

Session: Challenges in the Development of Domestic Production Systems (Rare Earth in U.S. Coal Measures)

Topics:

- **Rare Earth (Coal) Domestic Value Chain**
- **Regulatory Barriers**
- **Gaps, New Technologies**

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Value Chain: What Exactly Is it?

**“.....A process in which a company adds value
to its raw materials to produce products”**

For a geologist, “value chain” begins in the ground

Coal Basins of the U.S.



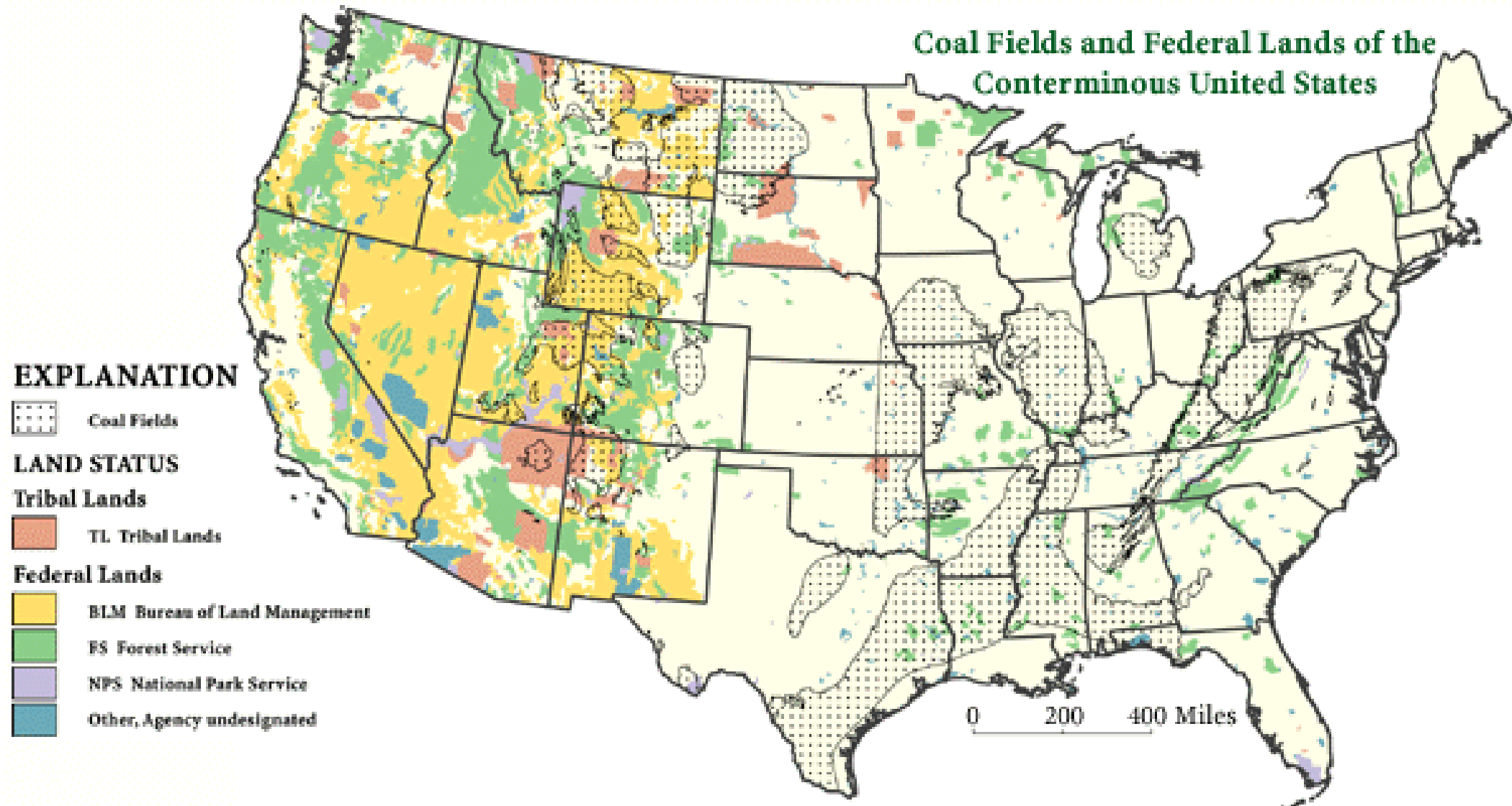
Value Chain Begins With Geology

- **First step is exploration (resource to reserve), then mining**
- **Similar to all other minerals/mining prior to production**
- **“Mine to Market”.....“Ore to Store”**
- **Geologists are only concerned with the “mine” and “ore” part**
- **Aka: “upstream”**

Regulatory Barriers for RE in Coal Measures

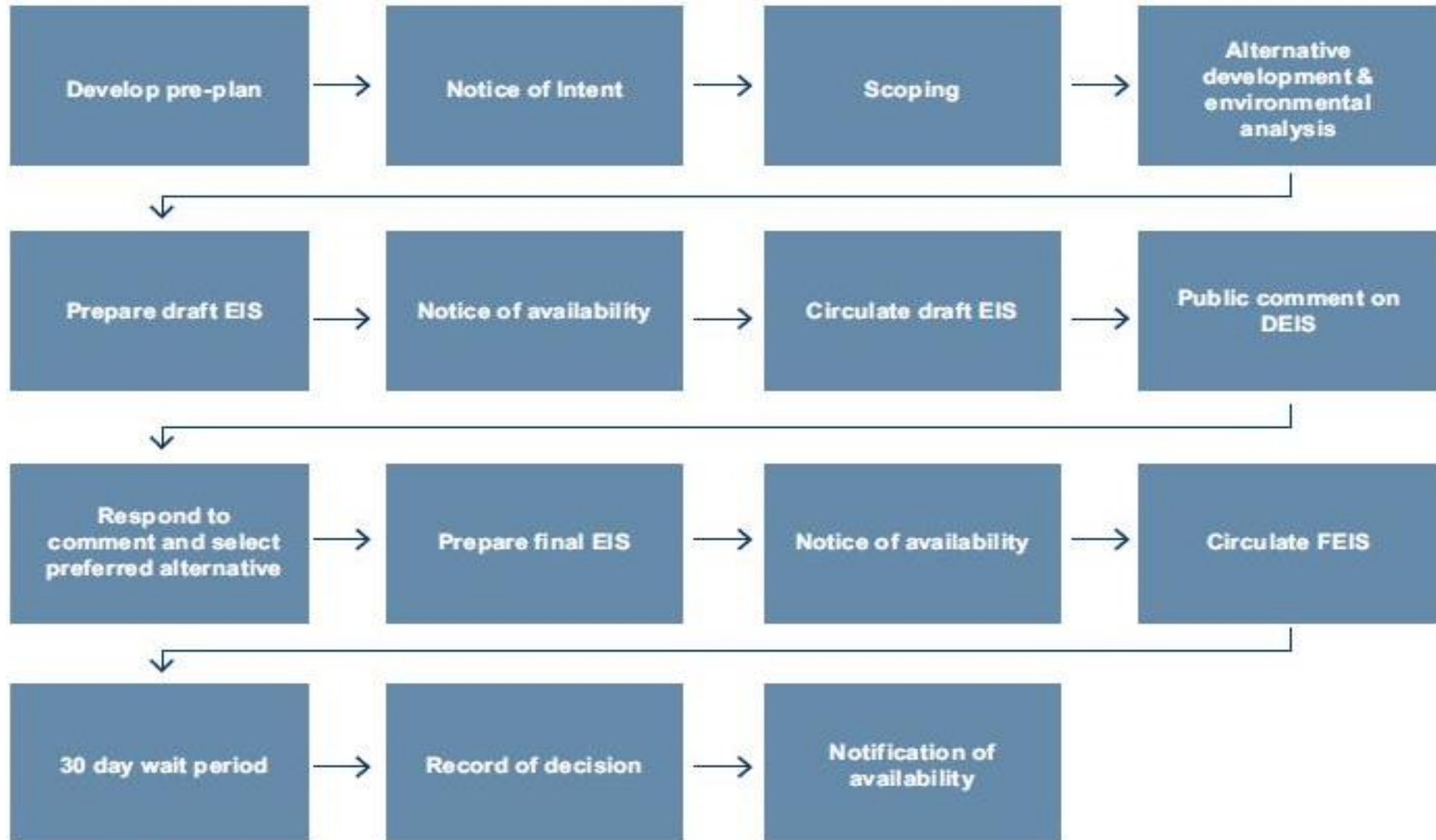
- Federal, state, and local/private lands (fed/state regs apply?)
- Major long-term hurdles include
 - Access to lands vs. lands withdrawn from mineral estate
 - Environmental and legal stand offs over land use for mining
 - Permitting labyrinths for exploration, mining, processing
 - NEPA gauntlet

Federal Coal Lands Ownership



Modified from U.S. Geological Survey Open-File Report 97-461

The NEPA Gauntlet—Mining on or near Federal Lands



Mining Permitting Process—Time and Uncertainty Join Forces in Some Coal Measures

- **Federal, state, and local land management agencies**
 - **Environmental analysis under blanket EIS**
 - **Exploration permit**
 - **Drilling permit**
 - **Mine permit**
 - **Environmental permit**
 - **Reclamation permit**

Mining Permitting Process—Time and Uncertainty Join Forces in Some Coal Measures

- **Other gov't agency stakeholder requirements**
- **Non-gov't groups**
- **Local indigenous groups**
- **General public: opposition, law suits, maybe local support**

U.S. Rare Earth Deposits



Coal Basins of the U.S.

