

Reframing U.S. Public Policy Toward Critical Minerals and Materials

A Semi-Organized Series of Thoughts

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Driving Forces

Two related but somewhat different forces are driving discussion today of U.S. public policy toward critical minerals and materials.

First, the energy transitions are at risk if the lack of production capacity of the right type leads to insufficient development and deployment of low-carbon technologies. To be of the ‘right type,’ this production capacity and the resulting supplies need to be:

- Sufficient to supply the quantity of materials necessary to meet the technology-deployment goals of the U.S. and other national governments, as well as the international community,
- Affordable so that consumers are willing and able to buy low-carbon technologies,
- Secure or at least resilient in the face of inevitable disruptions,
- Sustainable in an environmental sense, and
- Responsible in terms of how mining and processing involve and interact with local communities.

These challenges represent a medium- to long-term issue – that is, challenges looking five years to several decades into the future.

Second, national security is at risk if the lack of geographic diversity in production leads to volatility and surprise. This challenge is a short- to medium-term issue – that is, one to a few years, up to about a decade.

The Broader Context of Public Policy Toward Minerals and Materials: Whither Globalization and Industrial Policy?

For most of the last forty years or so, U.S. public policy has been developed using globalization and (reluctance to undertake) industrial policy as conceptual starting points.

The presumption has been that production should be located where costs are lowest, regardless of location. Public policy should facilitate more rather than less international trade. Significant reductions in costs of long-distance ocean transportation and improvements in communications technologies meant that multiple stages of a supply chain no longer necessarily needed to be located in close proximity to one another to avoid high transport costs and coordination difficulties over large distances.

The presumption has been that industrial policy should be avoided. That is, public policy should focus on creating the conditions in which market activities can thrive and generally should be agnostic with respect to prioritizing specific sectors, technologies or companies.

To be sure, public policy toward national defense and security never abandoned the preference for domestic production. But for the energy transitions and associated technologies, globalization and reliance on market solutions provided an essential starting point for considering specific public policies.

Gradually since the Great Financial Crisis and then dramatically since the supply-chain disruptions of the pandemic and Russia's invasion of the Ukraine, both globalization and industrial policy have been reconsidered.

Economic Framing

An economist might frame a discussion about public policy toward critical minerals and materials around two propositions:

- Rely primarily on market forces, but recognize the essential roles for government, and
- Be careful in reconsidering industrial policy.

Economists generally agree on several basic (economic) roles for government: establishing and maintaining legal and monetary systems; ensuring the provision of public goods such as national security, information, education, and basic research and development; internalizing negative externalities such as environmental damages; and promoting fairness in the distribution of benefits and burdens, providing a social safety net and giving priority to those who are least well off in society.

But we are reconsidering what we consider to be market failures through the lenses of globalization and industrial policy.

Industrial policy, arguably, is necessary to achieve change sooner than would occur by relying on markets, especially in the area of climate change and deployment of low-carbon technologies. Even previously free-market economists are warming to commercial policies that for most of the last several decades have been considered ill-advised subsidies: tax incentives, government loans and loan guarantees, government co-financing for industrial facilities, government offtake agreements, and domestic-content and assembly requirements. Potential dangers of these subsidies include government capture by special interests and higher costs for domestic users of mineral-derived materials than otherwise would occur.

Rethinking U.S. Public Policy Toward Critical Minerals and Metals

Within this broad context, how might we re-imagine mineral and material policy?

Starting points:

- Objectives: Enable the energy transitions, enhance national security

- Policy areas
 - Domestic: Responsibly and sustainably increase domestic production, as well as undertake activities that facilitate wasting less of what we do produce (through enhanced recycling and reuse) and using less of those materials that are ‘at risk’ (through the development of substitute materials and technologies).
 - International: Enhance collaboration with strategic partners.

Note: Self sufficiency is not an appropriate goal for public policy. Enabling the energy transitions and enhancing national security will require both more domestic production and enhanced collaborations and sourcing from strategic partners.

- Opportunities
 - Types of investment: greenfield v. brownfield
 - Types of resources:
 - Primary (from mining and initial metal production) v. secondary (recycling of manufacturing wastes and end-of-life products)
 - Conventional (a resource for which there is or has been a commercially viable operation at scale) v. unconventional (a resource without previous commercially viable production at scale)
 - Waste streams from mining and metal production
 - Existing operations
 - Historical wastes

- Time frames: Different policy approaches are appropriate for different time frames
 - Short term: ~0-5 years
 - Medium term: ~5-15 years
 - Long term: > ~15 years

(Note: “Time frame” refers to the time lag between initiation of the policy and actual market impact.)

Three parallel tracks of policy activity for domestic policy (incomplete):

	Short Term		Medium Term		Long Term	
	Target	Policy Area	Target	Policy Area	Target	Policy Area
Science & Technology Policy	Technology demonstration & deployment: 'Valley of Death'	Co-financing for commercial piloting & demonstrations	Applied R&D	Applied, use-inspired R&D through public-private partnerships	Basic research	Funding and tax incentives for activities throughout the supply chain
			Resource characterization	At ongoing and historical operations		
Commercial Policy, including land use, environment, & communities	'Conventional' wastes at ongoing operations	Clarify environmental liabilities that discourage material recovery from waste streams	New primary & secondary operations, unconventional resources, historical wastes	Permitting & environmental liabilities. Offtake agreements, etc.		
	Working inventories	Stockpiling				
Circular Economy	Circular economy	Incentivize material recovery from manufacturing waste streams	Circular economy	R&D to facilitate recycling and reuse of materials in end-of-life products		
Education & Workforce Development	K-12 STEM-focused public education; technicians and trades; undergraduate science and engineering; graduate research focused; professional education					
Strategic information & analysis	Basic material flow and market information; supply chain and economic analysis; market and price model; broader social science analysis; future scenarios.					

The policy framing above focuses on expanding domestic critical mineral production. One could expand this to include international initiatives to enhance cooperation between the US and importing exporting and importing nations.