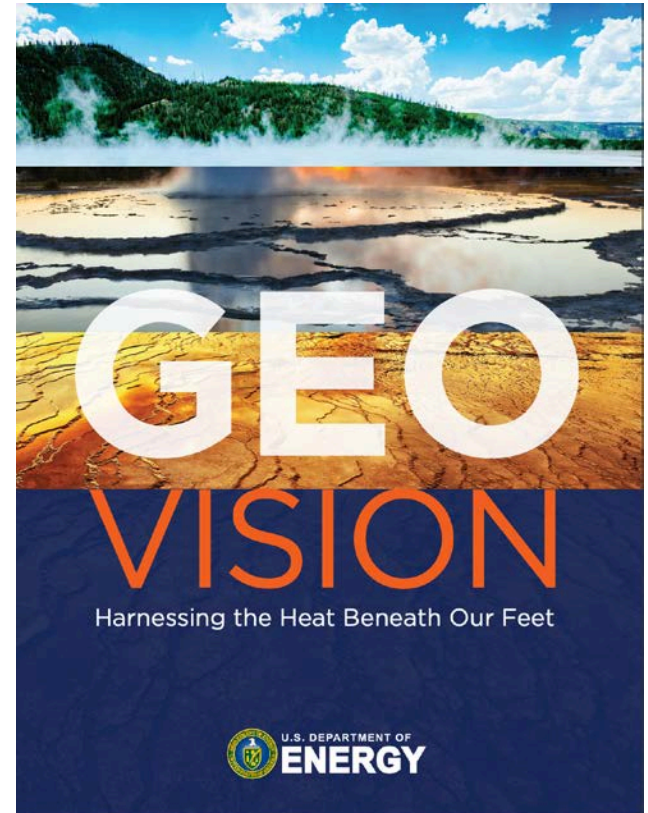


Topics and Considerations for Developing State Geothermal Regulations

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Background

- The 2019 Department of Energy's *GeoVision* and associated National Renewable Energy Laboratory Non-Technical Barriers Task Force Report identified numerous states in the eastern and southern United States that did not have geothermal regulations for power production or direct-use applications.
- The lack of state geothermal regulations were identified as a potential risk for non-conventional geothermal technologies and direct-use applications to enter those jurisdictions.



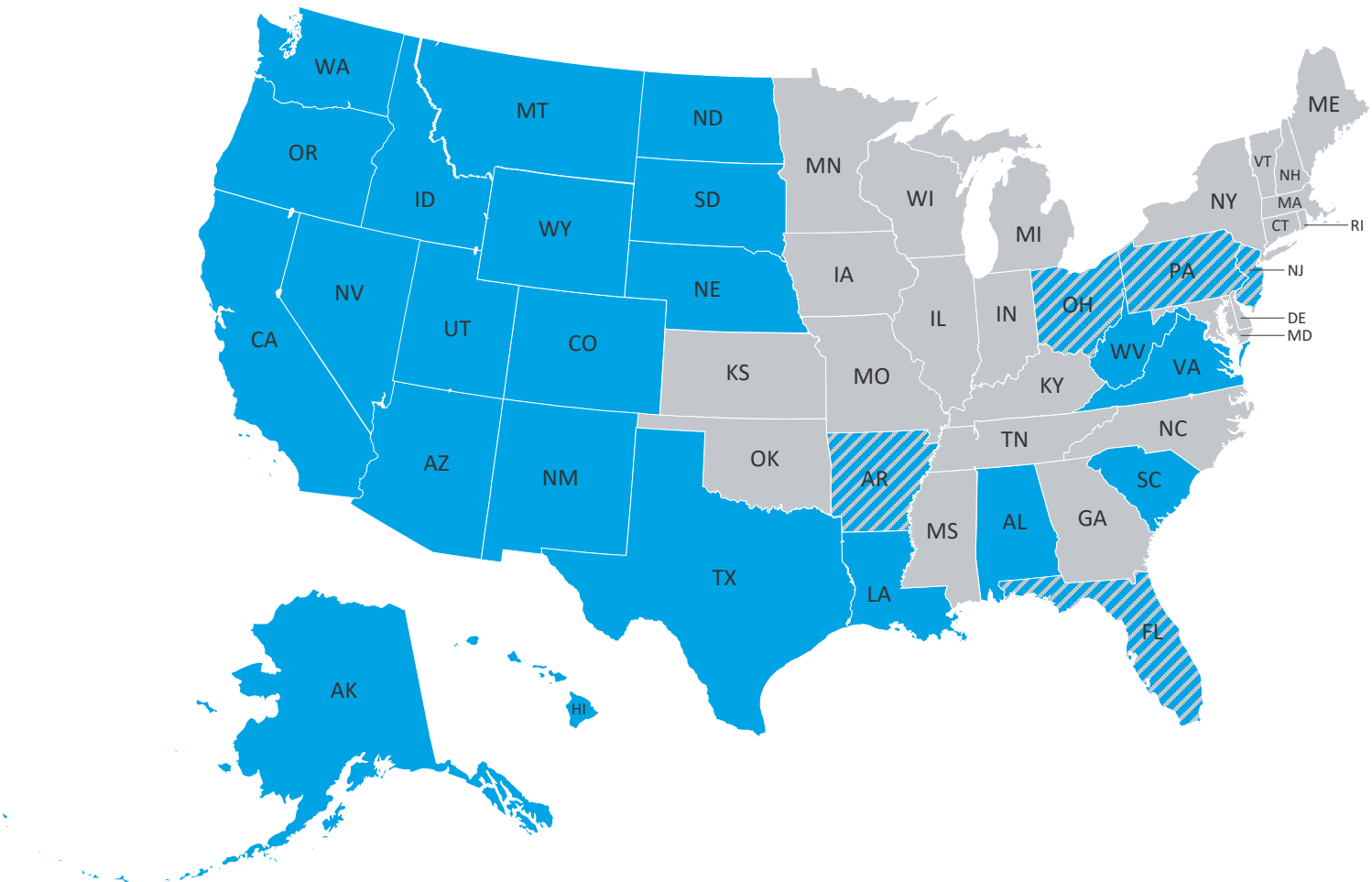
Project Overview

DOE's Geothermal Technologies Office funded NREL to lead an effort to develop a report summarizing existing state and federal geothermal regulations and key considerations for state-level decisionmakers. This process included:

- Reviewing and cataloguing existing state (i.e., 50 state survey) and federal geothermal regulations.
- Compiling documentation of regulatory best practices from geothermal and other extractive industries (i.e., oil & gas, mining).
- Establishing a volunteer Geothermal Regulatory Stakeholder Working Group (SWG) comprised of geothermal and oil & gas industry representation, state regulators, and academia to advise and review the report.
 - The SWG met approximately once per month over the course of a year to discuss specific topics and review existing state geothermal regulations.

State-Level Geothermal Regulations Across the United States

- Full Regulatory Program
- Definition of Geothermal Resources
- No Geothermal Regulations



Report Scope and Structure

Report Scope:

- Inclusive of all geothermal power generation and direct-use technologies with the exception of ground source heat pumps or the use of the subsurface as a thermal sink.
- Focused on the process up to the point of utilization of the resource for power or heat (e.g., this project did not focus on the regulatory process associated with power plant approvals).
- Covers five topics broken out into individual sections:
 - Geothermal resource ownership and definition
 - Leasing process
 - Exploration approval process
 - Drilling/wellfield development approval process
 - Underground injection control (UIC) process.



Photo Credit: Dennis Schroeder, NREL
Steamboat Hills, Washoe County, NV

Key Considerations: Ownership and Definition

State regulations vary considerably on both ownership of geothermal resources and what is encompassed within the definition of geothermal resources.

Key considerations include:

- The use of a specific temperature threshold could lead to multiple regulatory regimes, as well as the potential need for additional water rights, and/or permitting requirements.
- States should consider how the definition of the geothermal resource relates to water resources/water rights within the state.
- States may want to consider specifying what is encompassed within the geothermal right.
- States may want to consider use of the term “heat” in addition to “fluids.”

Key Considerations: Leasing Process

State regulations use different approaches for leasing/acquiring the rights to develop geothermal resources.

Key considerations include:

- States may consider employing either a competitive or noncompetitive leasing process for geothermal resources on state-managed lands/mineral estates.
- States may consider exceptions to the competitive and noncompetitive processes described above.
- States may consider geothermal lease terms without a fixed end date for a viable, producing resource.

Key Considerations: Exploration/Drilling Approval Process

States use different approaches to specify under what circumstances exploration will be permitted as what is encompassed within the exploration approval.

Key considerations include:

- States may consider whether exploration will be limited to leased or unleased lands/rights in the geothermal resource.
- States should be specific with what is permitted under an exploration permit versus a drilling permit.
- States may wish to offer a more inclusive drilling permit that does not distinguish between exploration and drilling for production.



Photo Credit: Carol Shipman
Arizona Exploration Test Well

Additional Considerations: Drilling Approval Process



Additional considerations for drilling include:

- Depth of drilling
- Type of development (conventional vs. non-conventional)
- Modification of wells (re-drilling, change of use)

Key Considerations: UIC Process

Underground injection control (UIC) processes are driven by the Federal Safe Drinking Water Act and the Environmental Protection Agency (EPA). States may seek to obtain primacy from the EPA for all or specific classes of UIC wells. Geothermal injection wells are classified as Class 5 UIC wells.

Key considerations include:

- States without existing UIC Class V wells primacy may need to determine whether they should seek primacy for Class V wells.

States with Class V Primary	Primary Enforcement Agency
Idaho	Idaho Department of Water Resources
Nevada	Nevada Division of Environmental Protection
New Mexico	New Mexico Environment Department
Oregon	Oregon Department of Environmental Quality
Utah	Utah Department of Environmental Quality

Key Considerations: Environmental Review

States that have a state-level environmental review process (e.g., California Environmental Quality Act) may add additional considerations to geothermal regulation.

Key considerations include:

- States may want to consider how frequently a geothermal project would be subject to environmental review (e.g., leasing, exploration, drilling, utilization).

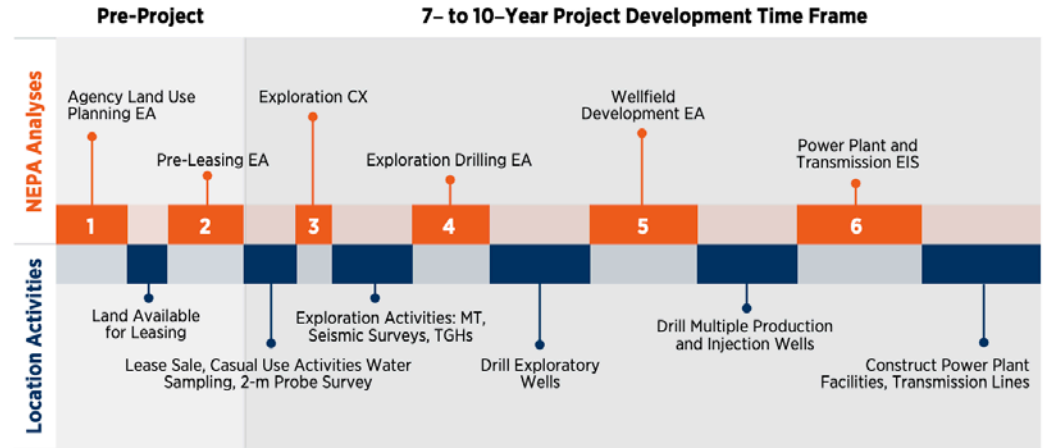


Figure 2-19. Example timeline of a geothermal project on federal lands, illustrating that a single location could trigger National Environmental Policy Act analysis six separate times

Source: Young et al. 2014

Figure Note: EA = Environmental Assessment, EIA = Environmental Impact Statement, CX = categorical exclusion, MT = magnetotelluric, and TGH = temperature-gradient hole.

Concluding Thoughts

States without existing geothermal regulations or states looking to update geothermal regulations should find the information included in this report helpful to inform policymakers/decisionmakers on what regulatory approach makes sense for their individual states.



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<https://www.nrel.gov/docs/fy23osti/86985.pdf>

Thank You!

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