National & Regional Security Impacts of Increased Production

Critical Minerals Mining, Processing, and Manufacturing in North America

Midwest-Canada Critical Minerals Workshop
November 15, 2024

SAFE

AGENDA

SECURITY IMPACTS

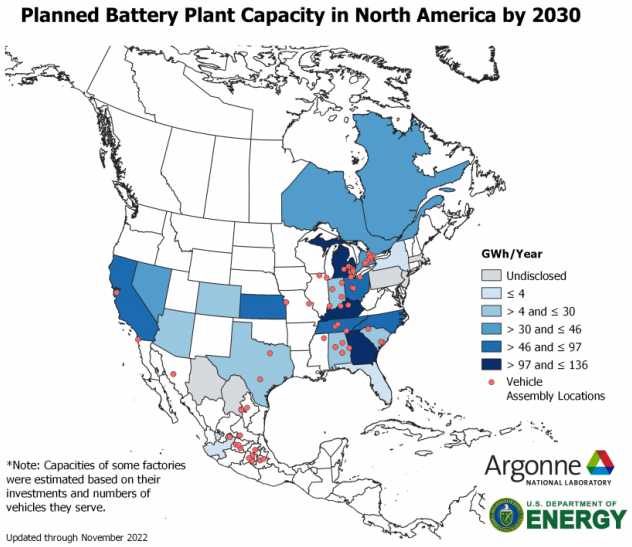
TRADE POLICIES

CANADA-U.S. OPPORTUNITIES

Who We Are

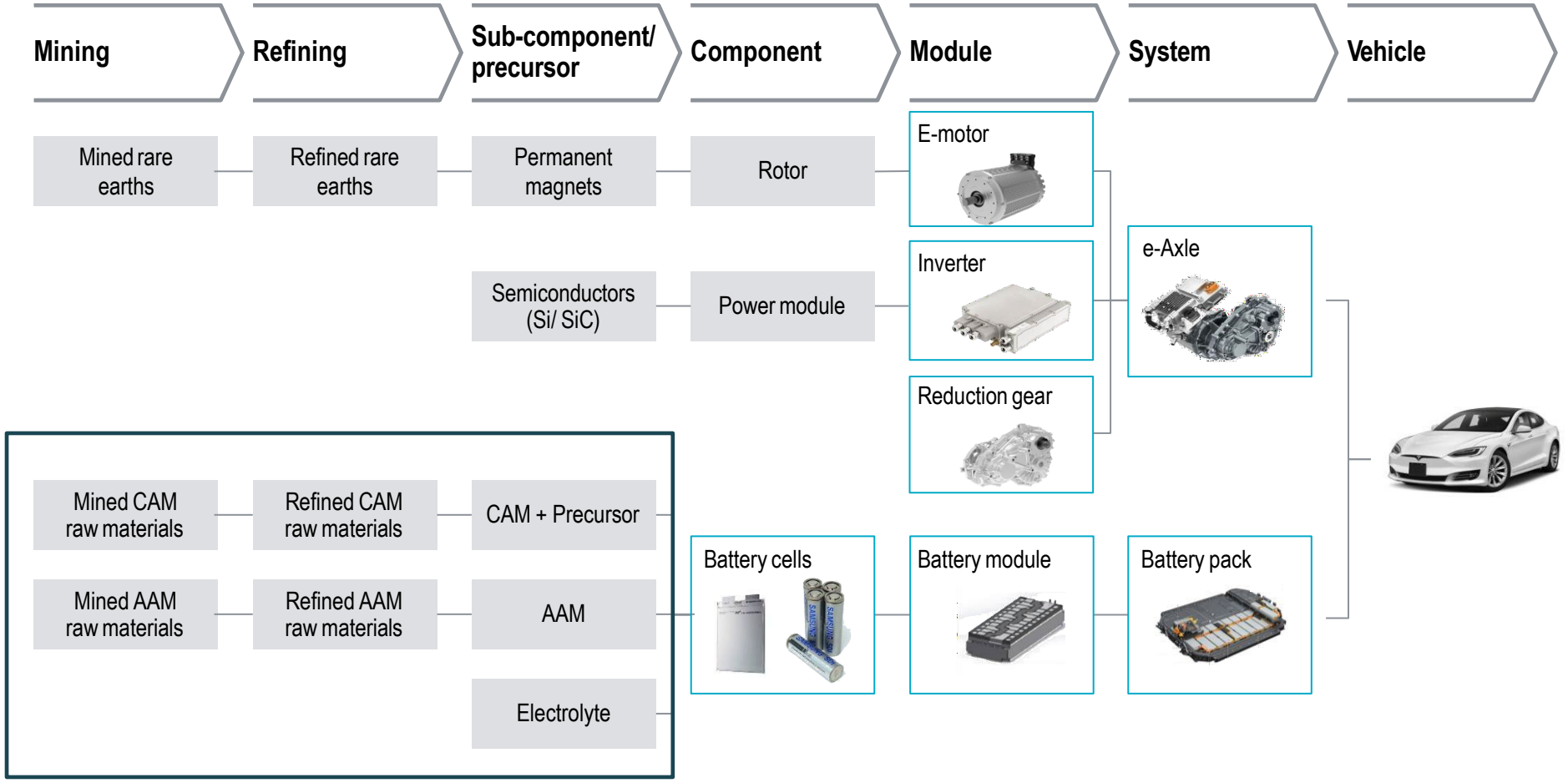
SAFE is an action-oriented, nonpartisan organization committed to transportation and energy policy solutions that advance the economic and national security of the United States, its partners, and allies.

SAFE has convened business and former military leaders since 2004 to advocate for secure, resilient, and transparent energy solutions. Recent initiatives have focused on transparent and rapid reindustrialization and supply chain security.



QUEBEC HISTORY

The Complexity of Electrification



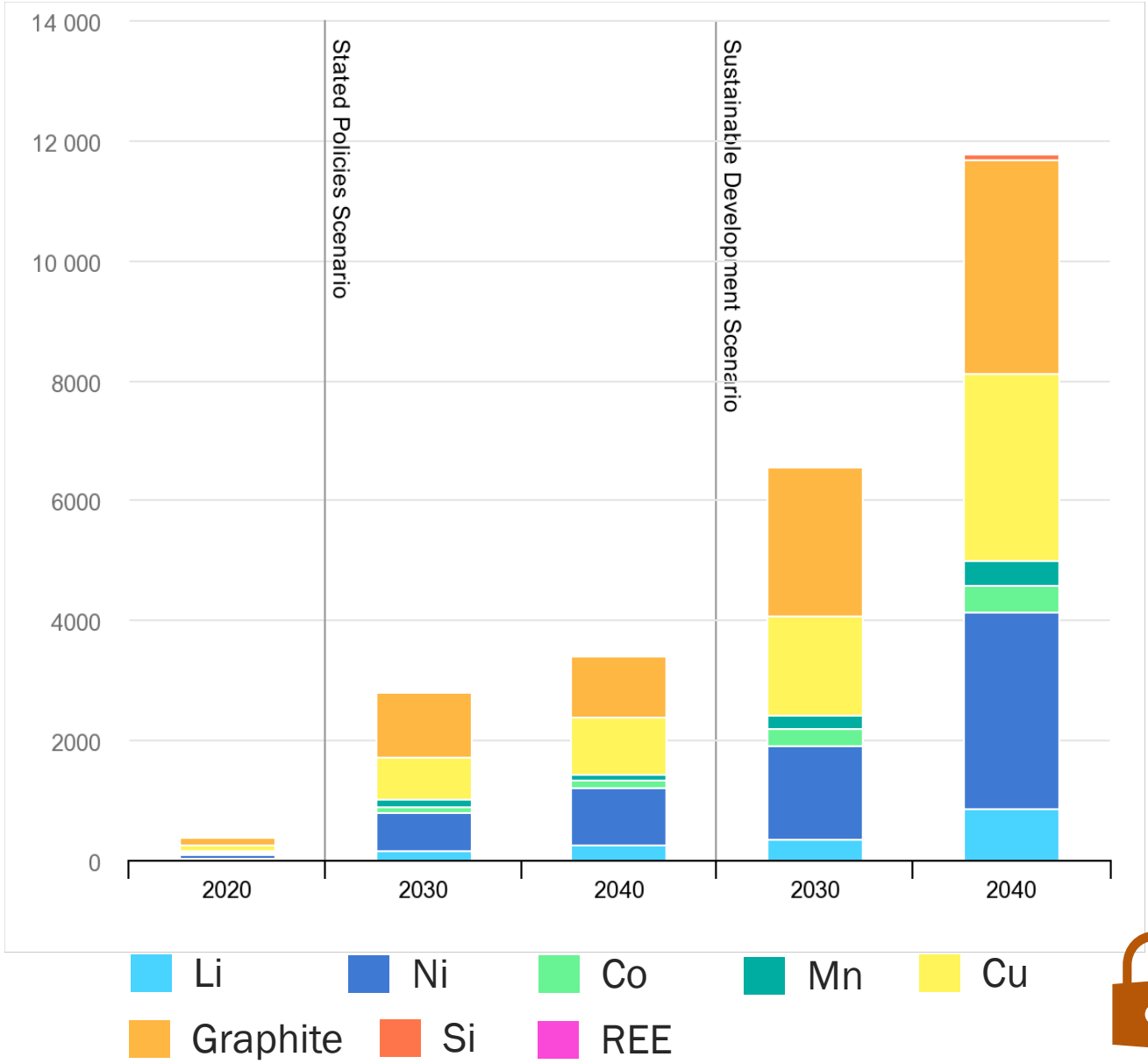
Other inputs not shown

- **Power module**: cold plate, substrate, copper trace, connector
- **Rotor**: rotor lamination, bearings, shaft
- **Inverter**: control board, driver board, housing, connectors
- **E-motor**: housing, sensors, connector, copper winding
- **Battery cell**: separator, foils, cover
- **Battery module**: electronics, housing, busbar, sensors
- **Battery pack**: electronics, sensors, thermal components, housing
- **Other EV systems**: on-board charger, DC/DC converter, high-voltage heater

The Mineral Intensity of EVs

- A typical EV requires 6x the mineral inputs as an ICE vehicle
- EVs need Al and Fe for the body and chassis, Cu for electrical wiring, and Li, Co, Mn, Ni, and C (graphite) (currently) for batteries. They also need REE for motors

Total mineral demand from new EV sales by scenario, 2020-2040 *(IEA, 2021)*



Examining battery mineral supply chains

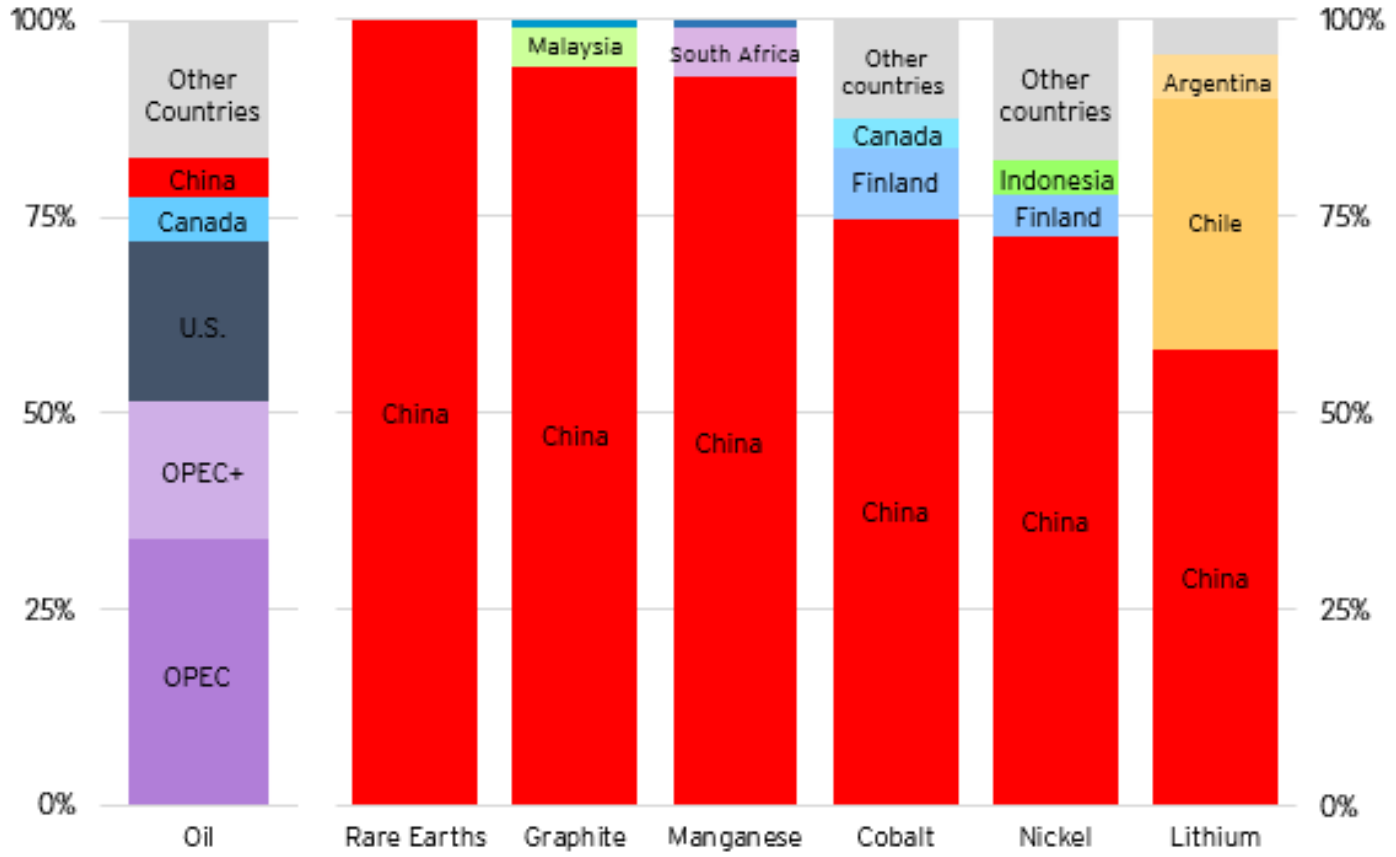
	Lithium (Li)	Nickel (Ni)	Cobalt (Co)	Manganese (Mn)	Graphite (C)	Rare Earths (REE)
Used In The…	CAM	CAM	CAM	CAM	AAM	Electric Motor
US Import Reliance	> 25%	56%	76%	100%	100%	>95%
Top US Import Sources	Argentina, Chile, China, Russia	Canada, Norway, Finland, Australia	Norway, Canada, Japan, Finland	Gabon, South Africa, Australia, Georgia	China, Mexico, Canada, India	China, Malaysia, Estonia, Japan
US Reserves	3.4%	0.36%	0.9%	0	0	1.76%
US Active Mines	1	1	1	0	0	1
US Production	Withheld	0.67%	0.4%	0	0	14.3%
Top Global Producer	Australia (47%)	Indonesia (49%)	DRC (70%)	South Africa (36%)	China (65%)	China (70%)
Top Global Reserves	Chile (36%)	Indonesia (21%), Australia (21%)	DRC (48%)	South Africa (37%)	Turkey (27%)	China (35%)
Top Global Processor	China (58%)	China (72%)	China (75%)	China (93%)	China (100%)	China (94%)

Data from the U.S. Geological Survey 2023 Mineral Commodity Summary and Benchmark Mineral Intelligence

Processing geographic and market concentration

- Critical mineral supply chains are highly concentrated, especially at the processing step
- The U.S. processes <4% of all mineral commodities
- Processing leads to expertise in ability to produce and create battery precursor materials and recycling:
  - China produces
    > 74% of all cathodes
    > 92% of all anodes

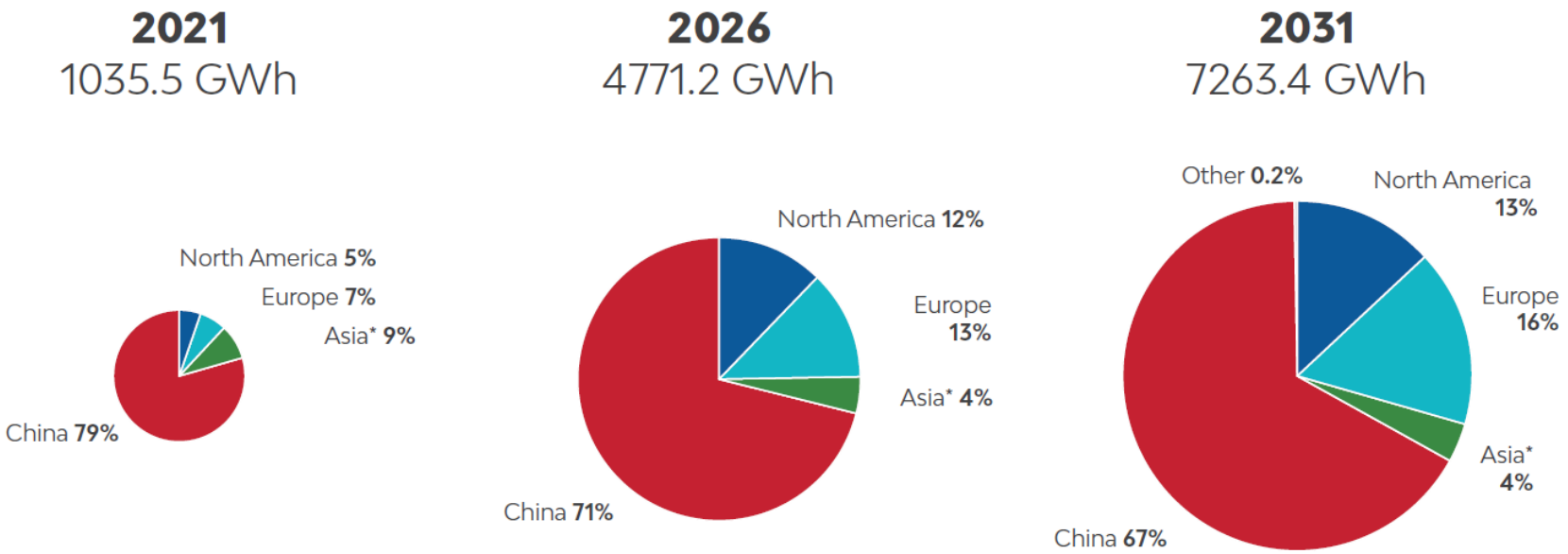
Oil Production vs. Critical Mineral Processing by Country, 2022



Source: SAFE analysis based on data from U.S. Energy Information Agency and Benchmark Mineral Intelligence.

China’s head start continues into batteries as well

Battery Capacity by Region, 2021-2031, estimates as of September 2022



Source: Benchmark Minerals Intelligence

Why do concentrated supply chains adversely affect our economic and national security?

Critical risk areas – Summary

Offshoring risk
Risk of losing potential EV-related jobs and investment to other countries

Labor costs, trade rules, and competing foreign incentives create conditions that favor offshoring **centers of gravity**, and thus much of the investment and job creation associated with EVs

Technological risk
Risk to long-term U.S. technology leadership, R&D, and knowhow

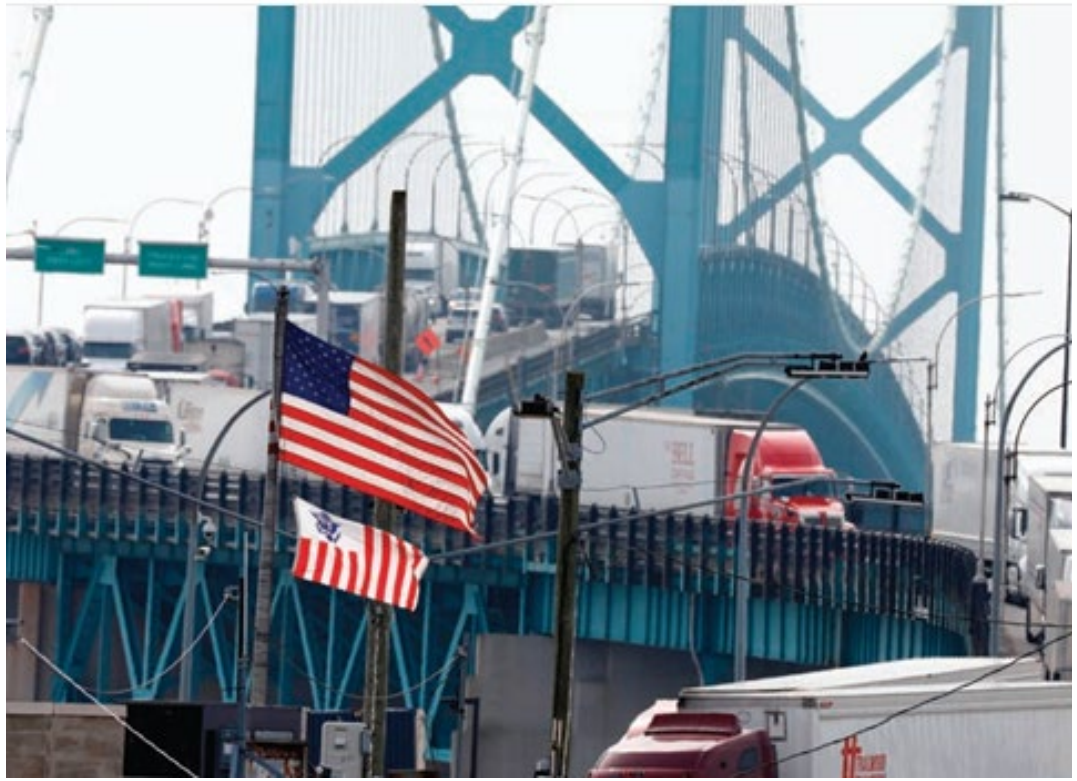
Lack of domestic U.S. players with a strong track record at areas that are key **technological differentiators** risks future technology leadership, R&D jobs, and local capabilities

Supply availability risk
Risk to obtain inputs critical to the function of the EV supply chain

Lack of U.S. capacity at upstream **strategic control points** that can limit downstream production – Many are dominated by Asian countries, especially China

WHY WE SHOULD CHARE:
PRESERVING OUR ECONOMIC COMPETITIVENESS

IMPACTS TO THE REGION



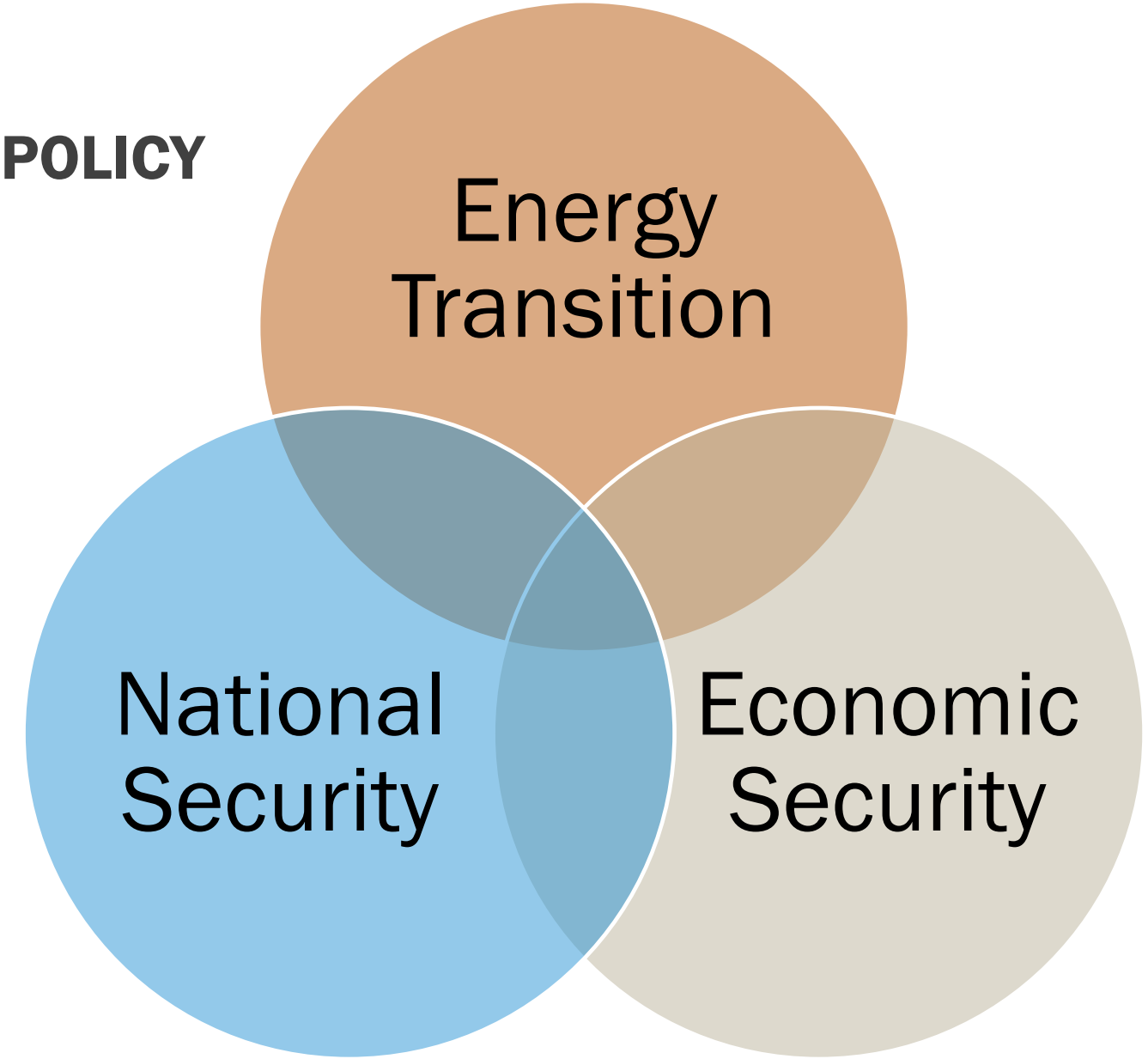
As the automotive industry undergoes the transformation to EVs—and begins building new supply chains for EV-specific automotive parts—we should continue to recognize the value of integrated North American supply chains among the United States, Canada, and Mexico.

Transparency & Standards in Supply Chains

- Promoting transparency within supply chains will help create a race to the top for the emerging EV and battery markets
- High ESG standards paired with blockchain technology or other traceability frameworks can help ensure standards are adhered to

A suspected reeducation camp in Xinjiang (Source: LA Times, Greg Baker/AFP/Getty Images)

U.S. CRITICAL MINERALS POLICY



U.S. CRITICAL MINERALS POLICY

Industrial policy

Bolster domestic manufacturing capabilities and strengthen regional and allied supply chains

Commercial diplomacy

Foster international collaboration to build diverse and sustainable production, processing, and recycling, capacities

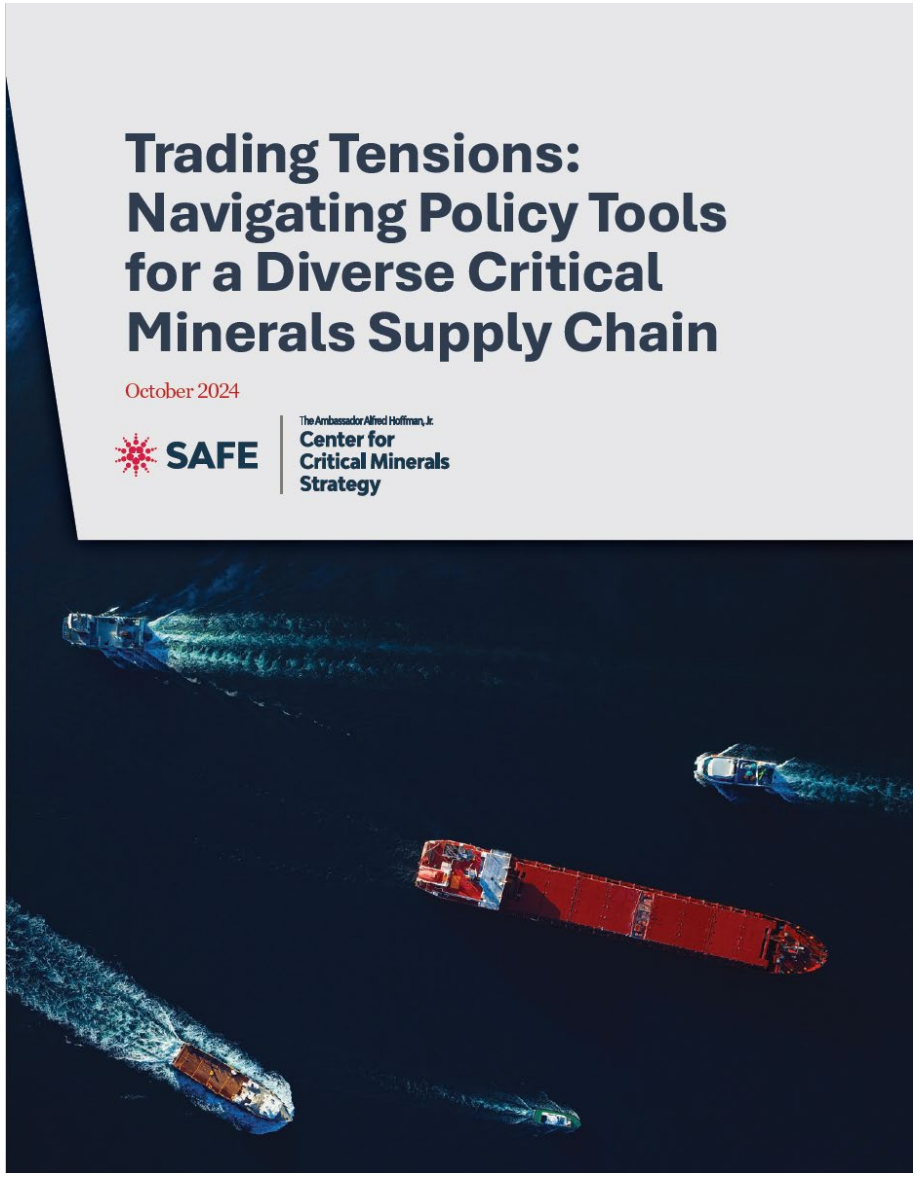
Trade policy

Informed by tariffs, export controls, and critical minerals agreements level the global playing field

Science & tech policy

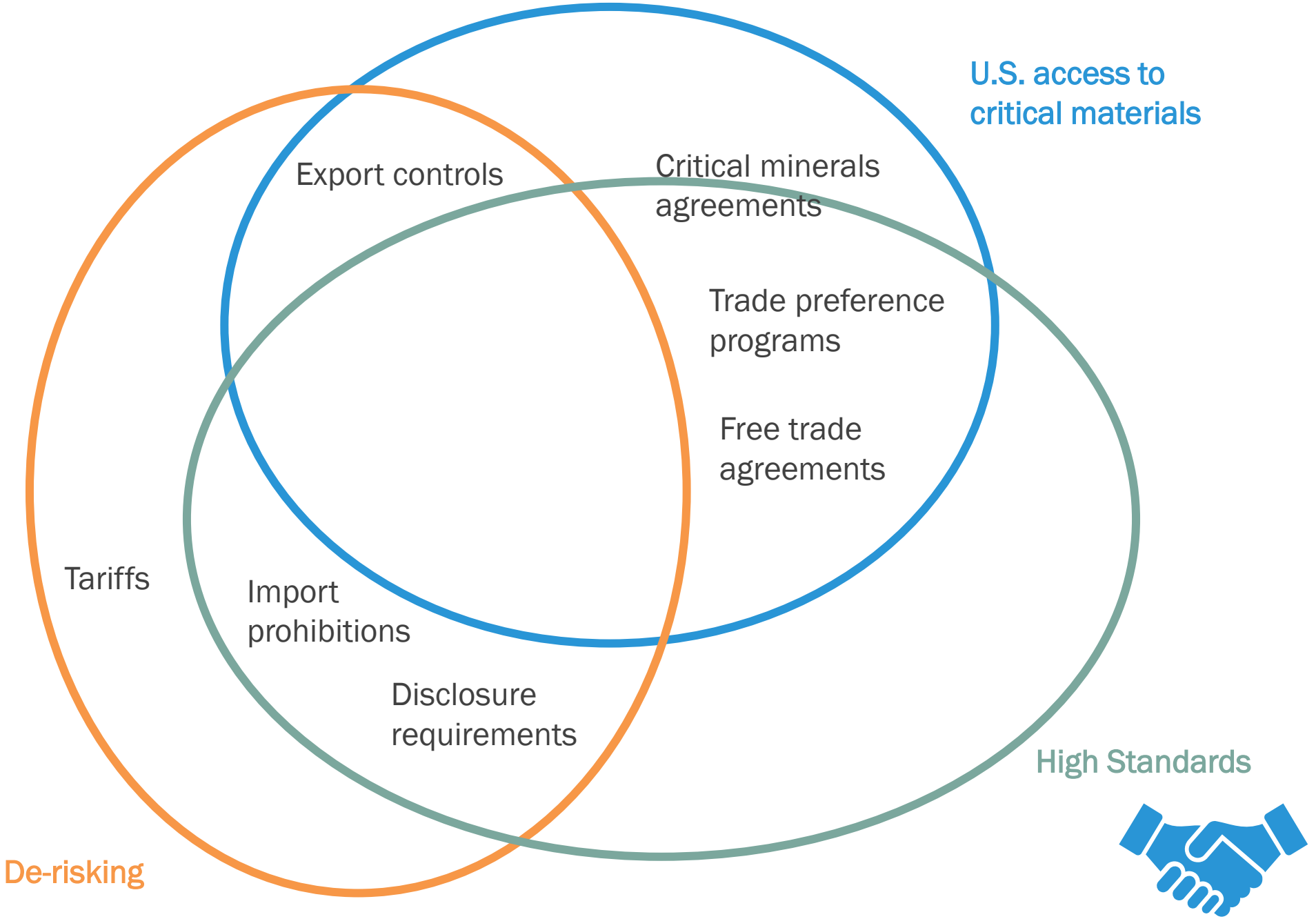
Drive lab-to-market innovation and support commercialization

QUESTIONS?


Trading Tensions:
Navigating Policy Tools
for a Diverse Critical
Minerals Supply Chain
October 2024
SAFE
The Ambassador Alfred Hoffman, Jr.
Center for
Critical Minerals
Strategy

How can the United States advance policies to influence the flow of critical minerals, with the goals of ***diversifying supply chains***, ***maintaining and building U.S. market presence***, and ***promoting high environmental and labor standards globally***?”

ANALYSIS OF TRADE TOOLS



TRADEOFFS & CHALLENGES

Balancing De-Risking, Domestic Manufacturing, and Responsible Production Priorities

Embedded Minerals and Trade Policies

Harmonizing U.S. and Allied Trade Policies

Long Project Timelines vs. Urgent Need for Materials in the Downstream

TARIFFS IMPOSED ON BATTERY MATERIALS FROM CHINA

Note: Battery materials include lithium hydroxide, lithium carbonate, cobalt sulfate, nickel sulfate, natural graphite, and cathode active materials.
Source: SAFE analysis using information from the World Trade Organization.

As we lower draw bridges to allies and like-minded countries, we need to ensure we are building high enough walls around bad actors.

TRADEOFFS & CHALLENGES

Balancing De-Risking, Domestic Manufacturing, and Responsible Production Priorities

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RECOMMENDATIONS

1. Enhancing the effectiveness of existing tools

- Improve supply chain transparency
- Assess the collective impact of existing and proposed trade tools on U.S. competitiveness
- Provide pathway for AGOA countries to negotiate sectoral trade agreements

2. New trade agreements and greater multinational cooperation

- Negotiate new sector-specific, enforceable critical minerals or commodity agreements with allies and strategic partners
- Work with close allies to coordinate unilateral policies

3. Bolstering domestic and allied production capacity

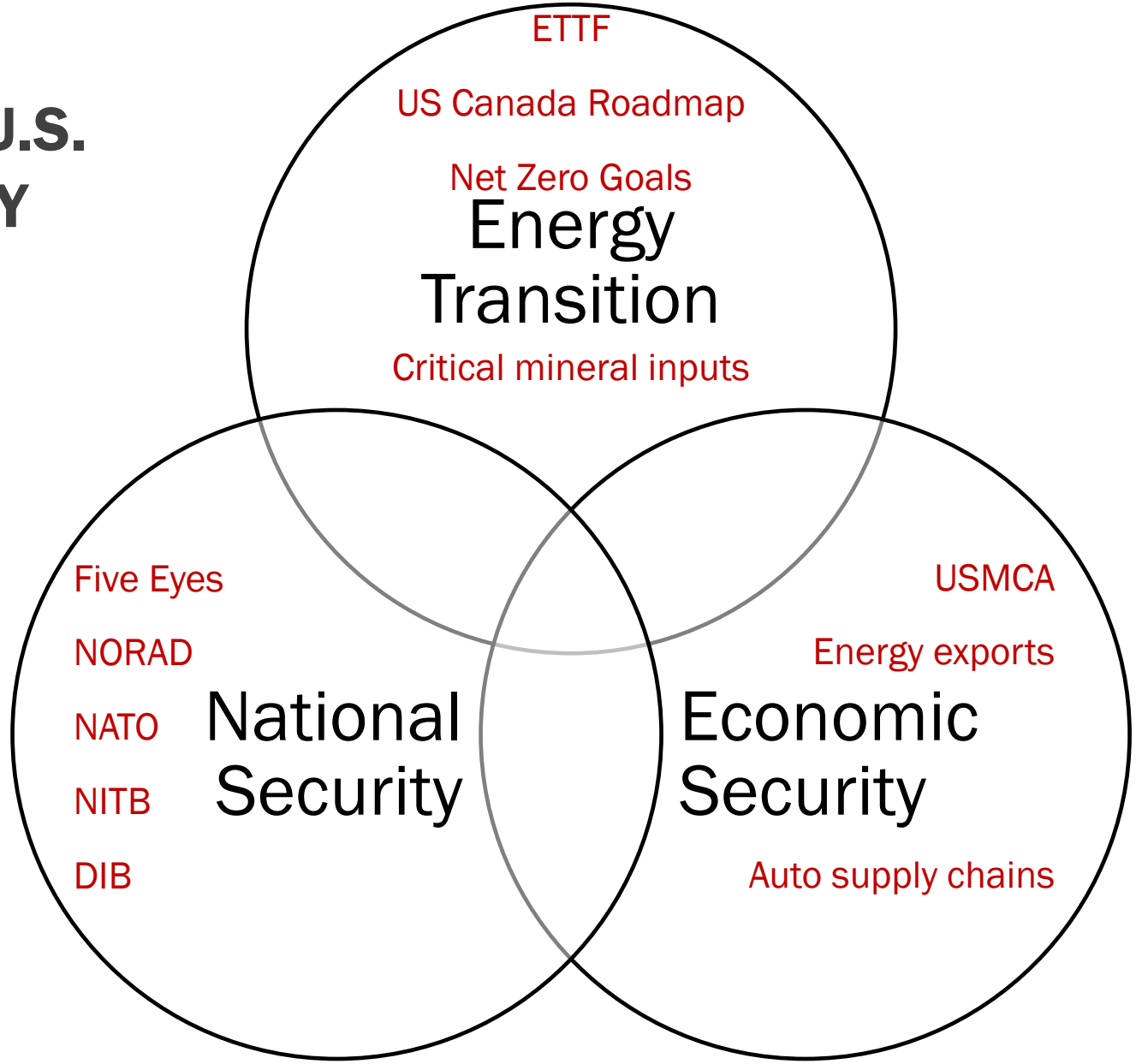
- Establish targeted incentives to build domestic upstream and midstream capacity, starting with permanent magnet production
- Support capacity building and joint investment in strategic resource-rich countries

WHAT TO EXPECT IN THE NEW ADMINISTRATION ON TRADE

- International Emergency Economic Powers Act?
- More 232 tariffs?
- Higher 301 tariffs?
- 30D/FEOC changes?
- USMCA Review

QUESTIONS?

HOW CANADA FITS WITH U.S. CRITICAL MINERAL POLICY MOTIVES



CRITICAL MINERALS LISTS

U.S.

2022 CM List
(USGS)

arsenic, barite, beryllium, hafnium, nickel, titanium, rubidium, zirconium

Both

antimony, bismuth, cesium, chromium, cobalt, fluorspar, gallium, germanium, graphite, indium, lithium, magnesium, manganese, nickel, niobium, platinum group metals (PGM), rare earth elements (REE), tantalum, tellurium, tin, titanium, tungsten, vanadium, zinc

Canada

2022 CM List

copper, helium, high purity iron, molybdenum, phosphorous, potash, silicon metal, uranium

CANADIAN COMPANIES U.S. FUNDING ELIGIBILITY

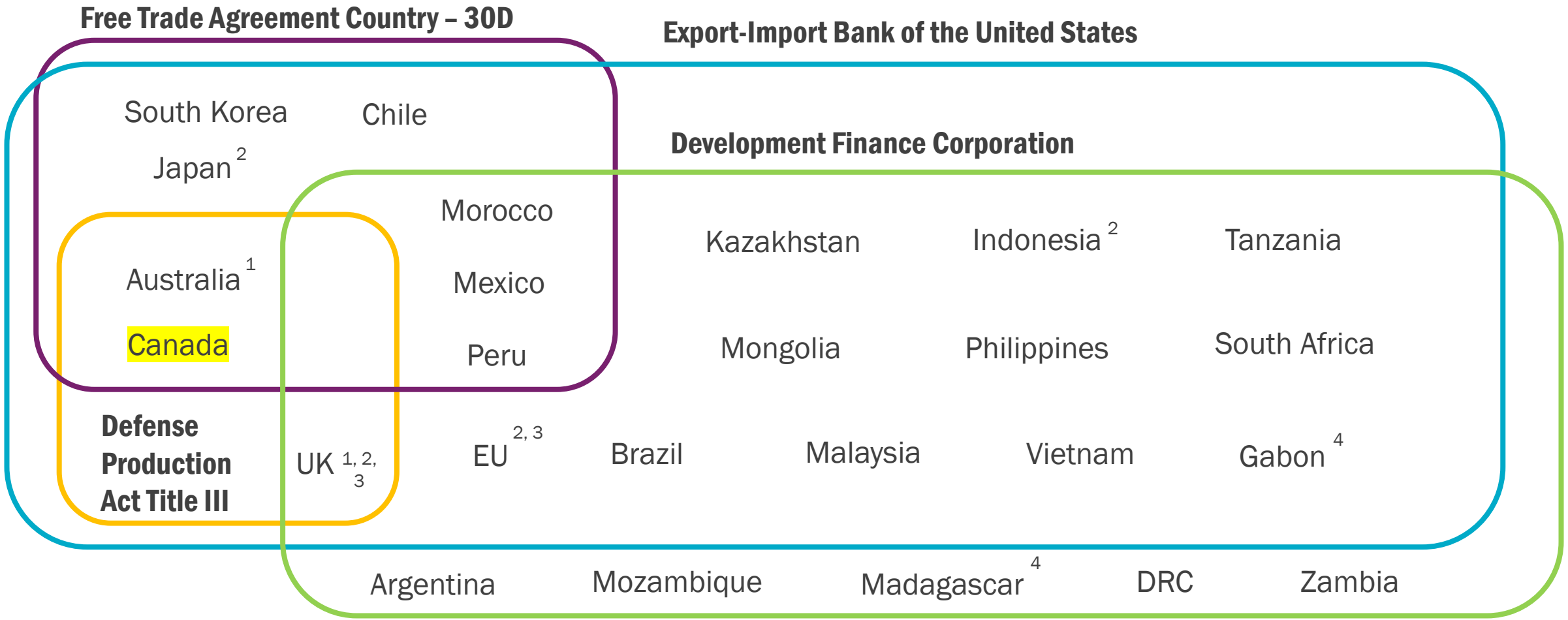
Mineral projects in Canada:

- DPA Title III
- IBAS
- EXIM Bank
- 45X indirectly
- 30D indirectly

Mineral projects in United States

- MESC BIL Grants
- LPO Title 17
- 45X directly
- 48C directly

WHAT CANADIAN COMPANIES ARE ELIGIBLE FOR



1 Australia and the UK can only be treated as a domestic source for the purposes of the DPA Title III program if national cannot be addressed by the United States and Canada.
2 Japan has a Critical Minerals Agreement (CMA) with the United States, which is treated as an FTA for the purpose of the 30D sourcing requirements. There have been reports of CMA
3 negotiations with the UK, EU, and Indonesia.
The UK and high-income EU countries are eligible for certain energy-related investments under the European Energy security and Diversification Act of 2019.
4 EXIM does not take over 7 years of public or private sector risk in Madagascar. EXIM does not take over 7 years of public sector risk in Gabon, but it does take on private sector risk.

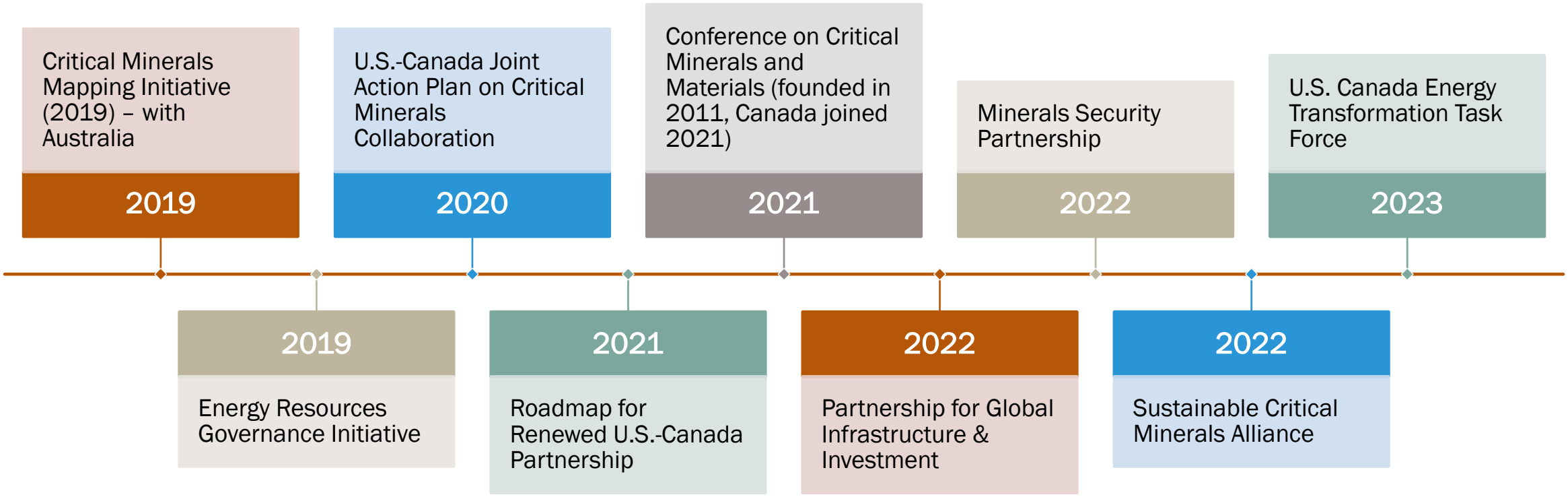
NOTE FOR EARLIER STAGE PROJECTS

Most U.S. funding opportunities (ex. EXIM, LPO) are available once projects reach the bankable or definitive feasibility study stage

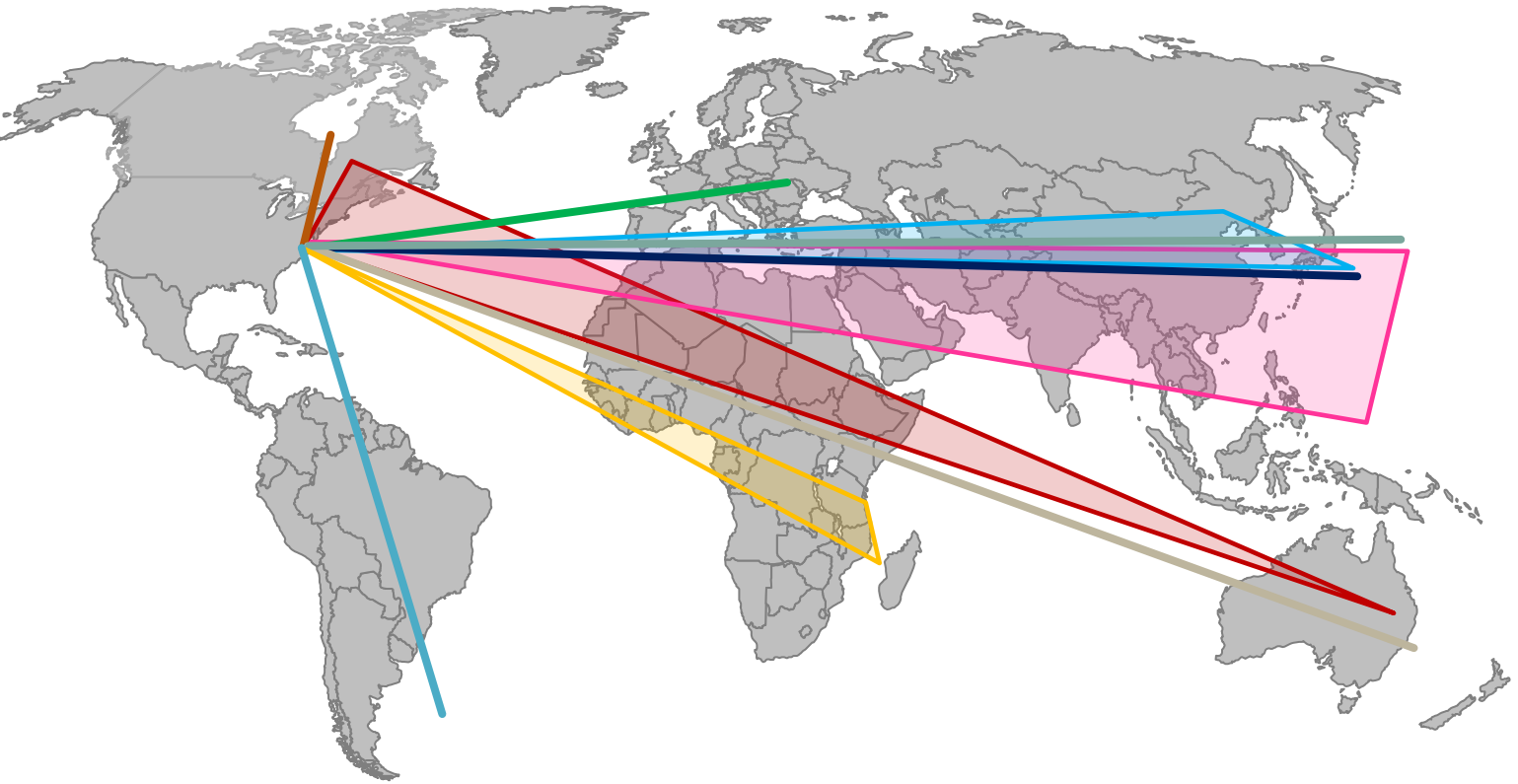
There are limited funding opportunities for earlier-stage projects:

DPA Title III – mining projects in Canada, Australia and UK are eligible

U.S. - CANADA BILATERAL & MULTILATERAL CRITICAL MINERALS INITIATIVES



OTHER U.S. BILATERAL AND TRILATERAL INITIATIVES, MOUS, AND OTHER AGREEMENTS



1) Critical Minerals Mapping Initiative (2019)
2) U.S.-Canada Joint Action Plan on Critical Minerals Collaboration (2020)
3) U.S.-EU Trade and Technology Council (2021)
4) Tripartite MOU between the U.S., Zambia, and DRC on electric vehicle battery value chains (2022)
5) U.S.-Australia Climate, Critical Minerals and Clean Energy Transformation Compact (2023)
6) U.S.-Japan Agreement on Strengthening Critical Minerals Supply Chains (2023)
7) Tripartite MOU between the U.S., ROK and Mongolia to collaborate on critical minerals (2023)
8) U.S.-ROK Next Generation Critical and Emerging Technologies (CET) Dialogue (2023)
9) U.S.-Japan-Philippines Trilateral Summit and Joint Vision Statement (2024)
10) U.S.-Argentina MOU to Strengthen Cooperation on Critical Minerals (2024)

WHAT IS COMING - POTENTIAL FOR CANADA'S G7 LEADERSHIP?

EXECUTIVE ORDERS

Executive Order on Addressing the Threat to the Domestic Supply Chain from Reliance on Critical Minerals from Foreign Adversaries

ECONOMY & JOBS | Issued on: **September 30, 2020**

★ ★ ★

USMCA REVIEW

- Updates to Rules of Origin for EVs
- Adding new countries?
- Critical minerals chapter

CANADA'S ROLE

1. **Canada is well positioned** to support the overlapping U.S. policy goals of 1) energy transition, 2) economic security, and 3) national security. But Canada's greatest comparative advantage lies in the security angles.
2. There is **limited U.S. funding available for Canadian projects**. Of that funding, it is indirectly or directly available for the upstream.
3. In the international minerals arena, **wherever the United States is, Canada is**.
4. The **U.S.-Canada policy ecosystem should be more complimentary**, especially if we recognize a future where minerals could be like auto parts and cross the border several times before the final product is sold -- at home or internationally.
5. It will take **phased-in policy incentives and coordinated market access regulations or tariffs** to make Canada, the U.S., and other ex-China jurisdictions competitive for minerals production.

QUESTIONS?

Thank you!

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Executive Director, SAFE Center for Critical Minerals Strategy

SAFE

Annex: SAFE's Permitting Reform Recommendations

NEPA: Judicial review period of 12 months

- **Why:** Proposed energy projects that have completed the NEPA process and that are *approved* by the federal government to begin construction are held up in court for years, sometimes up to 6 or 7 years, due to litigation and disquiet from the community and outside organizations that are not co-located with the projects.
- **How**: Amend the National Environmental Protection Act of 1969 to set a 12-month statute of limitations for court challenges to projects that have received a Record of Final Decision.

NEPA: Early community engagement and participation

- **Why:** It takes 10-20 years to permit a new mine in the United States often due to litigation brought forth by communities. Published studies have shown that earlier- and ongoing-community engagement, participation, and the development of a transparent grievance mechanism process will result in less lawsuits being filed against EA/EIS projects, ensuring faster permitting times.
- **How:** Amend the National Environmental Protection Act of 1969 to require agencies to notify the community during the scoping phase of NEPA and to prepare a Community Impact Report informed by community hearings and subject to a public comment period. The report needs to be completed by the end of the scoping phase of NEPA.

FAST-41: Include critical mineral mining, processing, refining, and recycling projects

- **Why**: The Federal Permitting Improvement Steering Council claims that projects covered by FAST-41 and made available to the online dashboard reduced their EIS completion timeline lengths by 45% from 4.5 years to 2.5 years, while still ensuring that they comply with regulations.
- **How**: Amend Title 41 of the Fixing America's Surface Transportation Act to include critical mineral mining, processing, refining, and recycling projects under the list of "covered projects."

Interregional Transmission Reform

- **Why:** Recent severe events such as Winter Storms Uri and Elliott have underscored the inflexibility of the power grid to move large amounts of power across regions. The ability to do this would not only make the grid more reliable but also more efficient allowing the market to move power when other areas are experiencing high demand or when economic value can be accomplished by moving power from lower price markets to higher price markets through interregional transmission.
- **How:** Support Interregional transfer mandates as part of permitting reform provisions to provide for a safer and more reliable grid. .

Annex: SAFE-State MOU Related to MSP

SAFE will develop a private sector network for the State Department with two goals:

- Infuse **private sector advice and input into DOS critical minerals policy development and implementation**, including the United States' activities in the Minerals Security Partnership (MSP).
- **Identify** strategic projects along critical minerals supply chains, **perform** risk mapping exercises for projects, and **facilitate support** in the form of public and private investments, **assist** with offtake agreements, and **leverage** diplomatic support, including U.S. activities in support of the MSP.