

The Energy Wealth of Indian Nations

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Economists have long sought to explain why some nations are rich while others are poor. Although the precise growth recipe remains a matter of debate, there is broad agreement that secure property rights and a stable rule of law are necessary ingredients for economic growth. Property rights provide incentives to generate wealth, encourage resource stewardship, and form the basis for market exchanges. The rule of law promotes long-term investment by reducing the cost of engaging in market exchange and encouraging capital accumulation.

The importance of the institutions of property rights and the rule of law is evident on American Indian reservations. Crossing into reservations, especially in the West, reveals islands of poverty in a sea of wealth. According to the most recent Census data available, per-capita income for all American Indians living on reservations in 1999 was \$7,846 compared to \$14,267 for Indians living off reservations and to \$21,587 for all U.S. citizens. Thirty-nine percent of Indians lived in poverty, compared with 9 percent of white Americans, and Indian unemployment was almost four times higher than the U.S. average.¹

These low incomes exist despite the fact that many Indian reservations contain considerable natural resource wealth including energy resources. Reservations contain almost 30 percent of the nation's coal reserves west of the Mississippi, 50 percent of potential uranium reserves, and 20 percent of known oil and gas reserves.² According to the U.S. Department of the Interior, there are "15 million acres of potential energy and mineral resources" that are

¹ Grogan, Maura. 2011. *Native American Lands and Natural Resource Development*. Revenue Watch Institute: 6.

² Grogan, 2011: 3.

undeveloped on Indian lands and only 2.1 million acres of Indian land are being tapped for their energy resources.”³ According to one study, the Crow Reservation in south-central Montana contains coal and other assets valued at nearly \$27 billion, or approximately \$3.3 million per person, making the tribe one of the largest coal owners in the world. Despite such energy wealth, the tribe’s annual rate of return on coal assets is a mere 0.01 percent.⁴ The tribe has reported unemployment rates as high as 78 percent.⁵ Similarly, the Fort Berthold reservation in North Dakota sits atop one of the nation’s largest oil and gas plays, but the development of resources on the reservation is slower than off the reservation.⁶ Simply put, energy resources on Indian lands are substantial, and the potential wealth which could be derived from such resources presents an opportunity for significant economic growth for Indians and for the U.S. economy.

Given the energy wealth of Indian nations, why do reservations remain poor? The answer has to do with the structure of the economic and legal institutions on reservations. Abundant natural resources are neither a necessary nor a sufficient condition for economic growth. What matters for economic growth in general and on reservations are the institutions that determine whether human capital, physical capital, and natural resources are used efficiently. In their search for the factors that promote economic growth on reservations, Stephen Cornell and Joseph Kalt explain that “a tribe’s resources can be wasted or go untapped unless that tribe can establish an incentive environment that channels them into productive ends.”⁷ Similarly, Acemoglu, Johnson, and Robinson conclude that “countries with better ‘*institutions*,’ more secure property rights, and

³ Middleton, Robert W. 2008. Hearing before the Committee on Indian Affairs, US Senate. *Indian Energy Development*: Statement of Dr. Robert W. Middleton, 110th Congress, Second Session, May 1. http://www.indian.senate.gov/public_files/May12008.pdf

⁴ Cornell, Stephen, and Joseph Kalt. 2000. Where’s the Glue? Institutional and Cultural Foundations of American Indian Economic Development. *Journal of Socio-Economics* 29(5): 443-70.

⁵ Cornell and Kalt, 2000.

⁶ Crane-Murdoch, Sierra. 2012. The Other Bakken Boom: A Tribe Atop the Nation’s Biggest Oil Play. *PERC Case Study*. Available at <http://perc.org/articles/other-bakken-boom>

⁷ Cornell and Kalt, 2000: 446.

less distortionary policies will invest more in physical and human capital, and will use these factors more efficiently to achieve a greater level of income.”⁸

The complex history of the federal government’s relationship with American Indians has largely denied tribes the institutional attributes that promote widespread economic growth. Crossing a reservation boundary means entering a very different set of legal institutions, including property rights and the rule of law. Outside reservations, local, county, state, and federal governments provide stable property rights through law enforcement and judicial institutions conducive to economic growth. Inside reservations, however, property ownership is a mosaic of private lands and trust lands. Under trust tenure, the federal government holds title to individual Indian lands and to tribal lands and oversees their use. This trust status has prevented tribes from fully capitalizing on their natural resource wealth. For example, Anderson and Lueck (1992) found that agricultural productivity on individual trust lands was 30 to 40 percent less and on tribal trust lands 80 to 90 percent less than on similar fee simple lands on a reservation.⁹ In the case of energy resources, at least four federal agencies are involved in the execution of any energy lease on tribal lands.¹⁰ Until the 1970s, tribes could not negotiate the terms for energy leases on their lands, and the Bureau of Indian Affairs (BIA) remains responsible for approving and overseeing energy development on Indian trust land. Not only does the BIA’s trust authority raise the cost of energy development on Indian lands, it has a long history of not living up to its fiduciary responsibility of managing Indian trust funds as evidenced by the 1996 class-action suit, *Cobell v. Salazar*.¹¹ This suit alleged that the U.S government incorrectly accounted for

⁸ Acemoglu, Daron, James Robinson, and Simon Johnson. 2001. The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*. 91(5): 1369.

⁹ Anderson, Terry L, and Dominic P. Parker. 2011. Un-American Reservations. *Defining Ideas*. February 24. Available at <http://www.hoover.org/publications/defining-ideas/article/67756>. Accessed July 14, 2013.

¹⁰ Grogan, 2001: 3.

¹¹ *Cobell v. Salazar* 573 F.3d 808 (D.C. Cir. 2009).

income from trust assets belonging to Indian landowners. The case settled in 2009 with the federal government agreeing to pay individual Indians and tribes \$3.4 billion.

To make matters worse, tribes often have difficulty attracting investment for energy development on reservations if they misuse their sovereign powers to tax and to use eminent domain. While tribal sovereignty can be an asset when it places control over energy development in the hands of tribal members because the tribe has a larger stake in the outcome, it can also be a liability if it makes the rule of law on reservations less certain. All governments face the dilemma of whether to promote institutions which create a climate for investment based on the rule of law or whether to pursue policies with short-term benefits by taking profits and property rights from investors.¹²

Several high-profile court cases involving takings of property by a few tribes have caused investment concerns throughout Indian Country.¹³ The Jicarilla Apache tribe in Arizona faced this dilemma when it began negotiating with petroleum companies to explore and produce oil and gas on its reservation. The contracts provided for royalty payments of 12.5 percent. Then in 1976, after the companies had made significant investments in infrastructure, the tribe added a severance tax, taking the total rate to nearly 20 percent. The companies took the tribe to court, contending that only state and local authorities had the ability to tax mineral rights on Indian reservations. The companies eventually lost the argument when the U.S. Supreme Court affirmed the tribe's sovereign power to tax.

More recently, the Hualapai tribe faced the dilemma after contracting with Las Vegas developer David Jin to invest nearly \$30 million in building a tourist attraction called the

¹² See Haddock, David D. 1994. *Foreseeing Confiscation by the Sovereign: Lessons from the American West*. In *The Political Economy of the American West*, eds. Terry L. Anderson and Peter J. Hill. Lanham, MD: Rowman and Littlefield Publishers.

¹³ *Merrion v. Jicarilla Apache Tribe*, 455. U.S. (1982); *Grand Canyon Skywalk Development, LLC v. 'Sa' Nyu Wa Incorporated*, U.S. Court of Appeals for the Ninth Circuit (2013),

“Skywalk.” The horseshoe shaped, crystal-clear, glass walkway jutting 70 feet out from the rim of the Grand Canyon opened in 2007 and has since attracted 1.4 million visitors with the potential of generating an estimated \$100 million over the next two decades. Arguing that Mr. Jin did not deliver on his end of the bargain, the tribe used its eminent domain power to take the property without compensation. Mr. Jin took the tribe to federal court, where, on February 11, 2013, U.S. District Judge David Campbell ruled in favor of Jin saying that the tribe had “clearly waived its sovereign immunity” and that its legal arguments were “odd,” “nonsensical,” and “wholly unconvincing.”

If investors believe tribal governments are likely to abuse their sovereign powers and take a larger share of profits, it can stifle private investment on reservations. Some members of the Hualapai tribe recognize that the reputation effects of its decision to take the Skywalk go far beyond Jin’s investment. Louise Benson, who was chairwoman of the tribe when the Skywalk contract was signed, said current tribal leaders are “giving the Hualapai a terrible reputation that will injure the tribe for years.” She added, “All over Indian country, I think this is bad.” The Jicarilla Apache had the same potential. These reputation effects may extend to tribal efforts to develop energy resources, which often require significant amounts of private investment from outside the reservation.

This paper estimates the growth effects of the institutions and regulations that restrict energy development on tribal lands. It demonstrates that economic growth could be realized in Indian Country if tribes and individuals had more secure property rights and a more stable legal environment. The paper proceeds by providing the background for reservation land tenure and the institutions governing tribal energy development. It then describes existing energy development on Indian reservations and discusses the energy potential on Indian lands using data

from the Department of the Interior. To demonstrate how much energy wealth is not being realized by tribes, we compare oil and gas well production on non-tribal lands in the western United States with production on tribal lands. Our results indicate that regulations governing Indian lands suppress energy-related economic growth by significantly limiting the number of oil and gas wells drilled on Indian lands.

Reservation Land Tenure and Energy Development

Understanding the evolution of reservation land tenure is important for understanding resource extraction on Indian lands. A brief history of American Indian land ownership and its impact on resource extraction helps explain the complicated relationship which exists between tribes and the federal government today.

The federal trust responsibility that defines the relationship between the federal government and tribes traces its roots to Supreme Court decisions in the early 1800s.¹⁴ Chief Justice John Marshall described tribes as “domestic dependent nations,” unable to negotiate treaties with foreign nations, but implying that they retained the power to govern themselves. Marshall went on to describe the relationship between tribes and the United States as “that of a ward to his guardian.”¹⁵ From this conception, the federal government became the trustee for Indian lands. This trust relationship between tribes and the federal government, which continues today, extends to surface and subsurface resources. Therefore, although tribal sovereignty implied the right for Indians to govern themselves, it did not grant tribes the autonomy to devise their own property rights and governance structures. Two centuries later, the trust doctrine

¹⁴ Johnson v. McIntosh, 21 U.S. (8 Wheat.) 543, 573 (1823); Cherokee Nation v. Georgia, 30 U.S. 1 (1831); Worcester v. Georgia, 31 U.S. (6 Pet.) 515 (1832).

¹⁵ Cherokee Nation v. Georgia, 30 U.S. 1 (1831).

requires any energy development taking place on tribal lands to be authorized by the federal government.

The government's characterization of Indians as "wards" was codified with the General Allotment Act of 1887, also known as the Dawes Act. Under the act, some lands were allotted to individual Indians or to the tribe, but held in trust until the secretary of the interior deemed the allottee "competent" to become private property owners. Other lands were considered surplus land and opened to homesteading by non-Indians. Once Indian allottees were declared competent, their allotments were removed from federal trust restrictions and fee-simple title was granted. This title gave the owners the right to manage their land as they saw fit, including the right to sell the land.

The allotment era ended with the passage of the Indian Reorganization Act (IRA) in 1934, which virtually froze lands—individual or tribal—for which fee simple title had not be granted into trust status. Those lands that had been released from trusteeship prior to reorganization remain in fee-simple title, giving owners autonomy over land-use decisions within the limits of the law. The land can be sold, encumbered as collateral for loans, or leased for energy development. In contrast, both individual and tribal trust lands are subject to BIA control. The BIA can grant or deny permission to lease or develop tribal resources. Trust lands cannot be sold and generally cannot be encumbered as collateral in the capital market. To make matters worse, individual trust lands have generally been passed in equal shares to heirs. After several generations ownership can be so fractionated that there are hundreds of heirs, all of whom must agree on how land is used.

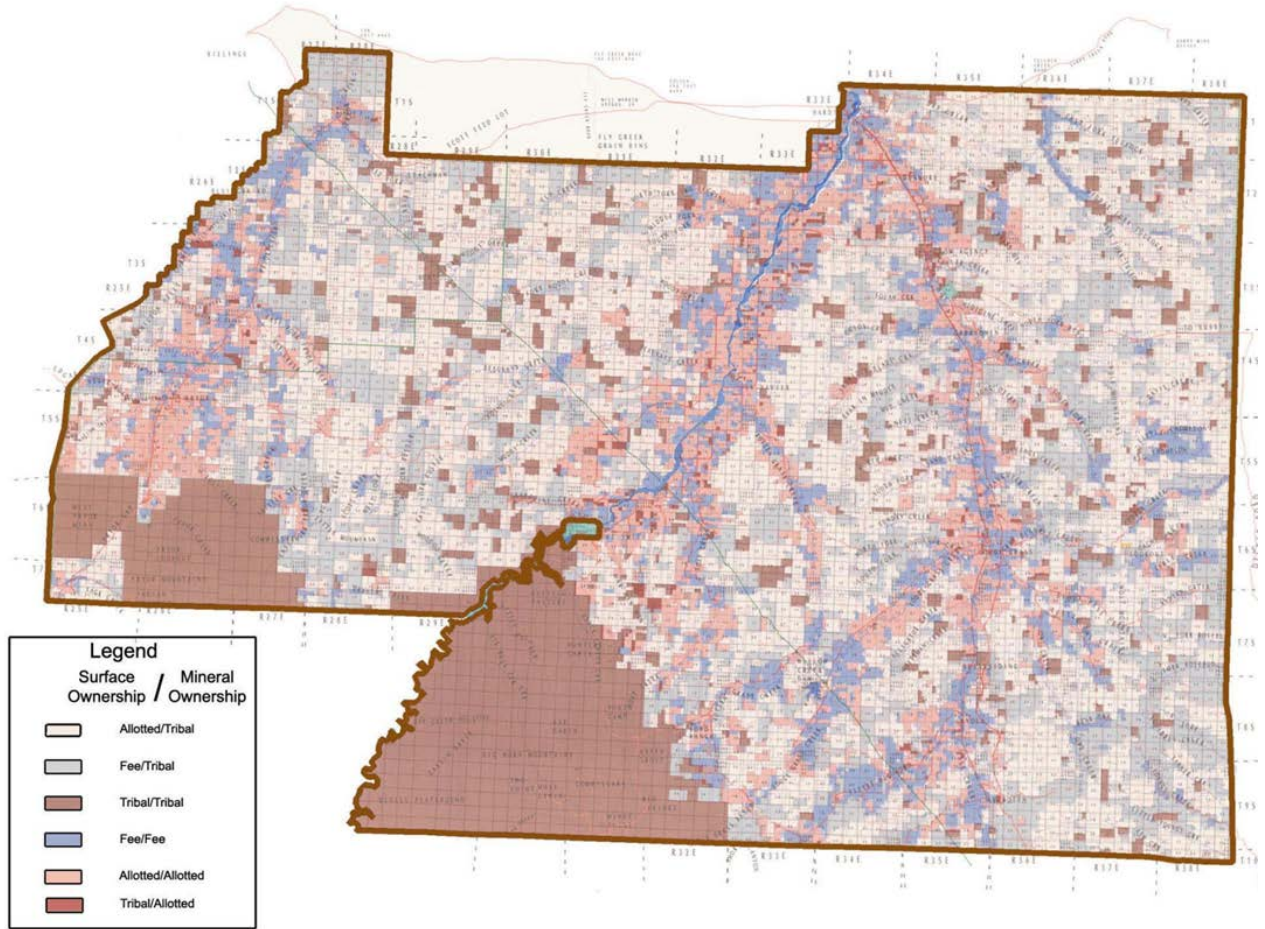
The combination of the Allotment Act, the IRA, and sale to non-Indian owners has left a complicated mosaic of land tenure on reservations including fee-simple, individual trust (also

known as allotted), and tribal trust lands. This mosaic extends to subsurface as well, where the ownership of mineral rights occasionally differs from the surface owner. Figure 1 shows this mosaic for the Crow Reservation in south-central Montana.¹⁶ Across Indian Country, 75 percent of surface rights are tribal trust land, 20 percent is individual trust land, and 5 percent is fee-simple land.¹⁷

¹⁶ For further discussion, see Terry L. Anderson and Dominic P. Parker. 2006. The Wealth of Indian Nations: Economic Performance and Institutions on Reservations. In *Self Determination: The Other Path for Native Americans*, (eds) Terry L. Anderson, Bruce L. Benson, and Thomas E. Flanagan. 159-193.

¹⁷ See <http://www.hoover.org/publications/defining-ideas/article/67756>

Figure 1
Mosaic of Land Tenure on the Crow Reservation



Energy development on Indians trust lands is further complicated by other federal laws. Under legislation passed in 1891, trust lands can be leased for agricultural or mineral development. Initially leasing required tribal consent for resource extraction, but Congress removed the consent requirement in 1919 for certain mineral leases in the West. Subsequently, energy development has occurred on reservations through a federal leasing process almost entirely controlled by the federal government.¹⁸ The Indian Mineral Leasing Act (IMLA) of 1938 attempted to revitalize tribal governments by restoring some tribal control over energy development decisions. The act prohibited state taxation of tribal mineral income, established a standardized leasing system, and set minimum rates for rents and royalties. In practice, however, tribal control was limited. IMLA granted tribes “the key right to consent before leasing could occur,” but allowed them “no say in the mining process once they authorized the leasing of their lands, and no right to cancellation” for breach of contract.¹⁹ The lease terms, including the royalty amounts and other payments, were decided on and enforced by the BIA and the U.S. Geological Survey. Both agencies have consistently undervalued Indian resources and, by all accounts, done a poor job of negotiating and collecting royalties on behalf of tribes.

During the 1970s and 1980s, tribes were afforded a more active role in energy development decisions on reservations. In 1982, for instance, the Indian Mineral Development Act (IMDA) allowed tribes (but not allottees) to enter into any type of energy extraction agreement they desired. The act also allowed lease terms and royalty amounts to be determined by tribes rather than the federal agencies. The IMDA represented a positive step towards tribal self-determination. Under the act, tribes can negotiate leases, joint ventures, production sharing,

¹⁸ Grogan, 2011: 13; Ambler, Marjane. 1990. *Breaking the Iron Bonds: Indian Control of Energy Development*. University Press of Kansas: 14.

¹⁹ Royster, Judith. 1993. Mineral Development in Indian Country: The Evolution of Tribal Control over Mineral Resources. *Tulsa Law Journal*. 29: 541.

or other agreements to develop their resources. Today, IMDA agreements are the primary means by which tribes lease lands for energy development. Nonetheless, the federal trusteeship of Indian lands limits opportunities for tribal resource development and self-determination. The BIA and other federal agencies oversee and approve all development agreements on Indian lands, adding burdensome layers of regulations and bureaucracy to tribal resource development. Tribes must acquire approval from the secretary of Interior for each specific lease or agreement, a process that is notoriously slow and cumbersome.²⁰

In 2005 Congress passed the Indian Tribal Energy Development and Self-Determination Act to further promote tribal self-determination. The act authorizes tribes to create Tribal Energy Resource Agreements (TERAs) that would afford tribes greater control over energy development. Once a TERA is approved, tribes no longer need to get separate approval for each business arrangement the tribes makes in order to undertake resource development. Thus far, no tribe has entered into a TERA because, as Grogan notes, “the rules and regulations around implementing a TERA are exceedingly complex.”²¹

Energy Resources on Indian Reservations

American Indian reservations make up nearly 56 million acres, or about 2.3 percent of the total U.S. land base. The Department of the Interior estimates that energy exploration and development in Indian Country has taken place on only 2.1 million acres, with another 15 million acres with energy and mineral resources left undeveloped.²² In other words, 86 percent of

²⁰ See Royster, Judith V. 2008. Practical Sovereignty, Political Sovereignty, and the Indian Tribal Energy Development and Self-Determination Act. *Lewis and Clark Law Review*. 12(4): 1065-1101. Specifically, see note 71, noting that an IMDA agreement on Fort Berthold took “over three years,” and testimony from a Crow member noting “an extremely slow BIA approval process.”

²¹ Grogan, 2009: 16.

²² Middleton, Robert. 2008.

Indian lands with energy or mineral potential remain untapped.

Of course, energy resources are not evenly distributed among Indian lands. Reservations in the western United States contain most of the energy wealth of Indian nations (see Table 1). Energy tribes, as they are often called, “receive a significant portion of their income from energy minerals or that own substantial undeveloped reserves”²³ and could receive more.

²³ Ambler, 3.

Table 1
Select Major Energy Resource Tribes

State	Tribe	Resources	% Tribal Trust*	% Individual Trust*	% Fee Simple*
AZ	Hopi	C, O, G	99	1	0
	Navajo	C, O, G, U	95	5	0
CO	Southern Ute	C, O, G	45	< 1	54
	Ute Mountain	C, O, G, U	99	1	0
MT	Blackfeet	C, O, G	20	43	37
	Crow	C, O, G	20	44	36
	Assiniboine and Sioux (Fort Peck)	C, O, G	18	25	57
	Northern Cheyenne	C, O	68	31	1
NM	Jicarilla Apache	C, O, G	93	0	7
ND	Three Affiliated (Fort Berthold)	C, O, G	10	40	50
OK	Osage	O, G	5	39	55
UT	Uintah and Ouray Ute	C, O, G, OS	23	< 1	76
WY	Arapahoe and Shoshone (Wind River)	C, O, G, U	77	5	19
C – Coal, O – Oil, G – Gas, OS – Oil Shale, U – Uranium *Refers to surface rights only.					

Source: Grogan (2011)

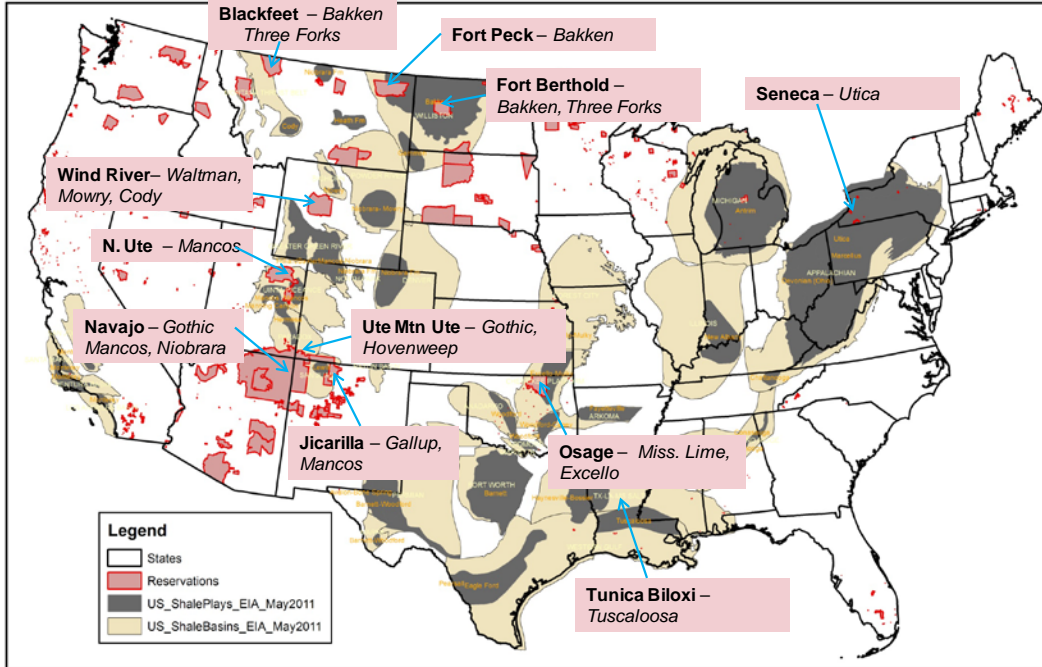
Technological advancements in energy extraction add to the potential energy wealth of Indian nations. Extensive shale oil and gas reserves which lay beneath many reservations are now accessible with improvements in hydraulic fracturing (see Figure 2). For instance, the Fort Berthold reservation sits above the Bakken oil field in North Dakota where the U.S. Geological Survey recently estimated that there are 7.4 billion barrels of recoverable oil and 6.7 trillion cubic feet of recoverable natural gas technically recoverable.²⁴ These estimates represent a doubling and tripling, respectively, of previous government estimates.²⁵

²⁴ <http://www.doi.gov/news/pressreleases/usgs-releases-new-oil-and-gas-assessment-for-bakken-and-three-forks-formations.cfm>

²⁵ In addition to coal, oil, and natural gas, tribes also have significant sources of oil shale, uranium, copper, and rare earth minerals. Some tribal lands also have the potential for renewable energy development such as solar and wind power. The focus of our discussion is on coal, oil, and natural gas.

Figure 2
Shale Oil and Gas Plays and Basins and Indian Reservations

Emerging Oil & Gas Shale Plays (Dark Grey); Shale Basins (Tan)



Source: Bureau of Indian Affairs “Oil and Gas Outlook in Indian Country”

Several factors create challenges for the development of tribal resources. As explained above, federal trusteeship of Indian lands and other legislation make difficult for individual trust land owners or tribes to decide whether to develop energy resources. In addition, the uncertainty of tribal legal institutions increases the cost of doing business on reservations, making it difficult for tribes to attract outside investors. Finally, federal laws put decisions regarding land use, in general, and energy development, in particular, in the hands of agencies that have a less than stellar record for managing resources so as to maximize the welfare of Indians.

Figure 3
Fort Berthold Reservation and the Bakken Formation



The economic costs of these factors are felt by the Three Affiliated Tribes on the Fort Berthold reservation. Located at the center of the boom in U.S. shale oil and gas development, Fort Berthold is missing out on the economic growth experienced beyond its borders. On Indian lands, companies must go through four federal agencies and 49 steps to acquire a permit to drill, compared with only four steps when drilling off reservation.²⁶ The effect of these additional constraints on Indian lands is to raise the cost of entering into resource development agreements with tribes or tribal members. When development does occur, it generates a lower return for the tribe due to bureaucratic and regulatory obstacles.

Despite such challenges, energy resources are the largest revenue generator in Indian Country, and they could be even larger.²⁷ In 2012, Indian mineral owners earned more than \$701 million in royalty revenue. The BIA estimates that Indian royalties will be between \$850 and \$900 million in 2013. The agency claims that it has “assisted tribes in negotiating 48 IMDA leases for oil and gas, totaling approximately 2,750,000 acres and about \$45 million in bonuses (upfront payments). These leases have the potential to additionally produce over \$20 billion in revenue to the Indian mineral owner over the life of the lease through royalties and working interests.”²⁸

Potential Energy Development on Indian Land

Like any estimate of potential energy resources, precise estimates of recoverable energy resources in Indian Country are a matter of debate for a variety of reasons. First, technological advancements in resource extraction, such as hydraulic fracturing, can quickly alter the amount of resources that are considered technically recoverable. Second, the value of unrecovered

²⁶ Crane-Murdoch, 2012: 3.

²⁷ Oil and Gas Outlook in Indian Country. 2013. Department of the Interior: Bureau of Indian Affairs.

²⁸ Oil and Gas Outlook 2013, 1

resources continually changes, affecting whether the costs of exploration and development exceed the expected value of the resource. Third, estimates of mineral resources require knowledge about the quantity and quality of resources that can be several miles beneath the earth's surface and cannot be known until fully explored. These factors, combined with the fact that there is less development and exploration on reservations, make it even harder to know what potential there is below Indian lands.

Table 2 provides the best estimates we have for potential undeveloped energy resources. The data were gathered from government reports dating back to 1976, when the BIA began modest efforts to inventory mineral resources on Indian lands.

Table 2:
Existing Estimates of Energy Potential on Indian Lands

Source	Date	Coal	Oil	Gas	Total Value
DOI/USGS	1976	1,581 billion tons	4.2 billion barrels	17.5 trillion cubic feet	n/a
DOI	2008	53 billion tons	5 billion barrels	37 trillion cubic feet	\$875 billion
DOI	2012	53.7 billion tons	5.3 billion barrels	37 trillion mcf	\$1.5 trillion

The variance in the estimates illustrates the extent to which precise data are lacking. A 1976 report found that, although exact amounts of such resources are unknown, about 4.2 billion barrels of oil and about 17.5 trillion cubic feet of gas existed on 40 Indian reservations in 17 states. At the time, the USGS estimated that Indian oil and gas reserves amounted to 3 percent of the nation's total reserves.²⁹ The same report also estimated coal resources on Indian land at 1,581 billion tons, or 7 to 13 percent of the nation's coal resources. The report concluded that, given such resource wealth, “[m]ineral resources development on reservations can thus provide substantial income and employment opportunities to the Indians.”³⁰

More recently, the Department of Interior estimated in 2008 that Indian lands “contain over 5 billion barrels of oil, 37 trillion cubic feet of natural gas, and 53 billion tons of coal that are technically recoverable with current technologies.”³¹ The DOI estimated the combined value of these resources at \$875 billion. Using the latest Census data which puts the Indian population living on reservations at approximately one million,³² the per capita value of the energy wealth on Indian land is \$875,000.³³

The DOI has since reiterated similar estimates, claiming in 2012 that Indian lands have the potential for 5.35 billion barrels of oil, 37.7 trillion cubic feet of conventional natural gas, and 53 billion tons of coal.³⁴ In 2009, the secretary of the Council of Energy Resource Tribes reported that, at current values, present-day revenue projects for energy resources on Indian

²⁹ GAO. 1976.

³⁰ GAO, 1976: 2.

³¹ Middleton, 2008.

³² See <http://www.census.gov/prod/cen2010/briefs/c2010br-10.pdf>, Table 5, pp. 13.

³³ It is not clear from the DOI estimate how the \$875 billion figure was derived or whether it is in present discounted value terms.

³⁴ See DOE, Office of Indian Energy, “Briefing for the Senate Energy and Natural Resources Committee and the Senate Indian Affairs Committee,” May 18, 2012. See chart: “Oil, Gas, And Coal Resources on Indian Lands” Lower 48, Indian Lands Undeveloped Reserves and Undiscovered Resources, 2012.

lands amounted to nearly \$1.5 trillion.³⁵ This estimate implies a potential per capita energy value of \$1.5 million for Indian reservations. This amount can be contrasted with 2010 Census data estimating American Indian per capita income to be \$16,645.³⁶

Although Indian lands contain tremendous energy wealth, most tribes are not generating significant returns on their assets. In 2012, energy resources earned tribal mineral owners \$701 million in royalty revenue.³⁷ Using the more conservative estimate of \$875 billion worth of undeveloped energy resources, this equals an annual return of less than 0.001 percent on tribal energy assets.

The reservation-specific estimates that are available are shown in Table 3.³⁸ Although these reports are dated and based on an early understanding of the minerals beneath Indian lands, they illustrate how much energy wealth is not being realized from Indian lands. For example, the DOI concluded that the Crow Reservation has 17 billion tons of coal and 40 million barrels of oil that remain undeveloped.³⁹ The Northern Cheyenne reservation has even more: 23 billion tons of undeveloped coal and 270 million barrels of undeveloped oil, almost all of which remains undeveloped today.⁴⁰ Using the current spot price for coal in the Powder River Basin, the Crow Reservation's coal reserve is worth \$179 billion, and the Northern Cheyenne's coal reserve is worth \$243 billion.⁴¹ Given the current spot price of WTI crude oil, the Crow Reservation's oil

³⁵ Prepared statement by Marcus Levings (of Ft. Berthold tribe) in Hearing before the Committee on Indian Affairs, US Senate, October 22, 2009: <http://www.indian.senate.gov/public/files/October222009.pdf>

³⁶ According to the 2010 Census, per capita income for the national U.S. population is \$27,334.

³⁷ BIA, Oil and Gas Outlook in Indian Country.

³⁸ Most reservations lacked the information necessary to make precise estimates of unrecovered resources. Tribes for which precise estimates for a resource were made are listed in Table 3.

³⁹ http://www1.eere.energy.gov/tribalenergy/guide/pdfs/crow_7.pdf. Note that earlier we reported an estimated value of coal and other assets on the Crow Reservation from the 1980s of nearly \$27 billion from Cornell and Kalt (2000).

⁴⁰ http://www1.eere.energy.gov/tribalenergy/guide/pdfs/northern_cheyenne_3.pdf

⁴¹ Coal price of \$10.55/ton as of June 27, 2013: <http://www.eia.gov/coal/news/markets/>. These values assume that each tribe's energy reserves remain as they were at the time of the DOI's original inventory. Although this assumption may not hold in some cases, tribes such as the Northern Cheyenne have yet to develop their coal reserves.

reserve is worth \$3.8 billion, and the Northern Cheyenne's oil reserve is worth \$25.9 billion.⁴²

Both reservations have yet to develop significant amounts of their coal or oil resources.⁴³

⁴² Oil price of \$95.82/barrel for WTI crude as of June 27, 2013: http://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm

⁴³ Grogan, 2011: pp. 36.

Table 3:
Reservation-specific Estimates of Coal and Oil Resources for Select Tribes⁴⁴

Reservation	Coal	Oil
Crow	17 billion tons	40 million barrels
Northern Cheyenne	23 billion tons (5-6B may be surface mined)	270 million barrels
Southern Ute	116 million tons	n/a
Jicarilla Apache	149.9 million tons	n/a
Blackfeet	30 - 50 million tons	5 - 25 million barrel

⁴⁴ Precise estimates of natural gas resources were not made in these reports.

On and Off Reservation Oil and Gas Development

Spatial data on oil and gas wells drilled in the Rocky Mountain region allow us to compare rates of oil and gas development on and off reservations in the western United States.⁴⁵ The data encompass a large time series from 1900 to 2012, which includes data from the recent boom in shale oil and gas development in western states.

When comparing energy development on and off reservation, the challenge is to adequately control for variations in the endowment of energy resources. If the areas examined off reservation have different energy endowments than areas on reservation, an appropriate comparison cannot be made, and the effect of reservation status on energy development cannot be tested.

To deal with these issues, we use geospatial software (ArcGIS) to limit our analysis to within U.S. shale oil and gas basins. By holding the resource endowment constant, we are able to compare areas on and off reservation which have similar resource characteristics to better understand the effect of reservation institutions. A map of shale oil and gas basins in the United States as identified by the Energy Information Agency is presented in Figure 4.

⁴⁵ The data include wells located in AZ, CO, ID, MT, NE ND, NV, SD, UT, WY, and parts of NM.

Figure 4:
Shale Oil and Gas Basins and Plays in the United States

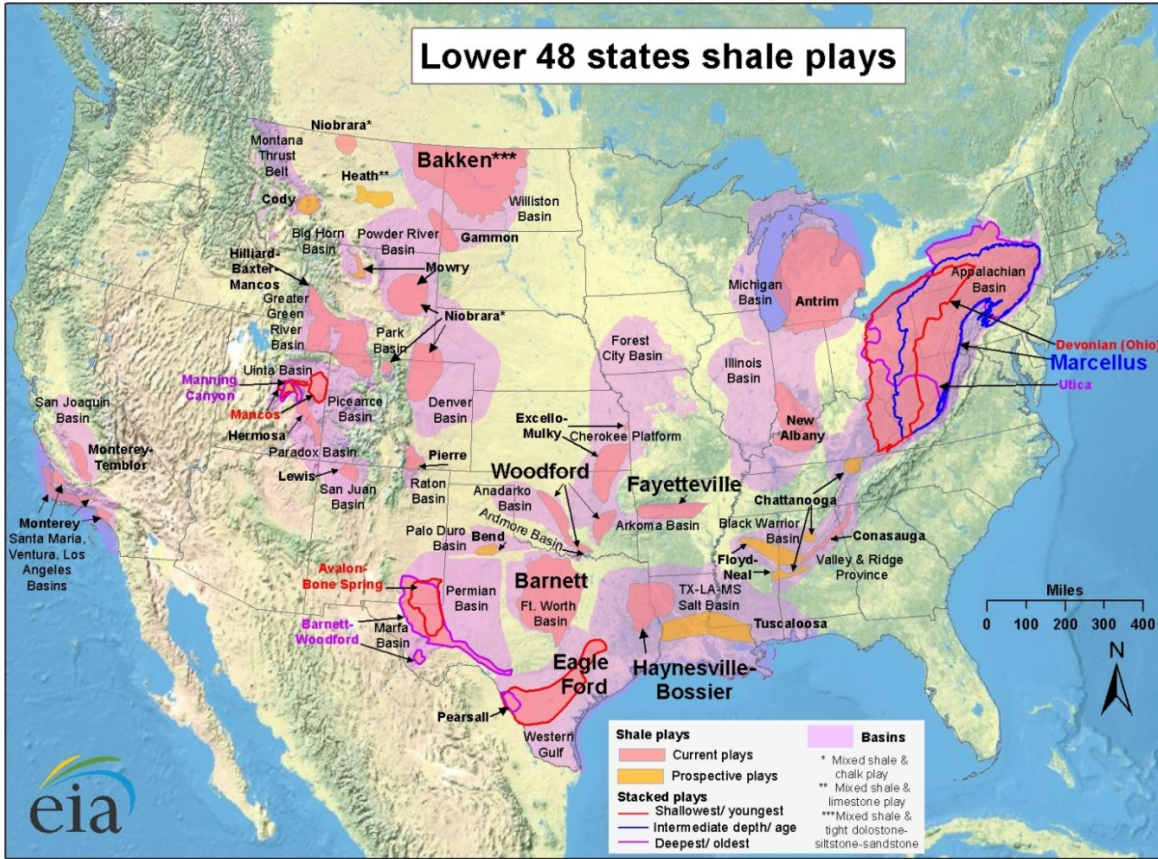


Table 4:
Comparison of Oil and Gas Drilling On and Off Reservation

DENVER	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	0.03	100.00	0.00	0.00
Off reservation	1.84	36.46	16.32	0.03
MONTANA THRUST BELT	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	0.05	82.22	10.00	5.56
Off reservation	0.01	89.78	1.08	0.58
PARADOX	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	1.20	36.73	52.94	2.86
Off reservation	0.22	71.27	18.24	0.56
POWDER RIVER	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	0.10	64.22	20.80	12.84
Off reservation	2.30	41.83	20.23	0.02
SAN JUAN	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	2.60	24.02	14.67	54.40
Off reservation	6.05	19.34	7.13	0.02
UINTA-PICEANCE	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	3.13	37.86	26.78	34.02
Off reservation	0.99	33.44	10.06	0.05
WILLISTON	<i>wells / sq. mile</i>	<i>% dry or abandoned</i>	<i>% oil</i>	<i>% gas</i>
On reservation	0.32	52.72	44.35	0.25
Off reservation	0.61	39.12	52.19	0.14

Table 4 compares the number of oil and gas wells per square mile on and off reservation within a single shale oil and gas basin. Before considering the implications of these data, keep in mind that we hypothesize that institutions matter. Reservations with more fee-simple land ownership have fewer bureaucratic constraints on surface land use, and reservations for which subsurface rights are not split from fee-simple surface rights have even lower costs of development. Moreover, different tribes have different reputations for sound tribal governance based on the rule of law and reputation. Unfortunately, we do not have the necessary data to better control for these differences, but the data do suggest that institutions matter.

Oil exploration on and off reservations varies considerably. In the Denver, Powder River, San Juan, and Williston basins, for example, the number of wells per square mile is greater off reservation than on reservation, often by a substantial amount. In the Powder River Basin, 23 times as many wells were drilled per square mile outside of Indian reservations than inside reservations. The Denver Basin has 62 times as many off-reservation wells per square mile as it has on-reservation wells. In the San Juan Basin of the southwestern United States, more than twice as many wells were drilled off reservation than on reservation. Likewise, the Williston Basin has roughly twice as many wells off reservation as it does on reservation.

For other basins, however, oil exploration is more prevalent on reservation. In the Montana Thrust Belt, Paradox, and Uinta-Piceance basins, more wells were drilled per square mile on reservation than off reservation. Although the difference between on and off reservation in these basins is smaller, each of these basins had at least three times as many wells drilled per square mile on reservation than off reservation.

Land tenure provides a plausible explanation for these differences. The Uinta-Piceance basin contains only the Uintah and Ouray Indian Reservation, on which 76 percent of the land is

held in fee simple. As discussed earlier, unlike both tribal trust and individual trust land, fee-simple land on reservations is, in effect, like much of the land located off reservation: it is free from BIA control and other forms of federal trusteeship; it can be used as collateral for loans in the capital market; and the transaction costs associated with development are much lower than tribal or individual trust lands. For these reasons, institutional challenges involved in developing energy resources may be less on reservations with more fee-simple lands.

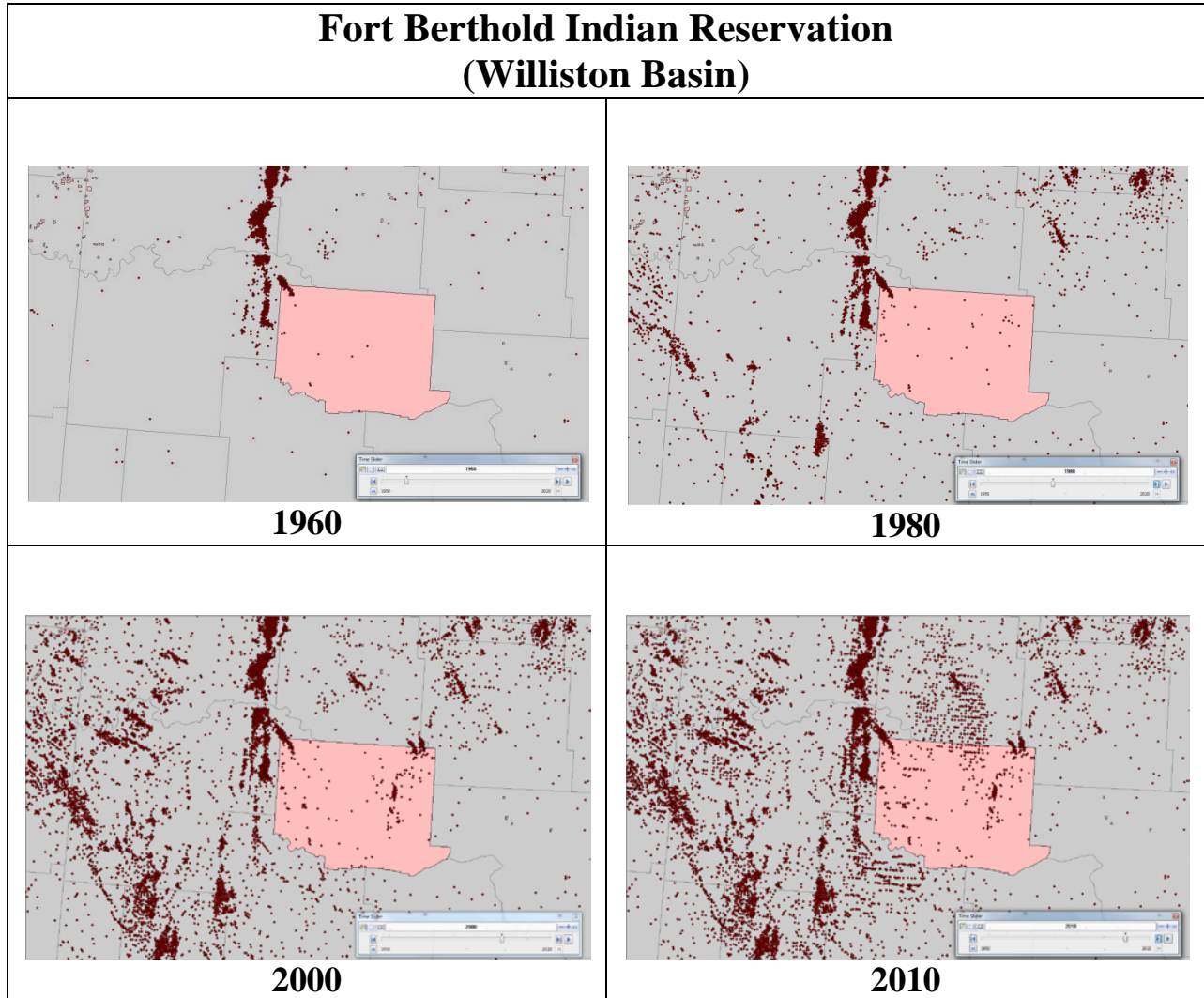
The Southern Ute reservation in the Paradox Basin provides further support for the argument that institutions matter. More than half of the Southern Ute reservation is in fee-simple ownership. Moreover, the tribe has a stellar reputation for energy management and other business activity. One report states that the tribe is, by a wide margin, “the most successful tribe in terms of energy resources in the United States.”⁴⁶

On and off reservation exploration can also be compared visually using mapping software. Figure 5 shows oil and gas wells drilled at twenty-year intervals beginning in 1960 in and around the Fort Berthold Reservation, which located within the oil-rich Williston Basin. Figure 6 shows the same for the Crow and Northern Cheyenne Reservation in south-central Montana’s Powder River Basin. The images provide a visual illustration of the results found above in Table 4.⁴⁷

⁴⁶ Grogan, 2011: 38.

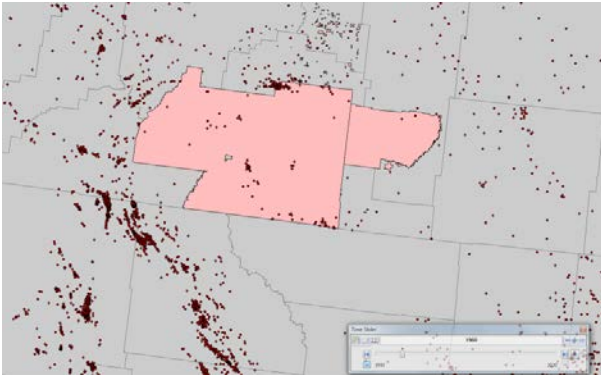
⁴⁷ The images display the cumulative amount of oil and gas wells drilled over time, not just those drilled during that year.

*Figure 5:
Oil and Gas Wells On or Near the Fort Berthold Reservation*

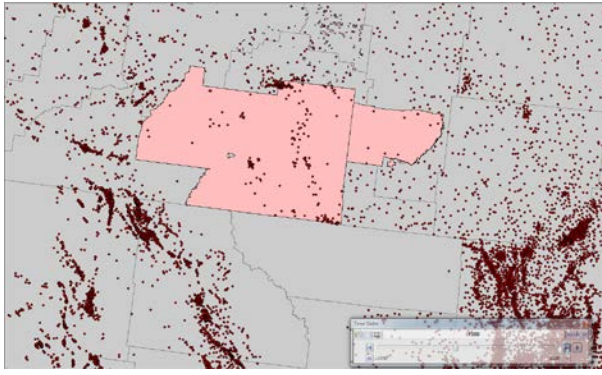


*Figure 6:
Oil and Gas Wells On or Near the Crow and Northern Cheyenne Reservations*

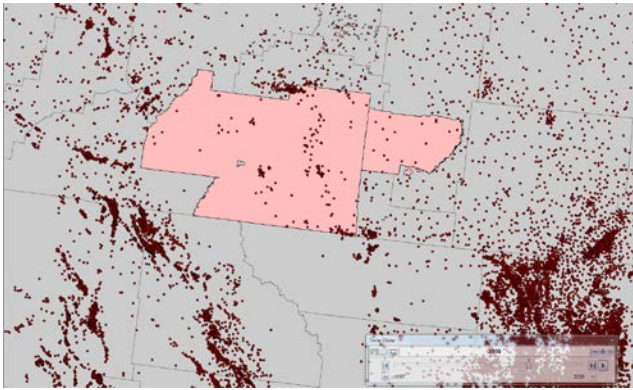
**Crow and Northern Cheyenne Indian Reservations
(Powder River Basin)**



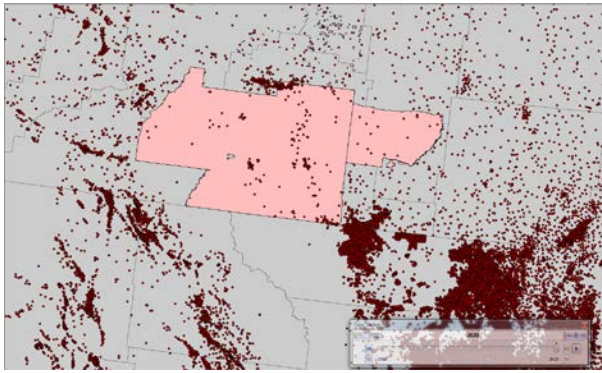
1960



1980



2000



2010

Roughly twice as many oil and gas wells are drilled outside of the Fort Berthold Reservation than are drilled inside, a fact demonstrated visually in Figure 5. Drilling activity has increased on the reservation in recent years, but only after lower-cost areas off reservation were explored and developed. In addition, technological advancements such as hydraulic fracturing have recently lowered the cost of tapping the oil-rich shale of the Williston Basin. Fifty percent of the land within the Fort Berthold Reservation is held in fee simple, and 43 percent of the subsurface minerals are held in fee simple.⁴⁸

Similarly, Figure 5 illustrates the finding that 23 times as many oil and gas wells were drilled off reservation in the Powder River Basin than on reservation. In recent years, oil and gas wells have encroached on the border of the Crow and Northern Cheyenne reservations, but have not noticeably increased within the reservations. Again, surface and subsurface ownership may explain this. Only 36 percent of surface land on the Crow Reservation is in fee-simple ownership and the map in Figure 1 indicates that even less of the subsurface rights are in fee-simple ownership.

Without more data to control for other variables that affect energy development, we cannot definitively conclude that fee-simple ownership and tribal governance explain the difference between on and off reservation energy exploration. The persistence of the relationship between institutions and energy development, however, suggests that institutions matter.

Conclusion

The data herein show that Indian lands hold a significant potential for generating energy wealth for Native Americans. However, for most shale oil and gas basins, Indians have not fully

⁴⁸ See <http://www.abadieschill.com/tag/fort-berthold-reservation/>. “The reservation encompasses approximately 945,000 acres, of which the current subsurface mineral lease ownership is roughly comprised of 211,186 acres being owned by the Tribe, 321,779 acres owned by individual Indians in trust and 409,657 owned in fee simple.”

capitalized on their energy wealth. Of course, tribal self determination includes the right to choose not to develop their energy wealth. But if institutional constraints such as trusteeship, an unstable rule of law, federal regulation, or all three hold Indians in poverty, it is time to reconsider those institutions.

A recent report examining energy development on American Indian lands stated that “the best way for the government to honor its trust obligations is to stop trying to determine what is in the best interest of tribes and instead support tribal efforts to make that decision autonomously.”⁴⁹ The report concluded, “When tribes are free to make decisions for themselves, they have the opportunity to align policy and planning with tribal priorities.”⁵⁰ Tribes have proven that when they are given the rights to manage their own resources, they can do so in ways that benefit tribes and the economy in general. For instance, a 1992 study found that when tribes were afforded more control over forest management decisions, the tribes provided significantly better management and higher output.⁵¹

The importance of institutions such as property rights and the rule of law in promoting economic growth have been demonstrated for surface land use on American Indian reservations, and they appear to be equally important for the subsurface. When tribes are freed from the oversight of the BIA and able to control their own resources, they capitalize on the value of their resources and contribute to economic growth. As long as tribes are denied the right to own their land and control their resources, they will remain islands of poverty in a sea of prosperity. If tribes were afforded the same rights and institutions as those living outside of reservations, they would have the opportunity to unlock the tremendous wealth of Indian nations.

⁴⁹ Grogan, 2011: 46.

⁵⁰ Grogan, 2011: 47.

⁵¹ Krepps, Matthew B. 1992. Can Tribes Manage Their Own Resources? The 638 Program and American Indian Forestry. In *What Can Tribes Do? Strategies and Institutions in American Indian Economic Development*, (eds) Stephen Cornell and Joseph P. Kalt.