-taiwan>.

to supply China’s military and economy in national emergencies, like war.<sup>19</sup> Consequently, when observing China’s mineral stockpiling, one must discern whether China is stockpiling for economic or strategic reasons, which are discussed below.

According to the White House, China stockpiles for economic reasons, “actively combatting price volatility or supporting particular industry segments.”<sup>20</sup> Amid low mineral prices, the Chinese government purchases minerals to increase mineral prices and increase margins for upstream mineral producers,<sup>21</sup> and amid high mineral prices, the Chinese government sells minerals to decrease mineral prices and increase margins for downstream mineral consumers.<sup>22</sup> For example, the Chinese government bought zinc at low prices in 2009 and 2012, and it sold zinc at high prices in 2021.<sup>23</sup> These purchases and sales are public as the government seeks to send price signals to the market, and they usually target minerals in which China has sizable production, like aluminum and zinc.<sup>24</sup>

China also stockpiles for strategic reasons—that is, preparation for national emergencies like war.<sup>25</sup> According to a study requested by the European Parliament, “Analysts believe...that China’s stockpile is growing to secure reserves in the event of a conflict.”<sup>26</sup> Typically, China’s strategic purchases are not announced publicly, and they target minerals—namely copper—in which China has far less production relative to domestic demand, and precious and minor metals—like cobalt—with specialized applications.<sup>27</sup>

---

<sup>19</sup> Gregory D. Wischer, “China Shows How Western Governments Should Stockpile Minerals,” *The Strategist*, Australian Strategic Policy Institute, March 6, 2024, <https://www.aspistrategist.org.au/china-shows-how-western-governments-should-stockpile-minerals/>.

<sup>20</sup> White House, “Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017,” June 2021, 188, <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>.

<sup>21</sup> “State Reserve Agency Stockpile to Buoy Aluminum Sector,” *Xinhua*, December 27, 2008, [https://www.chinadaily.com.cn/bizchina/2008-12/27/content\\_7346725.htm](https://www.chinadaily.com.cn/bizchina/2008-12/27/content_7346725.htm).

<sup>22</sup> Mai Nguyen and Min Zhang, “China to Release Copper, Aluminium and Zinc Reserves to Stabilise Prices,” *Reuters*, June 16, 2021, <https://www.reuters.com/world/china/china-release-copper-aluminium-zinc-reserves-stabilise-commodity-prices-2021-06-16/>.

<sup>23</sup> Andy Home, “Home: China’s Sale of State Zinc Reserves Is a Well-Timed Trade,” *Reuters*, June 24, 2021, <https://www.mining.com/web/chinas-sale-of-state-zinc-reserves-is-a-well-timed-trade/>.

<sup>24</sup> Andy Home, “Column: A Brief History of China’s Metals Stockpiling Programmes,” *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>.

<sup>25</sup> “SRB Revealed: Shedding Light on China’s State Reserve Bureau in the Copper Market,” *Fastmarkets*, July 31, 2015, <https://www.fastmarkets.com/insights/srb-revealed-shedding-light-on-chinas-state-reserve-bureau-in-the-copper-market/>.

<sup>26</sup> Elmer Rietveld et al., “Strengthening the Security of Supply of Products Containing Critical Raw Materials for the Green Transition and Decarbonization,” European Parliament, December 2022, 71, <https://www.europarl.europa.eu/cmsdata/267347/QA-04-22-302-EN-C.pdf>.

<sup>27</sup> Andy Home, “Column: A Brief History of China’s Metals Stockpiling Programmes,” *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>; and Pratima Desai, “Exclusive: China State Stockpiler Aims to Buy Up to 15,000 T of Cobalt, Sources Say,” *Reuters*, May 24, 2024, <https://www.reuters.com/markets/commodities/china-state-stockpiler-aims-buy-up-15000-t-cobalt->

To help discern whether China is stockpiling for strategic reasons—including a possible invasion of Taiwan—three key indicators exist: (1) stockpiling when domestic mineral producers do not face profitability issues, (2) high apparent mineral consumption<sup>28</sup> relative to real mineral consumption,<sup>29</sup> and (3) spiking mineral imports. These indicators would signal deviation from China’s normal stockpiling activities during its current military expansion, which is arguably the largest peacetime military expansion in recent history.<sup>30</sup> Therefore, these indicators could reveal that China is stockpiling minerals for reasons beyond military expansion, such as preparation for conflict.

Indicators 2 and 3 also assess Germany’s stockpiling activities before it and the Soviet Union invaded Poland in September 1939. Notably, Germany before World War II has similarities with China today: “Germany is an outstanding example of a major industrial nation in which processing of mineral raw materials is a far more important element in the national economic structure than production of the materials themselves,” according to the US Geological Survey in 1938.<sup>31</sup> Today, China mines appreciable volumes of some minerals, but it processes far larger volumes, being a global leader in processing production for many minerals.<sup>32</sup> Thus, Germany’s stockpiling activities before invading Poland in 1939 may parallel China’s stockpiling activities before potentially invading Taiwan.

**Indicator 1: Stockpiling when domestic mineral producers do not face profitability issues.** Generally, China stockpiles minerals to increase domestic mineral prices and support domestic mineral producers, which will sometimes request that the government

---

[sources-say-2024-05-23/](https://www.reuters.com/markets/commodities/china-state-stockpiler-aims-buy-up-15000-t-cobalt-sources-say-2024-05-23/). China is reportedly seeking to buy 15,000 metric tons of cobalt in 2024—a record amount of cobalt for a single purchase. See Pratima Desai, “Exclusive: China State Stockpiler Aims to Buy Up to 15,000 T of Cobalt, Sources Say,” *Reuters*, May 24, 2024, <https://www.reuters.com/markets/commodities/china-state-stockpiler-aims-buy-up-15000-t-cobalt-sources-say-2024-05-23/>.

<sup>28</sup> Apparent consumption is domestic mineral production plus mineral imports minus mineral exports.

<sup>29</sup> Real consumption is actual domestic mineral usage.

<sup>30</sup> Kitty Donaldson, “UK Urges China to Explain ‘Biggest’ Peacetime Military Build-Up,” *Bloomberg*, April 24, 2023, <https://www.bloomberg.com/news/articles/2023-04-24/uk-urges-china-to-explain-biggest-peacetime-military-build-up>.

<sup>31</sup> J.S. McGrath, “World Production of Minerals and Economic Aspects of International Mineral Policies,” in *Minerals Yearbook* 1938, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1938), 48,

<https://search.library.wisc.edu/digital/AZTQ7FWNGGO4TW86/pages/AQ33QVDT6XXY4A8J>.

<sup>32</sup> International Energy Agency, “The Role of Critical Minerals in Clean Energy Transitions,” May 2021, 13, <https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf>; Rodrigo Castillo and Caitlin Purdy, “China’s Role in Supplying Critical Minerals for the Global Energy Transition: What Could the Future Hold?” Brookings Institution, July 2022, 2, [https://www.brookings.edu/wp-content/uploads/2022/08/LTRC\\_ChinaSupplyChain.pdf](https://www.brookings.edu/wp-content/uploads/2022/08/LTRC_ChinaSupplyChain.pdf); and Mark Burton, “Why the Fight for ‘Critical Minerals’ Is Heating Up,” *Bloomberg*, November 20, 2023, <https://www.bloomberg.com/news/articles/2023-11-20/critical-minerals-china-s-dominance-as-supplier-is-a-problem-for-the-west>.

stockpile minerals to support domestic prices.<sup>33</sup> Consequently, China stockpiles when mineral prices are low and domestic mineral producers face profitability issues, increasing mineral producers' profit margins.<sup>34</sup> If China stockpiles minerals when mineral prices are not low or when domestic mineral producers do not face profitability issues, China could be stockpiling for strategic reasons, like preparation for a conflict.

To further discern China's intent for stockpiling, China stockpiling minerals with disproportionate military end-uses could indicate stockpiling for a conflict. For instance, a large portion of beryllium's demand is from defense applications; therefore, greater stockpiling of beryllium could indicate preparation for war.<sup>35</sup> The grade and form of the mineral being stockpiled could also indicate whether China is stockpiling for military purposes. For example, unalloyed beryllium metal and beryllium composite products predominantly have military end-uses.<sup>36</sup> Increased stockpiling rates of these minerals could indicate that China is preparing for war.

**Indicator 2: High apparent mineral consumption relative to real mineral consumption.**

Apparent consumption is domestic mineral production plus mineral imports minus mineral exports, while real consumption is actual domestic mineral usage. High apparent mineral consumption relative to real mineral consumption would suggest that China has far greater mineral production and imports than consumption and exports. This excess supply may be stockpiled by China's central government. For instance, if China has high copper production and high copper imports but low copper consumption and low copper exports, the excess copper may be stockpiled for strategic reasons.

For example, before Germany invaded Poland in 1939, Germany's apparent copper consumption in 1937 and 1938 far exceeded possible real consumption.<sup>37</sup> This circumstance indicated that Germany had far greater supply than demand, hinting that

---

<sup>33</sup> "Update 1-China Issues Tender to Stockpile Aluminium – Sources," *Reuters*, November 12, 2012, <https://www.reuters.com/article/idUSL3E8MC3MQ/>.

<sup>34</sup> Andy Home, "Column: A Brief History of China's Metals Stockpiling Programmes," *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>; and Pui-Kwan Tse, "The Mineral Industry of China," US Geological Survey, February 2015, 8.2, <https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/mineral-pubs/country/2012/myb3-2012-ch.pdf>.

<sup>35</sup> US Geological Survey, *Mineral Commodities Summary 2024* (Reston, VA: US Geological Survey, 2024), 17, <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>. Germanium is another element that could be monitored given its defense applications. See US Geological Survey, *Mineral Commodities Summary 2024* (Reston, VA: US Geological Survey, 2024), 17, <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>.

<sup>36</sup> Brian W. Jaskula, "Beryllium," US Geological Survey, January 2024, 44, <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-beryllium.pdf>.

<sup>37</sup> J.W. Furness and H.M. Meyer, "Copper," in *Minerals Yearbook 1939*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1939), 116, <https://search.library.wisc.edu/digital/AQGHPBQDKJTJZH9E/pages/AEJ7EHD3HQL3IT84>.

sizable copper volumes were stockpiled.<sup>38</sup> In 1940, the US Geological Survey confirmed that Germany's copper stockpiling was in preparation for conflict: "During the past few years [Germany's] apparent consumption is believed to have been considerably above real consumption, and large stocks of copper probably were accumulated in preparation for war."<sup>39</sup> Thus, if China's apparent mineral consumption far surpasses its real mineral consumption, China could be stockpiling minerals in preparation for conflict.<sup>40</sup>

**Indicator 3: Spiking mineral imports.** Under normal circumstances, mineral imports should be relatively stable, with increases and decreases correlated with domestic consumption. Spiking mineral imports suggest significantly increased mineral demand, but absent a corresponding increase in domestic consumption, these mineral imports could be stockpiled by the government for national emergencies like a conflict—or a pandemic. During the COVID-19 pandemic in 2020, China imported copper despite elevated copper prices, implying copper stockpiling.<sup>41</sup> Citi analyst Max Layton said China sought increased mineral stocks to withstand supply disruptions from the pandemic.<sup>42</sup> China, therefore, sometimes stockpiles for strategic reasons beyond conflict preparation.

Still, spiking mineral imports are a potential indicator of war preparation. In 1939, Germany had "sharp increases" in tin imports that suggested stockpiling.<sup>43</sup> Germany also imported such significant volumes of copper before 1939 that the US Geological Survey said, "[I]t seems almost certain that a stock pile [*sic*] of significant proportions has been accumulated."<sup>44</sup> During the Cold War too, an indicator of the Soviet Union possibly preparing for war was significantly increasing mineral imports.<sup>45</sup> Consequently, if China's mineral imports spike, China could be stockpiling minerals in preparation for war.

---

<sup>38</sup> J.W. Furness and H.M. Meyer, "Copper," in *Minerals Yearbook 1939*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1939), 116,

<https://search.library.wisc.edu/digital/AQGHPBQDKJTJZH9E/pages/AEJ7EHD3HQL3IT84>.

<sup>39</sup> H.M. Meyer, "Copper," in *Minerals Yearbook 1940*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1940), 102,

<https://search.library.wisc.edu/digital/ADCTPMSF6KGZOY85/pages/A2TWBIOW3S3Y5D8J>.

<sup>40</sup> China could also be consuming heightened volumes of minerals for new or secret military programs.

<sup>41</sup> Pratima Desai, "China's Blueprint to Stockpile Copper Expected in Five-Year Plan," *Reuters*, October 21, 2020, <https://www.reuters.com/article/idUSKBN2761B4/>.

<sup>42</sup> Pratima Desai, "China's Blueprint to Stockpile Copper Expected in Five-Year Plan," *Reuters*, October 21, 2020, <https://www.reuters.com/article/idUSKBN2761B4/>.

<sup>43</sup> E.W. Pehrson and John B. Umhau, "Tin," in *Minerals Yearbook 1939*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1939), 686, <https://search.library.wisc.edu/digital/AQGHPBQDKJTJZH9E/pages/AEPKD4VCAEKCCV9C>.

<sup>44</sup> J.W. Furness and H.M. Meyer, "Copper," in *Minerals Yearbook 1939*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1939), 119, <https://search.library.wisc.edu/digital/AQGHPBQDKJTJZH9E/pages/AUVQKSH5FCUDXI8J>.

<sup>45</sup> Edmund Brunner, Jr., "Perception and Strategic Warning," RAND Corporation, prepared for the US Air Force, November 1979, 6, <https://apps.dtic.mil/sti/tr/pdf/ADA080448.pdf>.



## Denial and Deception

Detecting these indicators could, however, face denial and deception. For instance, Germany started hiding its metal consumption beginning in 1935.<sup>46</sup> Regarding China's mineral stockpile, public information is lacking. While China's information control on stockpiling minerals not deemed "strategic" like zinc is less strict, it conceals its stockpiling activities for strategic minerals like copper.<sup>47</sup> To conceal stockpile purchases in preparation for conflict, China could also undertake stockpile purchases for strategic reasons under economic auspices. A portion of these purchases could actually be for conflict preparation, hiding the strategic intent behind the purchases. Additionally, a lack of detectable stockpiling activity could indicate that China has met its stockpile targets.<sup>48</sup>

China could also deceive observers about its stockpiling activities. For example, the Chinese government could direct "private" Chinese mineral companies like Tsingshan to undertake mineral stockpiling. Local and provincial governments could participate in the stockpiling effort too, and they usually stockpile for economic reasons and could thus obfuscate mineral stockpiling for strategic reasons.<sup>49</sup> They could better conceal such stockpiling as they purchase the minerals and have the mineral producers store the minerals at their facilities, rather than transferring them to government storage facilities.<sup>50</sup>

## Other Mineral-Related Indicators

Detecting other mineral-related indicators could help counter denial and deception efforts and ultimately help inform whether China is stockpiling for strategic reasons, like preparing to invade Taiwan. For instance, if China establishes a board of control for minerals, China could be preparing for conflict. Such an action is an extreme measure to govern the consumption of minerals in a state expecting significant mineral demand and

---

<sup>46</sup> Jonas Scherner, "Preparing for the Next Blockade: Non-ferrous Metals and the Strategic Economic Policy of the Third Reich," *The English Historical Review* 137, no. 585 (April 2022): 486, <https://academic.oup.com/ehr/article/137/585/475/6576229>.

<sup>47</sup> Andy Home, "Learning to Live with (Talk of) Chinese State Metal Sales: Andy Home," *Reuters*, June 16, 2021, <https://www.reuters.com/business/energy/learning-live-with-talk-chinese-state-metal-sales-andy-home-2021-06-16/>; Andy Home, "Column: A Brief History of China's Metals Stockpiling Programmes," *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>; and "SRB Revealed: Shedding Light on China's State Reserve Bureau in the Copper Market," *Fastmarkets*, July 31, 2015, <https://www.fastmarkets.com/insights/srb-revealed-shedding-light-on-chinas-state-reserve-bureau-in-the-copper-market/>.

<sup>48</sup> Andy Home, "Column: A Brief History of China's Metals Stockpiling Programmes," *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>.

<sup>49</sup> Andy Home, "Column: A Brief History of China's Metals Stockpiling Programmes," *Reuters*, May 1, 2020, <https://www.reuters.com/article/idUSKBN22D56W/>.

<sup>50</sup> Pui-Kwan Tse, "The Mineral Industry of China," US Geological Survey, February 2015, 8.8, <https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/mineral-pubs/country/2008/myb3-2008-ch.pdf>.

constrained mineral supply. For example, before World War II, Germany established boards of control to regulate mineral use as part of its “Four-Year Plan,” which was announced in 1936 and sought national economic self-sufficiency.<sup>51</sup>

Another mineral-related indicator that China could be preparing for conflict is the Chinese government heavily subsidizing unprofitable domestic mineral producers. This action indicates that the government expects curtailed mineral imports, possibly due to conflict. Before World War II, Germany undertook efforts to increase domestic mineral extraction despite the unprofitability of many domestic deposits.<sup>52</sup> In November 2023, China’s Minister of Natural Resources Wang Guanghua noted that China will increase its domestic mineral exploration, urging that “[t]he supply of minerals must be secured for both defense and livelihood purposes to ensure the domestic circulation is smooth under extreme situations.”<sup>53</sup> He noted, “This is a very urgent mission.”<sup>54</sup> Along with monitoring China’s mineral stockpiling, these other mineral-related indicators should also be monitored to better inform whether China is preparing to invade Taiwan.

### **China’s Mineral Stockpiling Should Be Monitored**

China’s stockpiling activities could indicate that China is preparing for an invasion of Taiwan. Three indicators that China may be stockpiling for strategic reasons, like a military invasion, are (1) stockpiling when domestic mineral producers do not face profitability issues, (2) high apparent mineral consumption relative to real mineral consumption, and (3) spiking mineral imports. Other mineral-related indicators—like boards of control for minerals and large subsidies to unprofitable mineral producers—could further indicate that China is possibly preparing to invade Taiwan. However, these indicators must be further contextualized with other state actions, specifically China’s military activities, to better discern whether China is indeed intending to invade Taiwan.

---

<sup>51</sup> J.S. McGrath, “World Production of Minerals and Economic Aspects of International Mineral Policies,” in *Minerals Yearbook 1937*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1937), 104–105,

<https://search.library.wisc.edu/digital/AFNJS6RDFYJR8T8F/pages/A2X5ZFHOMGQRIS86>.

<sup>52</sup> J.S. McGrath, “World Production of Minerals and Economic Aspects of International Mineral Policies,” in *Minerals Yearbook 1937*, ed. H. Herbert Hughes (Washington, DC: US Government Printing Office, 1937), 105,

<https://search.library.wisc.edu/digital/AFNJS6RDFYJR8T8F/pages/A2X5ZFHOMGQRIS86>.

<sup>53</sup> Kinling Lo, “China’s Strategic Mineral Supply Push ‘a Very Urgent Mission,’ Says Resources Minister, amid Self-Reliance Push,” *South China Morning Post*, November 10, 2023, <https://www.scmp.com/economy/china-economy/article/3240941/chinas-strategic-mineral-supply-push-very-urgent-mission-says-resources-minister-amid-self-reliance>.

<sup>54</sup> Kinling Lo, “China’s Strategic Mineral Supply Push ‘a Very Urgent Mission,’ Says Resources Minister, amid Self-Reliance Push,” *South China Morning Post*, November 10, 2023, <https://www.scmp.com/economy/china-economy/article/3240941/chinas-strategic-mineral-supply-push-very-urgent-mission-says-resources-minister-amid-self-reliance>.