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# Critical Minerals and Sustainable Development: Mining Partnerships in the Global South

The need to rapidly develop critical minerals supply chains is bound up with the ongoing transformation of world order as the US and its partners seek to rebuild global rules around industrial policy. To achieve its aims, the US both needs strong partnerships with countries in the global south. Developing and emerging countries are essential to building net-zero supply chains. But order-building depends on these countries as well: the US cannot lead without support. The strength of these partnerships will depend ultimately on the political and economic benefits to developing and emerging economies. The US and its partners need a strategy for engagement, but one that builds value-added abroad and respects autonomy.

## Introduction

Rising demand for clean technologies—wind turbines, solar panels, batteries, and electrolyses—are creating massive demand projections for all major metals.

Meanwhile, the US-China political competition is heating up, Europe is trying to wean itself off Russian natural gas, there is a brewing debt crisis in the developing world, and the US is trying to forge a new international economic order. There is a lot going on. The energy transition is now inextricably bound up with global geopolitics at the highest level.

The strategy for developing global critical minerals has to be integrated into the ongoing processes of problem-solving in other domains. Friendshoring and building out net-zero supply chains has to be done in a way that demonstrates the promise of a new international economic order and provides the fiscal space for developing countries to invest in their economies.

There are a number of interlinked challenges:

- Build out supply chains as fast as possible;
- Ensure countries in the global south benefit through value-added;
- Build a set of global rules that can achieve the above while ensuring the supply chains are sustainable.

This will be difficult, to be sure, but the return of industrial policy presents us with the basis of a solution. Industrial policy provides a powerful tool for development when wielded appropriately. Its return is a positive development for the global south. Countries in the north need to make space for southern industrial policy while they support the creation of net-zero supply chains. In this memo, we suggest that this can be done by prioritizing manufacturing and processing value-added in the global south. The difficulty will come in finding a set of global rules and institutions that can build truly sustainable supply chains.

## The Leading Sector Strategy

In an extraordinarily powerful analysis, Camba, Lim, and Gallagher present two strategies for developing and emerging countries in the energy transition. On one hand, they present the case of Malaysia, which has become a low-cost manufacturing hub. The Malaysian solar industry is dominated by Chinese firms, and though Malaysia hopes to translate this into domestic capacity, the prospects for capturing significant economic value-added seem dim. The worst case scenario here is the formation what economists used to call an “enclave economy”: where all the knowledge and profits are foreign, and there is only a thin piece of value added located in the country.



On the other, they present the case of Indonesia, which is aiming to leverage its nickel resources into a whole battery supply chain. Camba and colleagues argue that the Indonesian government is using nickel mining as a classic leading sector. The theory here comes from Albert Hirschman's 1958 classic, *The Strategy of Economic Development*. Hirschman argues that countries can solve the interlocking and complex problems of development only through a careful process of contextual problem-solving. The process should be focused on using leading sectors as drivers of economic development by creating and expanding linkages between that sector and adjacent sectors in the supply chain.

In today's parlance, we might say that the strategy involves using a sector to develop the upstream and downstream industries. In this schema, sectors in the middle of the supply chain, like iron and steelmaking, are the prima facie strong bets because they have lots of forward and backward linkages. But Hirschman is very clear we should not be dogmatic: the essential principle is that countries must use what they have and create an internal learning process by which the state and the economy effectively work out processes of problem-solving. Development is not driven by finding the right macroeconomic policy formulas, but by constantly working to resolve the problems that arise in a contextual way.

Key to Hirschman's account is an indigenous theory of capital formation in which firms will invest in and help develop adjacent sectors as they scale. Since capital was just globalizing when Hirschman was writing, we might forgive him for seeming a little naïve. Nonetheless governments today can take on this function of driving domestic capital formation through creating and sustaining linkages.

Camba et al tell us this is exactly what the Indonesian government is doing. It is seeking to leverage its nickel reserves into downstream, nickel processing and ultimately move into the battery supply chain: to cathode, and ultimately battery manufacturing. Indonesia is looking upstream to food, vendors, metal manufacturers, and so on to provide the critical inputs for nickel mining, nickel refining, and batteries. All of this is backed by an export ban on raw nicks, which incentivizes FDI. China has already made major investments in Indonesian nickel and, as a result, backed the export ban in the first place as this would give China more control over Indonesian nickel flows.

They contrast this with the case of Malaysia, which they suggest is not doing enough to leverage its burgeoning manufacturing base into a true domestic industry. Indonesia's export ban has become a lightning rod for the industry, with a number of countries following suit. However, this does not mean that they are good students of Hirschmann, nor that the metals that they seek to control will give them the same kind of advantages that Indonesia nickel does.



## Minerals and sustainable development

At the core of the juxtaposition is a set of questions as old as development economics itself:

1. What is the appropriate role for foreign investment in development?
2. How can countries capture value-added?
3. How can states achieve dynamic technological transfer and learning?

These questions are central to current conversations about industrial policy and have important implications for thinking about the future of mineral political economy.

After all, countries in the global south do not want a re-run of the colonial economy in which developed countries extracted commodities from the colonies only to sell them back higher value-added products. If countries in the global north are now seeking to repatriate manufacturing value-added, what will be left for developing and emerging markets?

Manufacturing is key to this conversation. The economic benefits of manufacturing and processing are well known:

- Productivity: a central source of technological productivity growth.
- Technology spillover (learning): productivity spillovers to other sectors.
- Organizational spillovers: manufacturing-style organizational knowledge benefits other sectors.
- Source of upstream demand for high productivity services (finance, transport, engineering).
- Exports: manufactured goods are the basis of an export-led development strategy.

Countries in the north had forgotten about these, not to mention the critical benefits to security and geopolitics.

As US National Security Advisor Jake Sullivan has argued, we need so much investment in manufacturing and processing that there is enough to go around. There is room to create collaborative global value chains that benefit all, but we have to be thoughtful and to create deals that are structured in ways to benefit all.

At the same time, in order to defend truly sustainable friendshoring efforts,

## Prospects for leading sector development in mining

Countries are voting with policy. A number of countries are now following Indonesia's lead. Both Namibia and Zimbabwe have banned raw lithium exports (China, as in Indonesia, is also likely to be behind the Zimbabwean export ban). Gécamines, the Democratic Republic of the Congo's state-owned mining



company, has signaled it intends to more carefully control cobalt flows. And Chile recently announced it will take equity stakes in its lithium mines.

The prospects for these strategies vary significantly. This is a first cut at trying to pull apart the factors.

#### *Factor 1: Strategic value of the minerals*

What works for nickel might not work for lithium. Indonesia has leverage because the world needs its nickel. It has 22% of the world's reserves and new production coming online is already creating downward pressure on nickel prices. Lithium from Namibia, on the other hand, may not hold the same strategic value. Lithium projects are more widely distributed globally and Namibia does not have the concentrations or volumes that give Indonesia its significance. An export ban could backfire unless there is a concrete strategy for FDI and technology transfer.

#### *Factor 2: The number and quality of the linkages*

In Hirschman, mining has lots of forward linkages, but not many backward ones. But finding forward linkages for minerals can be difficult. Many countries are seeking to go downstream to batteries. But there are a lot of hard, sophisticated steps between mines and batteries. Moreover, there is going to be global overcapacity in battery manufacturing. The world likely needs 2000-3000 GWh/year of batteries, but the global pipeline is well over 6500 GWh/year. That means significant downward pressure on prices (and value-added).

#### *Factor 3: Sustainability and policy alignment*

All things equal, countries that are able to produce metals in a sustainable fashion (with low-carbon energy and well-managed tailings) are likely to benefit more than dirty suppliers. This will hurt Indonesia. Meeting criteria, such as the IRA's Free Trade Agreement country requirement, will also drive demand. Morocco, for example, is emerging as a battery hub (fueled by Chinese FDI) on the basis of its clean energy buildout and US FTA.

## **Implications and recommendations**

1. The US needs a strategic approach to order-building.

Since the build-out of these supply chains needs to happen so rapidly, a targeted, strategic approach is necessary. The US can begin by identifying priority metals and countries for engagement. This prioritization must then guide the deployment of US overseas investment and the deployment of climate finance through domestic and international financial institutions.

2. We need to better understand what non-extractive, collaborative value chains in critical minerals look like.

How can global value chains for clean energy be distributed so that all countries benefit? What do collaborative supply chains that share value-added look like?



What are the implications for the investment strategies of governments and international financial institutions?

3. More finance must be directed to building manufacturing and processing value-added in the global south.

As our Lab's work has shown, the US has focused its overseas climate finance on deployment. Far more must be spent on processing facilities in the critical minerals supply chain.

4. Robust “high-road” standards for critical minerals will have to be enforced if the US wants to achieve significant rates of friendshoring.

This is somewhat in tension with the call elsewhere in this paper for autonomy, as green standards on minerals will be called out as protectionist. Thus, there may be opportunities to link earnest investments in value-added (3 above) to higher standards.

