Part IV

Stakeholder and Environmental Impacts

Chapter 8

New Mexican Stakeholders: Opportunities and Implications for Geothermal Growth and Development

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New Mexico is a diverse state, especially when viewed through a demographic lens. As of 2025, the state has the largest Hispanic[1] and the third-largest Native American population in the United States.[2] The state's 23 federally recognized Tribes contribute to a rich cultural landscape.[3] With regard to energy issues, New Mexico has myriad stakeholders, from ranchers and farmers in rural communities who have been in the state for generations to government agencies, research facilities, and one of the largest oil and gas industries in the nation. For geothermal energy to advance in New Mexico, proponents must engage several—if not all—of these stakeholders.

Several state agencies are involved in royalty management and geothermal energy regulation. Tribal and Pueblo leaders, whose land often overlaps with potential geothermal areas, are interested in the economic, environmental, and social impacts on their local communities. Other key stakeholders include the Department of Defense, labor unions, and even industries such as agriculture[4] and the film industry,[5] which can be affected and deserve consideration.

Other parties are interested in education, research, and technological developments related to geothermal energy, including the National Laboratories in New Mexico and state research institutions. This chapter discusses relevant constituencies that should be involved in the expansion of geothermal energy in New Mexico. We elaborate on the benefits to and effects on each of these

constituencies and provide recommendations for how to engage them in the future. By involving these groups in a respectful way, developers can foster a collaborative environment in which citizens and the state benefit tremendously from this renewable resource.

PRIMARY ROYALTY RECIPIENTS

New Mexico has only a few active geothermal projects that generate revenue for the state and federal governments. Currently, only two projects on federal land are operational and contribute to the state's income.[6] The financial benefits from oil and gas extraction and mining, of course, have proven to be much more profitable. Examining these benefits can provide insight into potential future royalties stemming from geothermal energy development.

Taxes, royalties, and other land income from oil and gas operations in New Mexico amounted to more than $15 billion combined in fiscal year (FY) 2023. Of this revenue, $1 billion went to local governments, $2.7 billion went to the federal government, and the remaining nearly $11.5 billion was divided among several state budgets (see **Figure 8.1**).[7] The funds are of particular interest to New Mexicans, as they provide millions each year to public schools, universities, health care programs, infrastructure, and more.[8]

Taxes on oil and gas (such as production, income, property, and gross receipts taxes) amounted to $6.6 billion in FY 2023.[9] Receipts from renewable energy in New Mexico, including geothermal energy, pale in comparison; for instance, the State Land Office received only $4.4 million from wind and solar

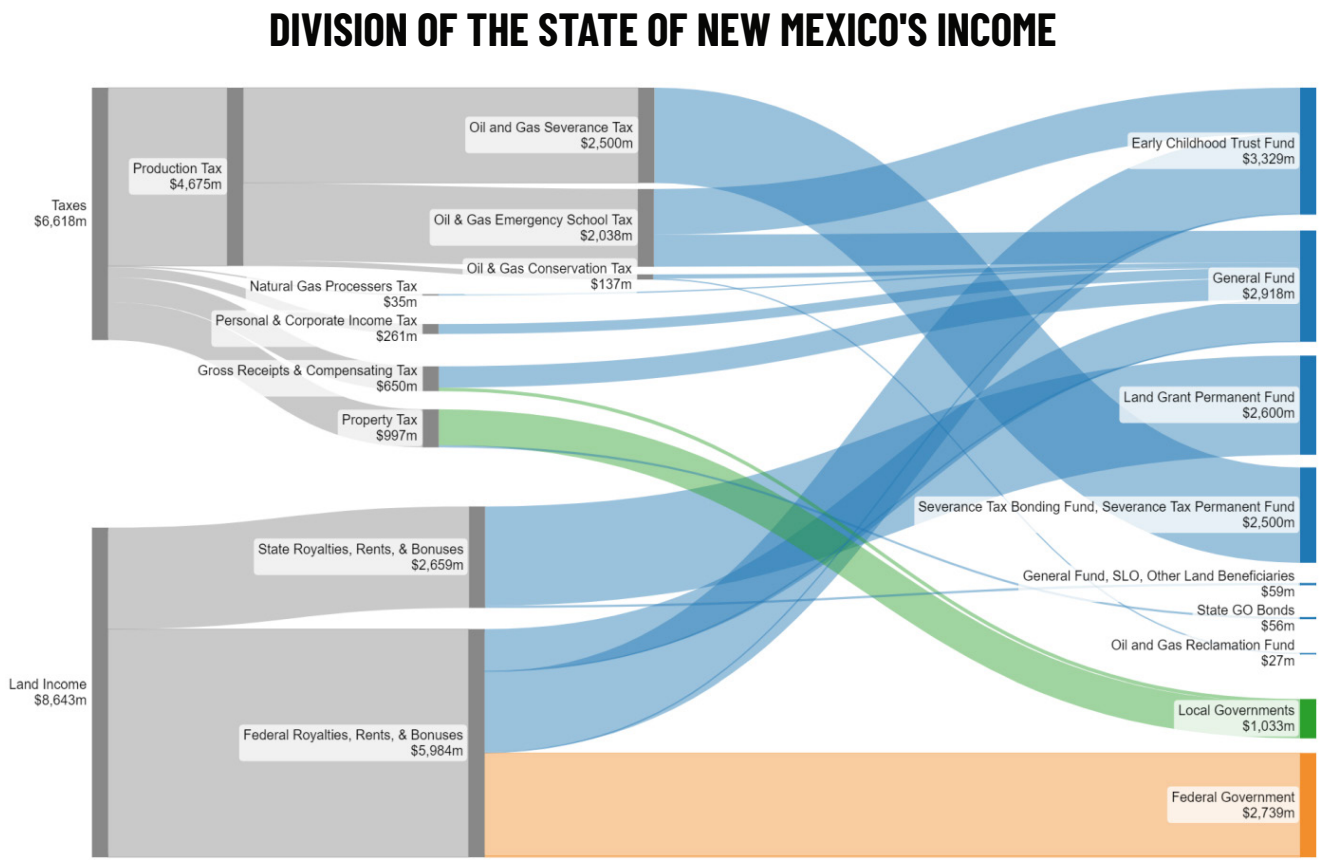

Figure 8.1: Schematic of funding sources (in gray) and sinks to federal (orange), local (green), and state governments (blue) from oil and gas revenues in New Mexico in FY2023. *Source:* Faubion, J. (2024, June 11). *Oil and gas revenue to the State of New Mexico* [Staff presentation]. New Mexico Legislative Finance Committee. https://www.nmlegis.gov/Handouts/ALFC%20061124%20Item%204%20Oil%20and%20Gas%20Revenue%20to%20the%20State%20of%20NM.pdf

in 2023.[10] Geothermal is currently only levied as a 0.19% conservation tax on the taxable value, which is calculated after royalties have been paid to the state, Tribes, and the federal government.[11] Geothermal land leases provide a bit more funding: On federal land, 50% of lease funds are distributed to the state, 25% to local counties, and 25% to the U.S. Department of the Treasury.[12] That said, in 2019, federal revenue from geothermal in New Mexico was only $122,000.[13] This amount is similar to the revenue from other renewable energy sectors. Funds collected from solar and wind, for instance, contributed slightly more than 1% to state revenue in 2023.[14]

According to New Mexico's Geothermal Resources Act, geothermal leases in New Mexico must provide "a royalty or percentage ... from the production, sale, or use of geothermal resources."[15] Given that the act does not specify the amount or percentage, it is difficult to estimate the financial contribution that geothermal royalties could make to the state. In California, geothermal energy royalty rates can range from 10% to 12.5% of the calculated product of gross value of electric power and a 42% set estimate of steam content.[16]

Federal royalties from oil and gas in 2023 amounted to $5.98 billion, of which more than half—$3.28 billion—stayed in New Mexico.[17] Royalties from operations on state lands contributed an additional $2.66 billion. (Royalty rates from oil and gas on federal lands in New Mexico were 18.75% in 2022 and 16.67% in 2023. Royalties on state lands can range from 12.5% to 20%.)[18]

Public data is not available on private landowner royalties from oil and gas in New Mexico. The royalty rates are negotiated on a case-by-case basis and can vary based on production level, resource quality, location, and market conditions. As of 2023, 11% of oil production and 15% of gas production occurred on private or Tribal lands.[19] Royalties from this land use can have an enormous impact on local and rural communities that otherwise might lack access to higher-paying jobs.

It is important to note that the major constituency of oil and gas stakeholders in New Mexico is locally owned, private businesses. These businesses make up 44% of identified entities (see Chapter 5) and have operated in the state for decades; they are used to a landscape dominated by subsurface energy. These landowners and small businesses could be major catalysts in the geothermal transition, especially when they consider the finite nature of fossil fuel extraction.[20]

MAJOR STAKEHOLDERS AND IMPACTED COMMUNITIES

Pueblos, Nations, and Tribal Communities

For the purposes of this chapter, the terms *Tribe* and *Tribes* are used inclusively to refer to Pueblos, Tribes, and Nations, all of which can be found across 7.8 million acres in New Mexico (see **Figure 8.2**).[21]

Native American Tribes are significant landholders in New Mexico and essential stakeholders in the development of energy resources, including geothermal. Developing geothermal energy could offer Tribes new revenue streams through royalties, land leases, and generated electricity for Native-owned utilities.[22,23] It could also offer employment opportunities during the exploration, construction, and operation phases of a project[24,25,26] and enhanced energy sovereignty from external generating stations and utilities.[27]

As an example of how geothermal could support Tribes, several of New Zealand's geothermal hubs have strong Tribal links. Māori communities play significant roles in the ownership, development, and cultural stewardship of these resources.[28,29] In some cases, industrial heat users are located close by so they can benefit from the geothermal heat. The Miraka and Waiū dairies are both partially owned by Tribes and use geothermal heat to process their milk.[30,31]

The development of geothermal projects on Tribal lands is both feasible and worthy of consideration. However, it must be approached with the recognition that each Tribe may pose a distinct set of questions and offer unique perspectives on energy development, reflecting these communities' cultural, historical, and political heterogeneity.[32]

Each Tribe in New Mexico is a sovereign Nation with its own government and legal system.[33] When engaging with Tribes, it is necessary to be familiar with their governance structures. A Tribe's leadership

is determined by either elections or appointments conducted by the Tribal council or traditional leaders or both. The authority to adopt such governing frameworks was granted under the Indian Reorganization Act (IRA) of 1934, which encouraged federally recognized Tribes to develop formalized systems of self-governance.[34] Since this act, many Tribes have ratified constitutions and bylaws that define the structure of their governments, delineate officials' powers and duties, and articulate their citizens' rights and responsibilities. These documents serve as the foundational legal instruments for contemporary Tribal governance.

Each Tribe has its own unique government setup, often split into three branches:

- Governors serve as the executive in Pueblos. Tribal presidents or chairpersons can be found in other Tribal governance structures. The Navajo Nation, for example, has a president.

- Tribal councils serve as the legislative branch of Tribal governments and are composed of elected or appointed bodies, in accordance with each Tribe's established governance structure. In some cases,

TRIBAL AREAS WITHIN NEW MEXICO, 2021

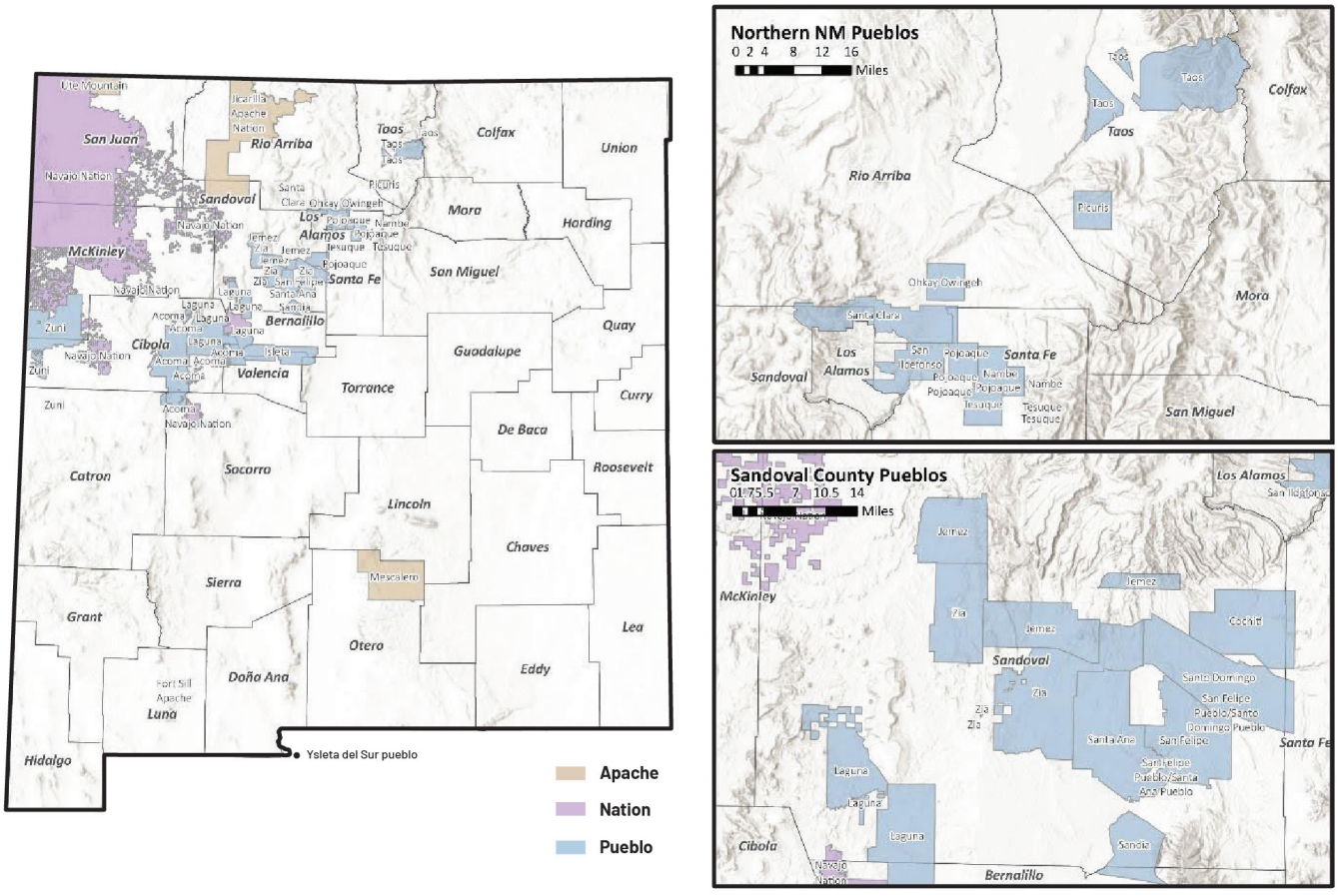

Figure 8.2: Tribal areas in New Mexico, 2021. Source: New Mexico Office of Information Technology. Map produced by Earth Data Analysis Center; Data Sources: US Census, RGIS; Base map: "World Topographic Map" and "World Hillshade" by Esri, NASA, NGA, USGS, New Mexico State University, Texas Parks & Wildlife, HERE, Garmin, SafeGraph, METI/NASA, Bureau of Land Management, EPA, NPS, USDA. https://www.doit.nm.gov/wp-content/uploads/sites/4/2021/12/NM_Tribal_Areas_2021.pdf

AN OVERLAP OF TRIBAL LANDS AND GEOTHERMAL RESOURCES

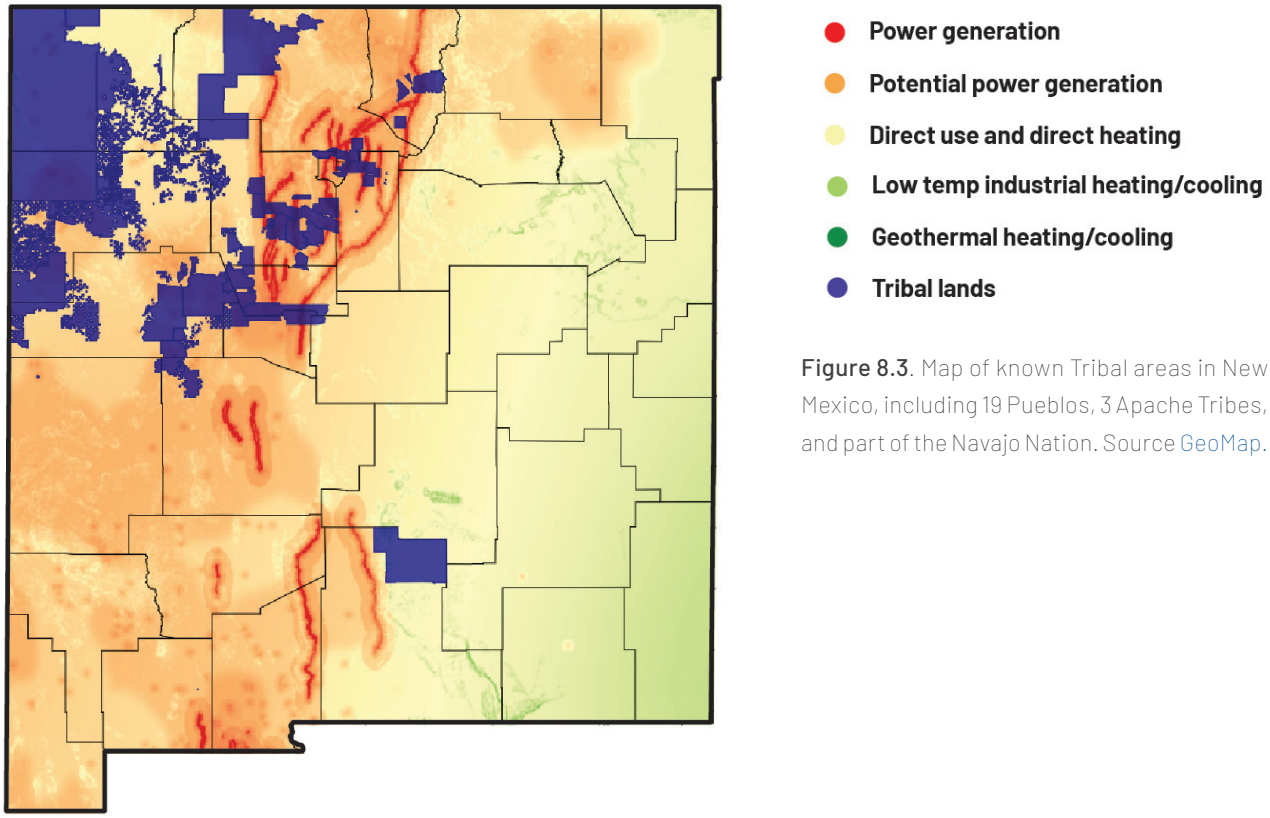

Figure 8.3. Map of known Tribal areas in New Mexico, including 19 Pueblos, 3 Apache Tribes, and part of the Navajo Nation. Source GeoMap.

councils may include former governors or other Tribal leaders. Tribal councils meet with frequencies established in their governing documents.

- Tribal courts serve as the judicial systems that oversee law and dispute resolution on Tribal lands.

Tribal governments have two additional unique aspects:

- Traditional leaders in some Pueblos are called *war chiefs* or *church helpers*. These leaders are separate from the elected or appointed executive leaders.

- Tribal administrators are employed at the discretion of the executive leader. This position will likely be the point of contact for a Tribe about projects. The individual in this position can remain over the years, while executive leadership may change according to appointments or elections.

Geothermal technology may not be on the radar of some Tribal leaders. Many Tribes do not have the in-house technical resources needed to effectively engage in these discussions.[35] In addition to these resource limitations, mistrust generated by past experiences with developers involving things such as housing, solar, and infrastructure development has made Tribes cautious. Fortunately, there are Tribal organizations working to demonstrate the potential benefits of using solar energy as a pathway to Tribal energy sovereignty. One such organization undertaking this effort is Sovereign Energy, whose executive director and founder, Mayane Chavez Barudin, was instrumental in working with the Tribes and bringing their concerns to the table during the development of the Community Solar Act in 2021.[36] A similar collaborative approach must be established for geothermal energy, and some initiatives are already underway. The Santa Fe–based company EnviTrace, for example, is actively developing a database of information about geothermal energy specific for Tribes. The company's Tribal outreach has resulted in discussions with some Pueblos to provide technical assistance on the potential development of geothermal projects.[37]

TRIBAL INTEREST IN GEOTHERMAL ENERGY

There are no current geothermal projects on Tribal lands in New Mexico, but several Tribes and Pueblos have expressed interest and have taken steps forward on geothermal energy exploration and development:

- The Jicarilla Apache Nation is taking part in ongoing geothermal feasibility studies.[38]
- The Navajo Nation, which also has oil and gas leases on its land, is consulting with developers for geothermal energy production on its lands in neighboring Arizona and Utah and is in discussions about expanding the idea to New Mexico.[39]
- The Jemez Pueblo conducted a feasibility study with the U.S. Department of Energy that found multiple sites with geothermal potential. [40]
- The Zia Pueblo, with the Department of Energy, conducted a feasibility study in the early 2010s to assess the viability of geothermal resources and identified a promising opportunity for sustainable energy development.[41]
- The Acoma Pueblo have had favorable heat characteristics for low-temperature geothermal found on their lands west of Albuquerque. [42]
- The Ohkay Owingeh submitted a funding application to the Department of Energy for a geothermal feasibility study in 2025.[43]

The impacts on the communities near geothermal project sites are most likely to be influenced by geothermal siting, design, and operations. Tribes may have several considerations for geothermal energy projects, including economic factors, effects on the community, and long-term environmental implications.[44,45]

Economically, unemployment rates are higher than average on Tribal lands, and limited revenue opportunities make potential job creation and royalties appealing.[46] Geothermal development can help resolve some of these issues through access to higher wages, more local employment, energy independence, and long-term resilience. In some cases, if a holistic approach is used when considering a geothermal project, the project could also address food security. Heat pumps in greenhouses, for example, could be functional year-round and provide high-quality locally grown food, which could then be used for health programs, senior centers, schools, clinics, and hospitals. Economic development could also be bolstered through year-round farming operations, trade jobs in operations and maintenance at geothermal installations, and the sale of power to the local utility company. If geothermal technology is used in residential homes and Tribal businesses, the associated utility bills would be lower, which would benefit both household and business budgets.

Early and transparent communication with local stakeholders, coupled with clear communications about the benefits to communities, can improve social and political acceptance of geothermal development. Politically speaking, sovereignty and Tribal decision-making authority are critical, and negative experiences with previous development projects can foster mistrust among community members.[47] A 2021 white paper submitted to the Planetary Science and Astrobiology Decadal Survey[48] emphasizes that "relationship building with the communities is first and foremost the foundation upon which all collaborations should be centered." Additionally, patience and two-way cultural training are imperative, as communication styles and internal difficulties can delay Tribal decision-making.[49] Social apprehensions include cultural preservation, respect for sacred sites, and community well-being. Developers should create a community engagement program to promote mutual respect, foster collaboration, and ensure Tribes can trust that their concerns will be addressed throughout the process.

The environmental concerns associated with energy development are deeply rooted in cultural beliefs and respect for the land. Some risks that the Tribe will likely consider are environmental degradation, water contamination, ecological disruption to cultural heritage sites, and perceived loss of control in preservation and conservation. The use of water and land disturbance are primary concerns, especially given the climate in New Mexico. Clear communication about the environmental benefits of geothermal—including improved air quality, reduced pollution risk, and minimized land footprint—will be critical. Developers will need to have a systematic environmental impact analysis completed and presented to Tribes to ensure their concerns are proactively addressed.

Rural and Low-Income Communities

Rural and low-income communities are often sensitive to economic changes because they have fewer industries and a small workforce, especially in New Mexico. Eddy and Lea counties, for example, are heavily dependent on oil and gas production. Others, such as Doña Ana and Hidalgo counties, depend on farming and ranching.[50] Geothermal energy can offer economic diversification in the form of local jobs that can last for decades.[51] Furthermore, a 2014 feasibility study indicated that geothermal energy development in rural areas could provide power to settlements up to 25 miles (40 kilometers) from a plant site.[52] Rural and low-income communities would likely see substantial economic benefits from geothermal energy and thus would be keen on its development.

Direct-use systems for local communities are also promising, as these have a relatively low initial cost and are a versatile option that has been applied to projects ranging from thermal energy networks to agri-processing to drying wastewater sludge.[53] In New Mexico, direct-use geothermal meets up to 93% of the thermal energy needs of the Masson Farms greenhouse, the second-largest greenhouse in the United States and an employer of 200 people in Doña Ana County.[54] In the city of Española, the geothermally heated City Hall has saved the city nearly $42,000 per year in heating and cooling costs.[55] And one year, during an intense cold weather pattern, the City Hall was the only public building in town that remained heated.

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Geothermal offers environmental benefits to local communities as well, including improved air quality, low land footprint, and little to no environmental pollution.[56] Each factor contributes to better public health as well. In fact, a 2020 study found that the main risk to public health from geothermal energy in local communities is exposure to hydrogen sulfide gas.[57] However, emissions of this gas are reduced by 99.9% with modern abatement systems in traditional binary and flash power plants.[58]

It is worth noting that proper education will be paramount for ensuring geothermal is viewed positively in local communities and is part of geothermal operators' corporate social responsibility initiatives. A 2016 study found that, when properly applied, robust local programs such as new business opportunities, additional training, and contributions to existing infrastructure are highly regarded by local communities.[59]

Oil and Gas, Mining, and Other Workforce Groups

Although New Mexico's oil and gas industry ranks high nationally and added $16.1 billion to the state's gross domestic product in 2022, it only employs 8.5% of New Mexicans.[60] This is still a sizable population of workers who have direct knowledge of subsurface resources, drilling, engineering, and geology that can be applied to geothermal. In fact, a 2024 survey found that the vast majority (95.5%) of the oil and gas workforce in the Permian Basin of southeastern New Mexico would participate in additional training if the training was free and convenient.[61] Though the survey did not specify geothermal energy training, we could assume that additional energy jobs, and the training for them, would be of significant interest since nearly 60% of the same surveyed group reported being concerned that clean energy jobs would not be available in New Mexico and 65% feeling concerned they would need to move as a result.[62]

BUREAU OF LAND MANAGEMENT GRAZING ALLOTMENTS

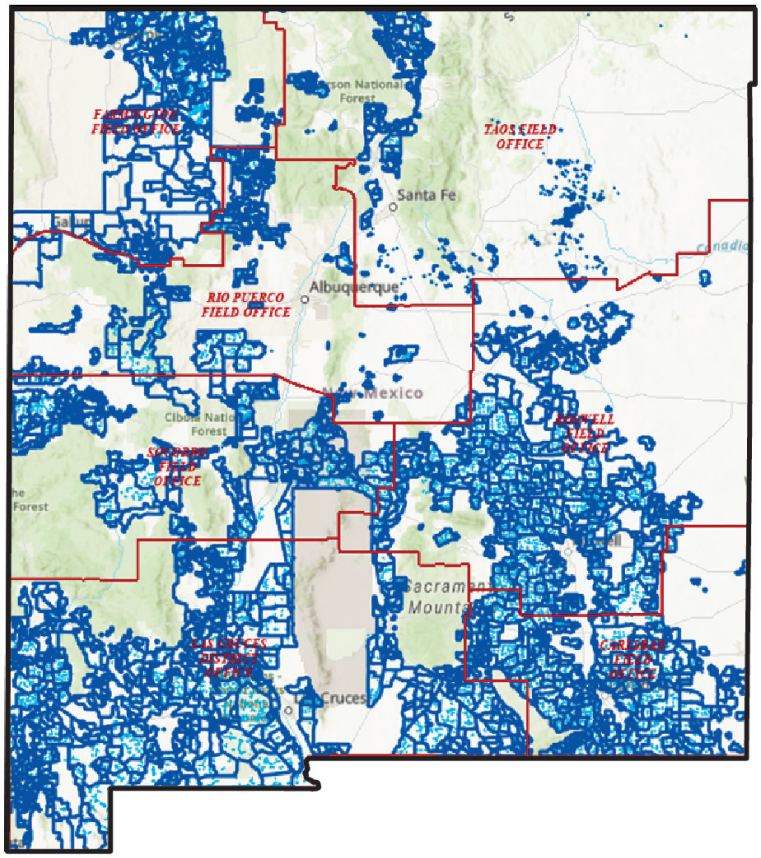

Figure 8.4: Bureau of Land Management grazing allotments in New Mexico as of 2023. *Source*: Bureau of Land Management. *BLM New Mexico statewide spatial data*. U.S. Department of the Interior. https://blm-egis.maps.arcgis.com/apps/webappviewer/index.html?id=dea6e3c9f3734e55be5a047f834b9c9d

Nearly half of the oil and gas workforce in the state is Latino, with a sizable portion being immigrant workers and approximately 20% making less than $25,000 annually.[63] These workers will be crucial to the development of geothermal energy in the state.

Other workforce groups will become more interested as the geothermal employment base grows. Labor unions, for example, are a prominent force in several industries. Of the 199 labor unions present in the state, the largest include mining and electrical engineering,[64] both of which are fields with direct crossovers to roles in a geothermal power plant. The Bureau of Labor Statistics and the Geothermal Energy Association estimate that a 50 megawatt geothermal power plant would need between 697 and 862 workers to be completed.[65,66] While the majority of these jobs are time limited during the various phases of development (i.e., exploration, drilling, plant design, and construction), if the state achieves the goal outlined in this report of developing 5 gigawatts of geothermal electricity, these jobs could be permanent, distributed across approximately 100 development projects over many years.[67] Union membership across these phases ranges from 4.9% (oil and gas sector average) to 20.8% (utility sector average).[68,69]

If the state were to adopt thermal energy networks, potentially more union jobs would be created. Utility workers, who have high levels of union membership, will also have a vested interest in geothermal development because they can stay employed while working on the transmission and distribution of electricity.

Other workforce groups could turn their attention toward geothermal energy, including agriculture, mining, and rural industries in regions with geothermal potential. Chapter 5, "Leveraging Oil and Gas Technologies,

Labor, and Workforce to Advance Geothermal in New Mexico," shows that the overlap of mining resources with geothermal potential is substantial, especially in the Rio Grande rift and in the southwestern part of the state. There is also a lot of overlap in direct-use geothermal resources (as discussed in Chapter 4) in the Rio Grande Valley[70] for agriculture and the farmland (see **Figure 8.4**). This overlap means ranchers and farmers will have an active interest in the geothermal development that could occur on their land.

Environmental interest and advocacy groups will also be a crucial part of the geothermal energy development process given the significant potential and benefits of geothermal energy in New Mexico. Environmental advocates will be needed to help advance more geothermal policies while also ensuring that frameworks are in place to mitigate any negative impacts.

Department of Defense

The Department of Defense is a potential early adopter of geothermal, as the agency has high energy demands, is in several remote locations, and has substantial capital to pursue new technologies (see **Figure 8.5**).[71] New Mexico is home to Kirtland and Holloman Air Force Bases. Major installations such as White Sands Missile Range[72] and Fort Bliss (partially in Texas)[73] —in the top five largest military sites in the United States by square miles—have garnered attention as possible development sites.[74,75] A 2017 Play Fairway Analysis examined the Tularosa Basin, a 100-mile-long geologic feature in southern New Mexico, for its geothermal energy potential.[76] The study identified 12 potential geothermal areas, with the most promising areas to the west of White Sands and in the northeast corner of Fort Bliss—where four slimholes were drilled by Sandia National Laboratories in the 1990s that reached

MAP OF MILITARY INSTALLATIONS AND GEOTHERMAL POTENTIAL

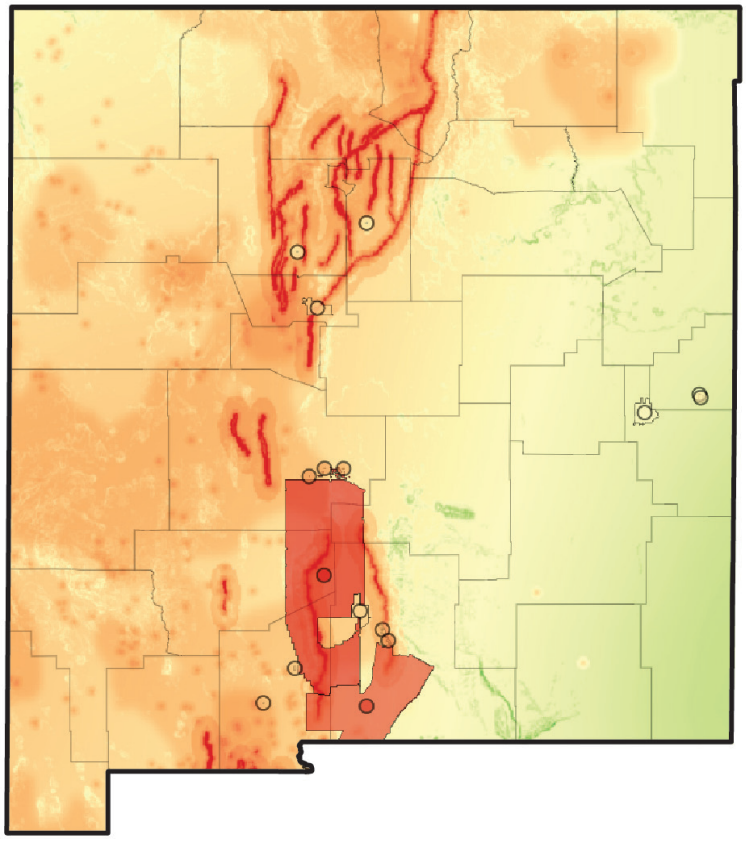

Figure 8.5: Note the large military installations in south central New Mexico directly above temperatures of at least 300°F (150°C). *Source*: Anderson, K. (2011). *Broad overview of energy efficiency and renewable energy opportunities for Department of Defense installations*. National Renewable Energy Laboratory.

close to 180°F (80°C–85°C).[77] An additional well was drilled in 2013 and reached 200°F (93°C) at 3,000 feet (900 meters) deep.[78] The site was determined to be suitable for a 20 megawatt power plant that could contribute 425 gigawatt hours of energy per year—roughly 10% of Fort Bliss's demand.[79]

Additional geothermal technologies, including ground source heat pumps, could be applied at White Sands and have been in use at Fort Johnson in Louisiana for more than a decade.[80,81] Though harnessing heat from coproduced water in oil and gas has never been done at a military site, it is done at oil and gas facilities out of state and is a viable option in southeastern New Mexico.[82,83] (In fact, a 1981 study argued for a high-temperature hydrothermal system beneath Kirtland Air Force Base near Albuquerque based on the intersections of faults, the presence of surface mineral deposits, and inferred high subsurface temperatures.[84]) Given the numerous potential geothermal applications, high electricity demand, and prominent socioeconomic position in New Mexico, Department of Defense installations should be a target stakeholder for future development.

State Agencies

Several state agencies help monitor geothermal energy development and are active stakeholders:

- The **Royalty Management Division** within the State Land Office processes royalty revenue from oil, gas, and geothermal operations.[85]
- The **Energy Conservation and Management Division** of the Energy, Minerals, and Natural Resources Department regulates exploration, development, and production of high-temperature geothermal resources in New Mexico.[86]
- The **Energy, Minerals, and Natural Resources Department** is also now responsible for the management of repurposing abandoned oil and gas wells for geothermal energy.[87,88]
- The **Ground Water Quality Bureau** within the New Mexico Environment Department oversees low-temperature resources.
- The **New Mexico Environment Department** oversees air permitting for potential gaseous emissions from geothermal operations.[89]
- The **Office of the State Engineer** supervises the appropriation and distribution of all surface water and groundwater in New Mexico, which is applicable because surface waters are used in geothermal drilling, construction, and operations.[90]

INNOVATION STAKEHOLDERS

Public and Private Universities

Academic institutions have a strong interest in participating in data-sharing initiatives—and often are required to do so. Plans at the New Mexico Institute of Mining and Technology to compile and share geothermal research findings through a centralized database reflect a commitment to collaboration. In addition, New Mexico's academic institutions are at the forefront of geothermal research and development.

- **University of New Mexico (UNM):** UNM researchers are exploring more efficient and sustainable materials for extracting geothermal energy, including high-temperature cement blends and specialized polymers.[91] In 2021, the Department of Energy awarded UNM a $2 million grant to develop technologies for enhanced geothermal systems focused on overcoming challenges such as thermal short-circuiting.[92] UNM has also considered updating its own independent utility system with a district heating geothermal system with wells drilled adjacent to campus.[93]
- **New Mexico Institute of Mining and Technology (NMT):** NMT's Bureau of Geology and Mineral Resources has been instrumental in geothermal exploration, resource assessments, heat flow mapping, and engagement in other geothermal research for more than 20 years.[94] NMT's Petroleum Recovery Research Center has expertise in related fields that is widely applicable to the geothermal industry.[95] Additionally, NMT houses GO-TECH, a historical database of oil and gas data that can be used in future research on coproduced geothermal or in adapting abandoned wells for geothermal

NEW MEXICO'S GEOTHERMAL DATA CENTER POTENTIAL

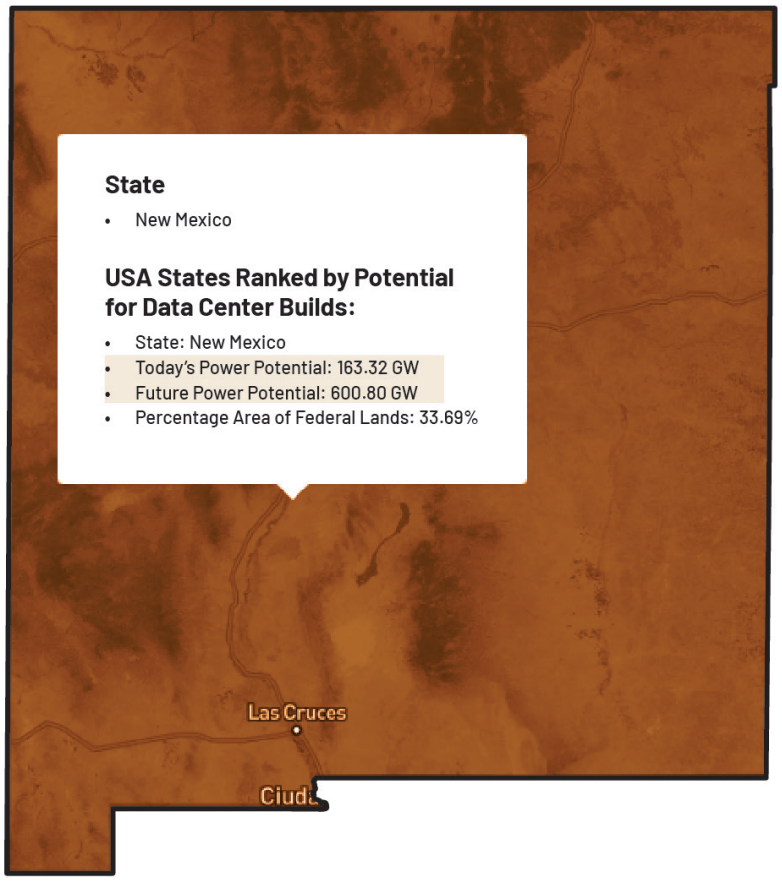

Figure 8.6: According to data from GeoMap, New Mexico is one of the top states for geothermal data center potential, with 163 gigawatts of power potential down to 5,000 meters. Source: GeoMap

purposes.[96] Finally, NMT has recently announced that the first geothermal training program in the state—with courses on well completion, advanced thermodynamics, advanced production design, and more—is slated to start in fall 2025.[97]

- **New Mexico State University (NMSU):** NMSU has been central to the state's geothermal research, notably through the 12,000 square foot (1,100 square meters) Geothermal Greenhouse Facility.[98] This facility served as a testing ground for commercial growers considering operations in southern New Mexico. The facility was heated via a district heating system that was active from 1979 through 2015.[99]

Department of Energy National Laboratories

New Mexico is fortunate to be one of only three states with multiple National Laboratories, both of which have a history of research into geothermal energy. In fact, New Mexico has 20 federal, state, and private laboratories,[100] all with robust supercomputing power to help solve the most challenging technical issues.[101] National Labs can play a role in policy initiatives, spark entrepreneurial growth in local areas, and inspire collaboration on both domestic and international scales.[102]

- **Sandia National Laboratories:** Sandia National Laboratories support advanced geothermal research focusing on drilling technologies, wellbore integrity, and high-temperature tool development, particularly for enhanced geothermal systems.[103] Previous work has improved polycrystalline diamond drill bits, which drill three times faster than standard bits.[104] Sandia National Laboratories are also known for high-resolution, high-fidelity microseismic monitoring.[105]

- **Los Alamos National Laboratory (LANL):** Building on a lengthy history of hot dry rock projects,[106] LANL conducts studies on thermodynamics, advanced

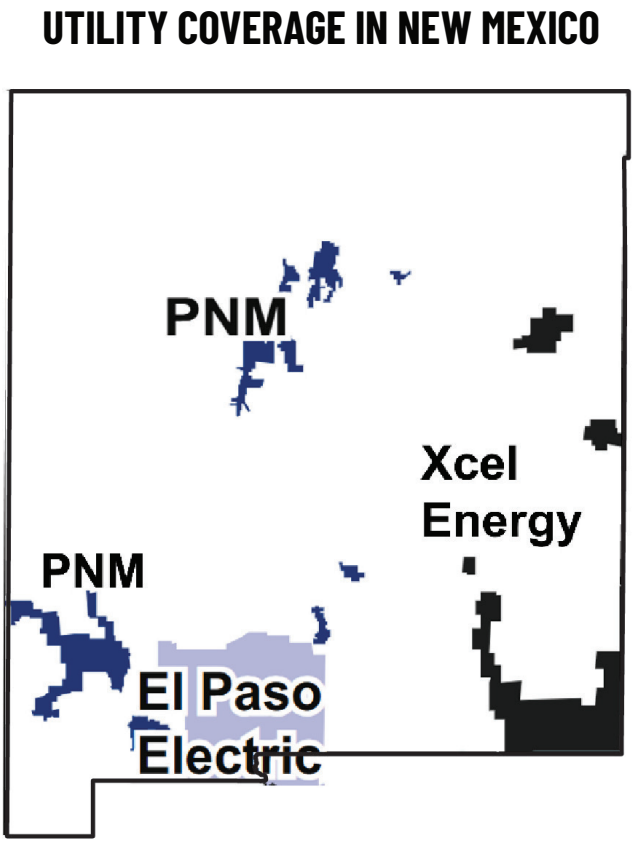

Figure 8.7: Map of major electric utility coverage areas in New Mexico. *Source*: Edison Electric Institute. (2024). *EEI U.S. member company service territories* [Map]. https://www.eei.org/-/media/Project/EEI/Documents/About/EEI-Member-Map.pdf

materials, and how to understand heat transfer efficiency in porous media for potential applications to geothermal systems through advanced computing in the geosciences.[107] LANL also hosted the first demonstration project of enhanced geothermal system technology in the 1970s in an early effort to demonstrate the feasibility of this technology. [108]

Data Centers

The introduction of artificial intelligence (AI) has created a need for more data centers, which are predicted to demand immense amounts of energy—as much as 9% of total U.S. demand by 2030.[109] Geothermal energy and related technologies can help satisfy some of this demand and have several benefits, including a high capacity factor, wide geographic availability, and a large volume of subsurface mass from which to harness or store heat.[110]

A 2025 study found that almost two-thirds of the growth in data center energy demand could be met in a cost-effective way by geothermal energy and that 13 of the 15 largest data center markets in the United States could meet 100% of their power needs via geothermal.[111] Analysis shows that New Mexico is ranked as one of the best states for geothermal data centers, with a potential for 163 gigawatts of energy (see Figure 8.6). The state offers several advantages, such as a central location between major markets in the Pacific, Mountain, and Central regions of the United States; competitive electricity costs; and a low risk of natural disasters.[112,113,114]

The Trump administration recently issued a Request for Information regarding building AI infrastructure on Department of Energy land, including at Los Alamos and Sandia National Laboratories.[115] In response, Project InnerSpace collected data that shows that the subsurface in those locations offers a significant opportunity for developing geothermal-powered data centers. These centers would leverage domestic, abundant, secure, baseload electricity—and support energy resilience and U.S. leadership in innovation and advanced drilling and completion technologies.

A current project by the National Renewable Energy Laboratory aims to use underground thermal energy storage to help cool data centers.[116] More advanced research will be needed to fully realize all applications of geothermal energy for data centers, but the data centers are nevertheless an important future stakeholder in New Mexico, especially considering societal reliance on AI.

Industry and Utility Companies

A final stakeholder group in geothermal development includes private companies. Some, such as utilities, are inevitably intertwined with energy development, as most geothermal operators are not also involved with the transmission and distribution of electricity. The main electric utilities in New Mexico, with some also having customers in west Texas, are El Paso Electric, Public Service Company of New Mexico (PNM), and Xcel Energy.[117] Although PNM is the only purchaser of

geothermal power from the Lightning Dock Geothermal Facility,[118] Xcel Energy and El Paso Electric currently serve customers in eastern New Mexico and southern New Mexico and west Texas (**Figure 8.7**), respectively. These companies would benefit from additional geothermal energy in New Mexico's energy portfolio.[119]

Other private companies are potential geothermal operators in New Mexico and are making strides in development. Zanskar Geothermal and Minerals, the current operator at Lightning Dock, recently drilled one of the most productive pumped geothermal wells in the world.[120] At the same location in 2022, Eavor Technologies drilled the deepest and hottest geothermal well in New Mexico, which reached around 480°F (250°C) at 18,000 feet (5,500 meters) and demonstrated the success of several new drilling technologies.[121] Additionally, several companies—including TLS Geothermics, XGS Energy, and Sage Geosystems—were designated as "awardable" by the Department of Defense for geothermal projects on U.S. Air Force bases, including bases in New Mexico.[122] Private companies also have opportunities to take on direct-use projects. As mentioned in Chapter 4, these can include agriculture, farming, greenhouse operations, and even oil and gas companies. Add to all those, potential district heating networks at places like the hot springs resorts in Mesa del Sol, a neighborhood in Bernalillo County, New Mexico.[123] Regardless of the application, private companies will be pivotal in expanding geothermal energy in New Mexico and are arguably the stakeholders with the most to gain, as they can serve as a launchpad to propel development forward.

CONCLUSION

A 2022 study noted that New Mexicans want an energy transition done *with* them, not *to* them.[124] Engaging all stakeholders is paramount to fostering involvement and collaboration so that every group feels included and valued. A single fracturing of stakeholder relationships during the development of any project could be destructive for all future projects. In this spirit, we propose the following recommendations to encourage positive interactions among all groups:

1. Strengthen collaboration and promote mutual understanding between state agencies, private developers, and Tribal governments. Tribal leadership is encouraged to view geothermal as part of a diversified economic strategy that aligns with both cultural values and long-term energy sovereignty.

2. Respect Tribal sovereignty and ensure Free, Prior, and Informed Consent (FPIC) processes are upheld. Support Tribal access to feasibility studies, technical assistance, and grant writing early and often in the project development process. Assist Tribes with locating funding sources for future projects.

3. Labor unions in New Mexico can benefit substantially from increased geothermal development and will likely express clear interest, with indications that even conservative geothermal growth would result in increased union membership in the state.

4. The Department of Defense has demonstrated interest in geothermal, and several installations have favorable conditions for power installation. As an entity with high capital and high need, these sites should be examined early for new projects.

5. Data centers pose a new, politically favorable application of geothermal energy with direct relevance to New Mexico. These opportunities should not be overlooked.

6. Environmental interest and advocacy groups are a crucial part of the geothermal energy development process in New Mexico. Engaging with environmental advocates is key to advancing geothermal policies while also ensuring that frameworks are in place to mitigate any negative impacts.

7. Innovative partnerships will be critical to solve the technical, economic, and social challenges of geothermal energy in the state. With an extensive network of universities, national labs, and private companies, new collaborations should be encouraged.

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