



# GEOLOGY FOR CCUS IN WYOMING

## GEOLOGIC CO<sub>2</sub> STORAGE

Permanent CO<sub>2</sub> storage requires at least three essential components:

### 1. Reservoir Rock

- Porous and permeable rock (typically sandstone or carbonate)
- Located ~800 to 4000m deep
- Must contain non-potable saline fluids (>10,000 mg/L TDS)

### 2. Seal Rock

- Low permeability shale, mudstone, or evaporite that acts like a lid
- Laterally continuous
- Strong enough to prevent fracture openings

### 3. Geologic Trap

- Natural geologic dome or folds or
- Changes in rock type (stratigraphic pinch-outs)
- Keep fluids contained in one area, preventing upward migration of CO<sub>2</sub>

At depths >800 m, injected CO<sub>2</sub> becomes supercritical, increasing storage efficiency and security.

## PRIORITY STORAGE BASINS

### Greater Green River Basin

Most promising basin in Wyoming.

Key advantages:

- Large structural traps
- Natural CO<sub>2</sub> accumulations (proven long-term containment)
- Multiple stacked reservoir-seal pairs

Major targets:

- Rock Springs Uplift
- Moxa Arch

### Powder River Basin

Strengths:

- Extensive subsurface data
- Strong hydrocarbon production history
- Laterally continuous Cretaceous sandstones

Challenges:

- Bowl-shaped geometry
- Key aquifers (Madison, Tensleep) are fresh and publicly used

Most likely storage pathway: CO<sub>2</sub>-ECBM in coal seams

### Wind River Basin

Strengths:

- Well-characterized stratigraphy
- Some hydrocarbon fields meet depth and seal criteria

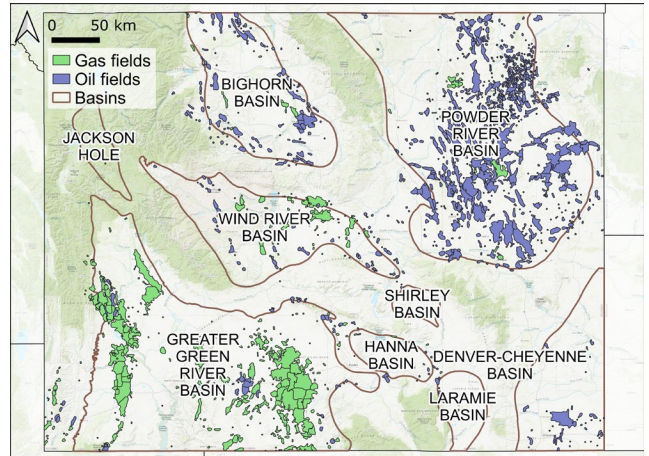
Challenges:

- Bowl-shaped geometry
- Deep aquifers have low salinity (may disqualify for saline storage)

## WHY WYOMING?

Wyoming has large sedimentary basins that have:

- Rock layers capable of storing large amounts of CO<sub>2</sub>, with natural seals above them
- Structures that trap fluids long-term
- Extensive oil and gas data to understand subsurface conditions.



## OTHER STORAGE PATHWAYS

Beyond deep saline aquifers, Wyoming also supports:

### CO<sub>2</sub>-Enhanced Oil Recovery (EOR)

- Storage in depleted hydrocarbon reservoirs

### CO<sub>2</sub>-Enhanced Coalbed Methane (ECBM)

- Injection into unmineable coal seams (notably Powder River Basin)

Existing hydrocarbon reservoirs may offer the highest storage efficiency in some basins.

## WATER RESOURCE CONSIDERATIONS

- Fresh groundwater is typically found at depths shallower than those required to store CO<sub>2</sub>
- Deeper formations tend to contain saline (non-drinkable) water
- Protection of Underground Sources of Drinking Water (USDWs) is mandatory under Class VI regulations.

## KEY TAKEAWAYS

- ✓ Wyoming contains deep rock layers capable of storing CO<sub>2</sub>.
- ✓ The Greater Green River Basin shows the strongest potential.
- ✓ Some basins are better suited for oil & gas-related storage.
- ✓ Protection of drinking water is a primary requirement.