

The Race to Secure Critical Minerals

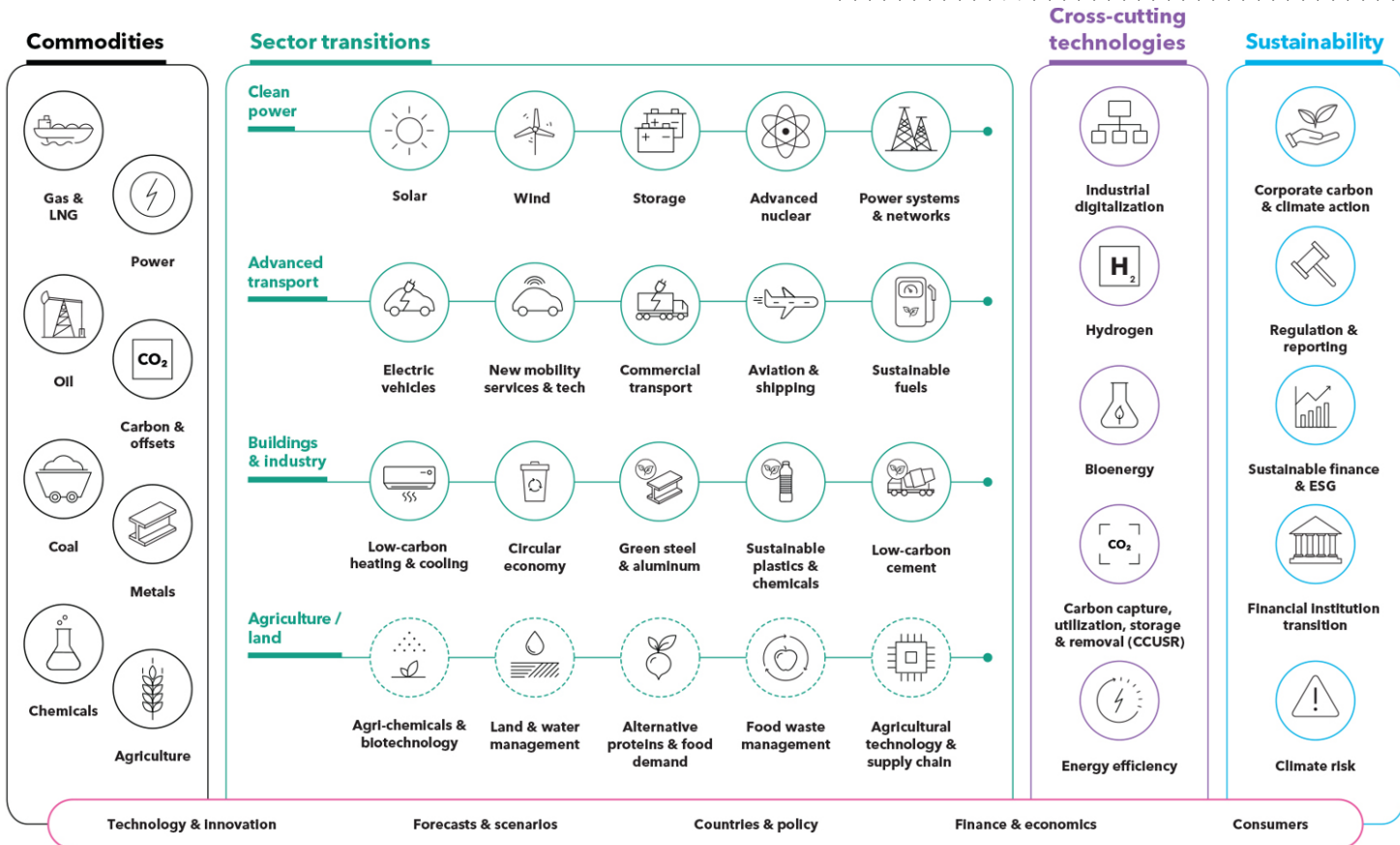
GSEU Day

Ellie Gomes-Callus

October 19, 2023

BNEF coverage

Strategies for a cleaner, more competitive future



BNEF offices around the world

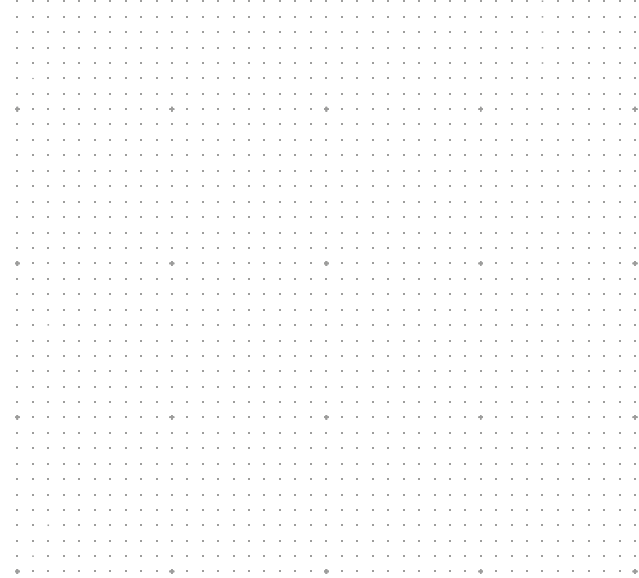


300+

BNEF professionals in
18 locations*

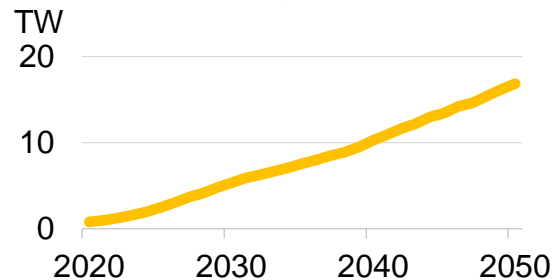
*Part of the Bloomberg LP network of
19,000 employees in 176 locations.

The opportunity

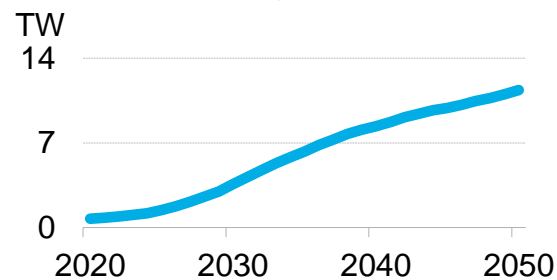


The energy transition will drive demand for critical minerals

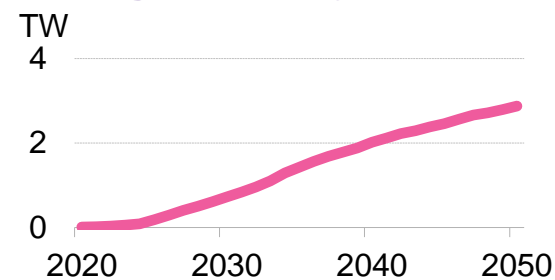
Solar capacity



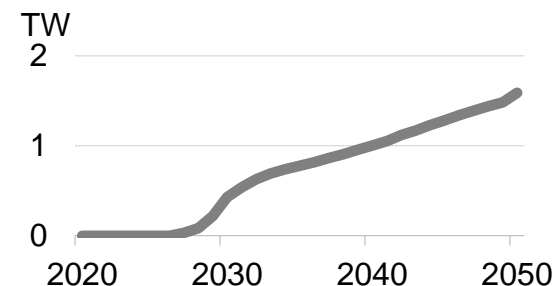
Wind capacity



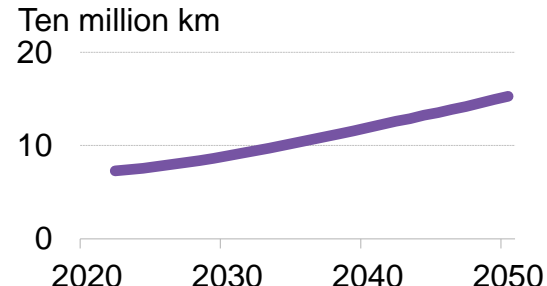
Storage capacity



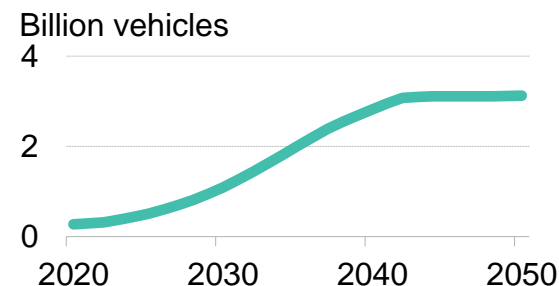
Coal/gas with CCS capacity



Grid length



Electric vehicle fleet

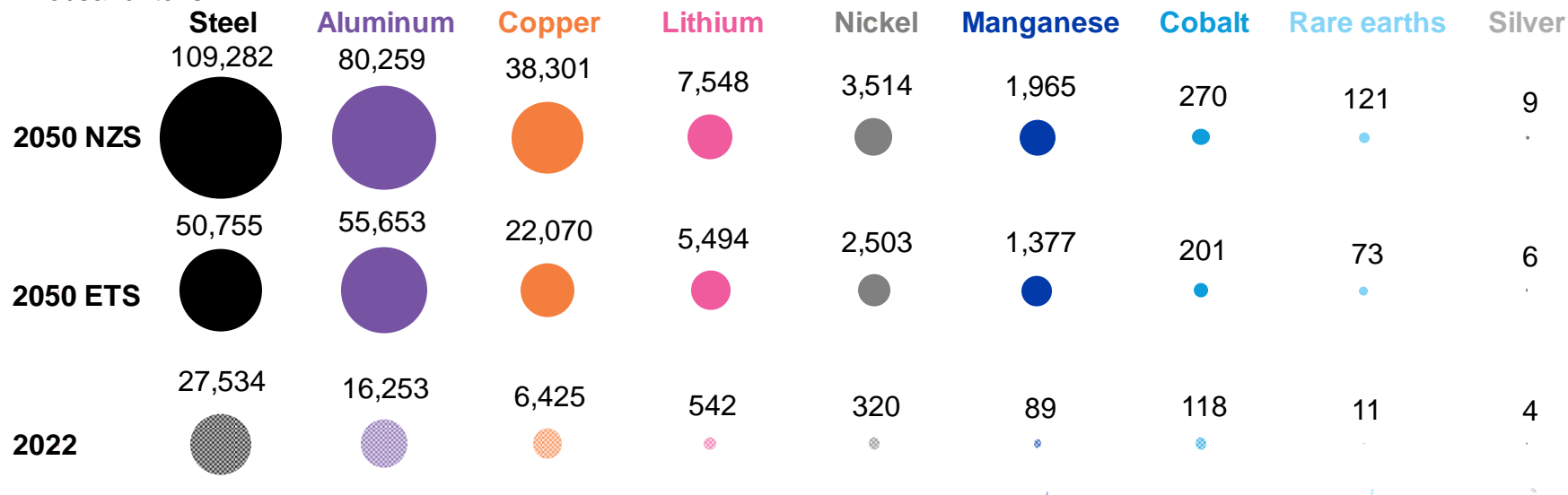


Source: BloombergNEF. Note: Demand is projected under BNEF's Net Zero Scenario. CCS is carbon capture and storage.

The energy transition will drive demand for critical minerals

Demand for energy transition metals in 2022 and 2050

Thousand tons

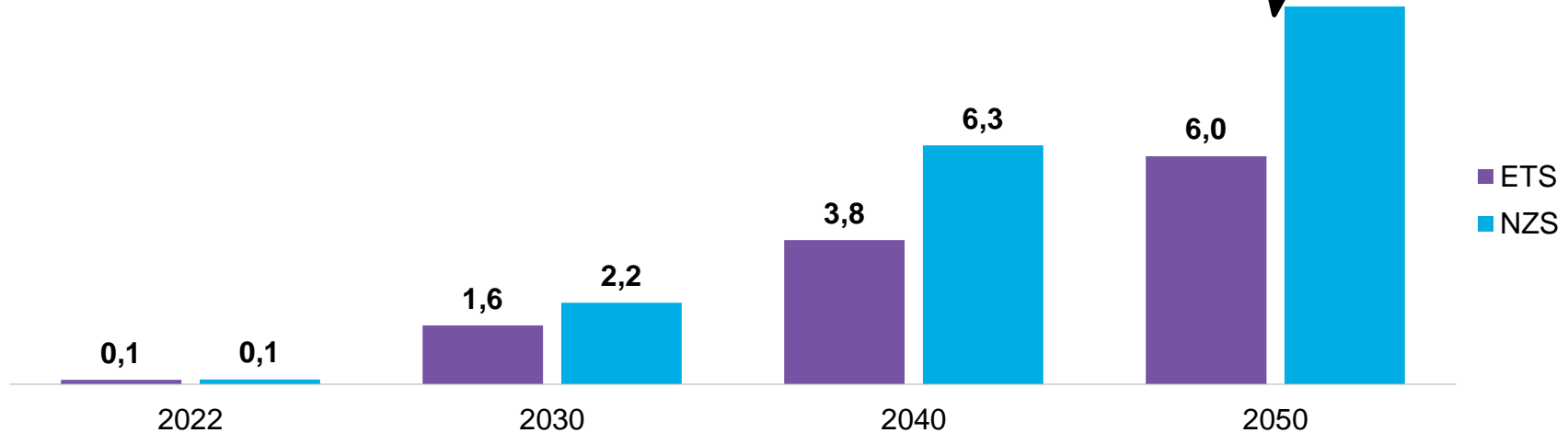


Source: BloombergNEF. Note: ETS and NZS are BNEF's Economic Transition and Net Zero Scenarios. Note: Energy transition demand includes power generation, battery storage, power grids and transport sectors.

Reaching net zero could create a \$10 trillion market

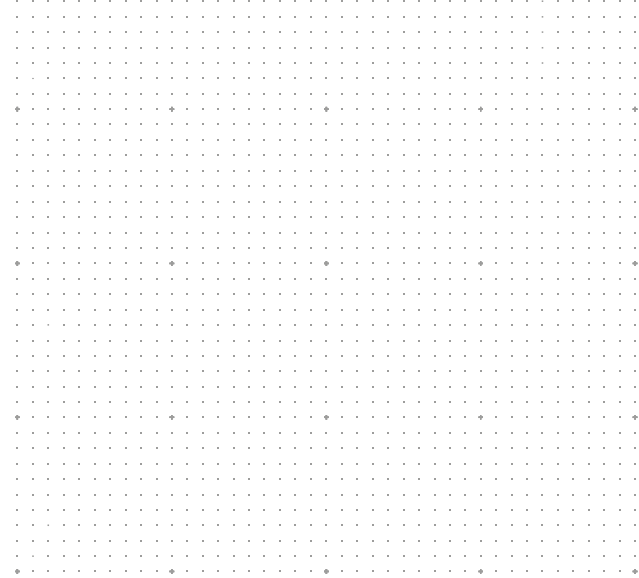
Cumulative dollar value of energy transition metals

\$ trillion (2022 real)



Source: BloombergNEF. Note: NZS and ETS are BNEF's Net Zero and Economic Transition Scenarios. Note: Energy transition demand includes power generation, battery storage, power grids and transport sectors. Prices in 2050 assumed to be the average of the last 10 years. Nominal dollar value in 2050 is discounted by a 2.75% annual rate. This is in line with the average rates for major economies where demand is concentrated.

The problem



Critical mineral supply chains get more concentrated from reserves to refineries

Cumulative percentage share of battery metal reserves



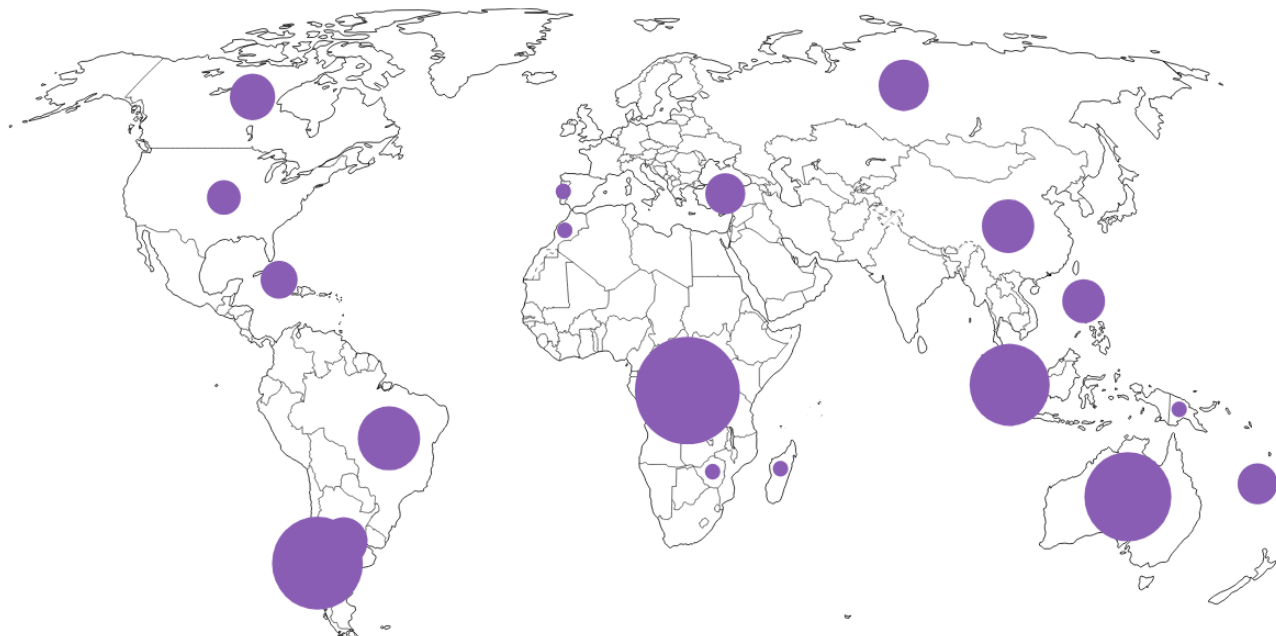
Reserves



Mines



Refineries



Source: US Geological Survey, BloombergNEF. Note: Only lithium, nickel and cobalt are considered in this chart. Data is from 2023 USGS publication. Note: Bigger bubbles equate to a bigger percentage share. Bubble size is relative only to the other bubbles shown on this chart.

Critical mineral supply chains get more concentrated from reserves to refineries

Cumulative percentage share of battery metal mined supply



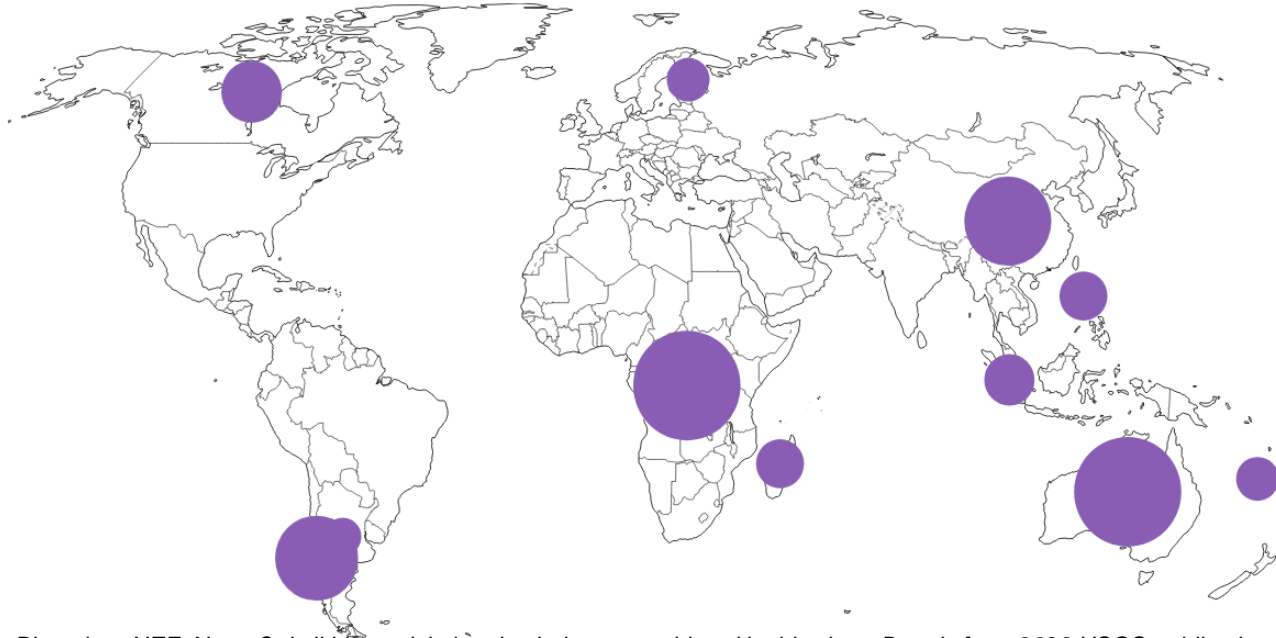
Reserves



Mines



Refineries



Source: US Geological Survey, BloombergNEF. Note: Only lithium, nickel and cobalt are considered in this chart. Data is from 2023 USGS publication. Note: Bigger bubbles equate to a bigger percentage share. Bubble size is relative only to the other bubbles shown on this chart.

Critical mineral supply chains get more concentrated from reserves to refineries

Cumulative percentage share of battery metal refined supply



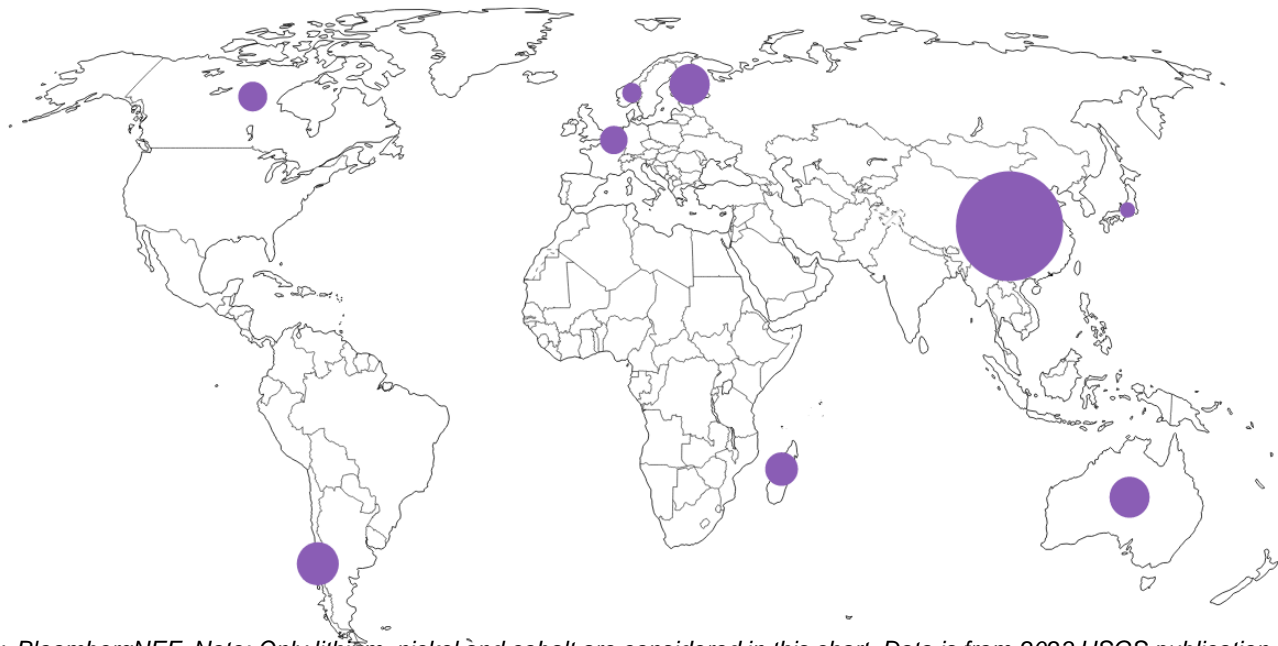
Reserves



Mines



Refineries



Source: US Geological Survey, BloombergNEF. Note: Only lithium, nickel and cobalt are considered in this chart. Data is from 2023 USGS publication. Note: Bigger bubbles equate to a bigger percentage share. Bubble size is relative only to the other bubbles shown on this chart.

China dominates the critical minerals supply chain – who will be next?

Top market in the three editions of BNEF's Global Lithium-Ion Battery Supply Chain Ranking

2020



China

2021



China

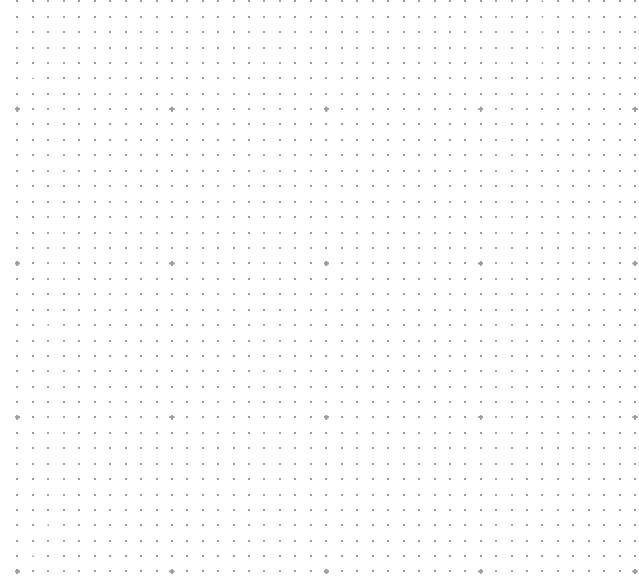
2022



China

Source: Wikimedia Commons, BloombergNEF.

The solution



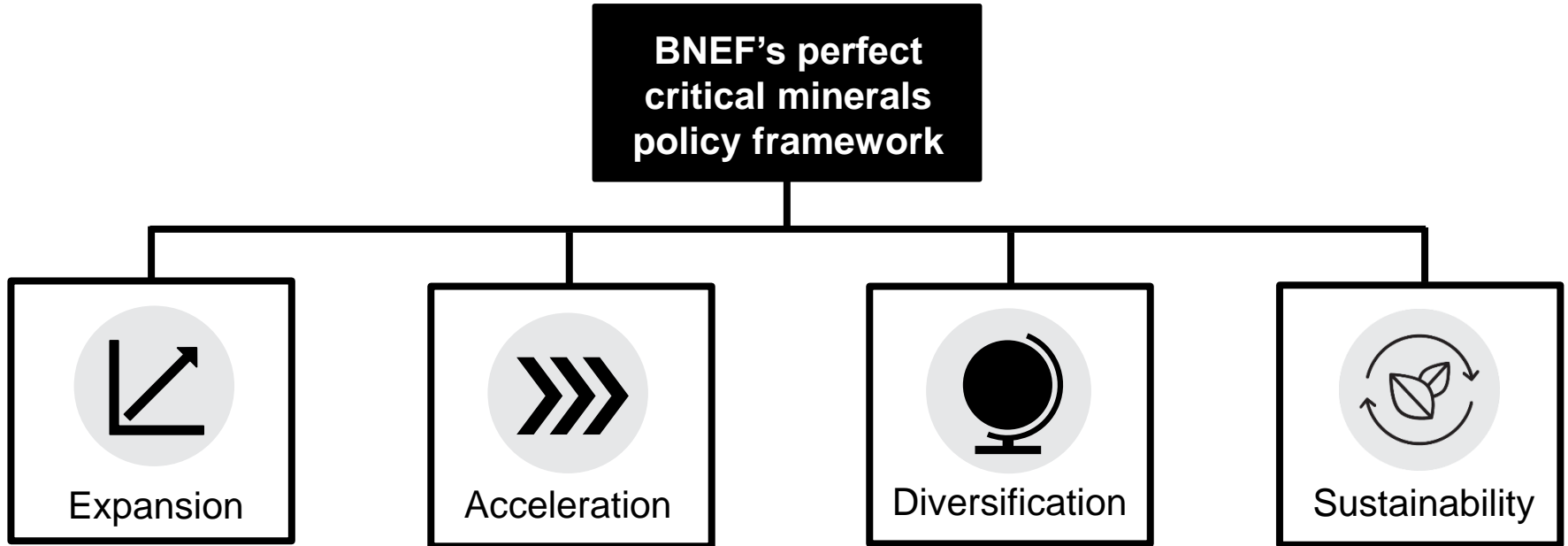
Which regions have made a move?



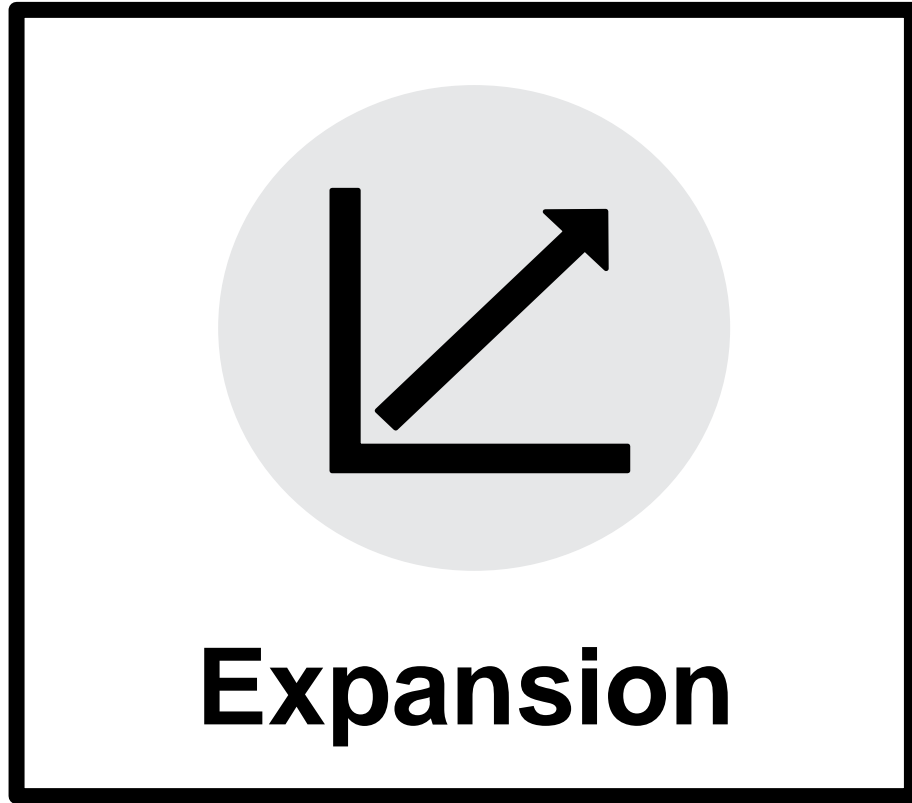
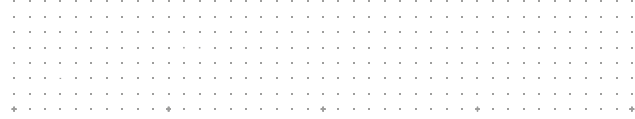
Source: Bloomberg Mercury.

What does the perfect policy look like?

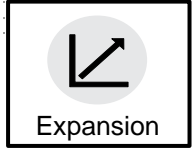
BNEF's framework for a perfect critical minerals policy



Source: BloombergNEF.



Encouraging expansion of domestic supply can take a carrot or stick approach



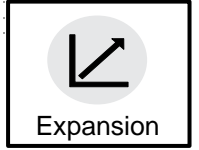
Reward



Regulation

Source: Bloomberg Mercury, BloombergNEF.

Encouraging expansion of domestic supply can take a carrot or stick approach



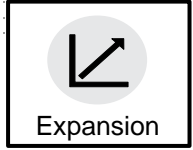
Reward



Regulation

Source: *Wikimedia Commons, BloombergNEF.*

The US rewards domestic supply with credit while the EU sets supply targets



Rewards: US Inflation Reduction Act

Targets: EU Critical Raw Materials Act

Production tax credit



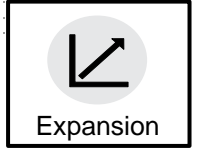
Suppliers receive credit for 10% of critical mineral costs when produced domestically

Source: US government, BloombergNEF. Note: Credit is measured as a percentage of the total cost of production.

Stage	Supply targets as % of annual EU consumption
Domestic extraction	10%
Domestic processing	40%
Domestic recycling	15%

Source: European Commission, BloombergNEF.

Accessing funding is easier in the US



Funding in the US

Uncapped \$\$\$



Inflation
Reduction Act

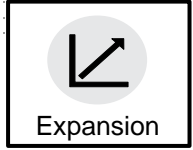


Bipartisan
Infrastructure Law

- Easy to navigate
- Sector specific
- Focused on implementation

Source: BloombergNEF.

Accessing funding is easier in the US



Funding in the US

Funding in the EU

Uncapped \$\$\$



Inflation
Reduction Act



Bipartisan
Infrastructure Law

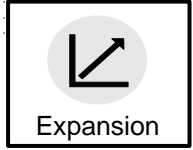
New funding announced in the
Critical Raw Materials Act:

€0

- Easy to navigate
- Sector specific
- Focused on implementation

Source: BloombergNEF.

Accessing funding is easier in the US



Funding in the US

Uncapped \$\$\$



Inflation
Reduction Act



Bipartisan
Infrastructure Law

- Easy to navigate
- Sector specific
- Focused on implementation

Source: BloombergNEF.

Funding in the EU

~ € 1 trillion



InvestEU



Horizon Europe



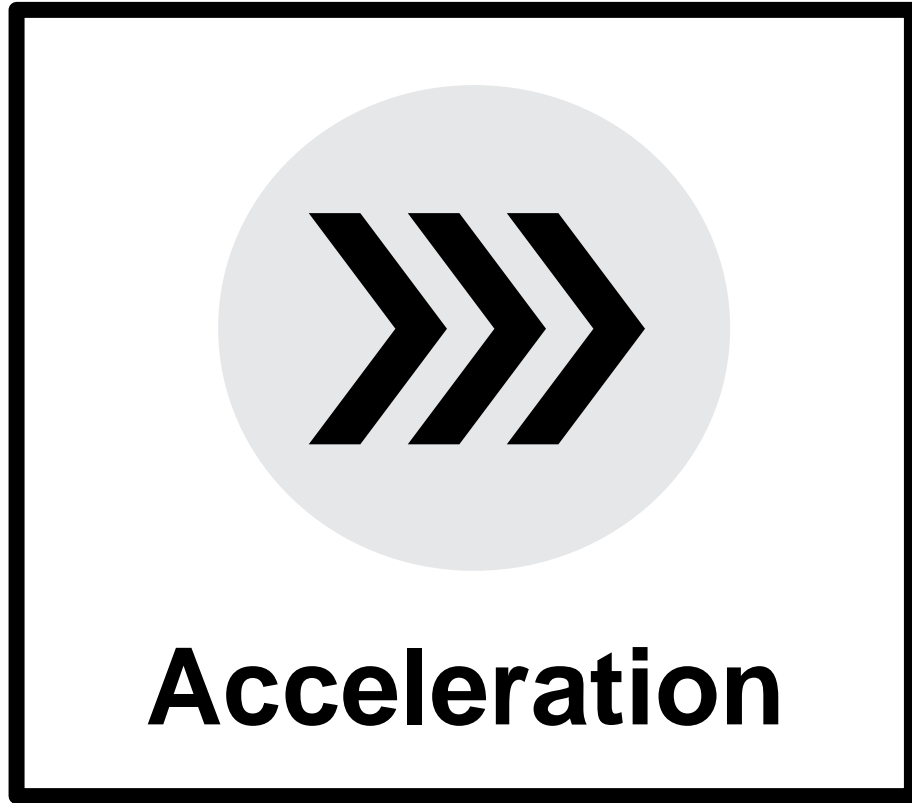
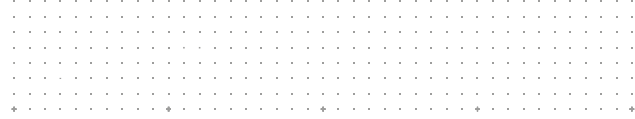
EU Innovation Fund



NetGenerationEU

- Difficult to navigate and competitive
- Non-sector specific
- Focused on early-stage/R&D projects

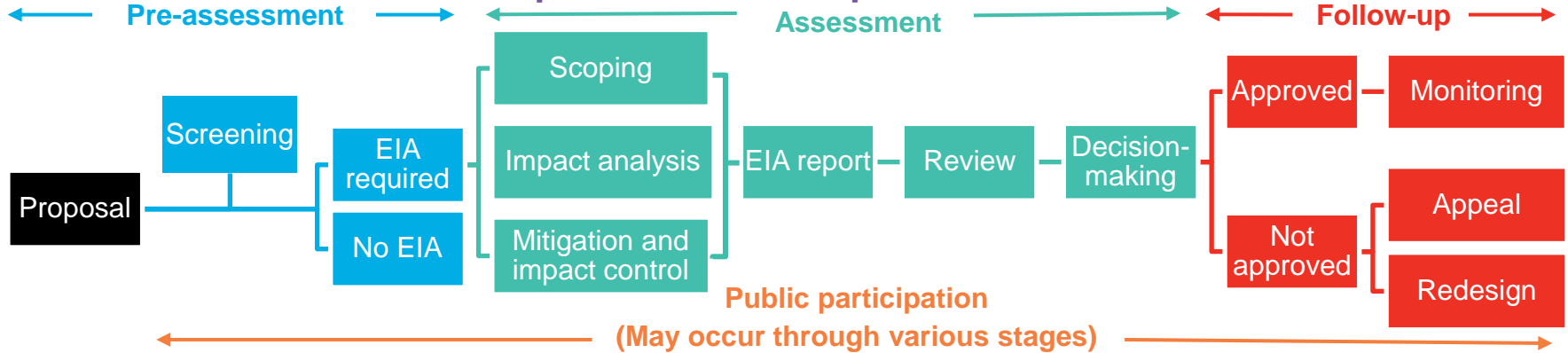
Source: BloombergNEF. Note: Funding is available between 2020-2030.



Long permitting timelines plague critical mineral production...



Generalized environmental impact assessment process flow chart



Average permitting timelines for select economies



Up to 10 years



Up to 5 years



Up to 7 years

Source: European Commission, Society for Mining, Metallurgy and Exploration, Wikimedia Commons, BloombergNEF.

...but accelerating timelines will take time



Updating the 150 year old US Mining Act

CLIMATE

Update needed for 1872 mining law to boost clean energy, report says

Biden's Interior Department recommends overhaul of law to reduce speculation and better target critical minerals

Interior Department: US must update century-old mining law to meet climate goals

Biden administration backing changes to mining act

Working group report suggests collecting royalties from mining firms working on federal lands, which has not happened since 1872.

FINAL REPORT

Recommendations to Improve Mining on Public Lands

Developed by the Biden-Harris Administration's Interagency Working Group on Mining Laws, Regulations, and Permitting



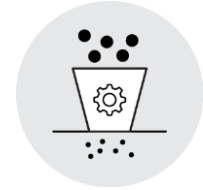
Source: Recycling Today, The Hill, The Washington Post, US government.

Streamlining EU's permitting timelines

Targets in the Critical Raw Materials Act

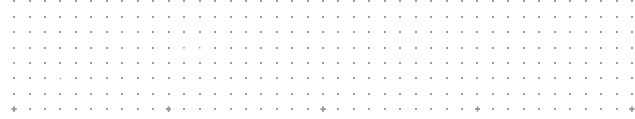


Permits for extraction should take no longer than 24 months

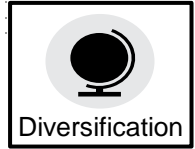


Permits for refining should take no longer than 12 months

Source: BloombergNEF.



International engagement is important for the US and EU



US focus on working with free trade agreement markets (and Japan)

EU's strategic partnerships on critical minerals

20 FTA markets plus Japan



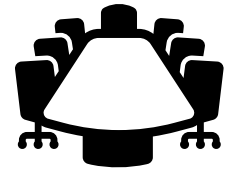
Existing



Canada

Ukraine

Planned



The Critical Raw Materials Club

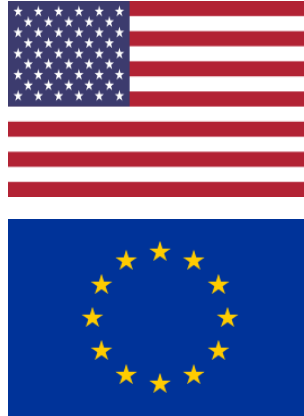
Source: BloombergNEF.

Source: European Commission, Wikimedia Commons, BloombergNEF.

Partnerships will be key for diversification but competition is high

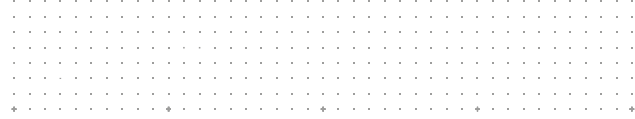


Governments



Companies

Source: BloombergNEF.



The EU continues to trailblaze in sustainable practices



Mentions of “sustainable” or “sustainability” in the US Inflation Reduction Act and EU Critical Raw Minerals Act

Inflation Reduction Act

~ 800 pages

0

Critical Raw Materials Act

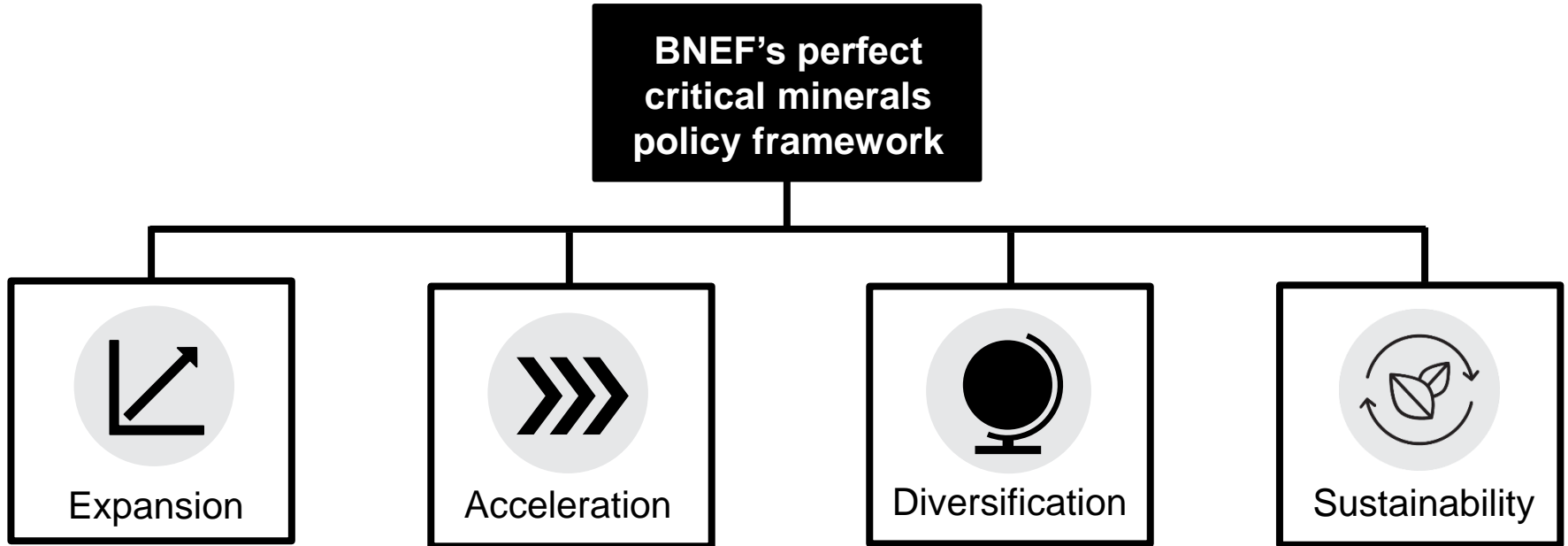
~ 100 pages

75

Source: European Commission, US government, BloombergNEF. Note: Only mentions of “sustainable” or “sustainability” related to critical minerals.

What does the perfect policy look like?

BNEF's framework for a perfect critical minerals policy



Source: BloombergNEF

There is no such thing as perfection

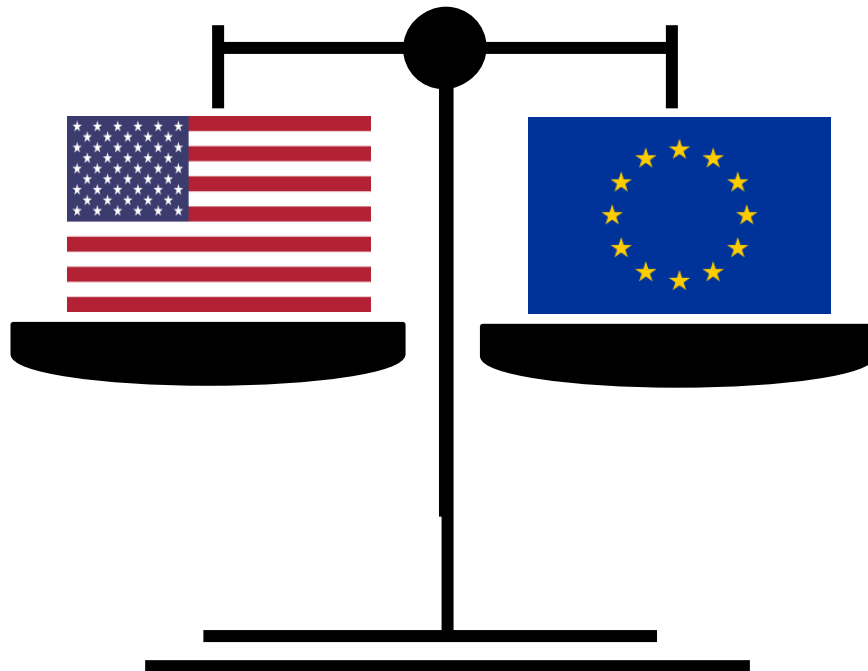
Comparing the US Inflation Reduction Act and EU Critical Raw Materials Act against BNEF's perfect critical mineral policy framework

Category	US IRA	EU CRMA
Expansion	Well addressed	Not well addressed
Acceleration	Addressed	Addressed
Diversification	Addressed	Addressed
Sustainability	Not well addressed	Well addressed

Well addressed Addressed Not well addressed

Source: BloombergNEF

US Inflation
Reduction Act

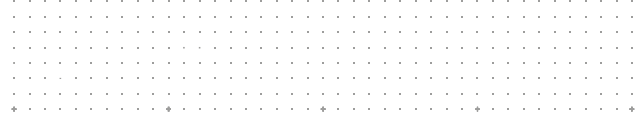


EU Critical Raw
Materials Act


US Inflation
Reduction Act



EU Critical Raw
Materials Act



Source: BloombergNEF.



**A secure and
reliable critical
mineral supply
chain**

Source: BloombergNEF

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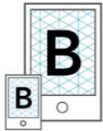
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We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

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