Rare Earth Element Opportunities for Wyoming

Tyler Brown, Scott Quillinan, and Parag Chitnis

Prepared for the University of Wyoming Board of Trustees

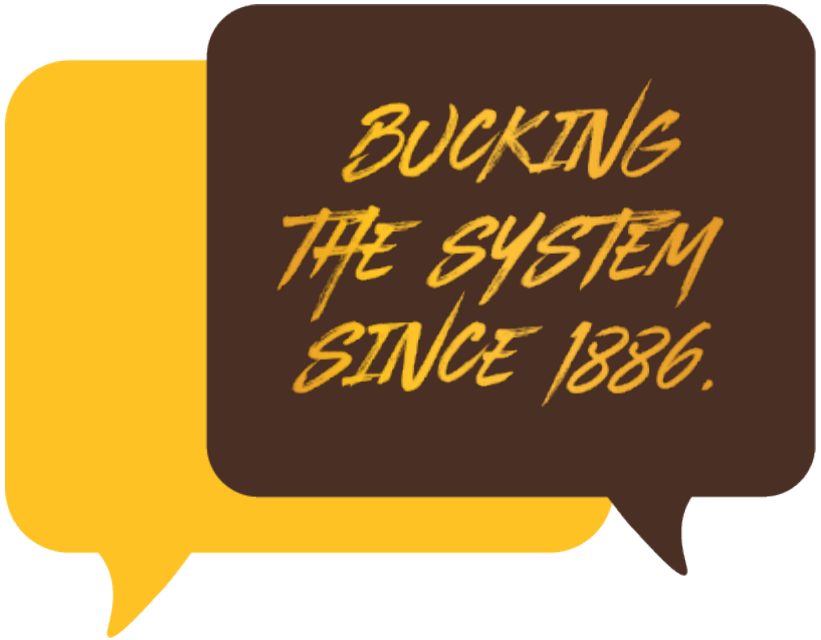
March 27th, 2025

UNIVERSITY OF WYOMING | School of Energy Resources

THE WORLD NEEDS MORE COWBOYS.

SER's Mission:

To advance energy-driven economic development for Wyoming



SER Research Structure

Staffed Centers of Excellence

- Center for Economic Geology Research
- Center for Carbon Capture and Conversion
- Hydrogen Energy Research Center
- 3D Visualization Center
- Center for Energy Regulation and Policy Analysis

Faculty-Led Centers of Excellence

- Center for Air Quality
- Center for Produced Water Management
- Wind Energy Research Center
- Nuclear Energy Research Center
- Subsurface Energy and Digital Innovation Center
- Center for Biogenic Gas Research

Research Programs/Groups

- Energy Engagement, Leadership, and Careers Program
- Jurisprudence of Underground Law and Energy Research Group

Partner Organizations

- Enhanced Oil Recovery Institute
- Wyoming Integrated Test Center

Select Research Topics

- Carbon capture, use and storage
- Carbon engineering (coal to products)
- Oil and gas production
- Produced water management
- Visualization
- Methane detection
- **Rare earth elements and critical minerals**
- Coal markets and sales
- Combustion
- Energy policy and economics
- Hydrogen
- Nuclear
- Applied geologic research
- Wind

Critical Minerals Program Overview

History and Development of the Program

- Initial seed funding WY Legislature in 2016
- Grown into large and successful multidisciplinary research program (>$10)

Expertise

- Geosciences, engineering, data analytics, economics, social science, law, policy, and more.

Campus, state, national, and international collaboration

- Several departments and colleges
- Wyoming cities and counties
- National labs, industry, academia

Events

Wyoming Rare Earths: opportunities for a Domestic Critical Mineral Supply Chain

- **Focus:** Convening experts from industry, government and academia to address critical mineral supply chains.
- **Location and Date:** Ucross Foundation June 16th-17th, 2025

Dr. Jacob Hochard, Haub

Critical Minerals Leadership Academy (CMLA) – <u>funded by the Department of Energy</u>

- **Focus:** Training for graduate students and early career professionals invested in critical minerals R&D across the supply chain.
- **Location and Date:** Laramie, August 3rd-10th, 2025

Dr. Erin Phillips, SER

Nearly everyday, “critical minerals” & “rare earth elements” in the news…

WORLD

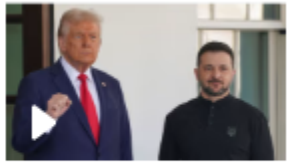
Why the U.S. Keeps Losing to China in the Battle Over Critical Minerals

Syrah Resources thought its graphite mine in Mozambique would challenge China’s dominance in the global market, but then things started going off the rails.

By Jon Emont | Photographs by Annie Flanagan for WSJ March 10, 2025 11:00 pm ET

VIDEO

Inside Trump’s Mineral-Rights Deal With Ukraine



President Volodymyr Zelensky has agreed to the framework of a deal that would allow the U.S. access to Ukraine’s critical minerals. WSJ’s Ian Lovett reports from Kyiv on what’s at stake. Photo: Nathan Howard/Reuters

By Wall Street Journal February 28, 2025 11:50 am ET

Is Trump mulling a minerals deal with conflict-hit DR Congo?

Endowed with minerals but losing ground to rebels, the Congolese government wants to boost security.

2 days ago | World

Putin offers Russian and Ukrainian rare minerals to US

The proposal to give the US access to minerals would also include those from territories taken from Ukraine.

25 Feb 2025 | World

Inside the race for Greenland's mineral wealth

The territory's untapped mineral wealth has caught the eye of both mining firms and Donald Trump.

26 Jan 2025 | Business

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Nearly everyday, “critical minerals” & “rare earth elements” in the news…

American Rare Earths launches development of Cowboy State Mine in Wyoming

Rachel Finch Laramie Boomerang Updated 17 hrs ago

In a significant stride toward boosting domestic rare earth resources, American Rare Earths and its subsidiary Wyoming Rare (USA) Inc have beg...

al market,

OCT 21

By Jon Emont | Photogr

VIDEO

Inside Trump’s Mineral-Rights Deal With Ukraine

President Volodymyr Zelensky has agreed to the framework of a deal that woul
critical minerals. WSJ’s Ian Lovett reports from Kyiv on what’s at stake. Photo: N

By Wall Street Journal February 28, 2025 11:50 am ET

ENERGY | MINING

Wyoming Rare Earths Producer Close To Completing $53 Million Processing Plant

Rare Element Resources needs one more thumbs-up from a federal agency to complete its $53 million rare earth demonstration plant in Upton. The rare earth refinery is billed as a game-changer not

AUG 06

ENERGY | MINING

Ramaco Hires Heavy Hitter To Push Production Plant For Wyoming Rare Earths

Ramaco Resources is closer to being able to start mining rare earth minerals in Wyoming. The company announced Tuesday that it’s hired a global engineering firm to push efforts to bu
plant outside of Sheridan.

to rebels, the Congolese government wants to boost security.

AUG 12

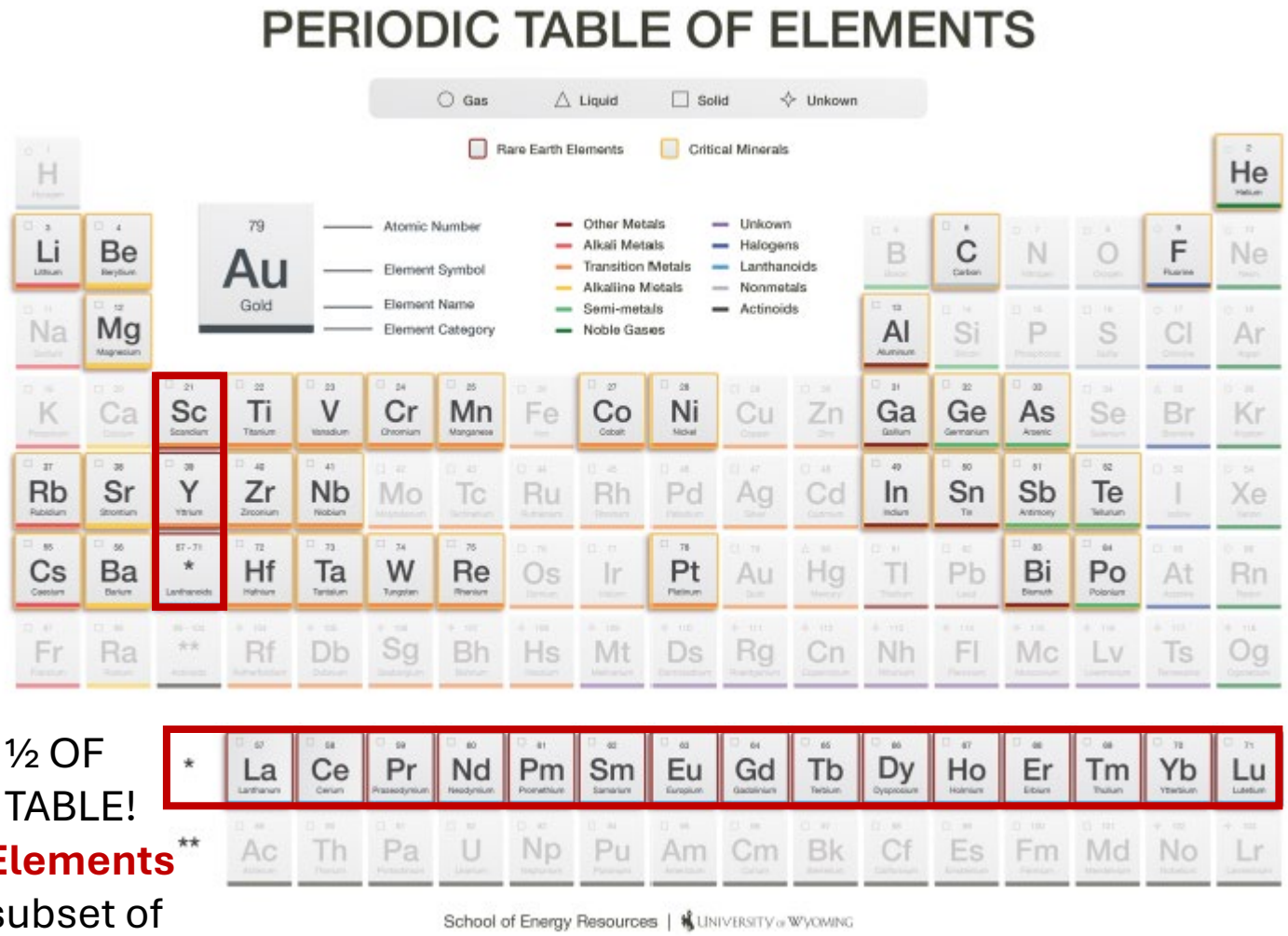
ENERGY | MINING

Wyoming Rare Earths Companies In Race To Start Producing

The Australian-based American Rare Earths Ltd. has restructured its Wyoming project to attract investment. With Wyoming becoming ground zero for U.S. rare earths, companies are in a race to be the first to start producing.

But what is meant by “Critical Minerals” and “Rare Earth Elements”?…

- ✓ A **non-fuel** mineral or mineral material essential to the **economic and national security** of the United States
- ✓ Serves an **essential function** in the manufacturing of a product, the absence of which would have significant consequences for the economy or national security of the United States (Energy Act of 2020).
- ✓ Has a **supply chain** that is **vulnerable to disruption**



ALMOST ½ OF PERIODIC TABLE!

Rare Earth Elements (REEs) are subset of **Critical Minerals (CMs)**

Initial list (2018) was revised in 2022, and there are planned **updates every 3 years.**

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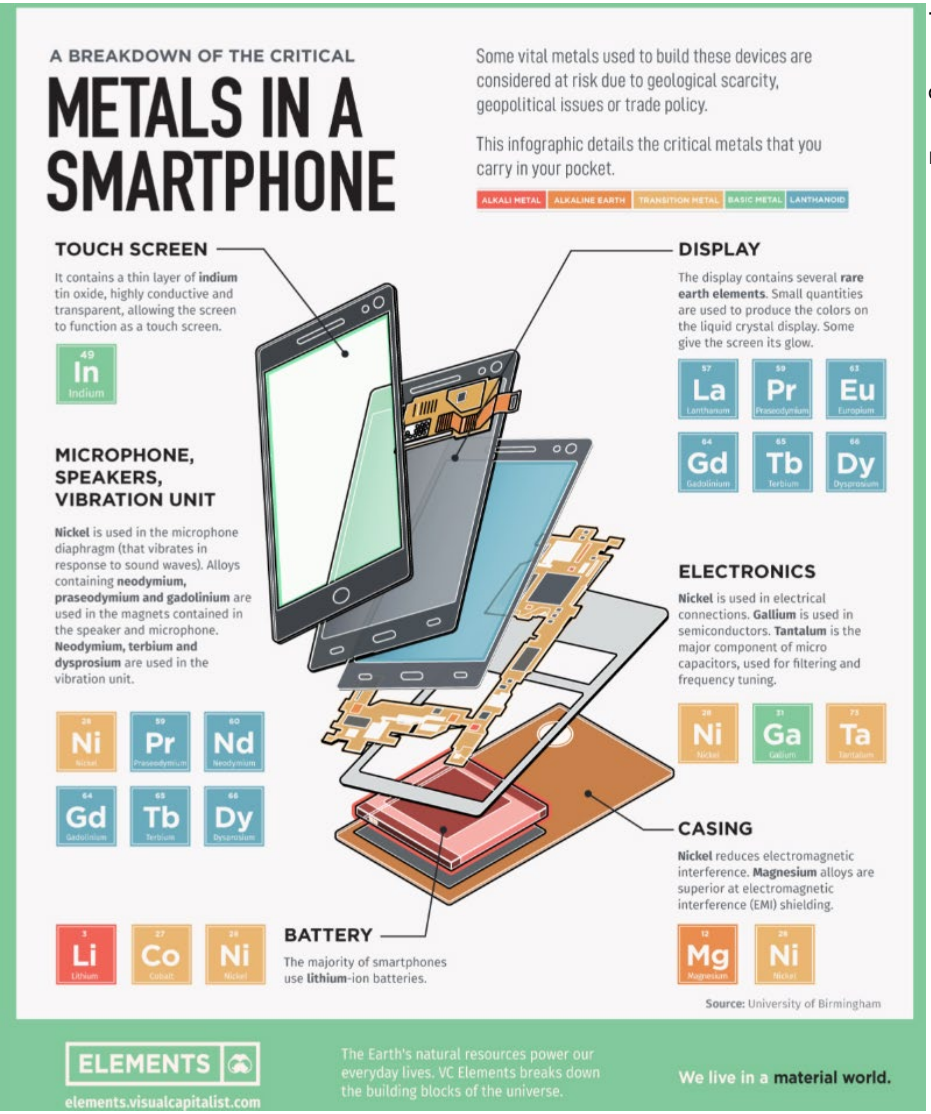
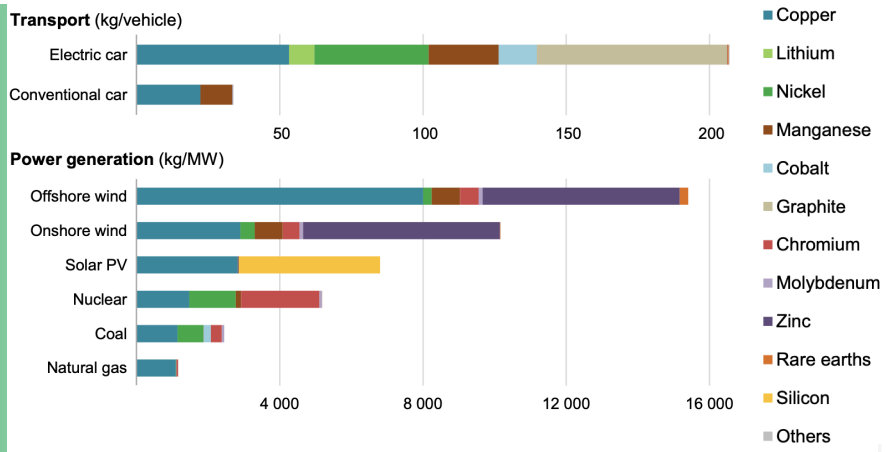
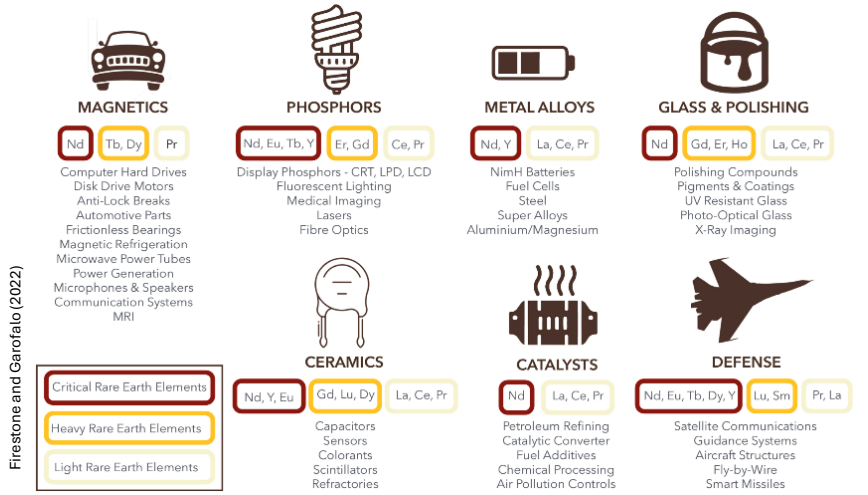
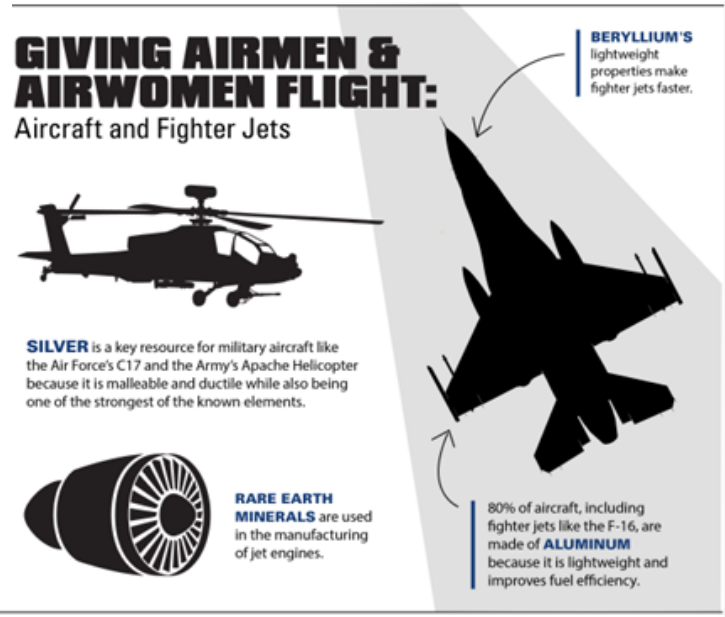
“Critical” because of essential function

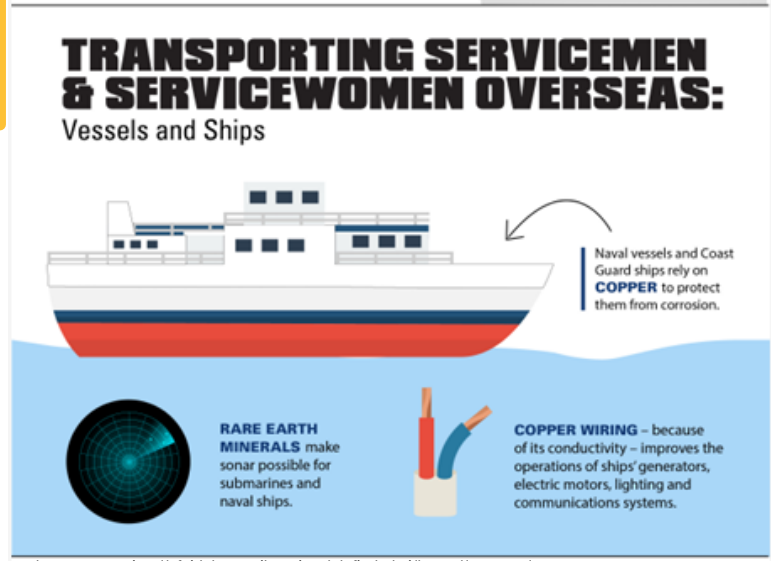




long list of manufacturing processes & manufactured products the use minerals







chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://nma.org/wp-content/uploads/2017/10/infographic_defense-01.pdf

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“Critical” because of potential supply chain disruptions

Resource Development and Supply Chains dominated by other countries

Supply Chain

UPSTREAM MIDSTREAM DOWNSTREAM

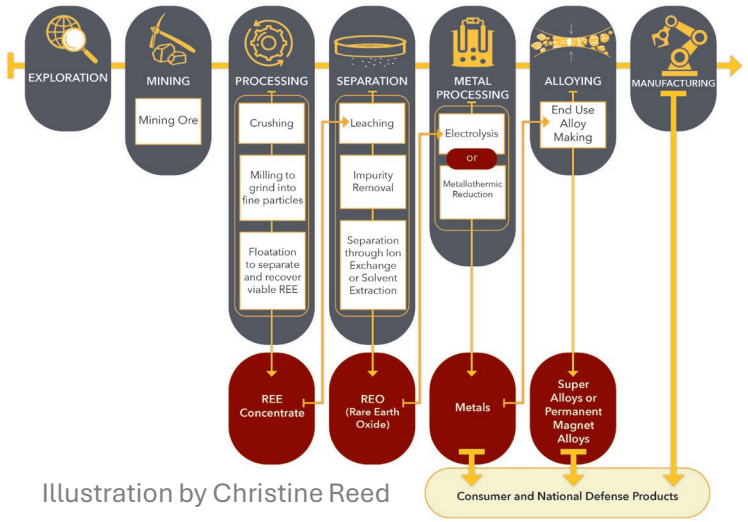
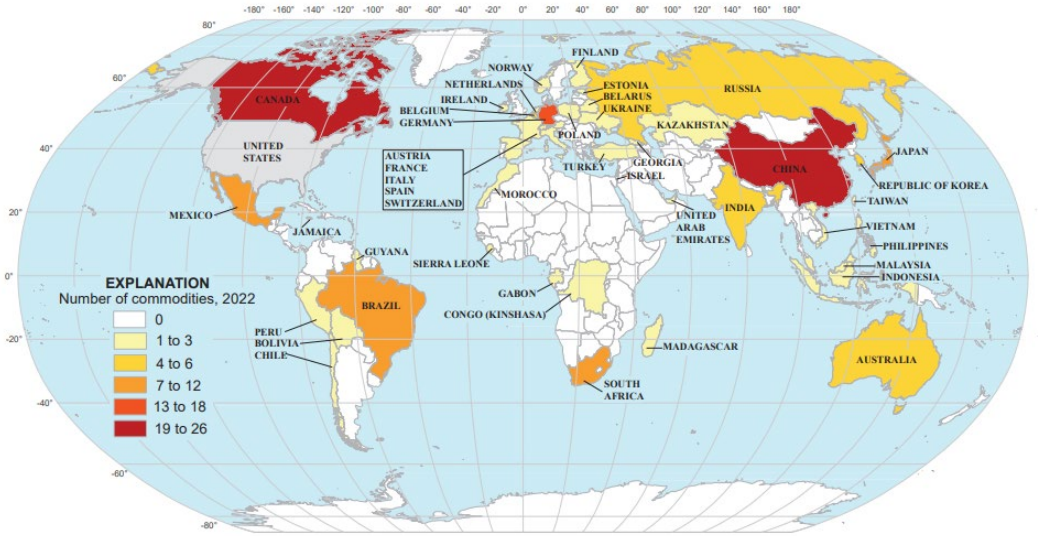
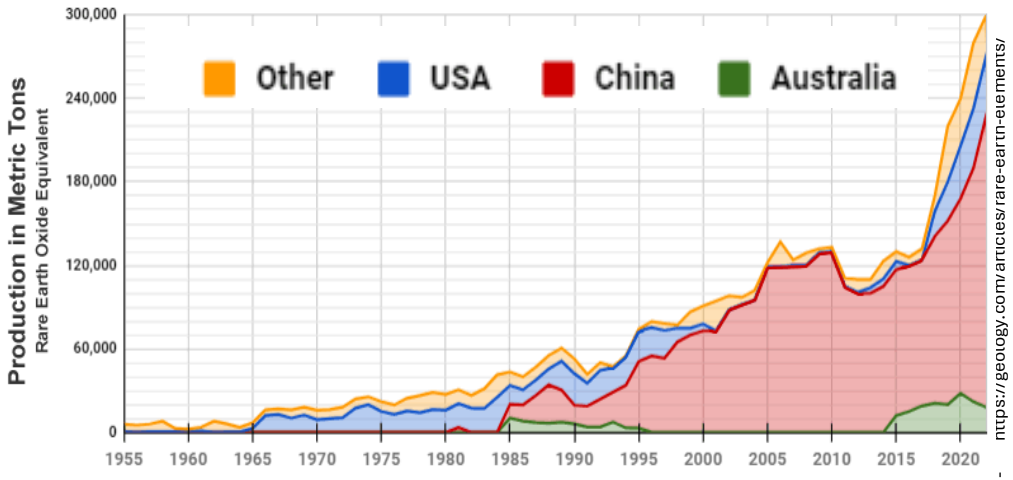


Illustration by Christine Reed

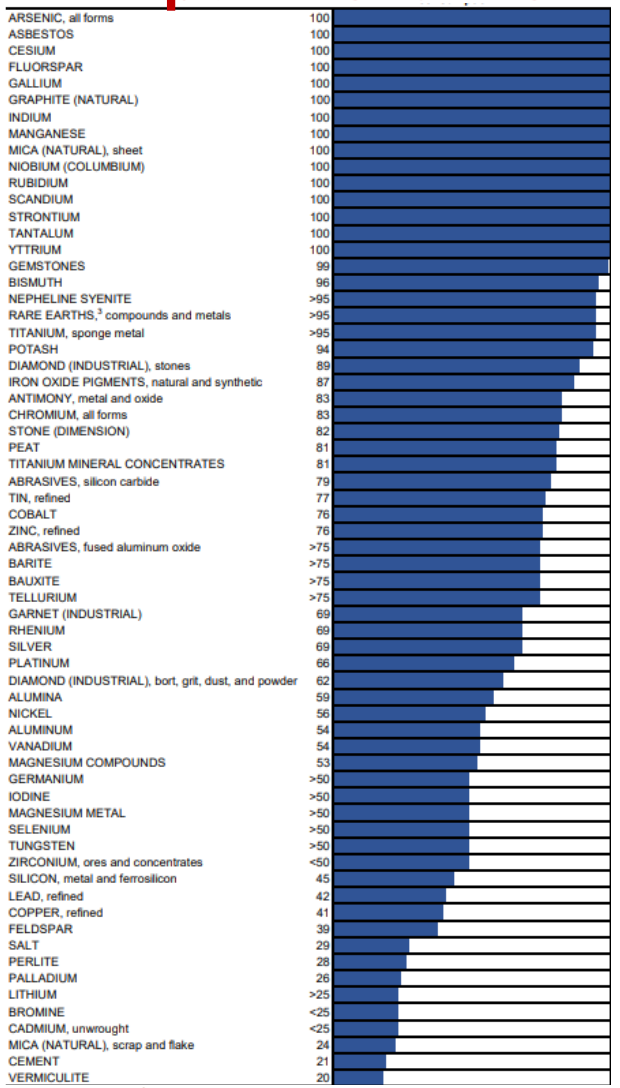


Locations of Developed Resources



https://geology.com/articles/rare-earth-elements/

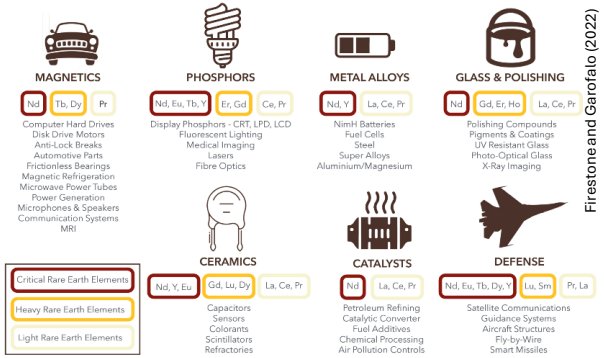
Import Reliance



USGS (2021)

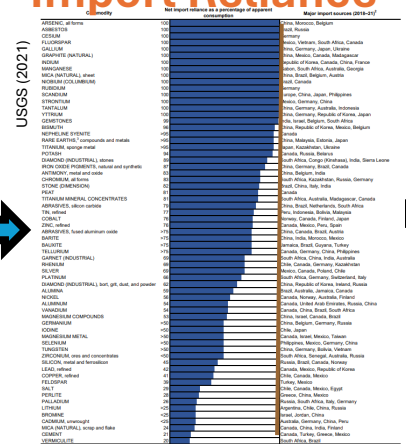
Led to the U.S. Critical Minerals Initiative

Products use minerals



Firestone and Garofalo (2022)

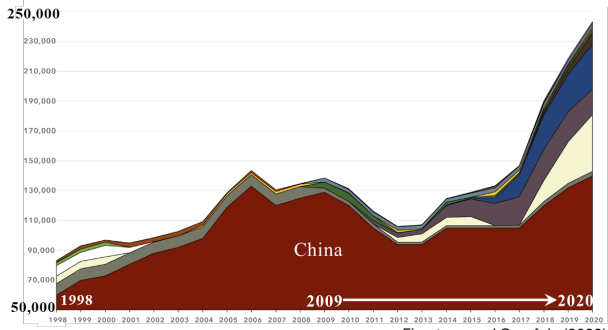
Import Reliance



USGS (2021)

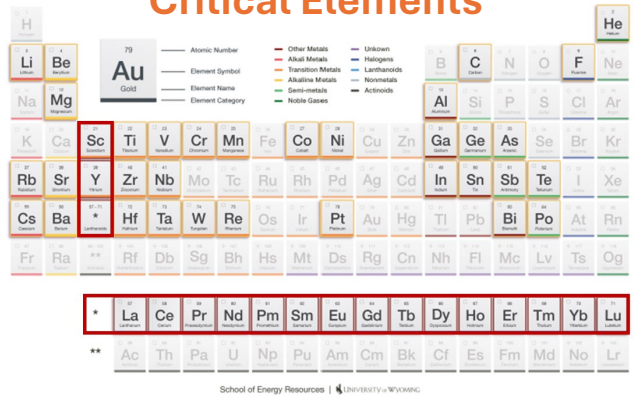
mineral 100%

Supply Chains dominated by China



Firestone and Garofalo (2022)

Critical Elements



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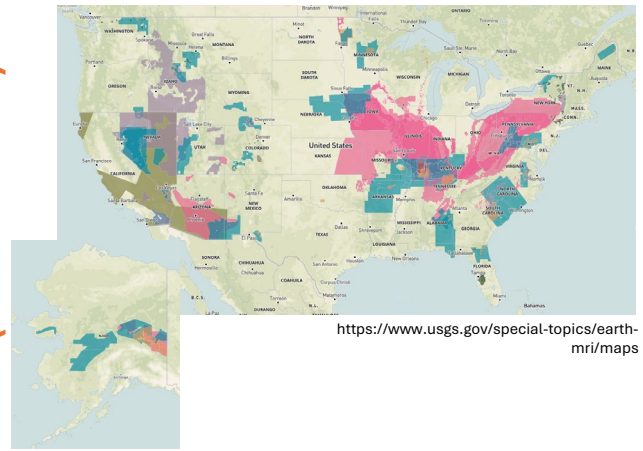
Bipartisan Infrastructure Law: $1,200,000,000,000.

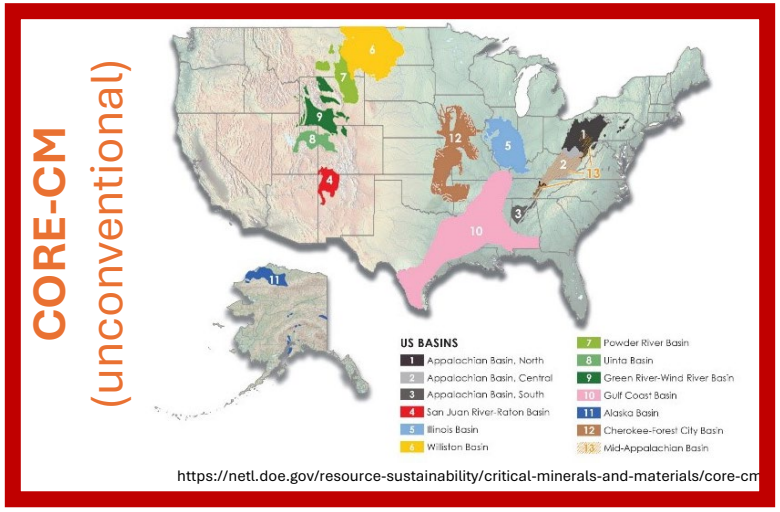
Hundreds of billions funding energy and mineral materials industries.

EARTH MRI (conventional)

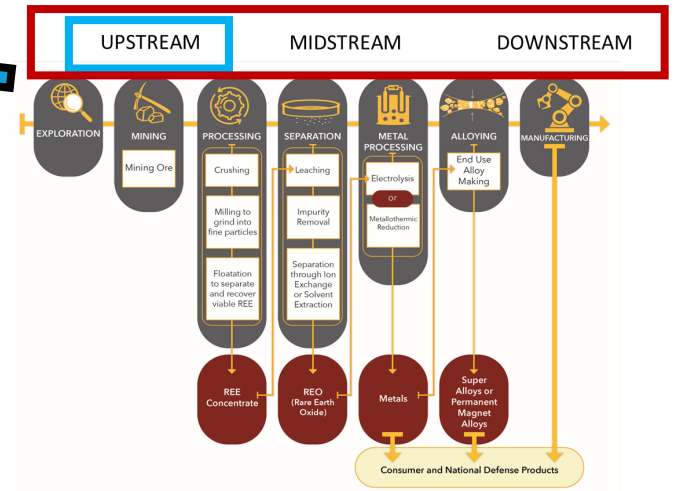


https://www.usgs.gov/special-topics/earth-mri/maps

CORE-CM (unconventional)



https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm



Domestic Supply Chains Needed

SER Research emphasizes UNCONVENTIONAL & SECONDARY resources

Anderson **COAL** Seam at Dry Fork Mine Powder River Basin, Wyoming

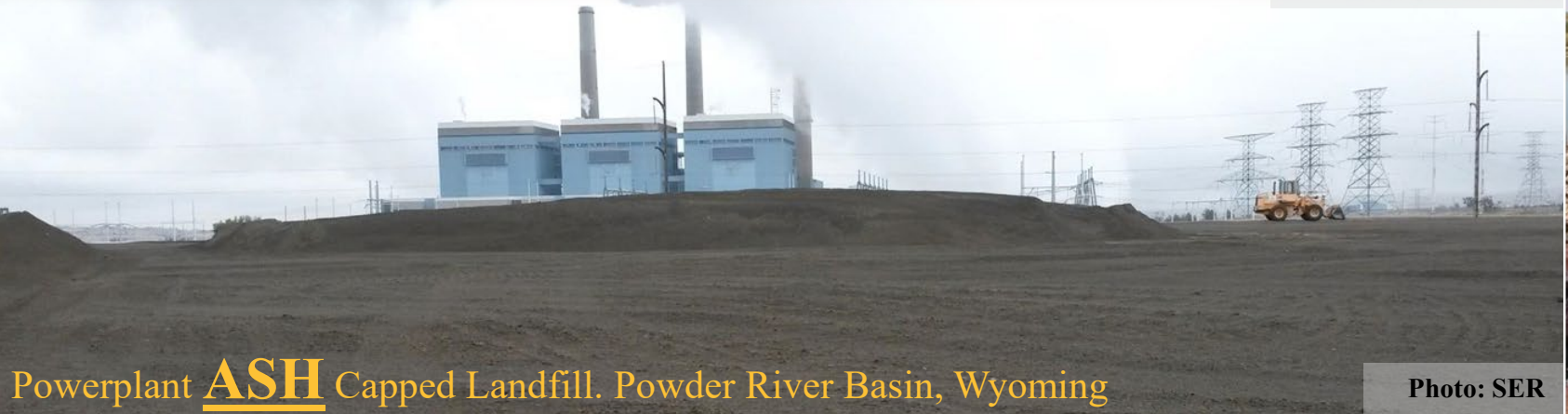
Photo: Christine Reed

Cliff Mine **TAILINGS PILE**, Centennial Ridge, Wyoming

https://loc.getarchive.net/media/cliff-mine-mine-tailings-pile-centennial-ridge-medicine-bow-national-forest

CBM **PRODUCED WATER** discharge facility, Powder River Basin, Wyoming

https://coyotegulch.blog/2022/02/[illegible]wyoming-state-[illegible]-coal-study-estimates-the-coal-bed-methane-[illegible]-drew-down-some-powder-river-basin-[illegible]-by-more-than-100-feet-wyofile/



Powerplant **ASH** Capped Landfill. Powder River Basin, Wyoming

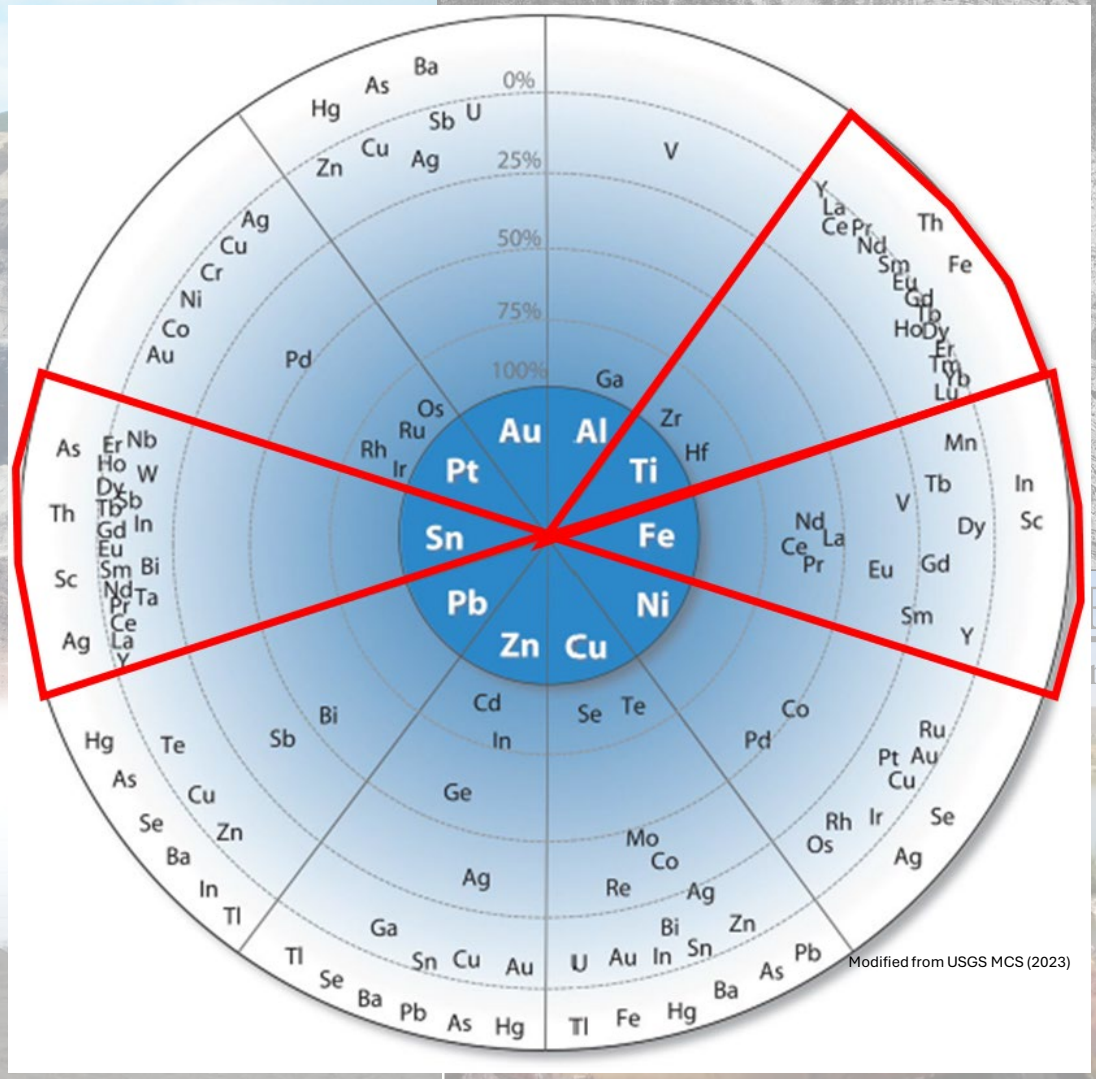
Photo: SER

Research emphasizes UNCONVENTIONAL & SECONDARY resources

Anderson **COAL** Seam at Dry Fork Mine Powder River Basin, Wyoming

Cliff Mine **TAILINGS PILE**, Centennial Ridge, Wyoming

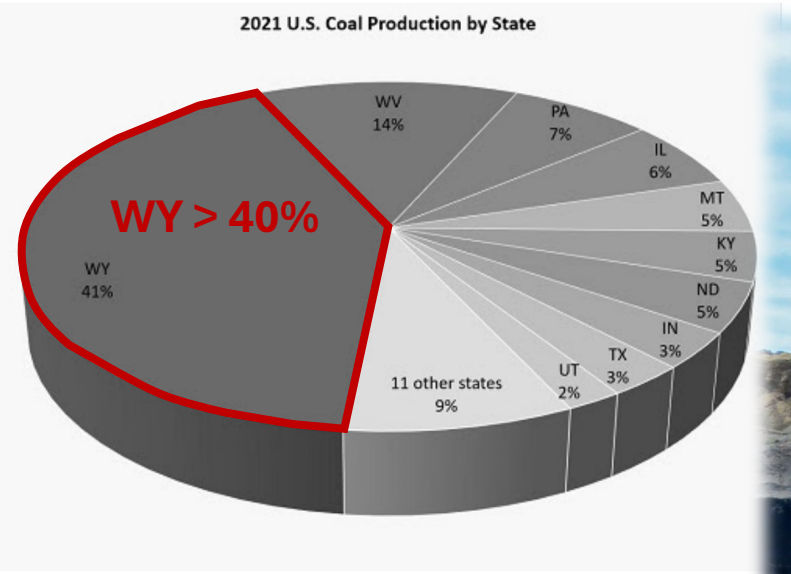
Goal of co-production and maximization of usable material



Powerplant **ASH** Capped Landfill. Powder River Basin, Wyoming

Photo: SER

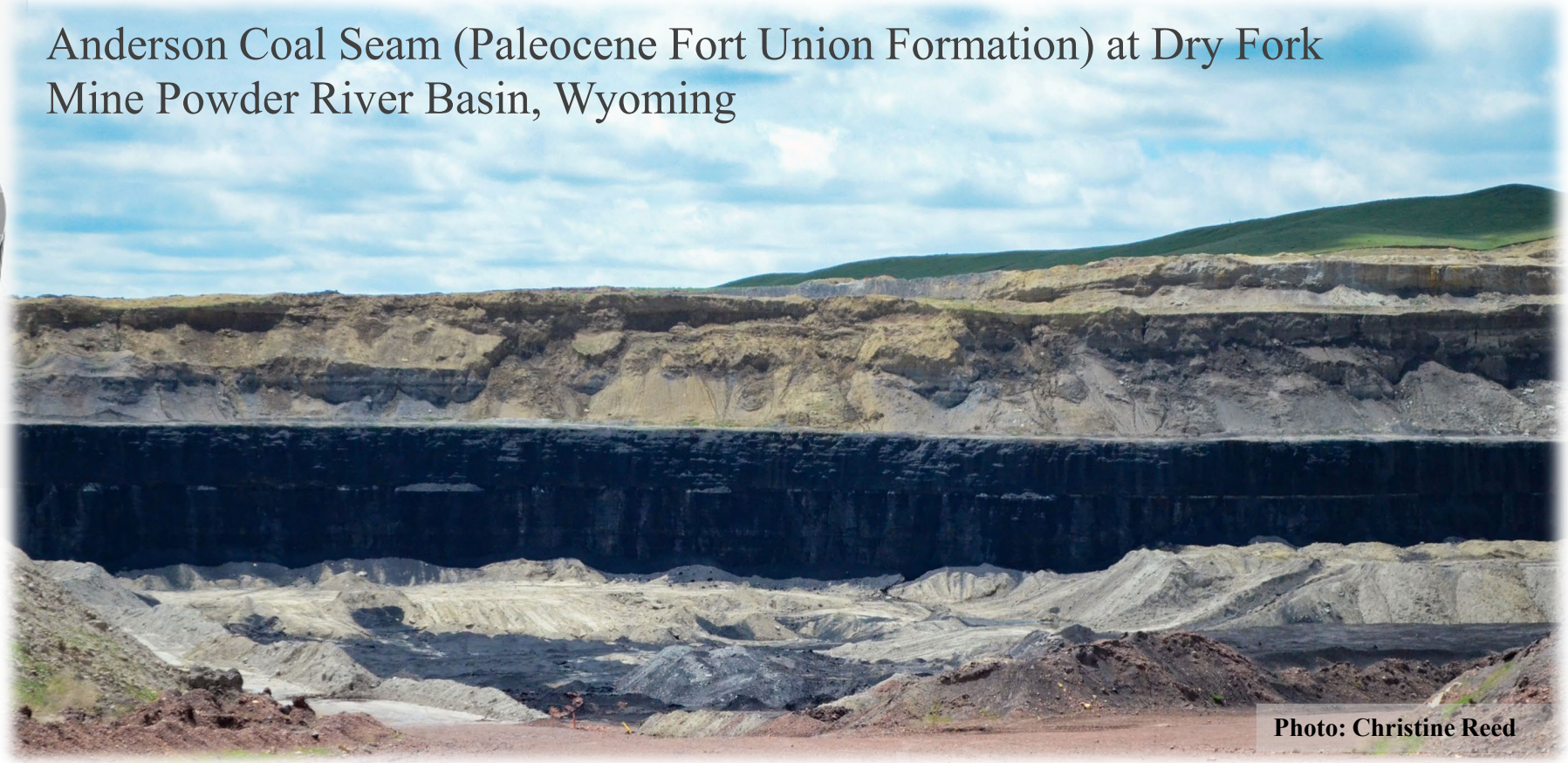
For Wyoming, REEs in Coal present a tremendous opportunity



Coal production by state, data from DOE-EIA. [Credit: WSGS]

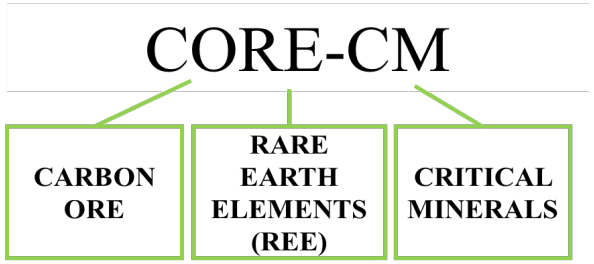
- 1/3 of all minable coal in the US
- > 40% of coal mined in U.S. sourced from Wyoming
- More than 5,500 jobs and almost $700M to state and local governments (https://wyoenergy.org/portfolio/)

10% increase in Coal production would provide >900 jobs and > $75M in tax revenue TO WYOMING



- **14 operating coal mines in Wyoming (+ 2 Greenfield)**
- **10 operating coal power plants in Wyoming**
- **Wyoming coal shipped to power plants in >25 US states**

CORE-CM Phase I: Program and Objectives



U.S. DEPARTMENT OF ENERGY

NATIONAL ENERGY TECHNOLOGY LABORATORY

https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

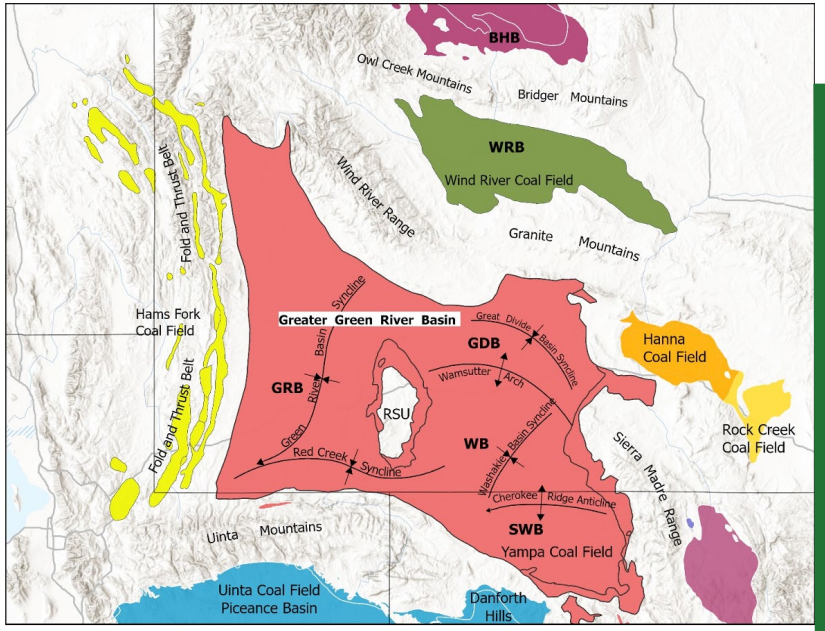
https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

Major Project Objectives

- **Develop a coalition team** to achieve project objectives
- **Complete detailed assessments**, that meaningfully contributes to DOE's CORE-CM goals nationally.
- **Strategic planning for regional economic growth and job creation**, associated technology innovation around coal and other materials.
- **Define regional economic growth potential around existing strengths, energy infrastructure, business and industry**, including planning for the leveraging of **highly trained workforces**, existing and novel coal technologies, and energy infrastructure in development of CORE-CM supply chains.
- **Develop a preliminary strategic plan** for increasing the supply of CORE-CM materials to manufacturers nationally
- **Assemble a committed network of stakeholders and communities**

CORE-CM Phase I: Two (2) SER-led CORE-CM Projects

Greater Green River Basin & Wind River Basin (GGRB-WRB; Area 9)



University of Wyoming

School of Energy Resources Center for Economic Geology Research | School of Energy Resources Center for Energy Regulation & Policy Analysis | School of Energy Resources Center for Carbon Capture and Conversion | College of Business Center for Business and Economic Analysis

Colorado School of Mines Earth • Energy • Environment | Colorado Geological Survey | Los Alamos National Laboratory | Wyoming Energy Authority

Coalgeo, LLC | Colorado Northwestern Community College | Western Wyoming Community College | Boston Strategies International Global growth. Guaranteed.

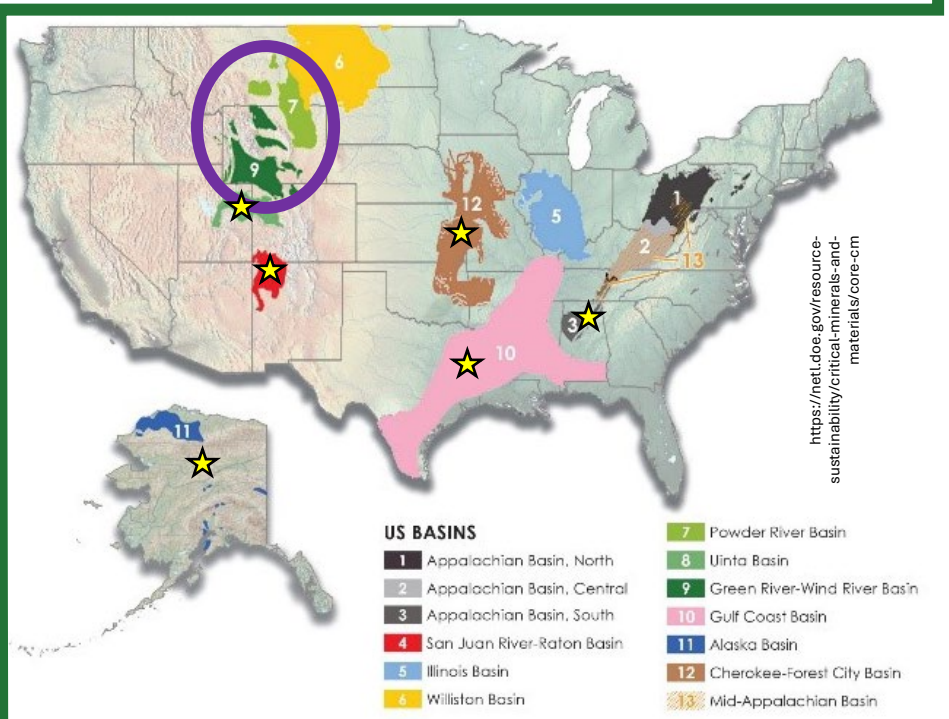
Period of Performance:

3 years (September 2021 to August 2024)

Project Funding:

Total Project $2,584,625

WEA Provided Cost Share $225,000



Period of Performance:

3 years (September 2021 to November 2024)

Project Funding:

Total Project $2,605,720

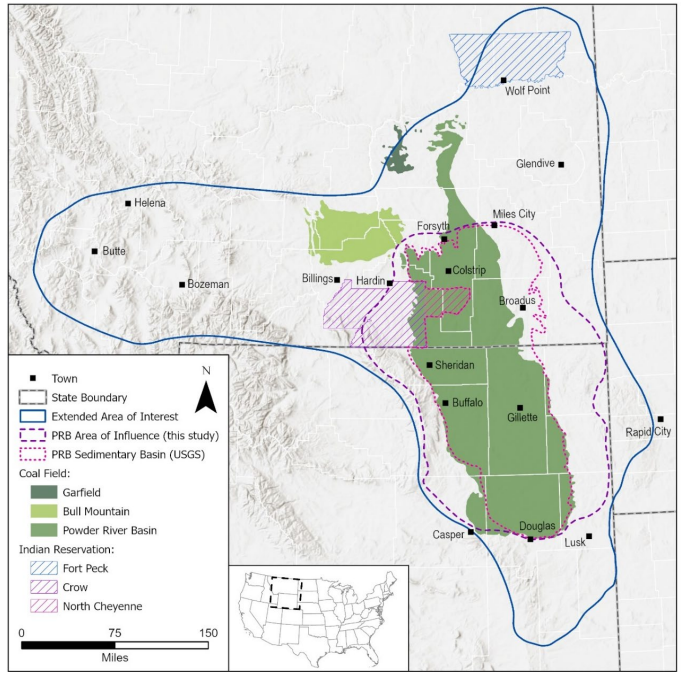
WEA Provided Cost Share $225,000

UW School of Energy Resources | School of Energy Resources Center for Economic Geology Research | School of Energy Resources Center for Energy Regulation & Policy Analysis | School of Energy Resources Center for Carbon Capture and Conversion | School of Energy Resources Shell 3D Visualization Center | College of Arts and Sciences Geology and Geophysics | College of Engineering and Applied Science Chemical Engineering

Wyoming Energy Authority | Battelle | Gillette College | Energy Capital Economic Development | Wyoming State Geological Survey | Southeastern Montana Development Corporation | BSI Energy Analytics | Los Alamos National Laboratory | MBMG Montana Bureau of Mines and Geology

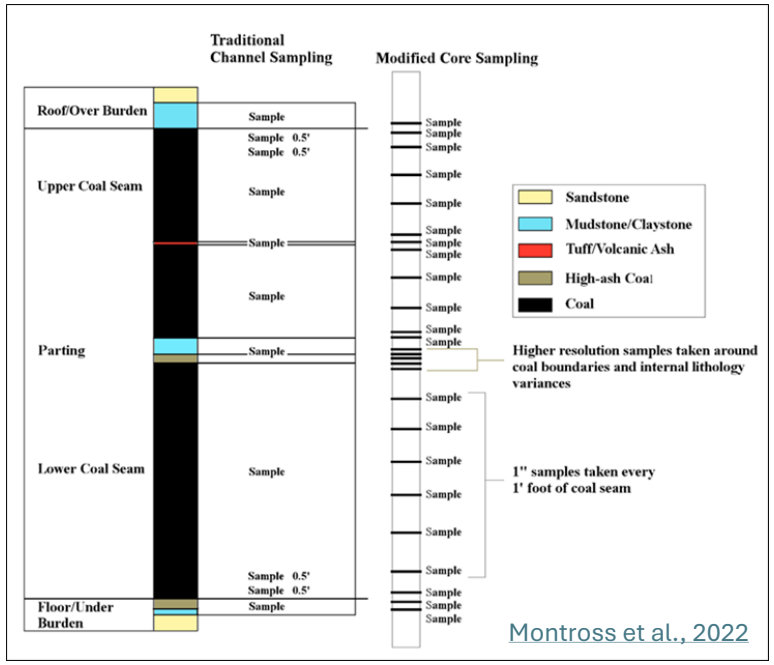
Dry Fork Mine Western Fuels-Wyoming, Inc. | Navajo Transitional Energy Company | Peabody | Black Hills Corporation

Powder River Basin (PRB; Area 7)



CORE-CM Phase I: Methods Development and Growing Database

Greater Green River Basin & Wind River Basin (GGRB-WRB; Area 9)

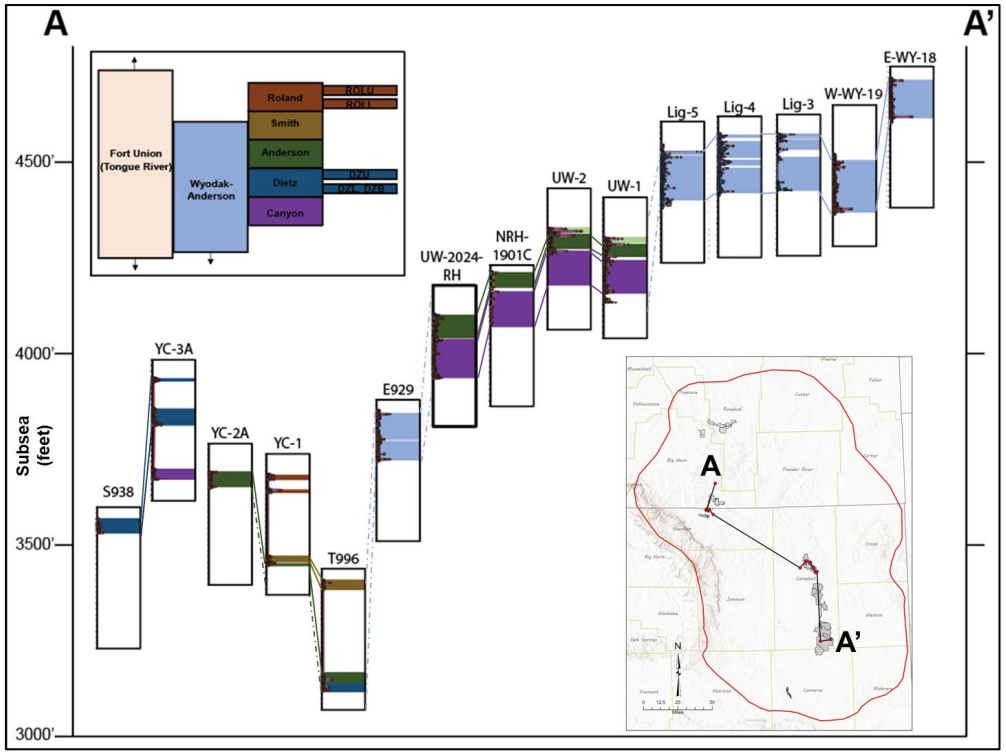


- **Collaborations with SER, led to technical standards used in other projects**
- **Addition of >2000 samples & >100,000 geochemical datapoints**

806 new samples and **130** previously unreported data are currently utilized within the GGRB-WRB CORE-CM coal assessment strategy

36,450 new geochemical data points and **4090** previously unreported data points are produced that include concise location information

Powder River Basin (PRB; Area 7)



690 new samples and **658** samples from previous related SER-studies are currently in the PRB CORE-CM assessment strategy

34,762 new geochemical data points and **30,954** data points from previous related SER-studies that include concise location information

A Machine Learning Screening Tool for Rare Earth Elements and Critical Minerals at the Mine Scale

2.5 year project: March 2023 – August 2025

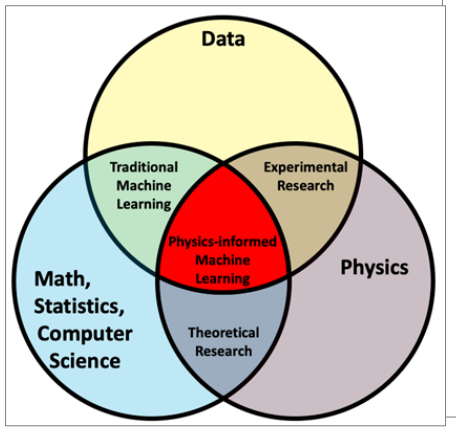
Los Alamos NATIONAL LABORATORY | U.S. DEPARTMENT OF ENERGY | Black Hills Corporation | University of Wyoming School of Energy Resources

Task 1.0 – Characterization

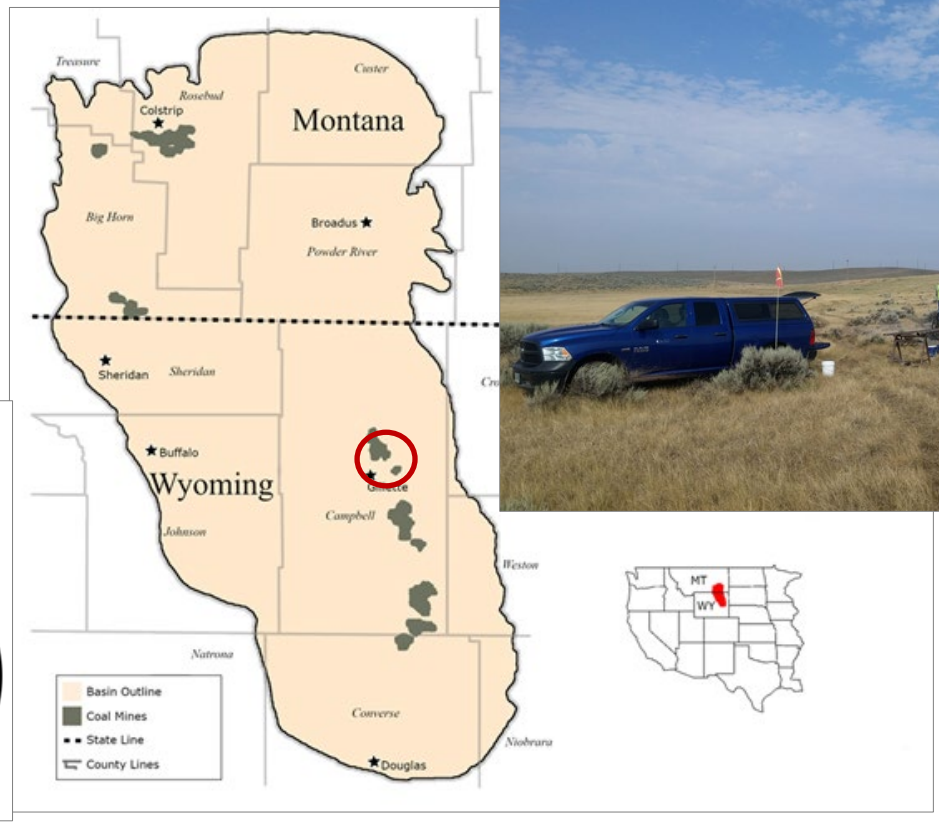
- catalog the existing data from core and well-logs
- add new samples from outcrop and core
- add new chemical and mineralogical data
- utilize advanced analytical techniques
  - ICP-MS, microprobe, elemental mapping (XRF), Raman spectroscopy, XRD, etc…

Task 2.0 – ML model development

- training of unsupervised ML model to extract REE/CM signatures
- construct high-resolution 3D geological framework model using Task 1 outputs and signatures learned with ML model



Wyodak Coal Mine



REE Extraction from Powder River Basin Coal Byproducts and Mining Waste, in response to DOE's Technology Commercialization Fund (TCF)

~4 year project: December 2020 – February 2025

NATIONAL ENERGY TECHNOLOGY LABORATORY

U.S. DEPARTMENT OF ENERGY

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Energy CAPITAL Economic Development

ENERGY CAPITAL OF THE NATION CITY OF GILLETTE, WYOMING

Campbell County wyoming

Year 1

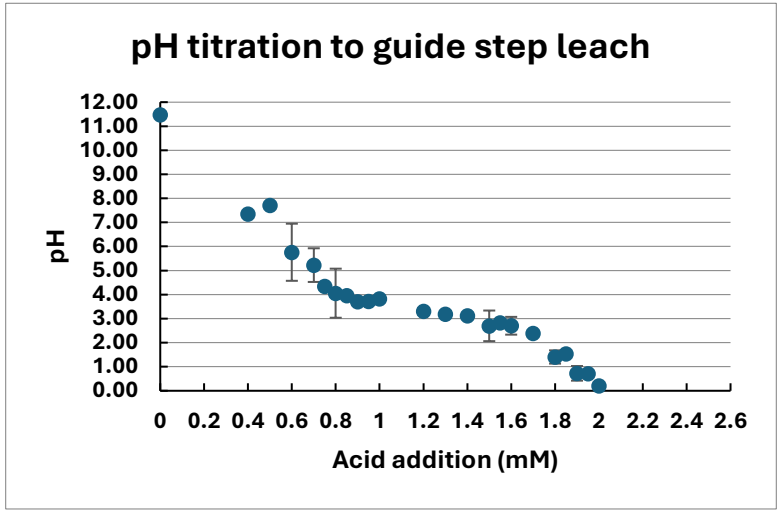
Assessment of PRB feedstocks and REE extraction technology testing/optimization per each feedstock tested.

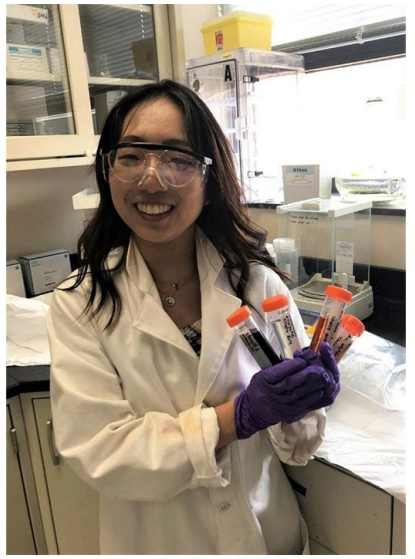
Year 2

Feedstock(s) down select paired with optimized technology selection for that feedstock(s) demonstration.

Year 3

Technology upscaling to achieve pilot-scale REE extraction on site. Pilot-scale facility to be located in the PRB by project end date.





https://netl.doe.gov/node/9840

REE Extraction from Powder River Basin Coal Byproducts and Mining Waste, in response to DOE's Technology Commercialization Fund (TCF)

~4 year project: December 2020 – February 2025

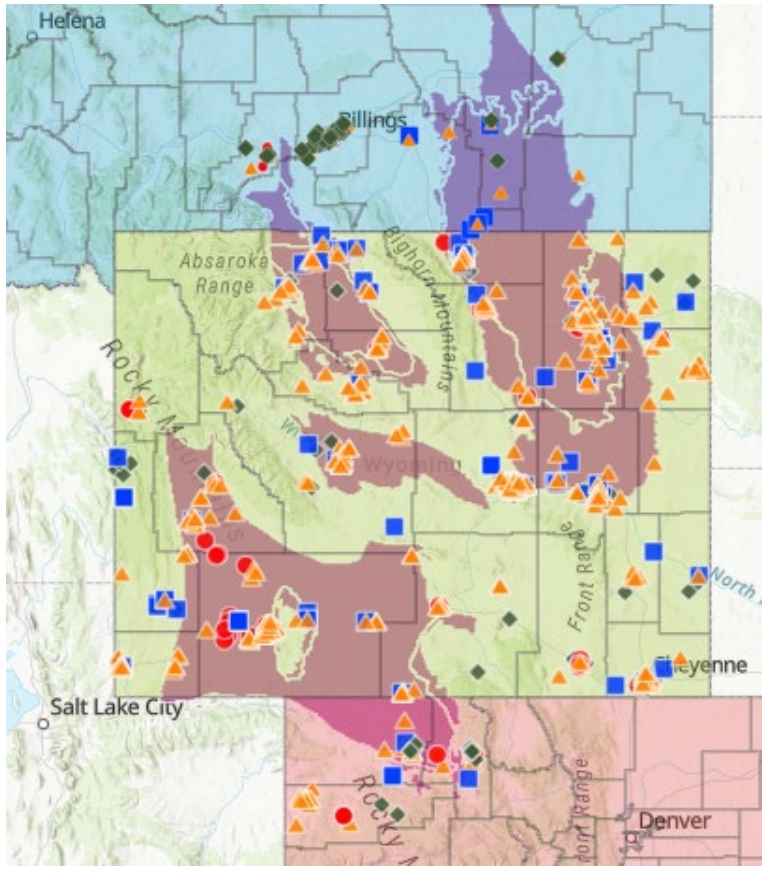
Year 1
Assessme
extraction
per each f

Year 2
Feedstock
optimized
feedstock

Year 3
Technolog
scale REE
facility to
end date.

https://netl.doe.gov/node/9840

CORE-CM Phase I: Economic Assessment of Infrastructure, Industries, & Businesses



Inventory of CORE-CM Supply Chain Relevant Businesses

Contacts: Angela Ture (ature@uwyo.edu)
Daniel Cooley (dcooley3@uwyo.edu)

Economic assessments necessary for planning of Technology Innovation Centers (TICs)

Next step: Preliminary Economic Impact Study
Sum of Direct, Indirect, and Induced Effects

Direct Effect
Economic impact directly through employment and operations

Indirect Effect
Economic impact through supply chain

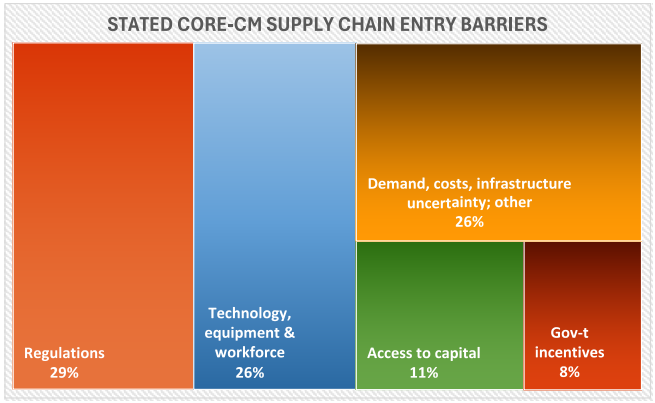
Induced Effect
Economic impact through local spending of income

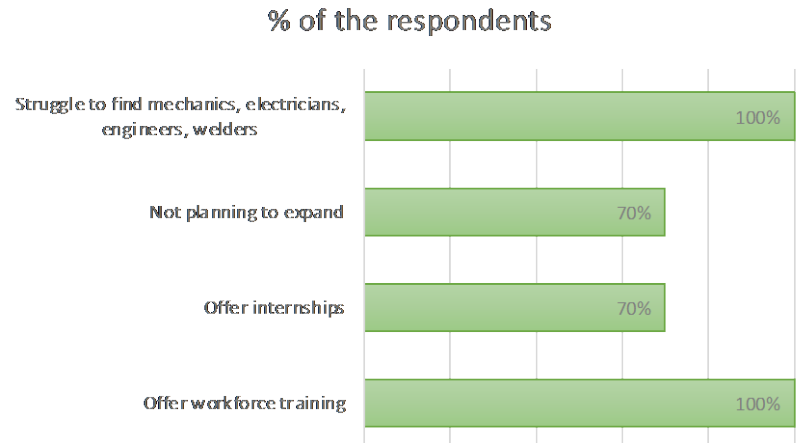
Measured Through:
Employment Labor Income Value Added Output

Exploratory Business Survey Responses (n=11)

Benefits
- additional revenue
- trade independence

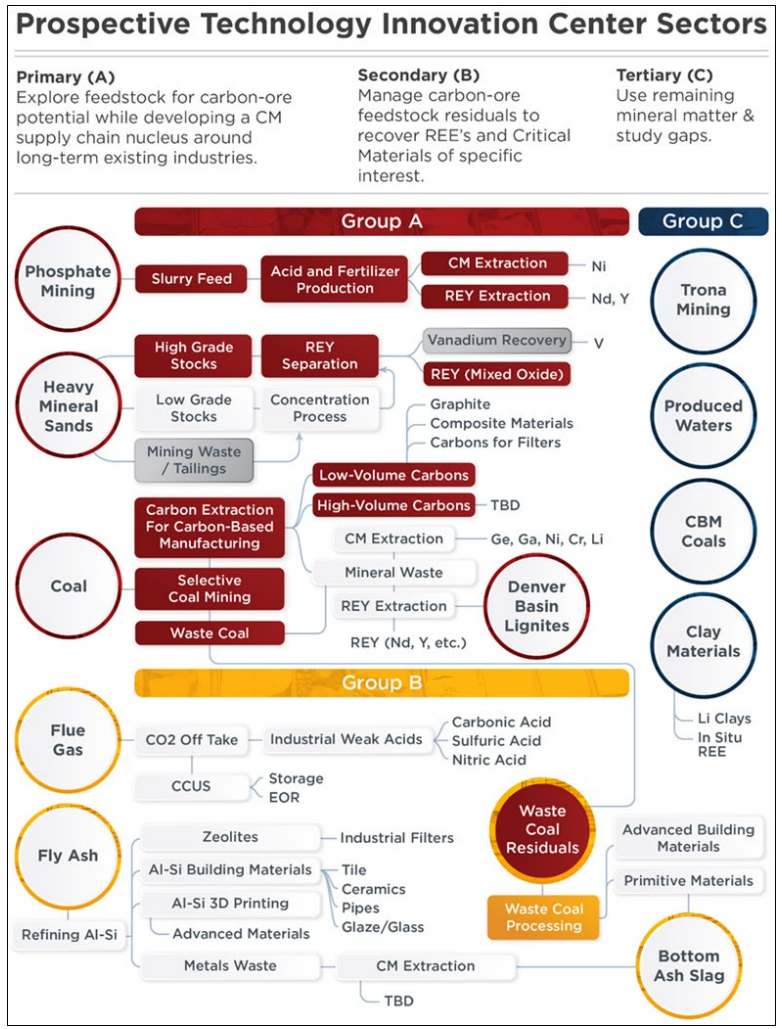
Risks & Uncertainty
- regulations
- market demand
- technology and production process





CORE-CM Phase I: Basin-specific Feedstocks Categorized & Ranked

Greater Green River Basin & Wind River Basin (GGRB-WRB; Area 9)

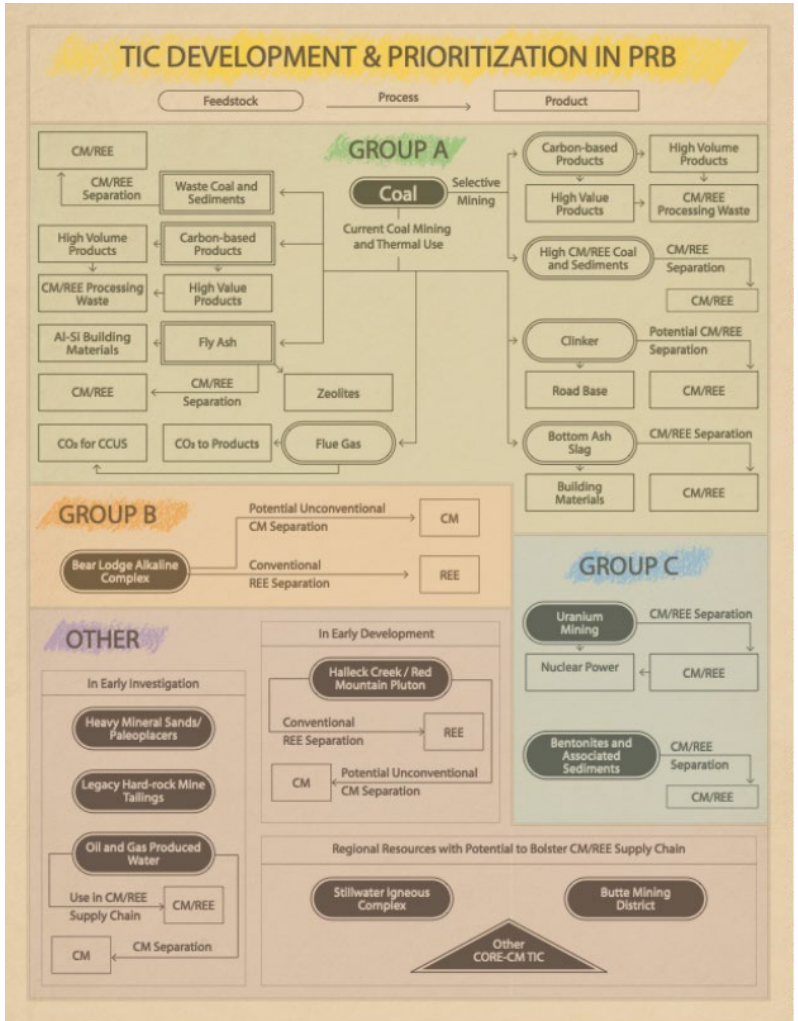


Technology Innovation Centers (TICs) development dependent on:

- **specific feedstocks**
- **technology readiness**
- **existing industry and workforce**

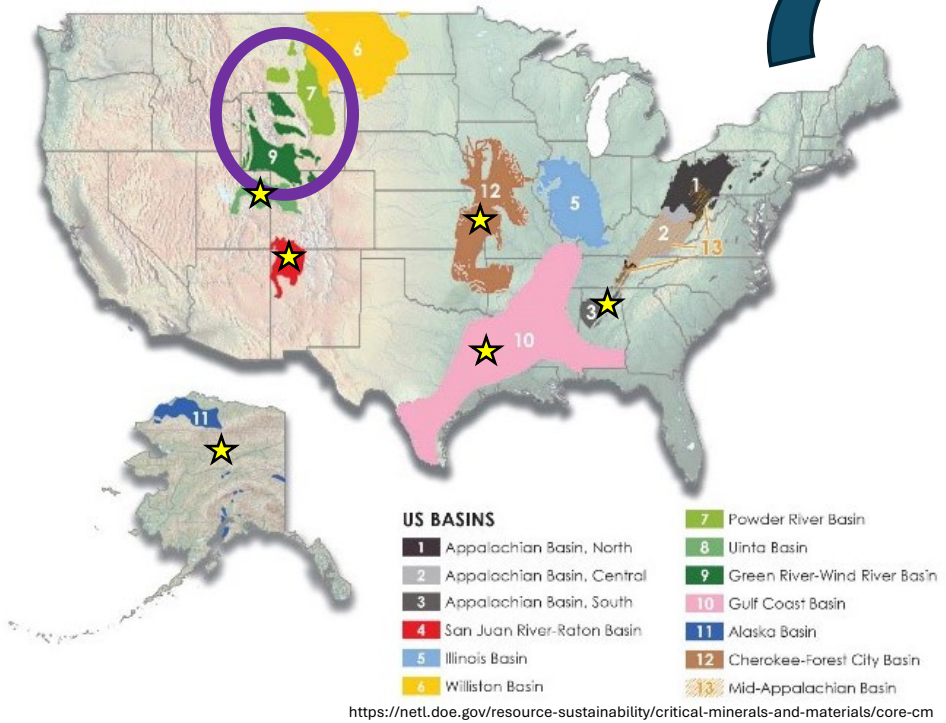
The goal for CORE-CM projects are TICs

Powder River Basin (PRB; Area 7)



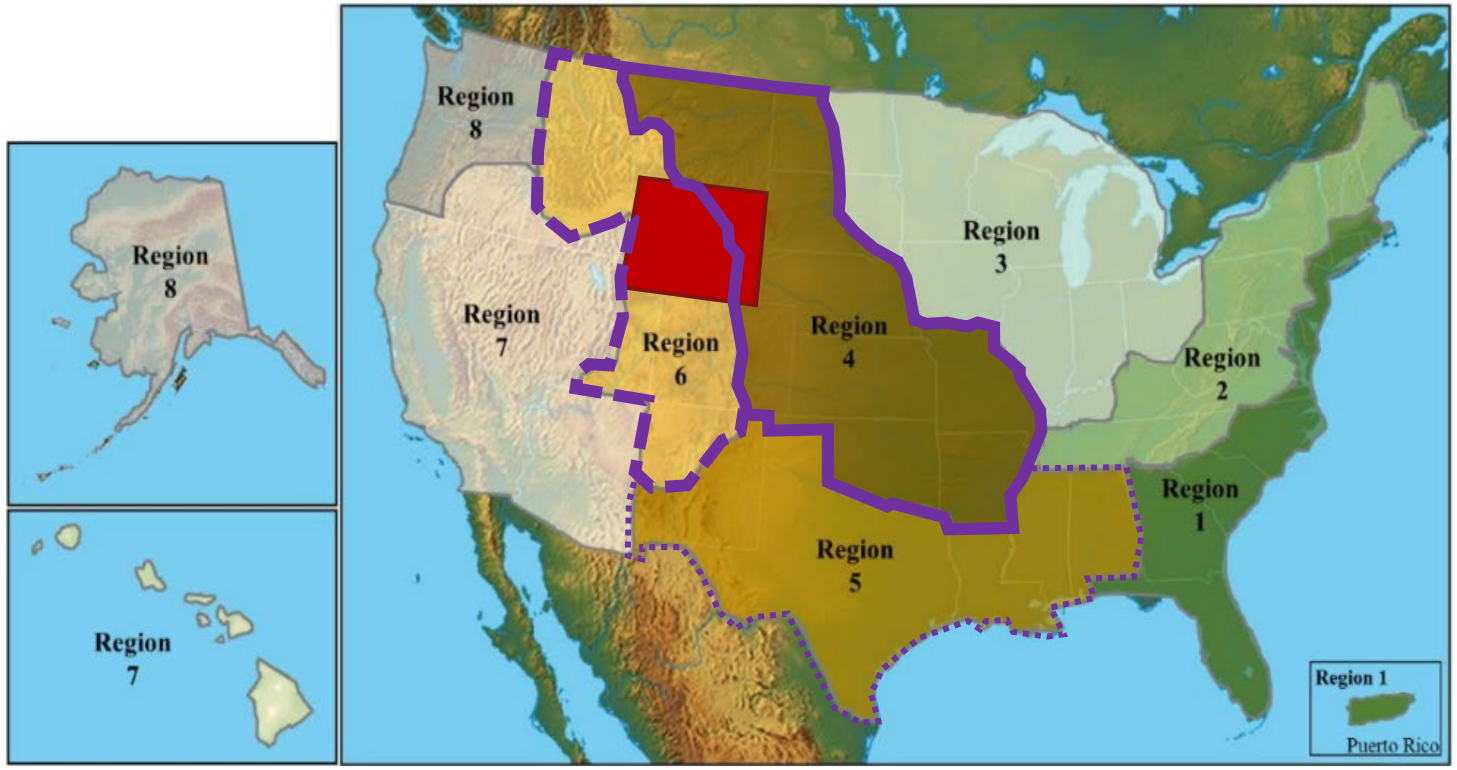
CORE-CM Phase II: CORE-CM Regional Framework

Basin-Specific Framework



https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

Regional Framework



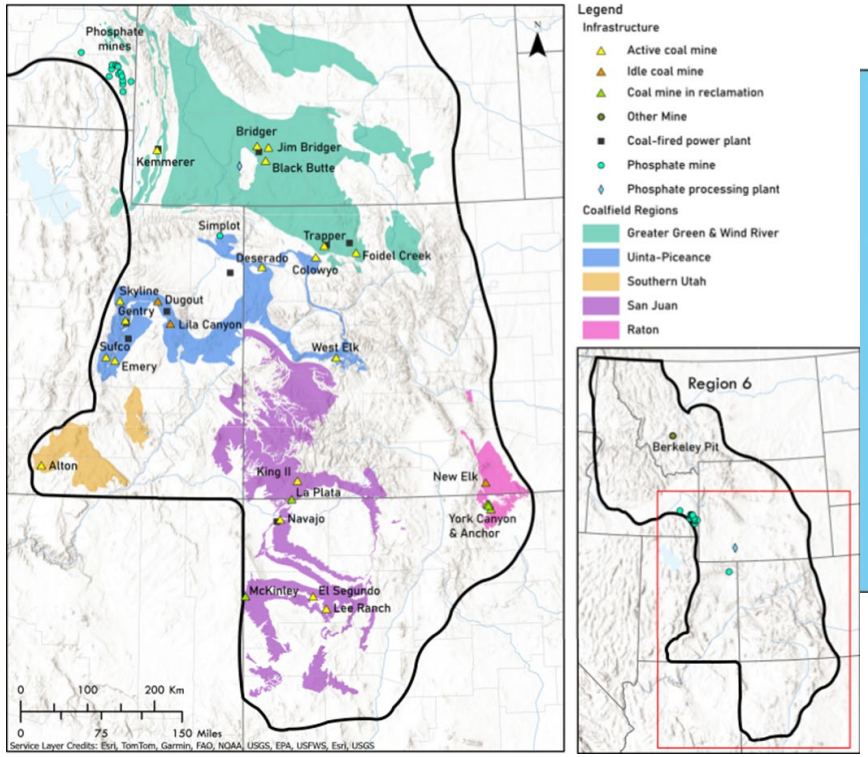
https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

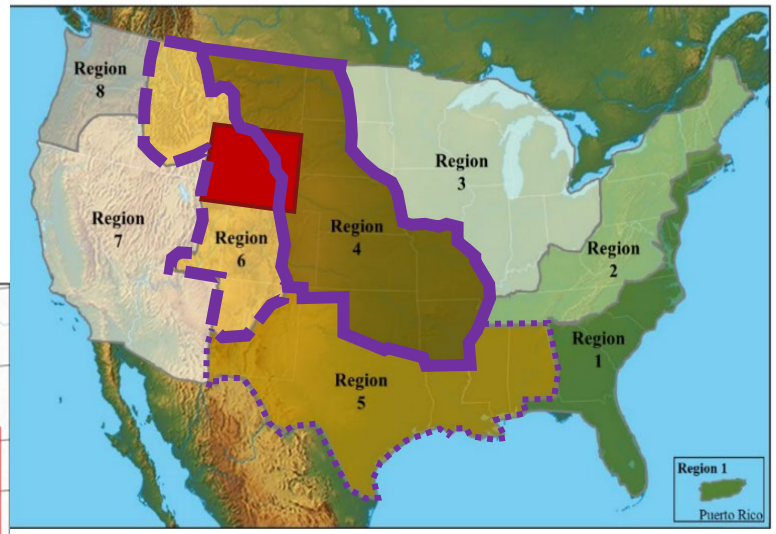
UW School of Energy Resources

Similar focus to Phase I CORE-CM but on a Regional Scale

CORE-CM Phase II: Regions & Budgets

Rocky Mountain (RM; Region 6)



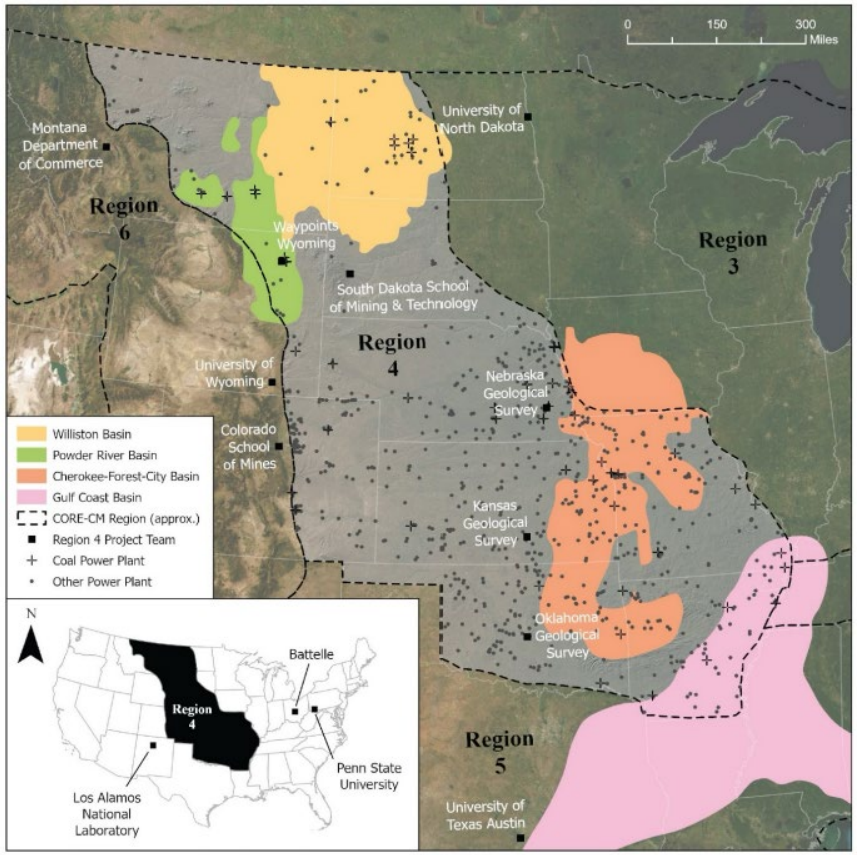


https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

Period of Performance: 3 years
Project Funding:

Total Project $2,574,095

Great Plains & Interior Highlands (GPIH; Region 4)



Period of Performance: 3 years
Project Funding:

Total Project $10,181,914

Phase II: Leadership and Coalitions

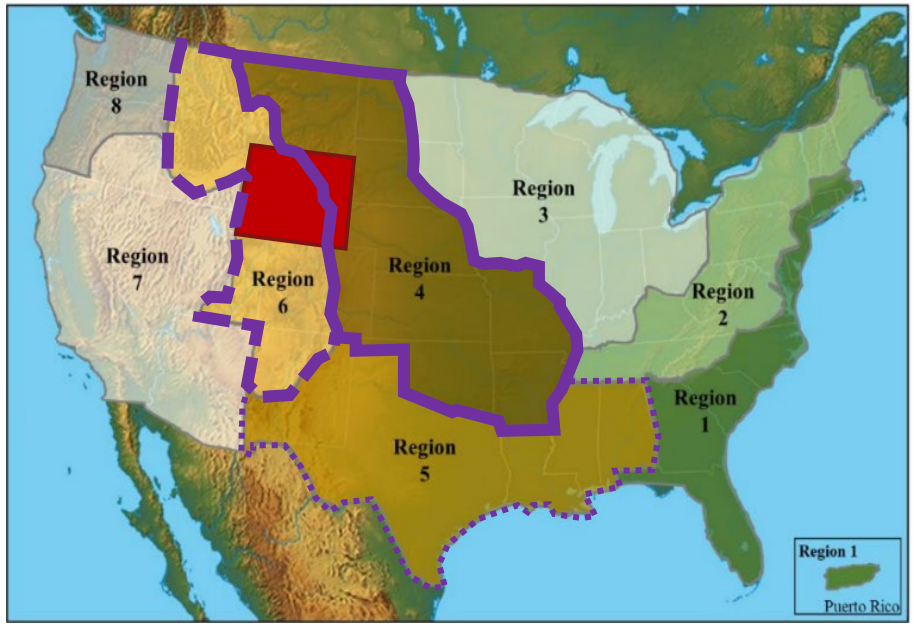
Rocky Mountain (RM; Region 6)

Phase II Leadership

- University of Wyoming
- University of Utah
- New Mexico Institute of Mining & Technology
- Colorado School of Mines

Phase II Coalition Team

- Idaho National Laboratory
- Sandia National Laboratory
- Los Alamos National Laboratory
- Colorado Geological Survey
- Utah Geological Survey
- Wyoming Geological Survey
- Lamar University
- Western Wyoming Community College
- Montana Technological University
- Western Colorado University
- Utah State University Eastern
- Utah Advanced Materials and Manufacturing Initiative
- Associated Governments of Northwest Colorado



https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/core-cm

Huge coalition teams with many partners, stakeholders, and supporters

Great Plains & Interior Highlands (GPIH; Region 4)

Phase II: Region 4 Leadership

- University of Wyoming

Phase II: Region 4 Coalition Team

- University of North Dakota/ Energy and Environmental Research Center
- Kansas Geological Survey
- Colorado School of Mines
- Pennsylvania State University
- Oklahoma Geological Survey
- South Dakota School of Mines & Technology
- University of Texas at Austin
- Los Alamos National Laboratory
- Battelle
- Western Fuels – Wyoming
- Navajo Transitional Energy Company
- Peabody Energy
- Black Hills Corporations
- Waypoints Wyoming
- Montana Department of Commerce
- Nebraska Geological Survey

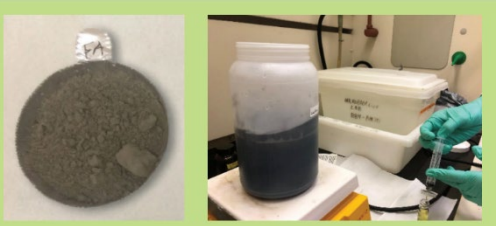
Example of ecosystem development in Wyoming leveraging TICs

Research-to-commercialization facility

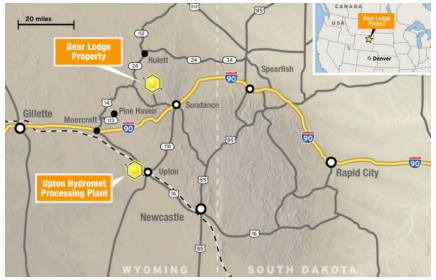
UND-CEMRI Demo Plant

REE/CM from Lignite. Part of FEED study.

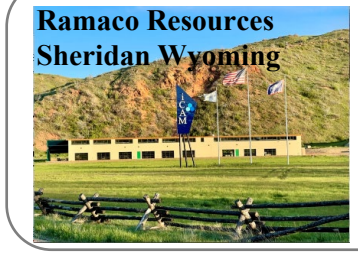
NETL REE Extraction from Coal Ash



Pilot-scale testing at the WY Innovation Center



Rare Element Resources DOE-funded demonstration plant to process rare earths from Bear Lodge Deposit, Upton Wyoming



Coal-to-products, rare earth element, and critical mineral research and development

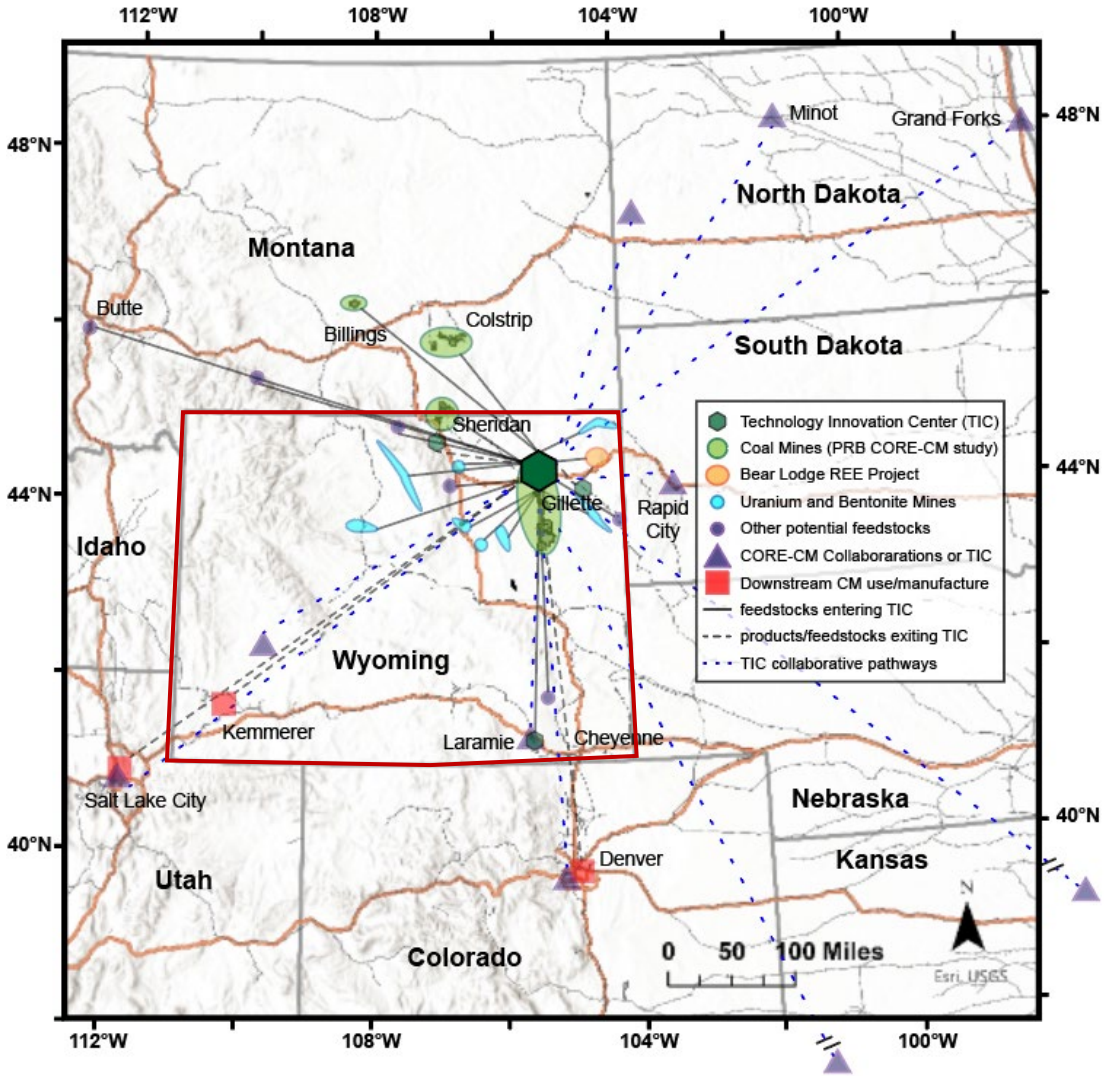
UW SER Center for Carbon Capture and Conversion

Two forthcoming field demonstrations for high volume uses for PRB coal in Gillette Wyoming

ITC WYOMING INTEGRATED TEST CENTER

Carbon capture and carbon utilization test center in Gillette Wyoming

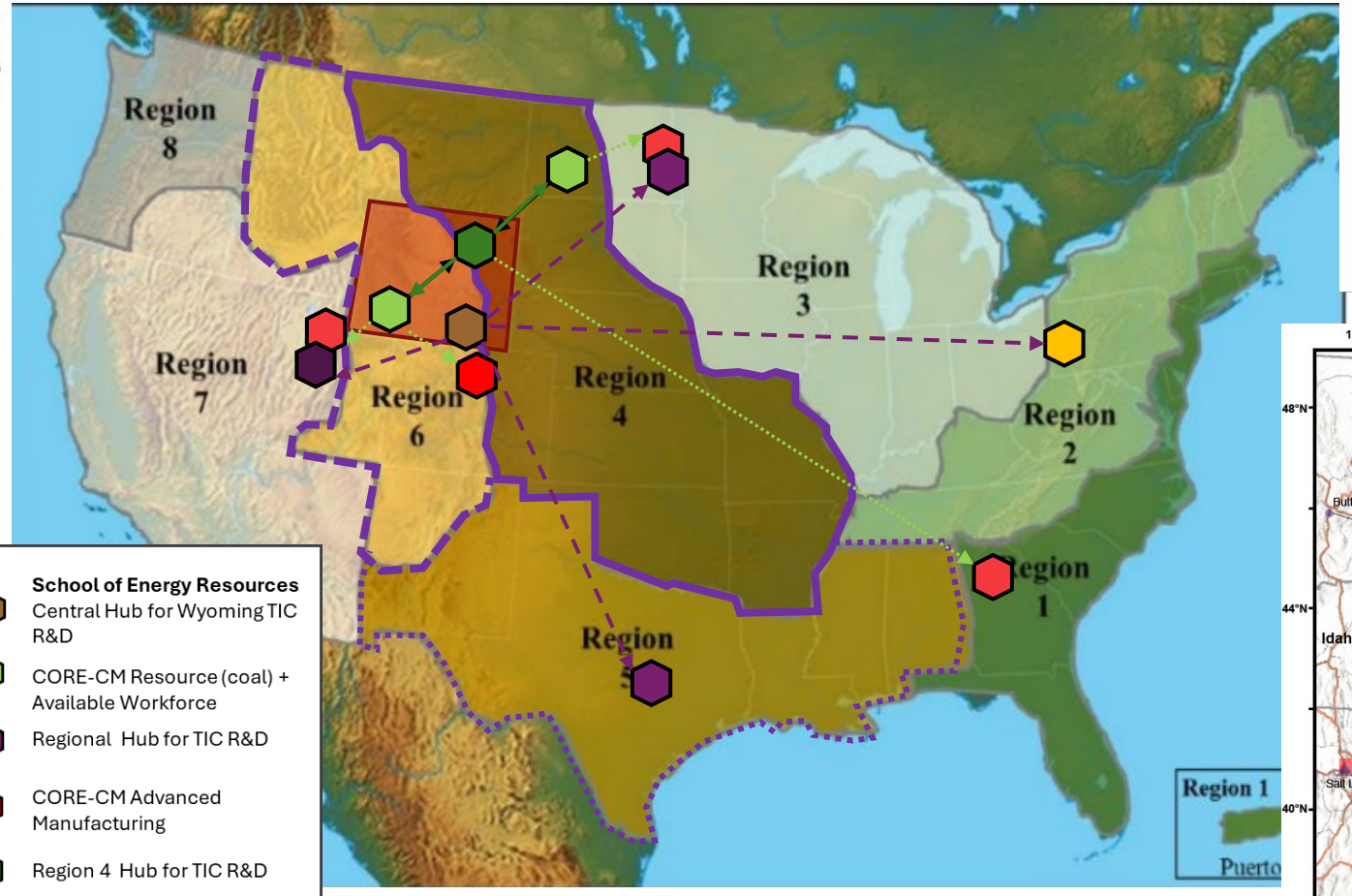
Connected Technology Innovation Centers



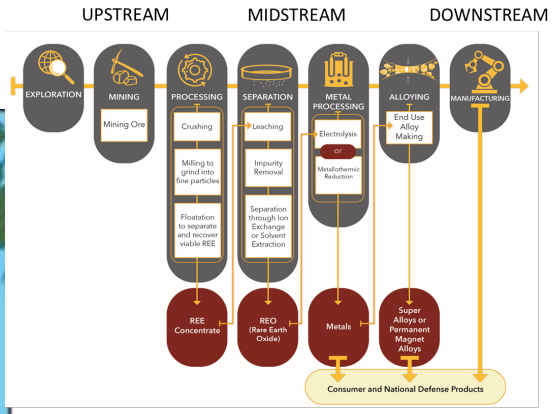
Wyoming has opportunity to be a NEXUS in the CORE-CM Supply Chain

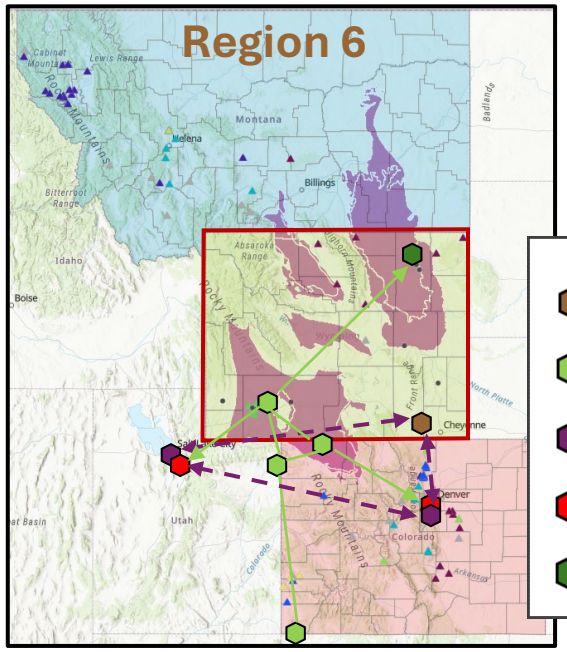
Transportation Infrastructure

Wyoming as a CORE-CM NEXUS



Supply Chain





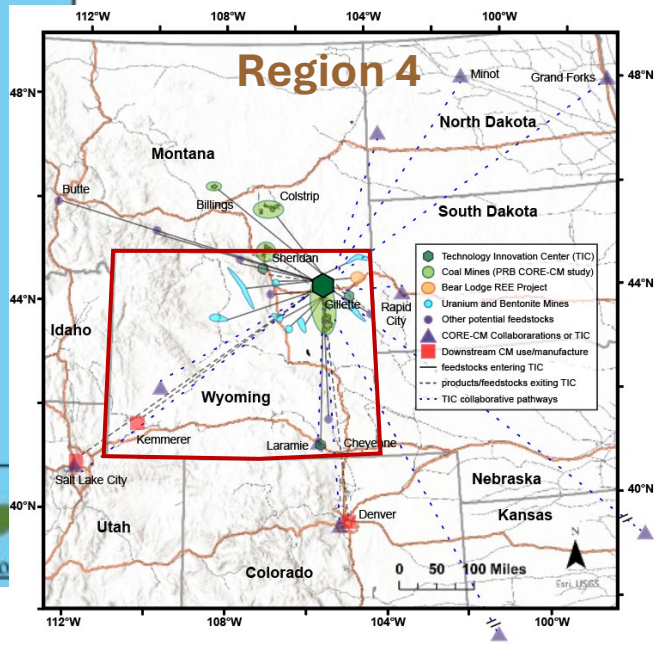
School of Energy Resources
Central Hub for Wyoming TIC R&D

CORE-CM Resource (coal) + Available Workforce

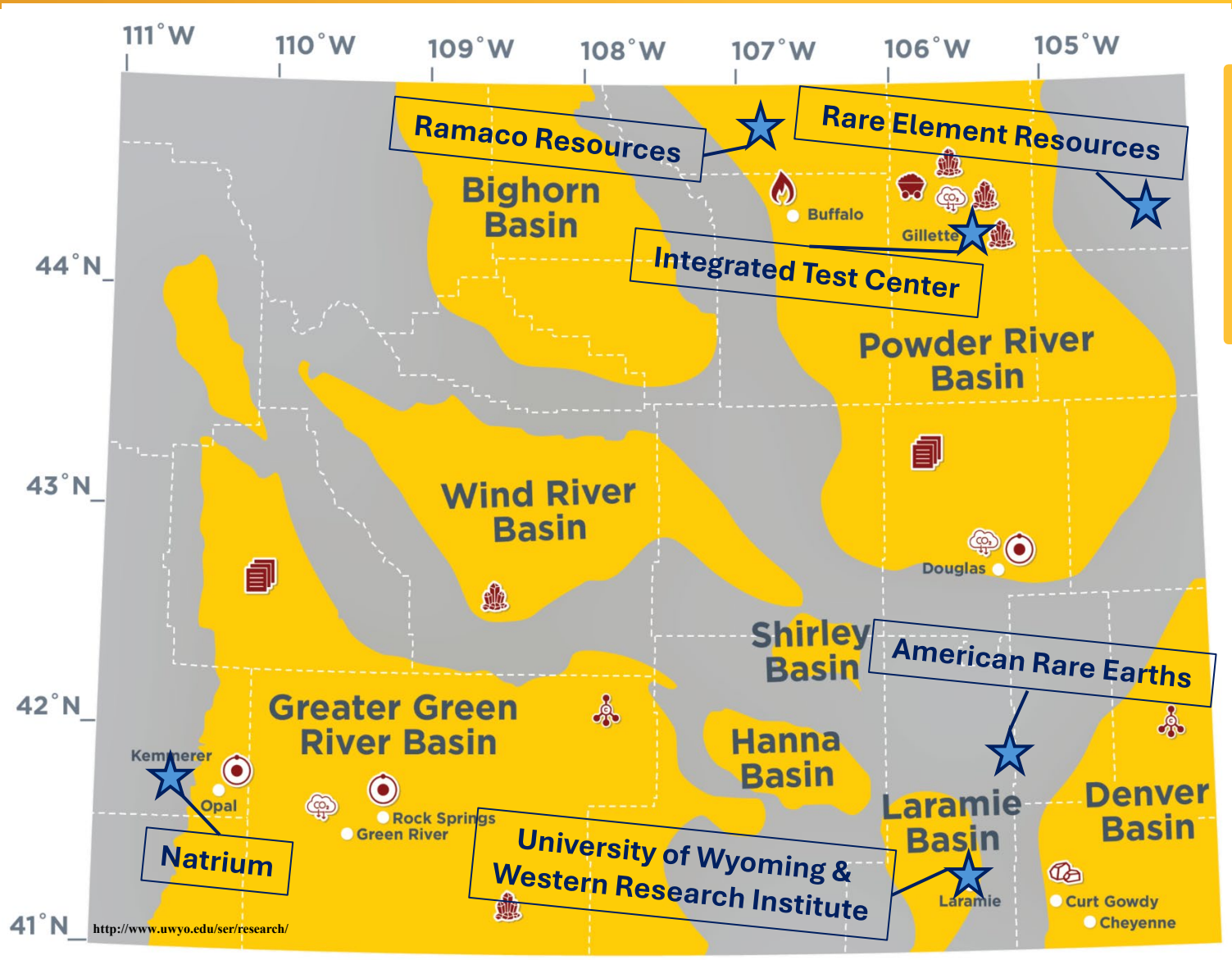
Regional Hub for TIC R&D

CORE-CM Advanced Manufacturing

Region 4 Hub for TIC R&D



REE+CM related Activities in Wyoming

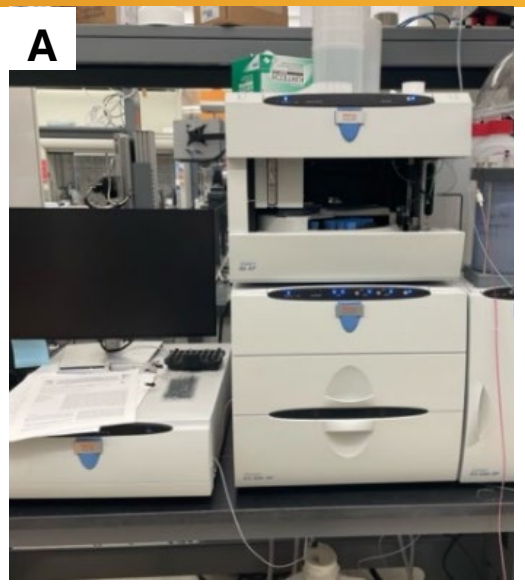


Wide-range of other REE+CM related actives in Wyoming. SER is, or has been, active in most all of them.

- Carbon Storage Project
- Nuclear
- Pipeline
- Hydrogen
- Methane Mitigation
- Carbon Engineering
- Mining
- Oil & Gas
- Class VI Database
- Critical Mineral and Rare Earth Element

SER & University of Wyoming : Science Facilities (Center for Economic Geology)

A



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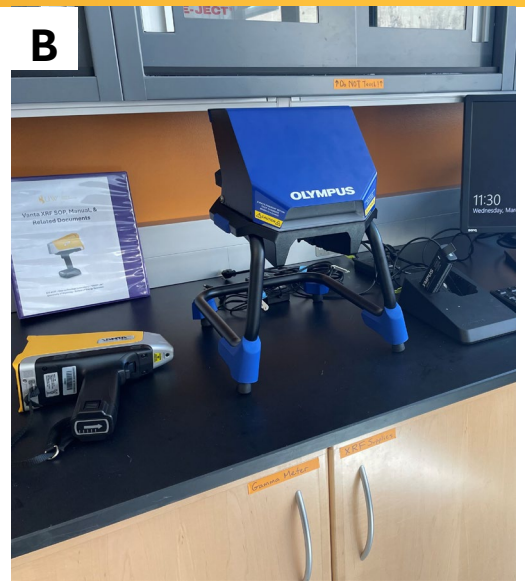
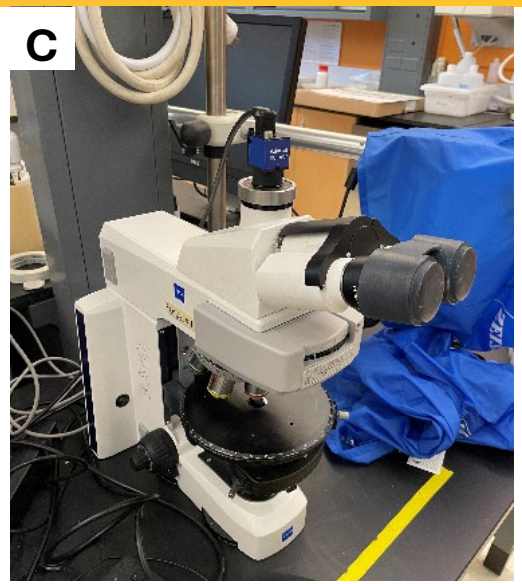
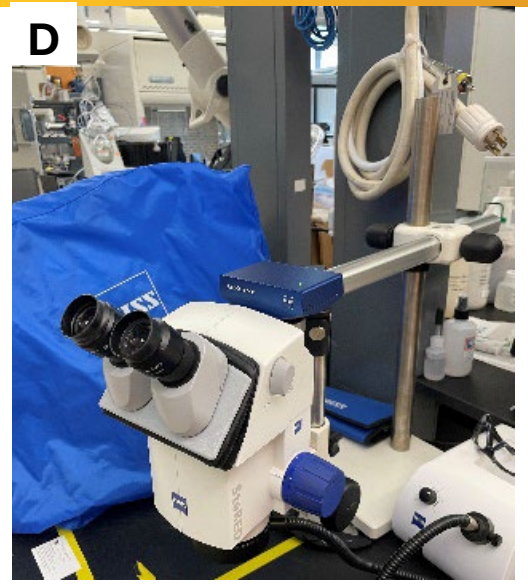


C

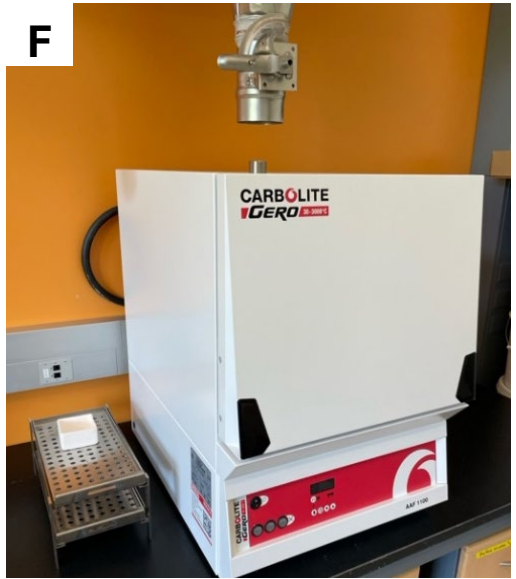


D



E

F



- **A)** Ion Chromatograph: Can detect REEs in fluid samples such as oil and gas brines
- **B)** pXRF Analyzer: Can detect elemental concentrations in solid and liquid samples
- **C-D)** Petrographic/stereo microscopes for examining rock samples and thin sections
- **E-F)** Sample Prep Station: Drying, grinding, and ashing samples in preparation for measuring elemental concentrations

SER & University of Wyoming : Science Facilities (Other UW Laboratories)

CCCC Laboratory (SER)

Facility dedicated to research supporting the future of Wyoming coal and creating economic development and diversification opportunities

Raman Microscope

GC-MS

Geochemistry Analytical Laboratory (G&G)

Facility which conducts chemical analyses of aqueous and solid materials using high-precision analytical instructments (e.g., moisture, volatiles, and ash in coals, REEs, PGEs, and more)

ICP-MS

TGA

ICP-OES

Materials Characterization Laboratory (G&G)

Facility which specializes in characterization of chemical composition, crystalline structure, morphology, and fabric of natural and man-made solid materials

XRD

SEM

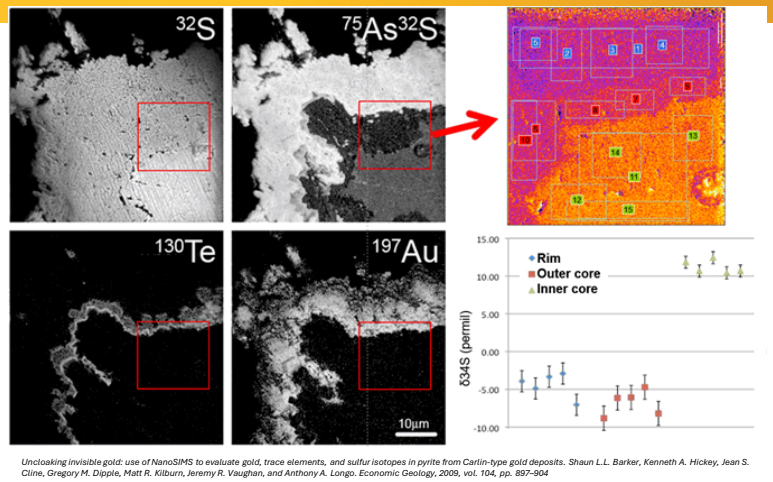
EPMA

SER & University of Wyoming : Science Facilities (potential future instrumentation)

Future Instrumentation & Research: ***NanoSIMS-HR***

- Ion microprobe capable of generating elemental and isotopic maps of geological and biological samples at nanometer resolution
- Applications:
  - Detecting rare earth element enrichment on small scales
  - Fingerprinting the source of critical minerals in Wyoming ore deposits
  - Discovering previously unknown concentrations of economically valuable minerals (e.g., “Invisible Gold” example to right)

https://www.cameca.com/products/sims/nanosims-hr



Uncloaking invisible gold: use of NanoSIMS to evaluate gold, trace elements, and sulfur isotopes in pyrite from Carlin-type gold deposits. Shaun L.L. Barker, Kenneth A. Hickey, Jean S. Cline, Gregory M. Dipple, Matt R. Kilburn, Jeremy R. Vaughan, and Anthony A. Longo. Economic Geology, 2009, vol. 104, pp. 897–904

SER & University of Wyoming: REE-related Teaching & Outreach

SCIENCE INITIATIVE ROADSHOW

Participation in conferences and workshops

- Geological Society of America Connects 2023, including **Pardee Keynote Symposium** on Critical Minerals Policy
- **DOE Tribal Clean Energy Summit**, 2022 and 2024
- Annual Resource Sustainability Meeting, 2022-2024
- International Pittsburgh Coal Conference, 2023
- Battelle Innovations in Climate Science, 2023
- National Environmental Justice Conference and Training Program, 2023
- National Academies of Science and Engineering Workshop on Mineral Resources Workforce, 2024
- Joint University of Wyoming-University of Utah virtual town hall focused on critical minerals research
- Hosted a presentation on Tribal Sovereignty for University of Wyoming leadership

THE GEOLOGICAL SOCIETY OF AMERICA®

Rare Element Resources – Bear Lodge Project

https://www.rareelementresources.com/home

2024 Bull Hill Total Rare Earth Mineral Resource Summary

Resource Class	Metric Tonnes (millions)	%TREO	Contained TREO Metric Tonnes (1000's)	Recovered Nd/Pr Metric Tonnes (1000's)
Measured	2.04	4.53	92.4	18.4
Indicated	3.98	3.85	153.1	31.3
Measured & Indicated (M&I)	**6.02**	**4.08**	**245.5**	**49.7**
Inferred	1.90	3.61	68.5	14.4

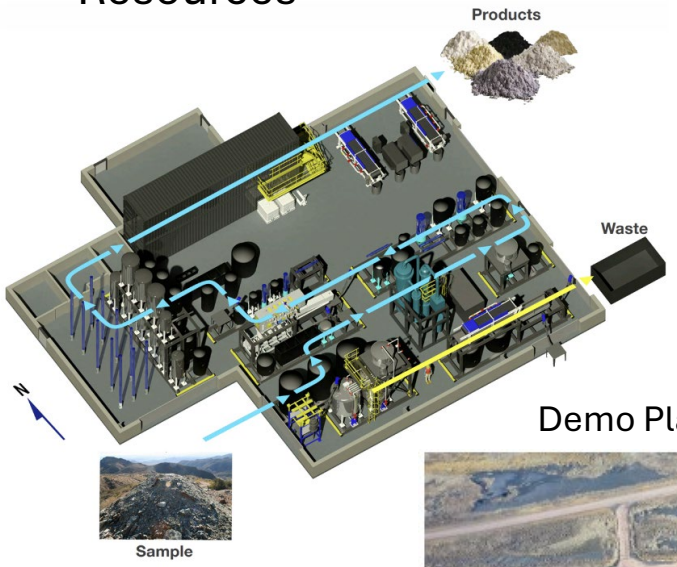
Artist Rendering of a Potential PUG Plant

Physical Upgrade Plant

Artist Rendering of a Potential Hydromet Plant

Hydromet Plant (Upton, WY)

- 245,000 tons of TREOs (Measured and Indicated)
  - Most ready technologically
- Existing relationship with the School of Energy Resources



Demo Plant

American Rare Earths – Halleck Creek Project

- 1.5B tons of TREOs (Measured and Indicated)
- SER and Department of Geology assistance investigating REE mineralization

Table 10-4: Estimated Rare Earth Resources at Halleck Creek (1,000 ppm TREO Cut-off)

Classification	Tonnage	Grade				Contained Material			
		TREO	LREO	HREO	MREO	TREO	LREO	HREO	MREO
	t	ppm	ppm	ppm	ppm	t	t	t	t
Measured	206,716,068	3,720	3,352	370	904	769,018	692,935	76,550	186,836
Indicated	1,272,604,372	3,271	2,900	360	852	4,162,386	3,689,999	458,140	1,084,256
Meas + Ind	1,479,320,439	3,334	2,963	361	859	4,931,405	4,382,934	534,691	1,271,092
Inferred	1,147,180,795	3,239	2,878	361	837	3,715,661	3,302,005	413,651	960,355
Grand Total	2,626,501,234	3,292	2,926	361	850	8,647,066	7,684,939	948,341	2,231,447
Rounded	2,627,000,000	3,292	2,926	361	850	8,647,000	7,685,000	948,000	2,231,000

‘UW in Your Community’ Event April 17 in Wheatland

Published April 02, 2024

Phoebe Futcher
Geology Ph.D. Student

Rare earth minerals explained

Dr. Lily Jackson (SER Research Professional) speaking at UW in Your Community event

Ramaco Resources – Brook Mine Project

Table 1.0-1 Current Brook Mine In-Place REO Exploration Target Tonnage and Grade Estimates (Ash-Basis)

	Total Model Volume	Total Model Mass	Primary Magnetics		Secondary Magnetics		Heavy		Light		Total		Ga and Ge	
Range	(M CY)	(M Tons)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)
Low	2,025	3,922	260	93	72	26	39	14	853	301	1,105	392	114	47
High	2,025	3,922	325	116	90	32	49	17	1066	377	1,382	490	143	59

- 1-1.5M tons of (*estimated) REEs, Ga & Ge
- SER presence & participation at the Ramaco Resources Rodeo
- Existing SER collaboration with NETL scientists

Dr. Holly Krutka (SER Director)speaking at 2024 Ramaco Research Rodeo

RAMACO

NATIONAL ENERGY TECHNOLOGY LABORATORY

School of Energy Resources

- Minerals Team (Center for Economic Geology Research) collaborates with:
  - Other SER Centers of Excellence
  - UW faculty and researchers from multiple colleges & departments
  - Universities, State Governments and Geological Surveys, US Geological Survey, National Labs, Department of Energy, and many Industry Partners

Many at SER have strong connections to the University of Wyoming education system

UW | School of Energy Resources