

Panel Session 3A: Do Non-Conventional Geothermal Developments Need a Specialized Legal Framework?

Faith Martinez Smith

National Renewable Energy Laboratory

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Presentation Overview

- Recently published NREL report
- Report Background & Overview
- Regulatory Considerations for EGS/AGS technologies

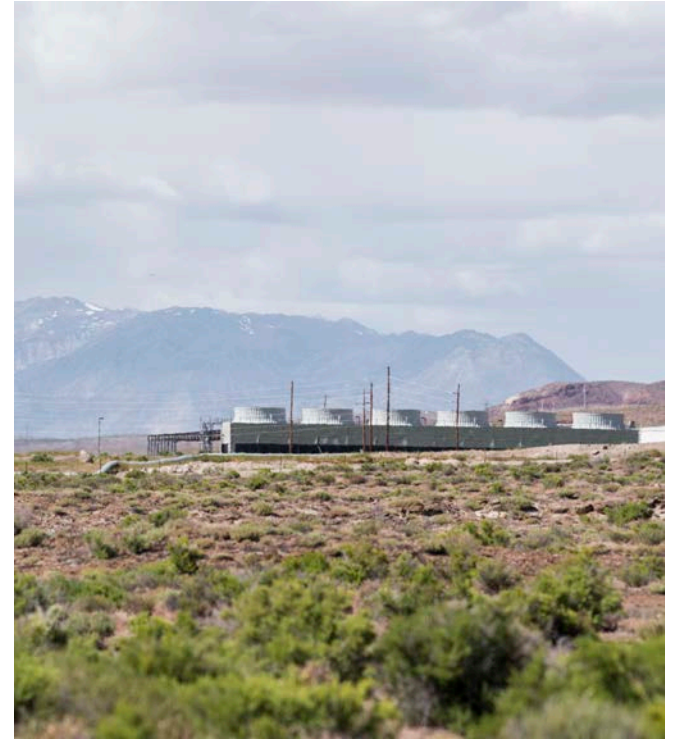


Photo by Dennis Schroeder / NREL, 48110

NREL Recently Published Report

The NREL Team recently published a final technical report entitled, *Topics and Considerations for Developing State Geothermal Regulations* (September 2023).

The following slides provide a brief overview of the project in addition to the report's structure.



Topics and Considerations for Developing State Geothermal Regulations

Aaron Levine, Faith Martinez Smith, and Heather Buchanan

National Renewable Energy Laboratory

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Office of Energy Efficiency & Renewable Energy
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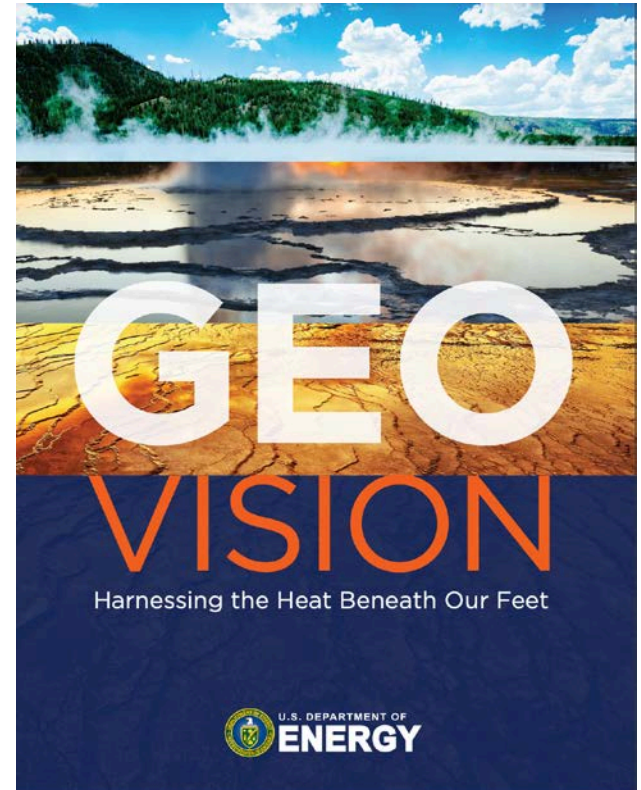
This report is available at no cost from the National Renewable Energy
Laboratory (NREL) at www.nrel.gov/publications.

Contract No. DE-AC36-08GO28308

Technical Report
NREL/TP-6A20-86985
September 2023

Report Background

- The 2019 Department of Energy's *GeoVision* and associated National Renewable Energy Laboratory Non-Technical Barriers Task Force Report identified several 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

The DOE 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.

Report Scope and Structure

- Inclusive of all geothermal power generation and direct-use technologies except for 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 power or heat (e.g., this project did not focus on the regulatory process associated with utilizing the resource).
- Covers five main topical areas 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 by Dennis Schroeder, NREL
Steamboat Hills, Washoe County, Nevada*

Regulatory Considerations for EGS/AGS Technologies

When considering a geothermal resource definition and/or right, the use of the term “heat” could be utilized to ensure inclusivity of all technologies seeking to harness the geothermal resource in question.

- This could include the use of specific terminology for what is encompassed within a geothermal right (i.e., what can and cannot be extracted from the subsurface).

The United States Federal definition of a geothermal resource is as follows:

“Geothermal steam and associated geothermal resources means:

- 1) All products of geothermal processes, including indigenous steam, hot water, and hot brines;
- 2) Steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations;
- 3) Heat or other associated energy found in geothermal formations; and
- 4) Any byproducts” (**43 CFR § 3200.1**).

Regulatory Considerations for EGS/AGS Technologies

As EGS/AGS technologies continue to commercially develop, the lifetime of operations remains unclear, as such, decision-makers may consider lease terms without a fixed end date. This would provide opportunities for all technologies to utilize the geothermal resource for as long as the resource remains viable.

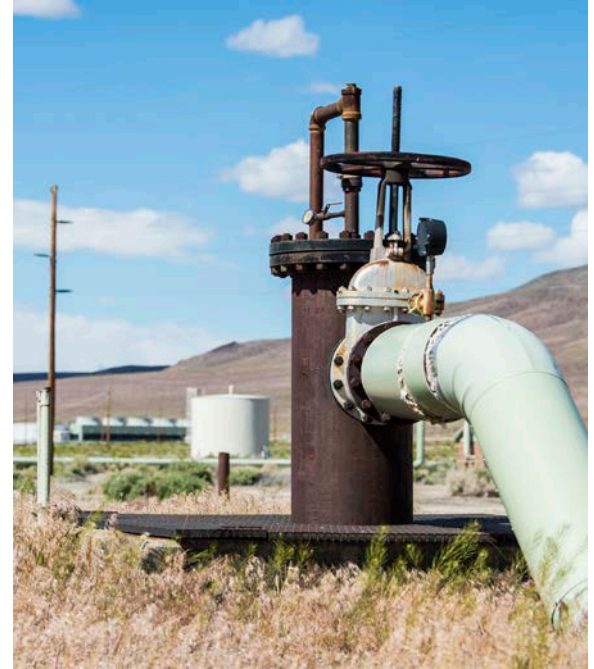
In the U.S. state of Oregon, “all leases may be without limitation as to time; but the department may cancel any lease upon failure by the lessee to exercise due diligence in the prosecution of the prospecting, development or continued operation of the mine or well, and shall insert in every such lease appropriate provisions for such cancellation (**Ore. Rev. Stat. § 273.551(2)**).

In the United States, Federal geothermal leases have a primary term of 10 years, with an initial extension of the primary term up to 5 years and an additional extension of the primary term for up to 5 years. There can also be a drilling extension of 5 years, a production extension up to 35 years and a renewal period of up to 55 years (**43 CFR § 3207**).

Regulatory Considerations for EGS/AGS Technologies

AGS/EGS technologies may not “inject” in the same manner as hydrothermal assets utilizing a UIC permit for reinjection, however, regulatory agencies may still consider any input of fluids to the subsurface an “injection,” thus requiring a UIC permit to operate.

Working directly with these regulatory agencies from project conception may be in the best interest of the developer. This can be as simple as familiarizing the regulator with the technology prior to any decision-making processes.



Injection well at San Emidio geothermal plant, Washoe County, Nevada. (Photo by Dennis Schroeder / NREL)



Topics and Considerations for Developing State Geothermal Regulations

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

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Thank you!

Faith.Smith@nrel.gov

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