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I want to hand over to David to represent the American view on this topic. America is back on the diplomatic scene, or is it? Give us an insight on how Americans look at this and I definitely believe that Americans need critical raw materials.

David Wurmser

Yes, they absolutely do. In 1948, the United States outlined its strategy to govern the Cold War in the NSC 68 document. Five years later, President Eisenhower did the Solarium exercise and produced NSC 162/2. These documents outline the critical values, and values are important, that industries, resources, which include capital, labor, and raw materials, geographies of the supply chain of all industry and the military structures to protect them. Then, in a loop, it defined the industries, talent, labor, resources, essentially and the logistics necessary to maintain and protect the military structure and deployment. Thus, the United States entered the Cold War aware of its vital interests and mobilized to leverage the full power of the United States in an orderly, unified and coordinated way. However, since 1989, the United States has lacked a similar new strategic plan.

Americans believe great powers rise and fall as a function of choice and civic virtue. Every educated young American reads Sir Edward Gibbons, *Decline and Fall of the Roman Empire*, to compare ourselves to Rome and avoid its fate. One critical mistake always suggests itself. Although Rome's roads and ownership of the Mediterranean were legend, its geographically specialized but diffused industries exposed its critical supply chains, which led to a precipitous collapse. Moreover, when talent centers were overrun, real knowledge was lost so it took Brunelleschi until the 15th century to understand how the Romans had built the Pantheon with cement. Those secrets were lost for 1 500 years. Today, when you look at it, moving goods, specializing production and outsourcing talent is easy, cheap and efficient. However, as Executive Order 14017, which came out in June, put it very clearly and I quote, "Our private sector and public policy approach to domestic production, which for years prioritized efficiency and low-cost over security, sustainability and resilience, has resulted in the supply chain risks identified in this report". This report is important and well done and kudos to Jake Sullivan, the National Security Advisor, a conservative; it is hard for me to say but credit where credit is due. However, the report is still insufficient. First of all, it focuses on high-tech and defense industrial activity, but a broad-based strategic policy must also look at the security of food

supply and other such less glamorous things. Two, it is not ambitious enough, of which more later. Three, it is stovepipe industries, a strategic plan that needs to look at the whole in a fluid way.

Still, NSC 68 and Solarium, this Executive Order and the EU Commission's report on raw materials, helps us focus on six key principles. One, production is preferably close to raw materials. We have our guests here from Norge Mining, which is great, I can use them as a prop shamelessly. The Norge Mining mine holds several raw materials critical to automobile batteries and Ingvil just outlined them. However, Elon Musk is setting up a factory in Germany for Tesla and for batteries. His current supply comes from Morocco and China and it is vulnerable to paralysis and the whole supply chain then becomes vulnerable to paralysis. On the other hand, if the mine and the factory were very close, even co-located, you eliminate a lot of these vulnerabilities.

Two, rare earth and critical raw materials, again using our friends from Norge as props, it is a big problem having the bulk of phosphates come from Western Sahara and our vanadium from China and Russia, rather than from a good ally like Norway. However, the imperative of cheap production costs leads companies to turn to questionable suppliers of labor and raw materials, using slave labor, child labor, organized crime, conflict spoils, etc. This is a wealth transfer to bad actors. When we attach so much urgency to green energy, we have to be mindful that it overpowers due diligence. Western extraction standards in mines are strict and expensive but green energy drives demand for raw materials with cost pressures favoring low-cost supply chains. While the end use of the product is green, the value-added supply chain is neither green nor moral. This is not obvious at times. China is working up this ladder of finished products and the more it goes up the more it hides the supply of raw materials and what you are buying. Some of these raw materials become hidden in terms of their costs, moral policy, etc. Sadly, in the United States we have been ramping down the way we have been following this and walking away from these documents. We had the Defense Logistics Agency Strategic Materials, which produced an annual report called the Strategic and Critical Materials Report on Stockpile Requirements. This year was the last that you will ever see, the reporting requirements has just been eliminated. We have another agency, the Non-availability of Domestic Supply Stockpile, the NDS, which stockpiles materials. It has been reduced and its transaction fund, the money to buy the stuff, has been zeroed out for 2024. Moreover, it liquidated much of its stockpiles at the end of the Cold War and for example, our titanium stocks are now at zero, titanium sponge is gone from our stockpile. There is an interagency Titanium Sponge Working Group, which is trying to figure out how to rebuild the supply chain, but right now the only answer it has is recycling it from end-of-life weapons systems, which is far from adequate. The other thing is the NDS only talked about strategic defense and civilian industries, it does not talk about our economy as a whole. It completely ignores things like food security, etc., so it is only for strategic military use products.

China by contrast, has the State Reserve Bureau, which is an economic stockpile, is growing and is more interventionist in markets. We also had this thing called the Defense Federal Acquisitions Regulation Supplement, DEFARS, which qualifies friendly countries to enter into reciprocal defense procurement agreements with us. We have complicated this activity horribly so that now only Japan and Australia are part of it and have this favored status. China meanwhile has pushed ahead with its equivalent program called, Go Out China.

The third principal is ideas need funding. Key investment centers are handmaidens to innovation incubation centers, consider our host, the UAE. I urge everyone to think more broadly about the Abraham Accords, not only do they wed the financial innovation centers of the UAE and Israel together but geopolitically it weds the emerging Eastern Mediterranean strategic area, anchored to Israel, Greece and beyond, with the Indian Ocean and East Asian strategic area anchored to the UAE, India, Japan and beyond. This should be conceived of as a powerful cultural and economic unity.

The fourth principal is human capital. We are discarding essential current knowledge and human capital. The lowering of value creation and outsourcing, especially in fields like mining, by Western countries, has led to a rise in the atrophy in key talent. The Department of Defense's fiscal year 2020 Industrial Capabilities report said this, "The entire US critical material supply chain faces workforce challenges, including aging, retiring personnel and faculty, public perceptions about the nature of mining and mineral processing, and foreign competition for US talent. Unless these challenges are addressed, there may not be enough qualified US workers to meet domestic production needs across the entire critical materials supply chain". In 1995, the US defunded the Bureau of Mines, which issued educational grants and assisted university programs. In contrast, China has 39 universities granting mineral processing and metallurgy degrees with thousands of graduate and undergraduate students.

Five, human capital innovation to pre-empt the future. The EU Commission report on raw materials identifies and extrapolates current existing technologies into yet underappreciated directions that will revolutionize industry. This was well done. Peter mentioned batteries so I will not go into that, but it is a very serious strategy. Yet, some of the biggest strategically important changes may come from beyond existing technologies and the EU Commission, let alone the Americans and honestly, we are out to lunch, does not really extrapolate cutting-edge research that will radically alter current concepts, so we need to widen the aperture. As I said, the US is no better and DARPA, which does this, is going away in the United States.

Let me give you a quick example so you can understand what I am talking about. Neodymium has been observed in producing crystals that exhibit spiral magnetism. We all know about polar magnetism, positive/negative, this is spiral, and it adds a potentially revolutionary dimension for quantum computing. I doubt that anyone in this room has quite thought the implications and applications of this, I certainly have not, and I still cannot understand my brother's PhD in physics, or even the title, so I am never going to understand this. This is precisely why centers of early-stage research, education, innovation incubators, are perhaps the most important strategic commodity to watch. They are the first draft of the future. We need to monitor these key centers of innovation incubation and education to extrapolate pre-emptively, to proactively secure, explore and protect those raw materials before others place a stranglehold on their production and export.

Sixth and finally, some of the most forward-thinking thought will come out of the military and security structures. Harboring a strong prejudice against national defense surrenders technological progress that only large military research budgets can yield and that define the world we live in now. Such broad aperture analyses are tenuously emerging quietly in the corridors of influence in Washington. However, geopolitical tensions and cataclysmic events



always happen, and they will eventually focus the usually strategically reactive Western nations on constructing a new strategic vision and develop a mobilization plan to coordinate and organize the nations around that plan, that vision, identifying new concepts of geography of critical industrial production and map out new geographies that prioritize raw materials. I will leave it at that.

Holger Bingmann

Thank you very much, David, for that American view, which really shows the necessity of a stable sourcing platform.