Reconciling Geothermal Resource Extraction with Western Water Law

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Two adults discussing water rights.
Prior Appropriation, the Basics

- All waters are the property of the public
- Beneficial Use - Use it or lose it
- Priority - First in time is first in right
- No diversion without approved permit or application
Water Use in Geothermal Development, Cont.

• Construction and Development
  – Minimal use for drilling and testing

• Power Plants (Dry Steam, Flash, Binary)
  – Significant nonconsumptive use
  – Air Cooled Binary (no consumptive use)
  – Water Cooled (50%+ Evaporative Losses)
  – Minimal consumptive use for culinary purposes

• Enhanced Geothermal Systems (EGS)
  – Imported water + uses described above
Water Use in Geothermal Development

Geothermal power plants have no smoky emissions. They emit water vapor.

Image courtesy of the Geothermal Education Office
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How does geothermal fluid fit into western water law?

• What is considered a geothermal resource?

• Who owns the right to extract the geothermal resource?

• Is diversion of geothermal fluids subject to water laws?

• Which state agency regulates withdrawal of geothermal fluids?
What is considered a geothermal resource?

• Hot rocks, steam, hot water, and hot brines.
  – Arizona, California, Colorado, Montana, Nebraska, Nevada, New Mexico, North Dakota, Texas

• Hot rocks, groundwater above a certain threshold temperature.
  – Alaska (248°F), Idaho (212°F), Oregon (250°F), Washington (moving target)

• Hot rocks
  – Utah (248°F)
Who owns the geothermal resource?

- **Surface Estate Owner Unless Severed**
  - Arizona, California, Idaho, Nevada, New Mexico, Oregon, Texas, Utah, Washington

- **Water Appropriator**
  - Colorado, Wyoming
Is diversion of geothermal fluids subject to prior appropriation?

• Largely Exempt from Water Law
  – California, Idaho*, Nevada*, Oregon

• Subject to Water Law
  – Colorado, Montana, Utah, Wyoming

• Other
  – Arizona

*Assuming no consumptive use of fluids.
Which state agency regulates diversion of geothermal fluids?

- **Mineral Agency**
  - Arizona, California, New Mexico, Texas

- **Water Agency**
  - Colorado, Idaho, Oklahoma, Nebraska, Utah, Wyoming

- **Both**
  - Nevada
Policy Considerations

• Clarity
• Promotion of Clean Energy
• Protection of Groundwater Resources
• Protection of Property Rights
• Ability to Adapt to Technological Advances
• Institutional Competence
Questions?