



Energy & Environmental Research Center (EERC)

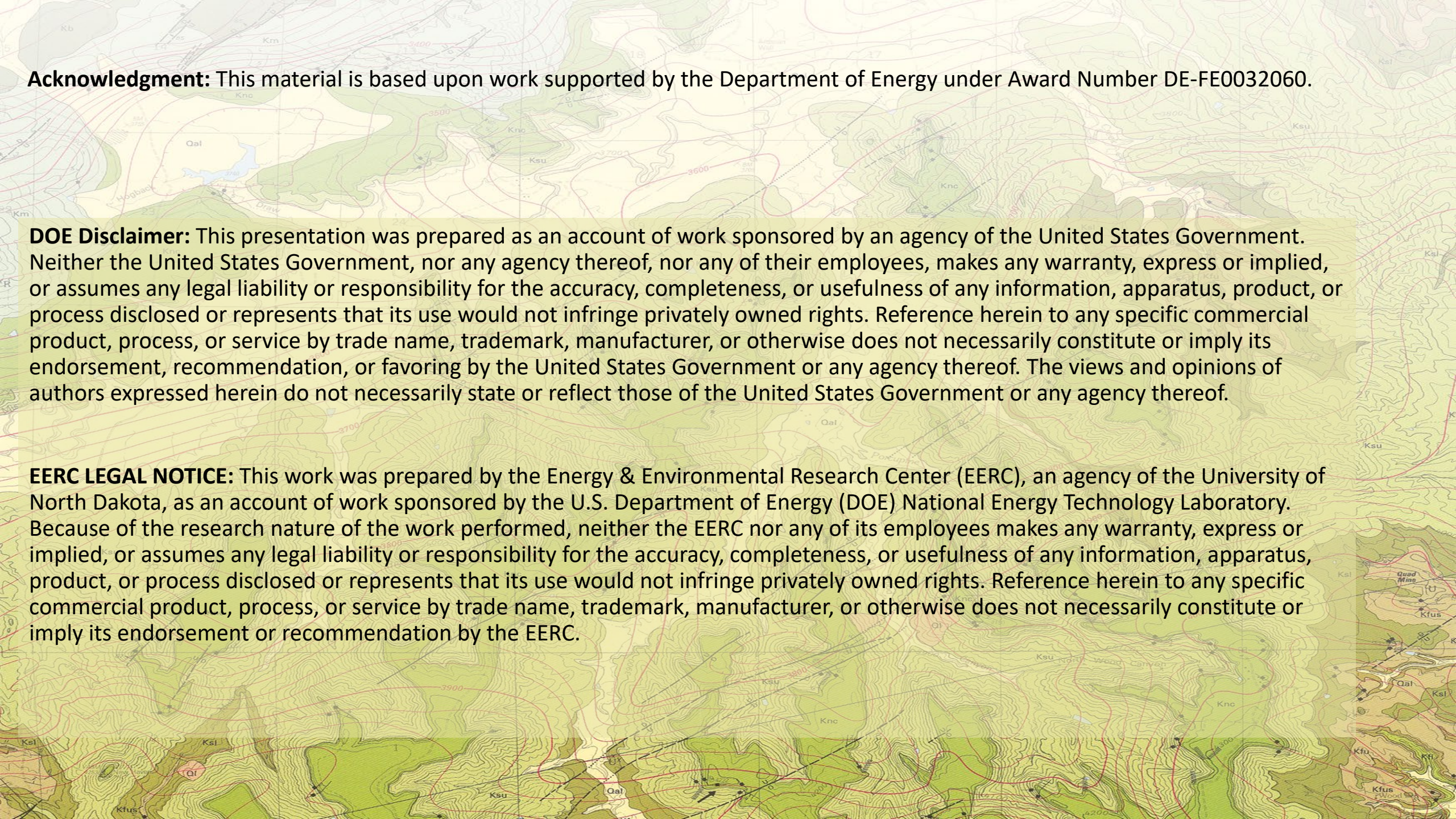
# **Williston Basin Carbon Ore, Rare Earth, and Critical Minerals (CORE-CM) Program**

*The 46<sup>th</sup> International Technical Conference on Clean Energy  
Clearwater, Florida*

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Stacy Kouba, Energy & Environmental Research Center  
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A detailed topographic map of a mountainous region, likely in the western United States. The map features numerous contour lines in shades of green and brown, indicating elevation changes. Several peaks and ridges are visible, with some labeled with names like 'Kno', 'Ksu', 'Ksl', 'Kfu', 'Kfi', 'Kfs', 'Kf', 'K', 'Kb', 'Kc', 'Kd', 'Ke', 'Kf', 'Kg', 'Kh', 'Ki', 'Kj', 'Kk', 'Kl', 'Km', 'Kn', 'Ko', 'Kp', 'Kq', 'Kr', 'Ks', 'Kt', 'Ku', 'Kv', 'Kw', 'Kx', 'Ky', 'Kz'. A prominent road or trail runs diagonally across the center of the map. The overall terrain is rugged and hilly.

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# Carbon Ore, Rare Earth, and Critical Minerals Initiative

## CORE-CM

- **U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL)-led program**
  - Catalyze economic growth.
  - Job creation in energy communities.
  - Energy communities not to be left behind.
  - Domestic production of rare-earth elements (REEs) and critical minerals (CMs).
  - Strengthen our national economy and security.



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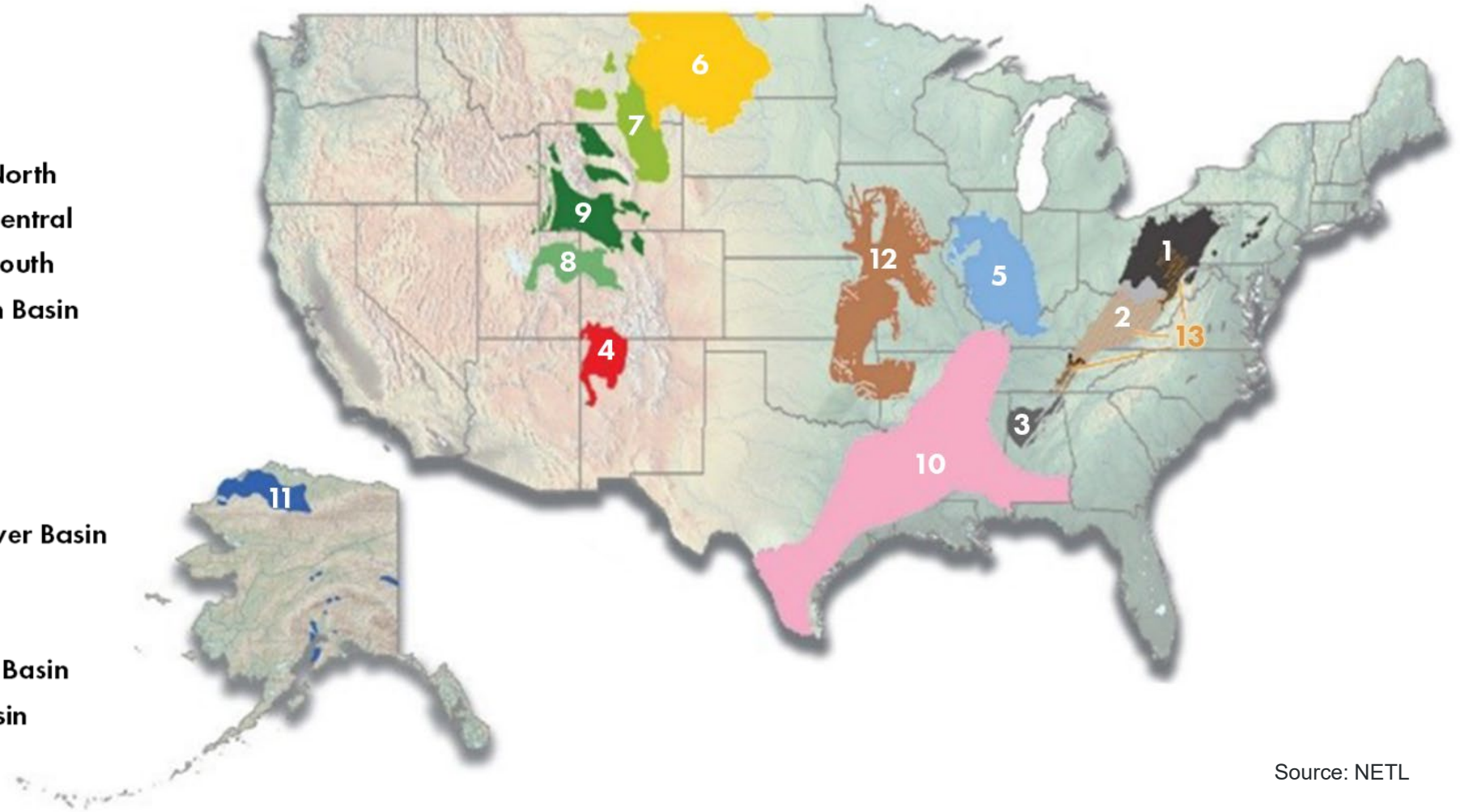


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# 13 Coalition Teams – CORE-CM Initiative

## US BASINS

- 1** Appalachian Basin, North
- 2** Appalachian Basin, Central
- 3** Appalachian Basin, South
- 4** San Juan River-Raton Basin
- 5** Illinois Basin
- 6** Williston Basin
- 7** Powder River Basin
- 8** Uinta Basin
- 9** Green River-Wind River Basin
- 10** Gulf Coast Basin
- 11** Alaska Basin
- 12** Cherokee-Forest City Basin
- 13** Mid-Appalachian Basin



Source: NETL



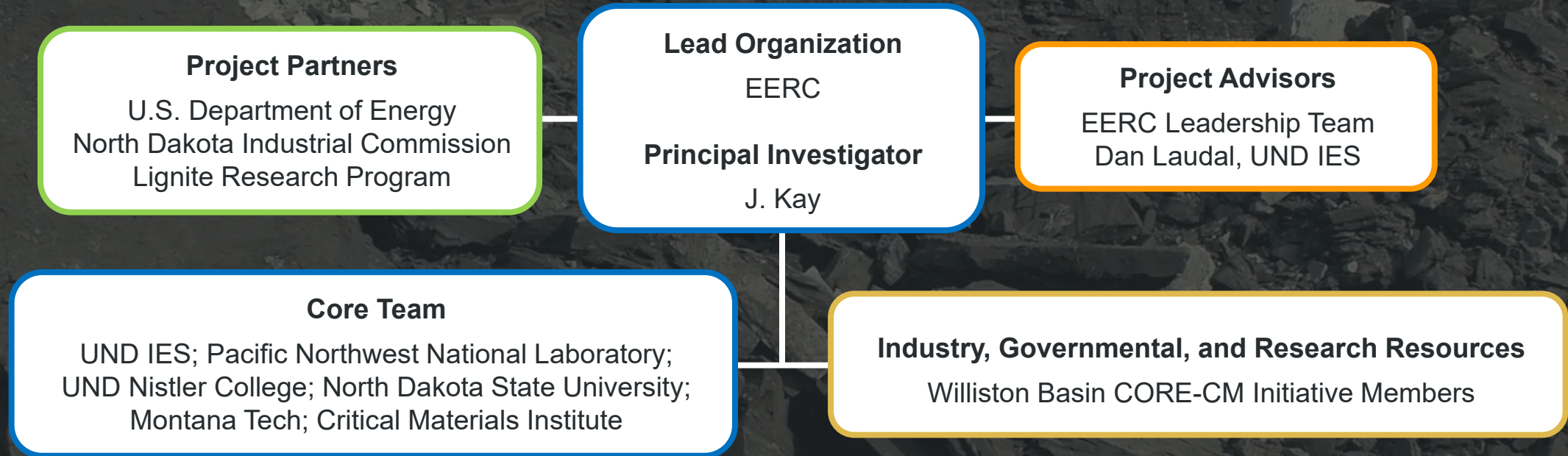
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# Team Players



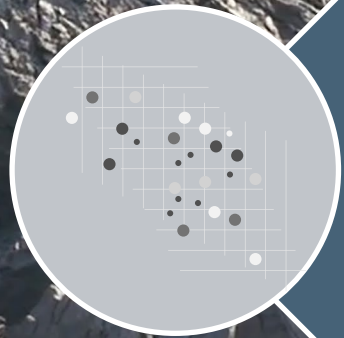
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**BASIN ELECTRIC  
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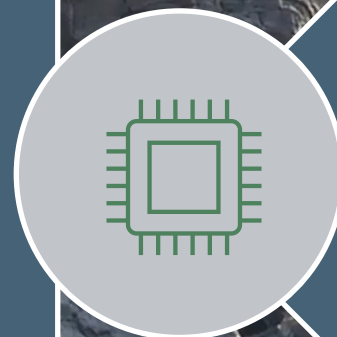
**Assessment of Resources**



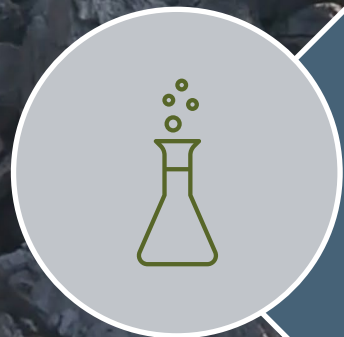
**Strategies for  
Infrastructure, Industries,  
and Business**



**Strategies for  
Waste Stream Reuse**



**Technology Innovation Centers**



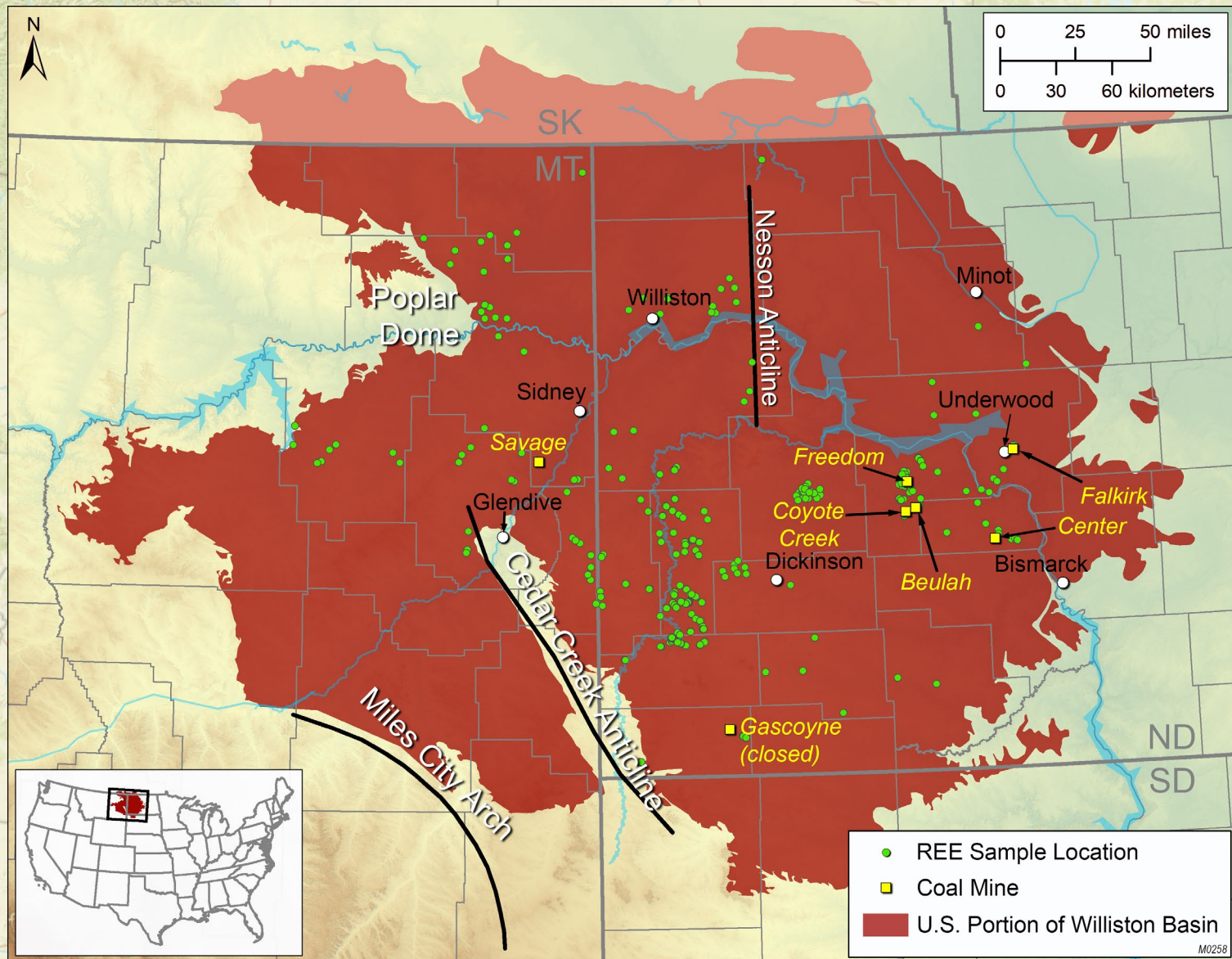
**Technology Assessment,  
Development,  
and Field Testing**



**Stakeholder Education  
and Outreach**



# Williston Basin Has...

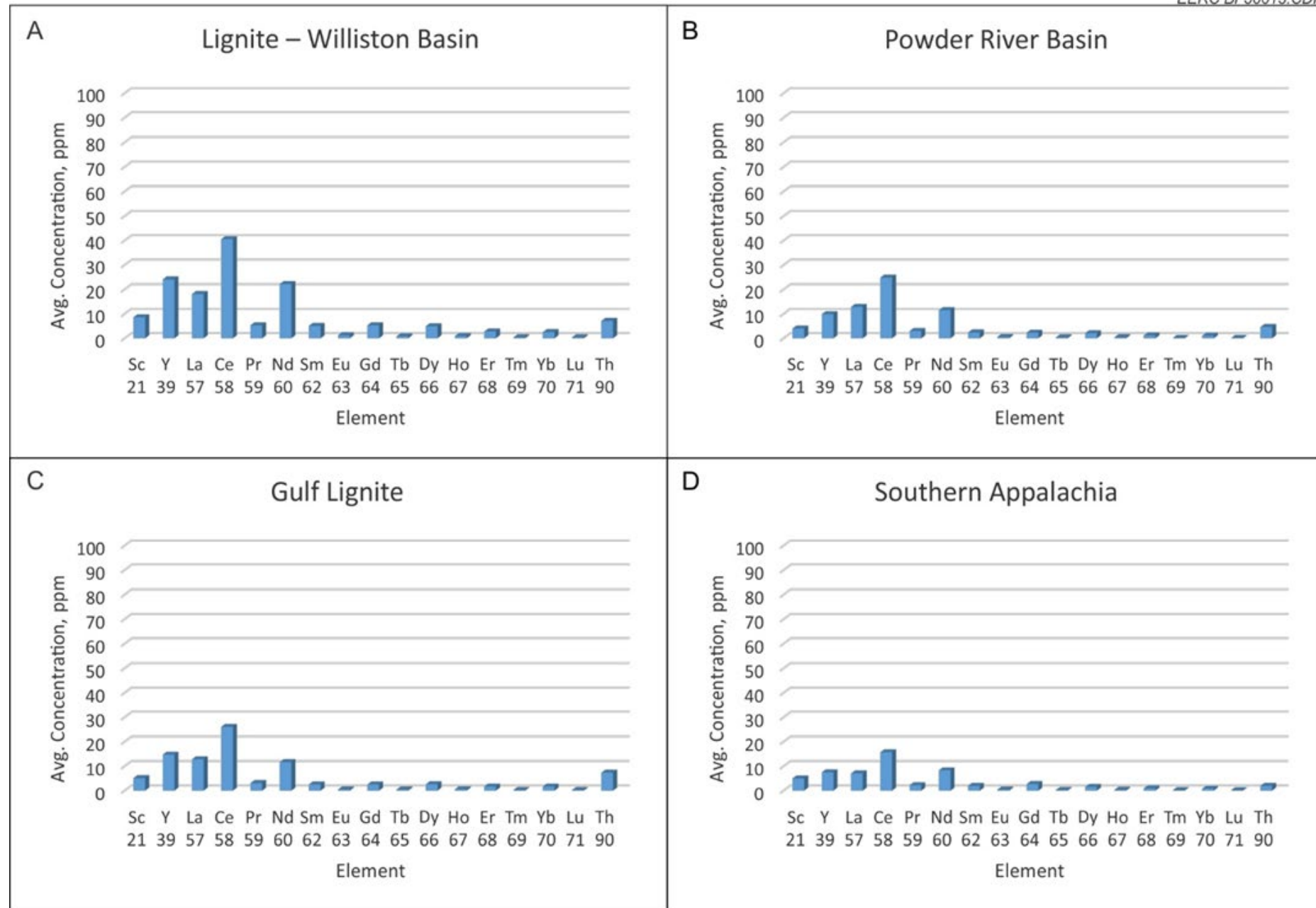


Resources

Infrastructure

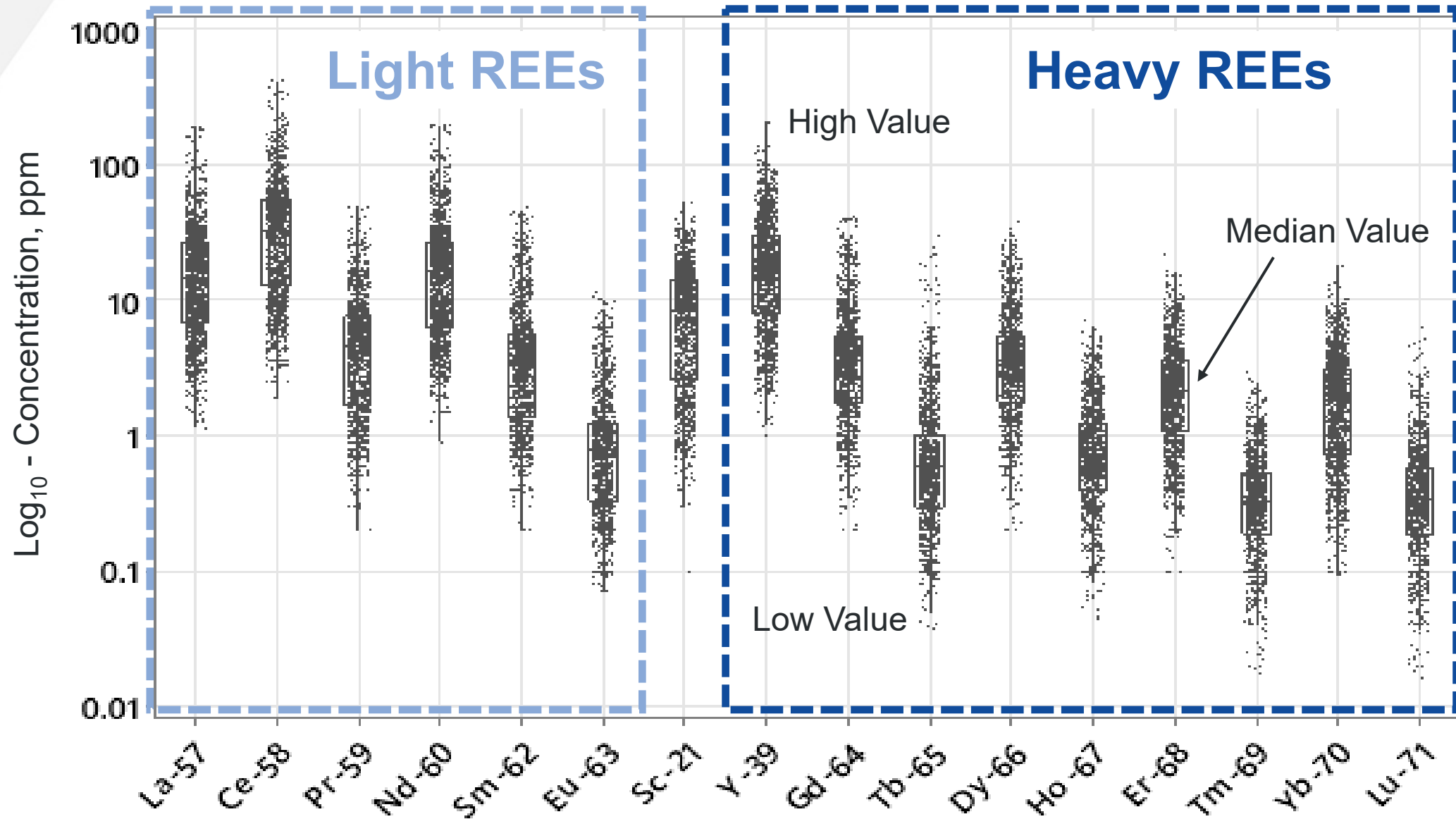
Knowledge

# Average ppm concentration of REEs in coal samples on a dry mass basis by region



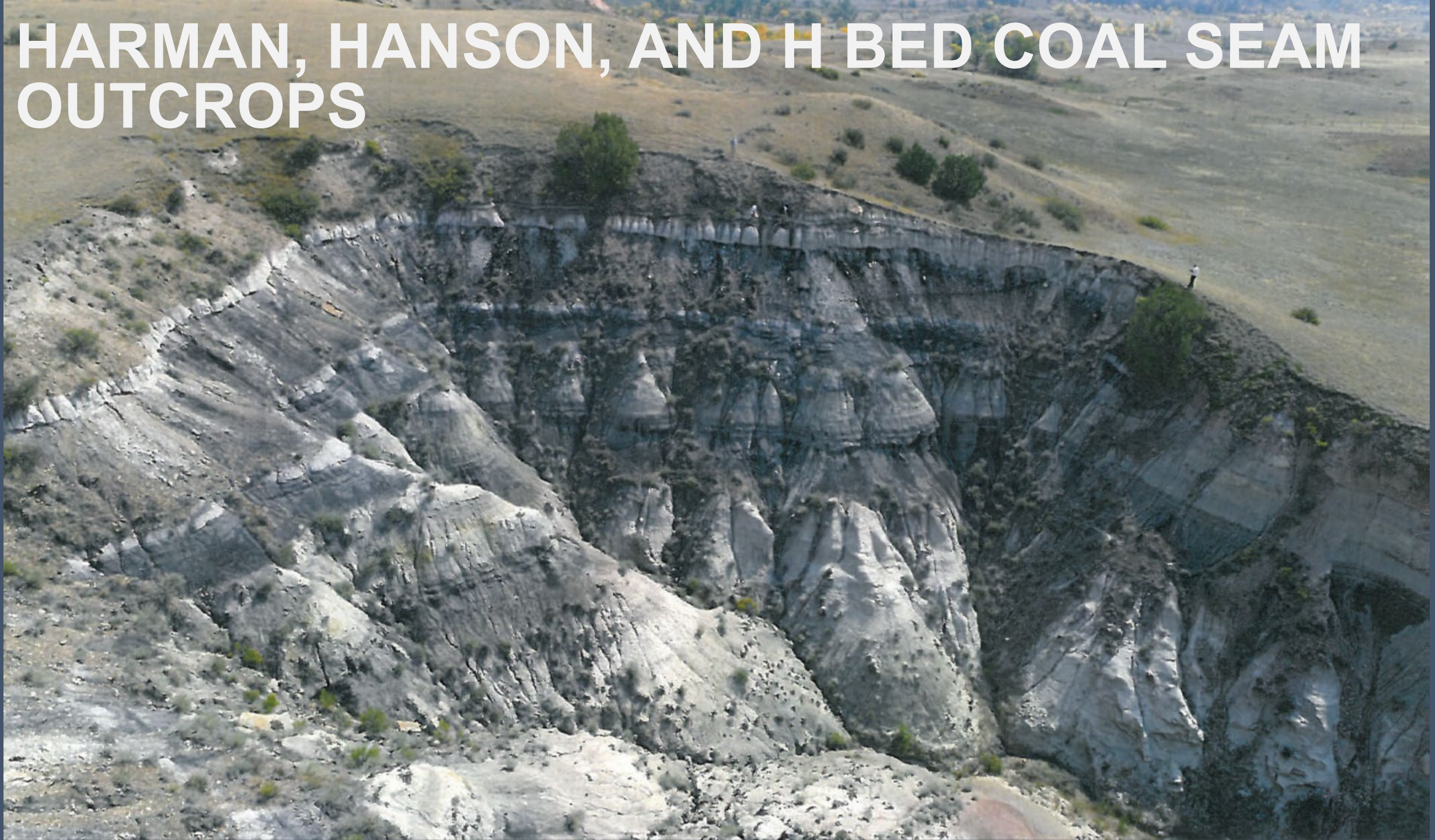


# REE Concentration Data



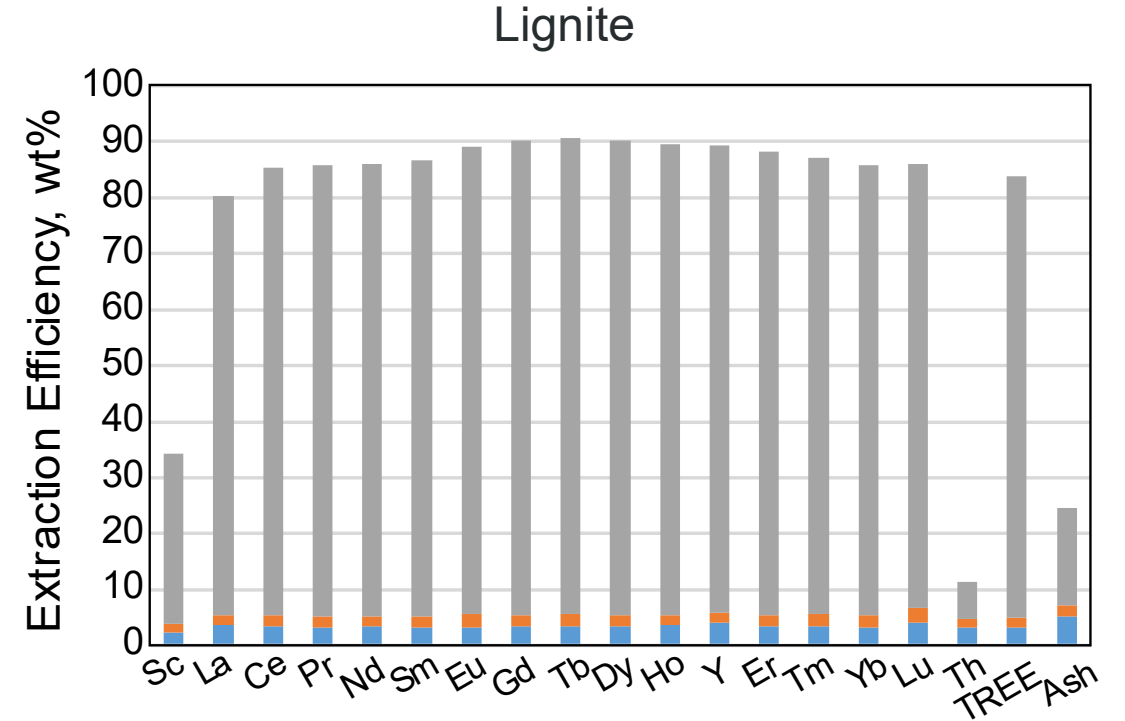
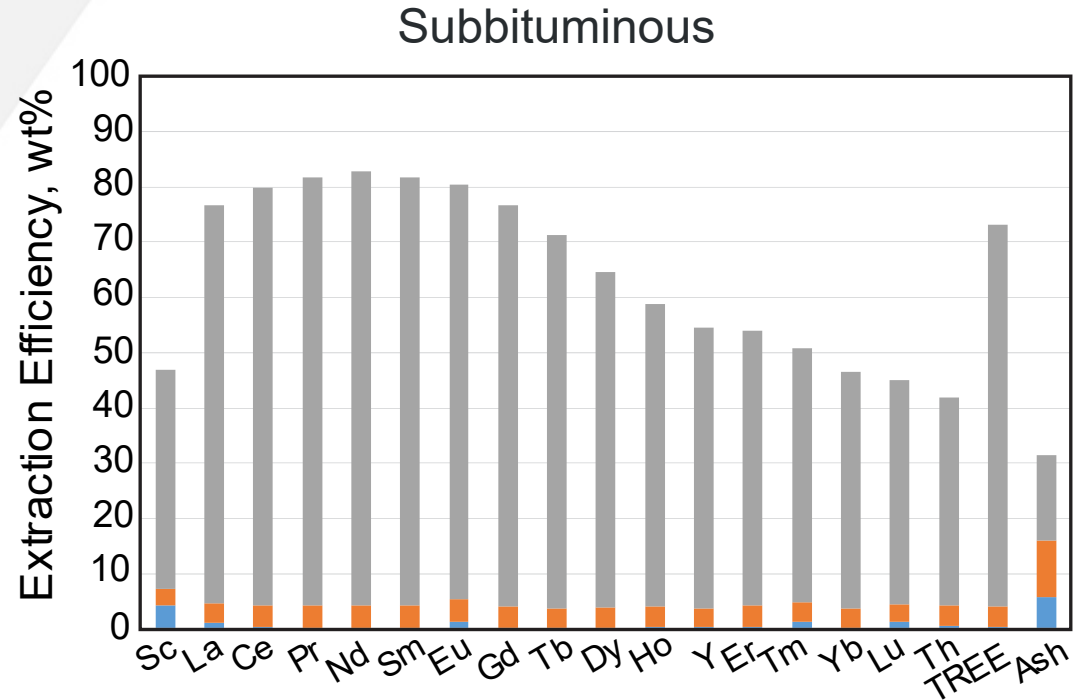


# HARMAN, HANSON, AND H BED COAL SEAM OUTCROPS





# REE EXTRACTION EFFICIENCY AND MODE OF OCCURRENCE



■ Water-Soluble ■ Ion-Exchangeable ■ Dilute Acid-Soluble/Organic Coordination

# Strategy

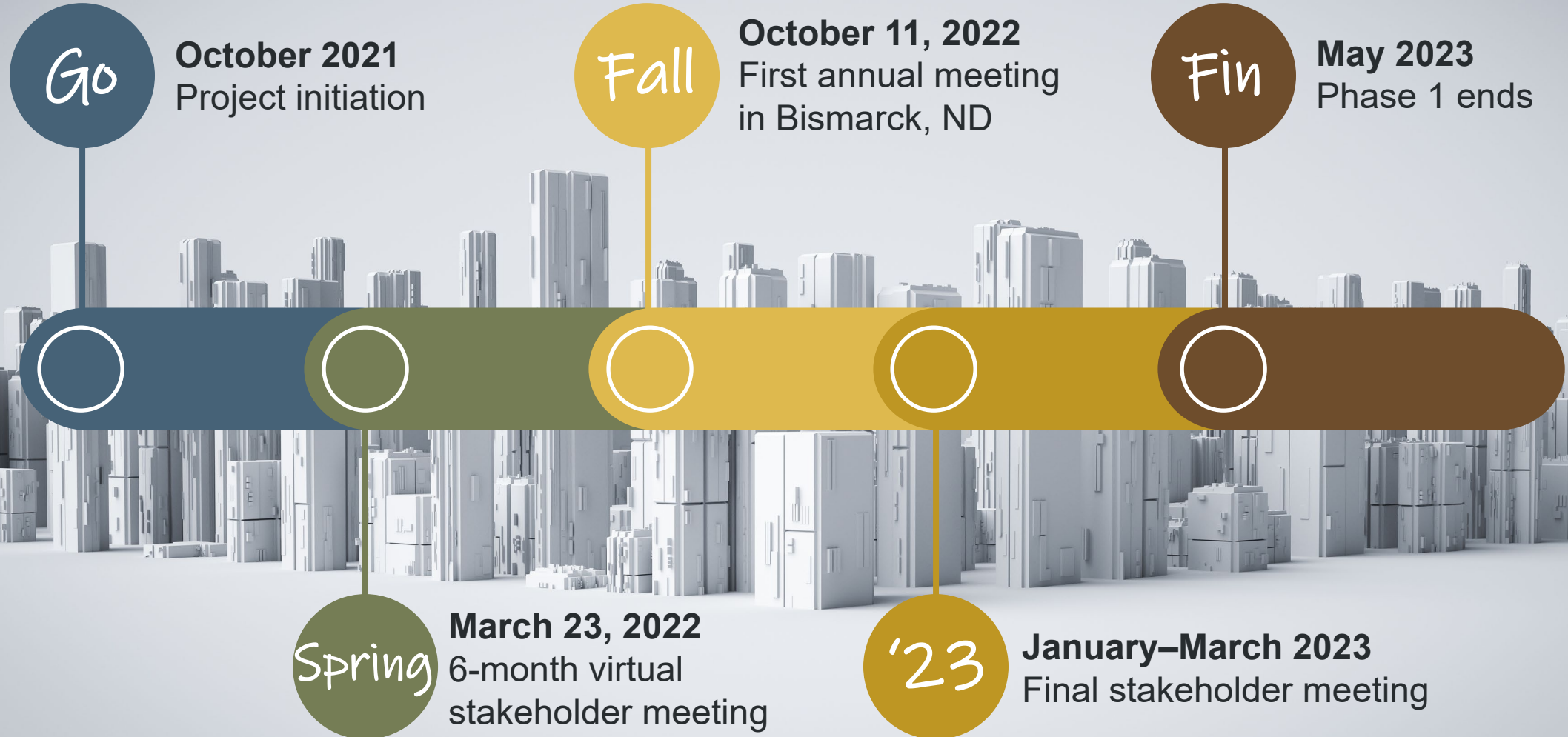
Raw REEs/CM?

Final Products?

- Magnets
- Aggregate
- Computer components
- Graphite/graphene
- Sensors



# STAKEHOLDER MEETINGS





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**THANK YOU**

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