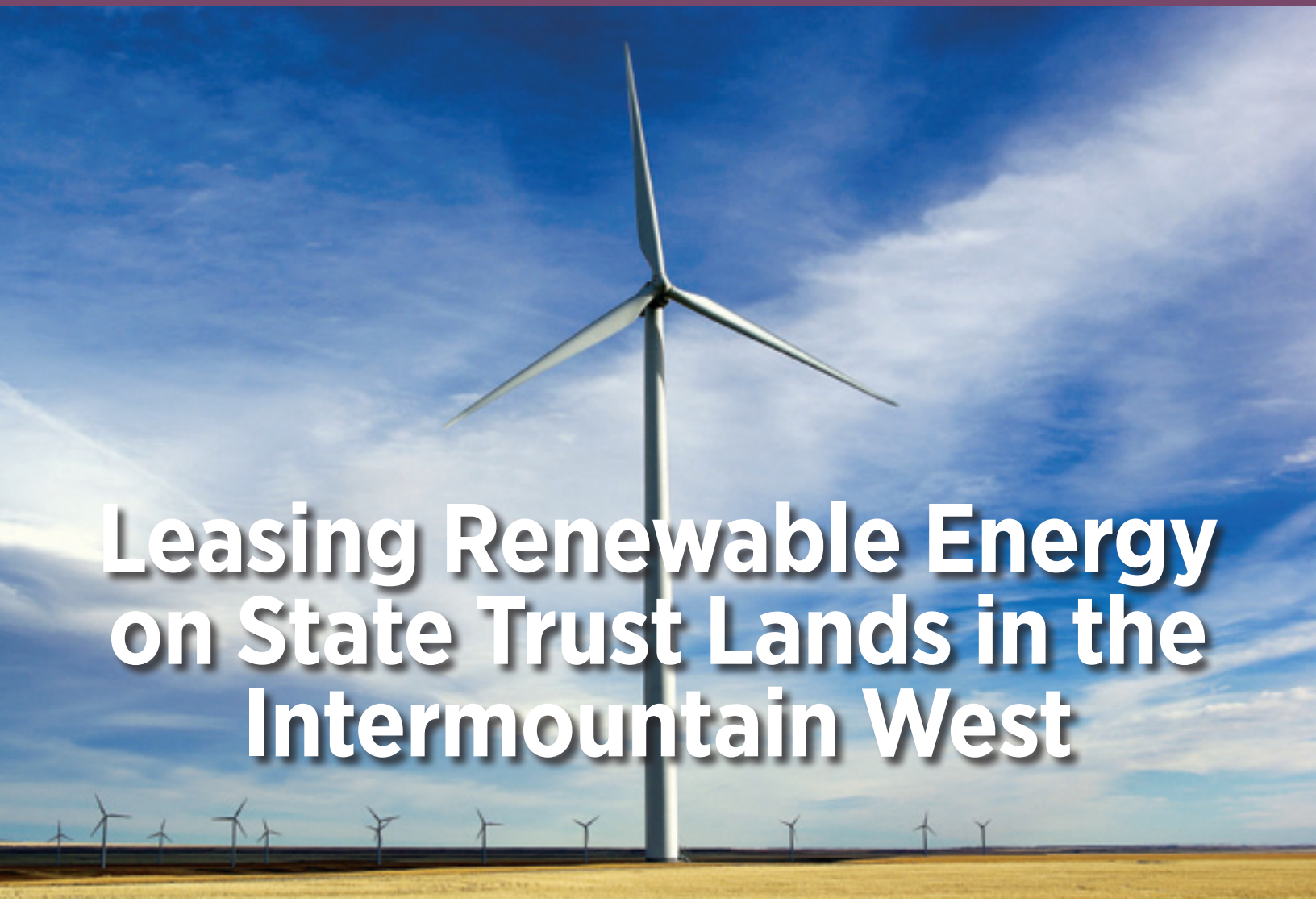

Leasing Renewable Energy on State Trust Lands in the Intermountain West

Judith Gap Wind Farm, on state trust land in Montana, generates about $50,000 a year and funds public education.

Alison Berry

State trust lands in the Intermountain West could play an important role in the growing market for renewable energy. Congress granted these territories, covering 35 million acres, to states upon their entry to the Union, to support schools and other public institutions. As managers of these state trust lands search for innovative and sustainable ways to lease and sell parcels to generate income, renewables could prove to be a double boon—by supplying clean, sustainable power and providing a strong revenue stream for the public benefit.

All seven states in the Intermountain West—Arizona, Idaho, Colorado, Montana, New Mexico, Utah, and Wyoming (figure 1)—are using state trust lands to develop renewables, including wind, solar, geothermal, and biomass projects. Yet the industry has not flourished to its full potential. In 2011, the installed renewable energy production capacity on state trust lands was only 360 megawatts—not enough to power 2 percent of the homes in the region. The $2 million in revenue generated by these sources on state trust lands amounts to less than 1 percent of the $1 billion-plus generated there annually by other means (Berry 2013; WSLCA). Wind energy is experiencing the most activity by far; all the Intermountain West states have leased state trust lands for wind projects, and all have operational wind farms. Although Arizona, New Mexico, and Utah have leased state trust lands for solar operations, only one generation facility is in production on state trust lands in the Intermountain West, in Arizona. Only Utah has a geothermal plant on state trust land, and no states in this region have active biomass facilities on trust lands.

This article will focus on three types of renewable energy production in three states—a wind farm in Montana, geothermal projects in Utah, and solar generation in Arizona—and the conditions,

legislation, and other factors that led to successful operations. All three examples demonstrate that these territories offer a largely untapped bounty for this burgeoning, sustainable market; provide learning opportunities across state lines; and help meet growing demand for renewable energy.

Judith Gap Wind Farm, Montana

Judith Gap is Montana's only operational wind farm on state trust land, straddling private land as well, in the central-eastern part of the state. It has 90 turbines total, each with a capacity of 1.5 megawatts; 13 are on state trust lands, on the leading edge of the wind farm, with a total capacity of 19.5 megawatts. The per-megawatt fee of approximately 2.6 percent of gross receipts brings in about $50,000 per year according to Mike Sullivan of the Montana Department of Natural Resources and Conservation (DNRC). At the time of construction, there was a one-time installation fee of $20,000 (Rodman 2008).

Bob Quinn, founder of a local wind development company called Windpark Solutions, initiated the project in 2000, when he proposed the idea to a small group including representatives from the local utility, the Montana Department of Environmental Quality, and the DNRC. Quinn says that close collaboration between the developer and personnel in these state agencies was key to successfully siting the project on state trust land. State staff also helped Quinn navigate other difficult challenges including unanticipated delays in the request for proposals (RFP) process required by the state.

After conducting preliminary studies—allowed for one year through a land use license from the DNRC—developers must apply to the DNRC in order to proceed with energy projects. The state then issues a request for proposals (RFP). Applicants with a land use license do not receive preferential treatment. After a successful applicant is identified, the developer must conduct environmental analyses, secure a power purchase agreement with a utility, and determine economic feasibility before signing a lease with the DNRC. Currently, fees for new land use licenses are generally $2 per acre per year. Lease agreement costs for new wind projects include a one-time installation charge of $1,500 to $2,500 per megawatt of installed capacity, and annual fees of 3 percent of gross annual revenues or $3,000 for each megawatt of installed capacity, whichever is greater (Rodman 2008, Billings Gazette 2010).

Lease and Fee Structures

Every state has different leasing systems for renewable energy projects on state trust lands, but they all follow a similar pattern. The process usually starts with a short-term planning lease that allows for exploration and meteorological studies. The construction phase is next, followed by a longer-term production lease. Payments to the trust land management agency usually include a per-acre rent during the planning phase, which may continue into the production phase. There are additional installation charges for equipment, including meteorological towers, wind turbines, solar collectors, structures, and other infrastructure. During the production phase, the fee is typically based either on the installed capacity or the gross revenues of the generation facility.

Since Judith Gap was completed in 2005, several wind farms have proposed development on state

FIGURE 1
State Trust Lands in the Intermountain West

Source: Western States Land Commissioners Association website, *http://www.wslca.org.*

TABLE 1
Renewable Portfolio Standards in the Intermountain West

Many states have adopted Renewable Portfolio Standards (RPS), which mandate that a certain percentage of a state's energy derive from renewable sources. This table shows the RPS and the current proportion of energy generated from renewable sources in Arizona, Montana, and Utah.

	RPS: Proportion of Energy from Renewable Sources	Target Year	2011: Proportion of Energy from Renewable Sources
Arizona	15%	2025	9%
Montana	15%	2015	46%
Utah*	20% (goal)	2025	5%

Sources: Database of State Incentives for Renewables & Efficiency *(http://www.dsireusa.org)* and U.S. Energy Information Administration *(http://www.eia.gov/electricity/data/state)*.

* Utah has no regulation, but rather a goal of 20% by 2025.

trust lands in Montana, but none have reached the production phase. These include the Springdale Wind Energy project—an 80-megawatt wind farm consisting of 44 turbines, 8 of which would be on state trust lands. The DNRC has also leased 3,000 acres near Martinsdale to Horizon Wind Energy for a wind farm with 27 turbines, 7 to 15 of which would be on state trust lands. The Martinsdale wind farm could expand to 100 turbines in the future (MT DNRC).

These territories offer a largely untapped bounty for this burgeoning, sustainable market and provide learning opportunities across state lines.

In order to make state trust lands more attractive to these and other renewable energy developers, the DNRC would benefit from a more streamlined process. Developers working on state trust lands in Montana have cited struggles with timing, financing, environmental mitigation, cooperation from power buyers, and transmission (Rodman 2008). According to Quinn, Judith Gap succeeded in part due to dedication and close collaboration between agency personnel and the energy developer. In the future, the DNRC may need to assign personnel to renewable energy projects in order to guide developers through the process. The DNRC could also attract projects by granting land use license holders preferential status in the RFP process and by opening up bidding faster. Quinn notes that evaluating bids according to performance rather than price alone would improve the system.

Geothermal Energy, Utah

Geothermal energy is a potentially constant power source, offsetting fluctuations from intermittent renewables such as wind and solar. However, it's also technically complex and expensive—and thus rare on state trust lands in the Intermountain West. Utah is currently the only state in the region with active geothermal facilities on state trust land. Measured by land area, geothermal is Utah's largest renewable energy supply, with approximately 100,000 acres leased on state trust lands. There are currently two geothermal energy plants in production, generating revenue of $200,000 to $300,000 per year. For geothermal projects, the State and Institutional Trust Lands Administration (SITLA), which manages state trust lands in Utah, charges 2.25 percent of electricity sales for the first 5 or 10 years, and 3.5 percent thereafter.

PacifiCorp's 34-megawatt Blundell plant, on a mix of federal, state, and private territory, was the state's first, built in 1984. Blundell taps into an underground reservoir that is 3,000 feet deep, more than 500°F, and pressurized at 500 pounds per square inch. A well brings the hot, high-pressure water to the surface, where it powers a steam turbine. The Blundell plant has two units, a 23-megawatt unit built in 1984 and an 11-megawatt unit completed in 2007.

The newer Raser plant in Beaver County has been less successful. Raser originally planned to build a 15-megawatt operation using a new, modular technology produced by United Technologies, says John Andrews, SITLA associate director. The company aimed to cut costs and development time by exploring the geothermal resource while constructing the generation facility—instead of fully developing geothermal wells first, then building the power plant later. Unfortunately, the geothermal resource fell short of expectations and could not support a 15-megawatt operation. With limited income, Raser could not cover debts and declared bankruptcy in 2011. The plant continues to run at limited capacity (Oberbeck 2009).

The experience at Raser shows that the costs of geothermal development continue to be daunting and that it's worthwhile to fully characterize the available geothermal resource prior to constructing generation facilities, although that additional step is costly and time-consuming. Future technological advances may help to cut the costs and time required for geothermal development, but, given the current state of technology, geothermal projects still require significant upfront outlays.

For renewable energy development, SITLA

responds to applications as they are received; they can also offer lands through a request for proposals or a competitive sealed bid process (Rodman 2008). The state has mapped renewable energy zones, but the task of finding locations and proposing renewable energy projects devolves to developers.

Utah faces other challenges to all forms of renewable energy development on trust lands. Because of the high proportion and pattern of federally owned territory, national agencies sometimes take the lead on energy development projects. According to Andrews, the absence of an RPS in Utah is another drawback, leaving local utilities without a state mandate to supply renewable energy.

Even without an RPS, however, Utah is geographically well-positioned to export energy to other states—particularly to population centers on the west coast. Although transmission can be a barrier in some parts of the state, transmission capacity is available between Utah and southern California. What's more, developers can tap an array of renewable resources—wind, solar, and geothermal. SITLA would benefit from marketing trust lands within renewable energy zones to potential developers and by offering reduced rates for renewable energy projects within these areas.

Solar Developments in Arizona

Even in Arizona—the sunniest state in the U.S., according to the National Weather Service—the solar industry faces several obstacles on state trust lands. The only active solar facility on state trust lands, the Foothills Solar Plant opened on 400 acres in Yuma County in April 2013, when the first 17 megawatts came online. An additional 18 megawatts are scheduled to go online in December 2013. Once it's fully operational, the facility will serve 9,000 customers. The 35-year lease will generate $10 million for state trust lands beneficiaries, and most of that money will fund public education.

The slow development of the solar industry on trust lands mirrors a larger trend seen nationwide. In 2010, only 0.03 percent of the nation's energy came from solar projects, while 2.3 percent came from wind (www.eia.gov). Solar projects usually require exclusive use of a site—putting them at an even greater disadvantage on state trust lands, where many acres are already leased for agriculture, grazing, or oil and gas production. Wind projects, by contrast, can co-exist with other land uses. Solar projects also require large tracts—as many as 12 acres per megawatt (Culp and Gibbons 2010)—whereas wind facilities have a relatively small footprint. And, although prices are dropping, solar generation facilities can be very expensive.

The Blundell geothermal energy plant, on state trust lands in Utah, draws on a 3,000-foot-deep underground reservoir to generate 34 megawatts of power.

Despite these drawbacks, there are ways in which solar development is well-suited to state trust lands. For starters, these territories are untaxed and owned free and clear; unburdened by the carrying costs that private owners might have, state trust land management agencies have an advantage for holding and maintaining renewable energy projects. Some solar developers have found state trust land attractive because they can work with one owner for very large tracts. Solar generation is also well-suited to previously disturbed sites, such as old landfills and abandoned agricultural areas, which may include trust lands. Near urban areas, state trust lands slated for future development could be used for solar generation in the interim; after the solar leases expire, the grounds could be developed for urban uses (Culp and Gibbons 2010).

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State-level RPS and tax incentives could also encourage solar development. Some states provide up to 25 percent investment tax credits, property tax exemptions, and standard-offer contracts on solar, guaranteeing a long-term market for solar output.

As one of the largest landowners in the state, with several large, consolidated parcels, the Arizona State Land Department (ASLD) would do well to position itself as an attractive partner for the renewable energy industry (Wadsack 2009). The ASLD is taking steps in the right direction by developing a GIS-based renewable energy mapping system to analyze state trust lands for general suitability for solar production, based on avoiding critical wildlife habitat and wilderness areas, and minimizing distance to roads, transmission, and load. But it must follow up and market the most suitable areas for renewables (Culp and Gibbons 2010) and facilitate the process for developers, who can be deterred by complex leasing structures, requirements for public auctions, and required environmental and cultural analyses (Wadsack 2009). The more the agency can build capacity to help developers through this process, the more the renewable energy industry might flourish on state trust lands. For example, the department could offer long-term leases, expedite land sales, or develop a reduced-cost, revenue-sharing lease system specifically tailored for renewable energy development.

General Recommendations for Montana, Utah, and Arizona

Leasing renewable energy on state trust lands is complicated. Each state has a unique set of political, environmental, and economic circumstances that makes it difficult to determine any one best method for all. However, the accomplishments, problems, and solutions detailed in the examples above provide some general recommendations for success.

At the state land trust agency level:

- Proactively market suitable sites to developers. State trust land management agencies in some states, including Arizona and Utah, are creating inventories of the most suitable areas for renewable energy development on state lands. Other states could follow this model (BLM 2011, Berry et al 2009), market these parcels, and offer incentives for development, either as a part of the leasing process or through tax incentives (Culp and Gibbons 2010).
- Reduce risks to developers by granting them exclusive rights early in the discovery phase or prioritizing those who have conducted initial site assessments in the bidding or auctioning process.
- Foster close collaboration between the developer and trust land managers by educating staff on renewable energy issues in order to guide developers through the process of permitting, financing, and working with federal agencies.
- Break down silos and collaborate with other landowners and land management agencies to streamline permitting and coordination between various agencies at the local, state, and federal level.

Foothills Solar

The Foothills Solar plant, on state trust lands in Yuma, Arizona, will provide power for 9,000 customers once it's fully online in December 2013.

At the state level:

- Streamline environmental requirements. The National Environmental Policy Act (NEPA) requires a thorough analysis of environmental impacts for projects on federal lands. Montana and other states require additional, separate analyses for developments on states lands, while others streamline their requirements by allowing federal NEPA analyses to meet state obligations for projects on both federal and state jurisdictions. This streamlined approach can be more attractive to energy developers, while still effectively protecting environmental resources.
- Adopt or increase renewable portfolio standards. In the Intermountain West, Arizona, Colorado, Montana, and New Mexico have enacted RPS policies, whereas Utah has only a renewable energy goal. Trust land managers in Utah and Idaho sited the lack of a renewable portfolio standard as an impediment to the renewable energy industry in their states. Within the region, states' RPS targets range from 15 percent renewable energy up to 30 percent. Those states with lower targets could reasonably consider strengthening their RPS policies to encourage more renewable energy development.
- Offer tax policies that encourage renewable development, including property tax incentives, sales tax incentives, or tax credits. Each state could either adopt additional tax incentive policies, or increase existing incentives to better encourage renewable energy development.

Federal policies play a considerable role as well. Production tax credits in particular have spurred U.S. renewable energy deployment in recent decades. Likewise, federal investment tax credits for renewable energy—which provide developers with a tax credit during the planning and construction phases—have helped the renewable energy industry grow in recent years, even when the national economy was in recession. Finally, there have been several proposals for a federal-level renewable portfolio standard, although researchers disagree whether this type of policy would interfere with existing state-level RPS policies, which have proven extremely effective.

Renewable energy offers state trust land managers an opportunity to diversify their revenue stream to benefit the public good. For the most part, wind and transmission projects can be co-located with pre-existing leases for grazing, agriculture, oil, and gas. Solar projects could have great potential in previously disturbed sites or areas with little other value. Where geothermal resources are available, they offer consistent power that can offset intermittent sources like wind or solar. Technological advances could help bring down prices for renewables, particularly solar, geothermal, and biomass. As our energy demands grow, state trust lands are poised to play an important role in the growing renewable energy industry.

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ABOUT THE AUTHOR

ALISON BERRY *is the energy and economics specialist at the Sonoran Institute, where her work focuses on land use issues in a changing West. She holds a bachelor's degree in biology from the University of Vermont and a master's degree in forestry from the University of Montana. Her work has been published in the* Wall Street Journal, *the* Journal of Forestry, *and the* Western Journal of Applied Forestry, *among other publications. Contact: aberry@sonoraninstitute.org*

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