Policies Affecting Renewable Energy Generation on State Trust Lands in the Intermountain West

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Lincoln Institute of Land Policy
Working Paper

Lincoln Institute Product Code: WP14AB1

Abstract

State trust lands could play an important role in the growing market for renewable energy. These lands, covering 35 million acres in the Intermountain West, were granted to the states at the time of statehood by Congress to support public education and other public institutions. In each state, state trust land managers search for a variety of innovative and sustainable ways to generate income from these lands in order to support their beneficiaries.

All of the states in the Intermountain West have pursued renewable energy projects on trust lands to some degree, although none have met their full potential in the renewable energy sector. This report discusses federal and state-level policies affecting renewable energy generation on state trust lands, with a focus on state-level renewable portfolio standards and tax incentives. These policies encourage large-scale renewable energy development by driving market demand and making projects more economically feasible.

About the Author

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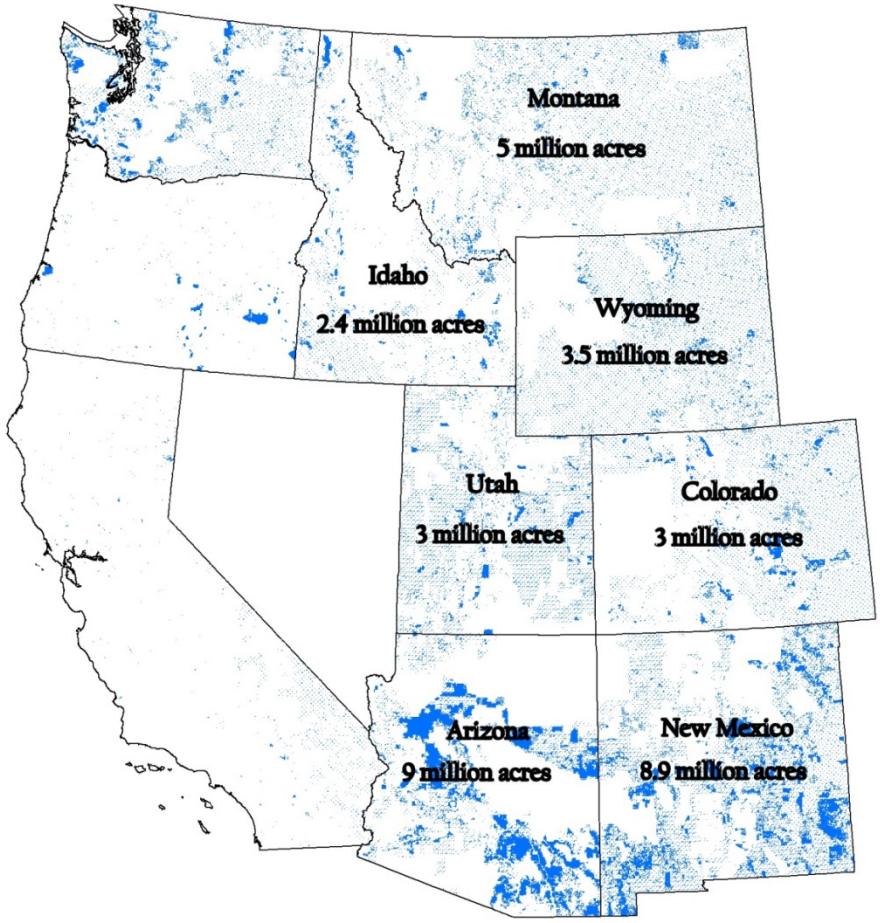
Policies Affecting Renewable Energy Generation on State Trust Lands in the Intermountain West

Introduction

There are 35 million acres of state trust lands in the Intermountain West (Figure 1); and these lands have the potential to play an important role in the growing renewable energy industry.[1] Although the fiduciary responsibilities and trust mandates vary from state to state, generally state trust lands must be managed to generate revenue for their beneficiaries, the majority of which are public schools (Culp et al. 2006).

Figure 1: Map—State Trust Lands in the Intermountain West



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

[1] This research does not include the Intermountain West state of Nevada, because there are only 3,000 acres remaining in trust land ownership. The state sold most of its trust land holdings in the early days of statehood.

Renewable energy offers one potential revenue stream. As our population and energy needs grow, energy developers are pursuing new infrastructure projects, including generation facilities and transmission lines. Renewable energy sources are attractive for several reasons: 1) to increase domestic energy production; 2) to cultivate a diversity of energy sources; and 3) to reduce reliance on carbon-based fossil fuels.

Most trust land management agencies in the Intermountain West are involved in some form of renewable energy development, including wind, solar, biomass, and geothermal projects, among others. Renewable energy projects provide a supplemental revenue stream, which can complement more traditional revenue sources like agricultural leases and resource extraction. Other public land management agencies like the U.S. Bureau of Land Management and the U.S. Forest Service are also pursuing renewable energy projects.[2] However, since these agencies must manage lands for multiple uses—and they are not required to generate revenue—they have less of an impetus to enter into the renewable energy industry.

Although the renewable energy industry is active on state trust lands, it has not flourished to its full potential. In 2011, the installed renewable energy production capacity on state trust lands was only 360 MW,[3] not enough to power 2 percent of the homes in the region. The $2 million in revenue that renewable energy on state trust lands brings in amounts to less than 1 percent of the $1 billion plus generated on state trust lands annually (Berry 2013; WSLCA).

There is room for growth in the renewable energy industry on state trust lands. This paper will describe the role of policy in encouraging renewable energy generation on state trust lands and discuss the efficacy of policies in supporting the renewable energy industry on state trust lands. Specifically, the focus is on policies like renewable energy portfolio standards that generate market demand for renewable energy, and tax incentives that help make renewable energy projects economically viable. These policies aim to stimulate the renewable energy industry in general, and are likely to affect state trust lands in a similar manner to other large land holdings.

This working paper focuses on policies that encourage utility-scale renewable energy generation facilities that would best generate revenue for state trust land beneficiaries. This includes federal policies like tax incentives that help make renewable energy generation economically viable for energy developers. However, the primary focus is on the many state-level policies that stimulate the renewable energy industry and provide an opportunity for comparison between jurisdictions.

There are also many non-policy factors that influence the amount of renewable energy generation within a state. For example, previous studies have demonstrated the importance of available renewable resources, transmission capacity, electricity prices, electricity demand, and state gross domestic product (Doris 2010; Yin and Powers 2010; Carley 2009; Bohn and Lant 2009). While these factors are clearly important, they are not the primary focus of this research.

This paper begins with a general overview of federal tax incentives, as well as a discussion of the potential for a federal-level renewable portfolio standard. This is followed by a discussion of

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[2] See, for example: http://www.blm.gov/wo/st/en/prog/energy/renewable_energy.html.

[3] This figure does not include hydroelectric capacity.

state-level policies, including information on tax incentives and renewable portfolio standards in Arizona, Colorado, Idaho, Montana, New Mexico, Utah and Wyoming. The final sections identify some useful tools for state trust land managers working on renewable energy development and discussion and conclusions about how policies affect renewable energy projects on state trust lands.

Policies Affecting Renewable Energy Generation on State Trust Lands

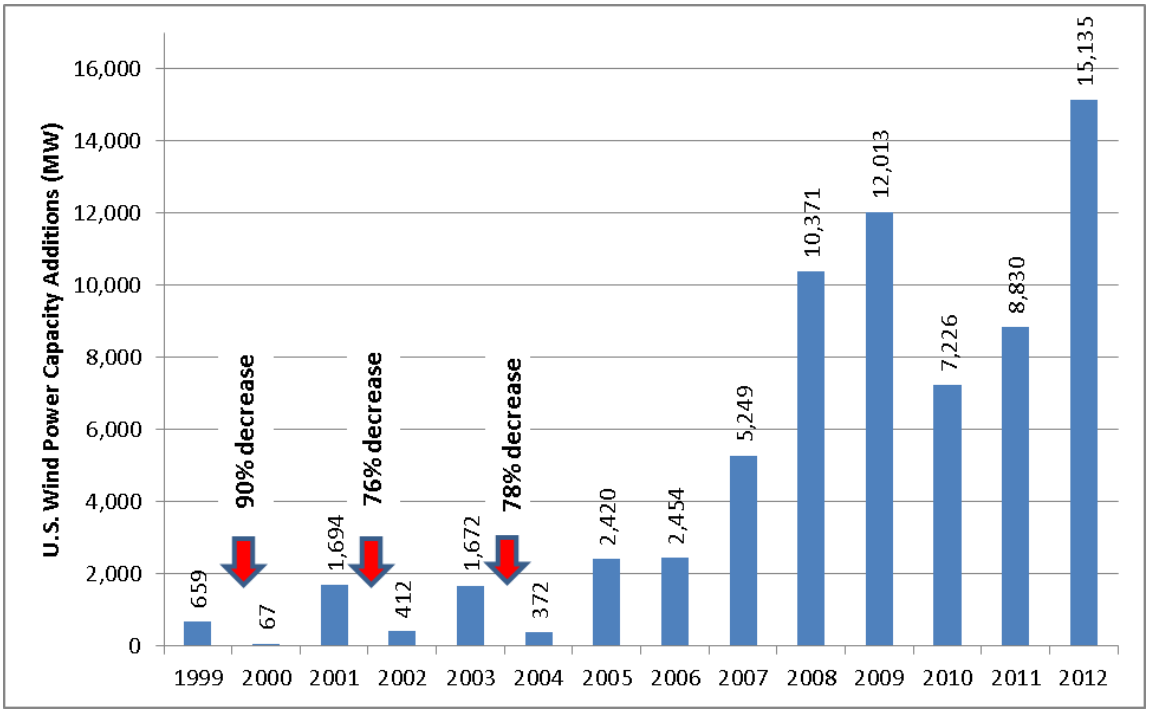
Federal Policies

Several federal policies have played an important role in the renewable energy industry. In particular, U.S. wind deployment has been driven by the passage, renewal and expiration cycle of the federal production tax credit (American Wind Energy Association 2013; Wilson and Stephens 2009). The amount of the tax credit has scaled up over time. It is currently a 2.2 cent per kilowatt hour (kWh) credit for all wind, geothermal and closed-loop biomass[4] facilities, and a 1.1 cent per kWh credit for all other renewable facilities (DSIRE).

The production tax credit (PTC) was first passed in 1992, and has expired and been renewed numerous times. Most recently, the PTC was renewed by the American Recovery and Reinvestment Act of 2009 and again by the American Taxpayer Relief Act of 2012 (DSIRE). When the PTC expired at the end of 1999, 2001, and 2003, annual wind power capacity additions decreased noticeably (Figure 2) (American Wind Energy Association 2013; Bohn and Lant 2009).

[4] "Closed-loop biomass" refers to generation facilities that process organic materials into energy, where the organic materials are planted exclusively for the purposes of generating energy. In contrast, "open-loop biomass" facilities may use by-products of agricultural or forest operations or other waste materials.

Figure 2: U.S. Wind Power Capacity Additions 1999–2012



Source: www.awea.org

The American Recovery and Reinvestment Act of 2009 also provided the option for renewable energy developers to forgo the PTC and instead secure a grant from the Treasury Department in the amount of a 30 percent investment tax credit (ITC). In the post-recession economy, this option helped energy producers to monetize tax credits regardless of energy production rates (American Wind Energy Association 2009). In other words, energy developers were eligible for a tax credit on their investment in renewable energy projects, even while the generation facilities were in the construction phase and not yet producing energy. The option for an investment tax credit helped the wind industry grow, even in a lagging economy. Figure 2 shows increasing wind capacity additions in recent years.

Since the late 1990s, there have been several proposals for implementing a federal-level renewable portfolio standard (RPS). This would be similar to the many state-level policies that require utilities operating within a state to generate a certain percentage of energy from renewable sources. State policies vary from 10 percent renewable required in Michigan by 2015 to 33 percent required in California by 2020 (DSIRE). The federal-level policies proposed to date generally suggest requiring 20–25 percent renewable energy nationwide, and they are usually accompanied by requirements for energy efficiency measures and reductions in energy demand (Sullivan et al. 2009).

The advantage of a national RPS is that it would create a consistent standard across the country. In addition, a federal RPS would enact a policy in states that currently do not have RPSs in place. Opponents of a national RPS, however, claim that RPS policies are best maintained at the state level in order to optimize use of available renewable resources on a local level and to limit

increases in electricity costs to consumers (Palmer and Burtraw 2005; Yin and Powers 2010; Fountain 2010).

Some existing state-level RPS requirements already exceed those that have been proposed at the federal level. One analysis from the National Renewable Energy Laboratory modeled renewable energy generation under existing state-level policies versus proposed federal policies, and found that current state-level policies would be more successful in increasing the amount of renewable energy generation (Sullivan et al. 2009).

It is not clear how a national RPS would mesh with existing state-level policies. Currently, 29 states and Washington DC have implemented RPSs, which mandate utilities to produce a certain proportion of energy from renewable sources. Eight states have implemented renewable portfolio goals, which set a target for renewable energy generation, but compliance by utilities is voluntary (DSIRE). Since so many states already have RPS policies in place, it could be difficult to implement a federal standard that would coordinate with all of the various existing state policies.[5]

State Policies

State governments control regulation and siting of energy facilities as well as transmission; they are well-positioned to create legislation that best suits local conditions (Busche 2010; Wilson and Stephens 2009). Some research indicates that an approach that incorporates a suite of policies is most effective at encouraging renewable energy generation in-state (Stephens and Wilson 2009; Duane 2010). However, developers often look for RPSs as an indication of general support for the renewable energy industry.[6] Well-designed tax incentives and streamlined permitting and leasing processes also encourage renewable energy deployment (Wilson and Stephens 2009; Berry 2013).

Renewable Portfolio Standard

Renewable portfolio standards are the most common state-level legislation working to stimulate market demand for renewable energy. Between 2001 and 2004, RPSs were cited as the driving force behind the installation of approximately 47 percent of new wind facilities in the United States (Environmental Protection Agency 2006). Table 1 shows the RPSs in each Intermountain West state, as well as the current proportion of energy generated from renewable sources.

[5] Personal communication with Luigi Resta, Satec Solar, March 8, 2013.

[6] Personal communication with Van Jamison, Gaelectric, February 2, 2013; and personal communication with Luigi Resta, Satec Solar, March 8, 2013.

Table 1: Renewable Portfolio Standards in the Intermountain West

	RPS: Proportion of Energy from Renewable Sources	Target Year	2012: Amount of Energy Generated MWh	2012: Proportion of Energy from Renewable Sources
AZ	15%	2025	110,693,616	7%
CO*	30%	2020	53,594,241	15%
ID**	NA	NA	16,175,834	87%
MT	15%	2015	27,725,939	42%
NM***	20%	2020	36,573,792	8%
UT****	20% (goal)	2025	39,649,068	6%
WY	NA	NA	49,811,153	11%

*Colorado's Renewable Portfolio Standard is 30% by 2020 for investor-owned utilities. The standard for electric cooperatives with more than 100,000 customers is 20%, and 10% for co-ops with fewer customers. Municipal utilities with more than 40,000 customers also must meet a standard of 10%.

**The majority of Idaho's renewable energy as tabulated here comes from large hydropower facilities.

***New Mexico's Renewable Portfolio Standard is 20% by 2020 for investor-owned utilities, and 10% by 2020 for rural electric cooperatives.

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

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

The market is more complicated than the table indicates, however, because most states allow utilities to meet RPS requirements by importing renewable energy generated across state lines. Out-of-state renewable energy generation is eligible under Arizona's RPS policy if it is produced at a facility that is directly interconnected to Arizona's grid. Montana and New Mexico require only that the energy be delivered to the state in order to meet eligibility requirements. Colorado has no restrictions on out-of-state eligibility, allowing utilities to import renewable energy through transmission systems, or to purchase renewable energy certificates or credits (Cory and Swezey 2007; DSIRE).

Renewable energy certificates or credits (RECs) are a tradable commodity, which allow renewable energy producers to separate the renewable attribute of electricity from the physical energy produced. One REC typically represents the attributes of 1 megawatt hour of renewable electricity generation (Cory and Swezey 2007). Credits are registered into renewable energy tracking systems to avoid double-counting and ensure against fraud (U.S. Environmental Protection Agency).

Over the past decade, the market for RECs has grown consistently. RPSs create a "compliance market" for RECs—in which utilities purchase credits in order to comply with the requirements of state laws. In 2009, demand on the compliance market for RECs was 30 million MWh, and that amount is expected to grow to 100 million MWh by 2014 (Holt et al. 2011). Prices for RECs vary depending on several factors including vintage, the volume purchased, and the region in which the generator is located. The western region does not release price information publicly,

but recent data from the northeast shows REC prices on the compliance market ranging from as low as $1 up to nearly $60 per megawatt hour (U.S. Department of Energy).

The advantages of RECs are in further expanding the market for renewable energy producers, reducing the need for transmission (and associated costs), and maximizing comparative advantage from a resource availability standpoint. However, allowing states to purchase RECs to meet RPS requirements does little to specifically encourage in-state renewable energy generation (Cory and Swezey 2007).

Eligibility of out-of-state generation to meet RPS requirements can stimulate a broader market, however. For example, west coast population centers are markets for renewable energy produced in the Intermountain West states. In particular, California's RPS, which requires 33 percent renewable energy by 2020, is spurring new renewable energy generation and transmission throughout the West (Hurlbut 2009). California rules allow renewable energy generated out-of-state to count towards its RPS if the generation facility ties directly into California's grid. Out-of-state renewable energy credits or delivered renewable energy may also count, but at a discounted rate.[7]

Some analysts believe that in order to encourage in-state generation, RPS policies should not count imported energy as eligible, either through transmission or RECs (Yin and Powers 2010; Cory and Swezey 2007). Alternatively, states can provide extra RPS compliance credit to in-state facilities, create set-asides for in-state systems, or have complementary policies like rebates, tax incentives, public benefit funding, and net metering to encourage in-state generation (Cory and Swezey 2007).

Several studies find that the existence of a RPS policy has a positive impact on renewable energy development within a state (Yin and Powers 2010; Menz and Vachon 2006; Adleaja and Hailu 2008; Brown and Busche 2008). This trend increases the longer the RPS is in place (Carley 2009; Sarzynski et al. 2012). A study of in-state renewable energy capacity and energy policies found that non-mandatory renewable energy "goals" were not associated with significant increases renewable energy generation (Shrimali and Kneifel 2011).

RPSs have varying effects on different types of renewable energy generation. Shirmali and Kneifel (2011) found that RPS policies have positive impacts for geothermal and solar generation, but not for wind or biomass. They also found that allowing hydropower to meet RPS will decrease the likelihood of increasing other forms of renewable energy. Sarzynski et al. (2012) found that the presence of an RPS policy does not increase the deployment of solar generation. Many states implement "solar carve-outs," which require a portion of the RPS to be met with solar energy; this can be an effective way to specifically encourage more solar development.

RPS policies are most effective if they impose consistent, defined penalties for non-compliance. Arizona, Colorado, and New Mexico allow regulators to impose non-compliance penalties, but do not specify what the penalty will be. In contrast, Montana has a non-compliance penalty of

[7] Personal communication with Luigi Resta, Satec Solar, March 8 2013.

one cent per kilowatt hour, which may not be recovered by billing customers. For comparison, California imposes a higher penalty—five cents per kilowatt hour—but allows that penalty to be recovered from customers (Cory and Swezey 2007).

In short, RPSs are some of the most important policies driving the market for renewable energy. Strong and consistent policies are most effective at encouraging renewable energy generation. These are policies that require higher portions of renewable energy generation, with well-defined compliance standards, and are equally applicable to all utilities within a state (Cory and Swezey 2007; Wiser et al. 2005).

Tax incentives

Most states offer some form of tax incentives that complement the production tax credits and investment tax credits offered at the federal level. The most common state-level incentives are credits on personal or corporate income tax or exemptions from state sales tax, excise tax, or property tax. A few states offer production tax credits, similar to the federal PTC, which are assessed per kilowatt-hour of renewable energy generated (Environmental Protection Agency 2006).
State tax incentives tend to be smaller than federal tax credits, and generally don't drive siting decisions. However, the additive combination of federal plus state tax credits can become an economic consideration (Environmental Protection Agency 2006). [8] Because different tax incentives are suitable to different taxpayers' circumstances, states may want to consider using a range of tax incentives to match these circumstances (Environmental Protection Agency 2006).

Additional State Policies

There are a range of other state policies that create incentives for renewable energy generation. Although many are focused on facilitating distributed generation, there are a few that could also affect large-scale facilities suitable for sting on state trust lands.

- Mandatory Green Power Option: These regulations require electric utilities to offer their customers the option to buy electricity generated from renewable resources. Utilities may offer renewable energy generated at their own facilities, contract with other renewable energy producers, or purchase RECs (in some states) to meet customer demands (DSIRE). In most states, voluntary green power purchases do not count toward RPS compliance—most voluntary market customers expect their purchases to be additional to any policy requirement (Cory and Swezey 2007). Several studies find that mandatory green power option policies are associated with increased deployment of renewable generation in-state (Yin and Powers 2010; Shrimali and Kniefel 2011; Menz and Vachon 2006).

[8] Personal communication with Nicholas Hiza, Development Director at Orion Renewable Energy Group, LLC March 6, 2013; and Personal communication with Steve Brown, Vice President of Development, Cyrq, March 6, 2013.

- Public Benefits Fund: These programs generate funds for grants, loans and production incentives for research, development, and deployment of renewable energy. Public Benefits Funds are paid for through additional charges to all customers on their electricity consumption (Shrimali and Kniefel 2011). Studies have found that clean energy funds result in increasing capacity for renewable energy generation in general (Shrimali and Kniefel 2011; Bolinger et al. 2001), although Menz and Vachon (2006) found that public benefits funds have no effect on wind capacity deployment.

- Facilities Siting Regulations: State-level facilities siting regulations can have an effect on renewable energy generation and transmission siting. State-wide policies can help reduce uncertainty and facilitate the permitting process for renewable energy developers.[9]

State Summaries

Arizona

With abundant renewable resources, particularly for solar energy, Arizona is poised to be on the leading edge of renewable energy development and has taken steps in that direction. Arizona was one of the earliest states to adopt a RPS, and the Arizona Corporation Commission (ACC) offers a range of incentive programs in support of renewable energy.[10]

However, in early 2013 the ACC unexpectedly eliminated performance-based incentives that had been available for large renewable energy systems. The goal is to wean the renewable energy industry off of subsidies, and the ACC maintains that the renewable energy industry is stable and will grow in the absence of incentives. However, the sudden policy change has left energy producers struggling to balance budgets without state payouts. Producers expect the elimination of incentives to setback the growth of the renewable energy industry in Arizona (Trabish 2013).

The Arizona Office of the Bureau of Land Management (BLM) has conducted a statewide assessment of federal, state trust, and private lands (military and tribal lands were excluded) that may be suitable for solar and wind development. The agency ultimately designated more than 190,000 acres of BLM holdings as Renewable Energy Development Areas (Bureau of Land Management). The Arizona State Land Department conducted its own assessment of trust lands, identifying 53,000 acres as suitable for renewable energy development (Culp and Gibbon 2010). Even some local jurisdictions are assessing their lands; the Town of Gila Bend and Pima County are identifying and zoning areas they feel are suitable for solar and wind development.

[9] Personal communication with Van Jamison, Gaelectric, February 2, 2013; and with Mary Sexton, former head of the Montana Department of Natural Resources and Conservation, February 20, 2013.

[10] Personal communication with Todd Hardy (Arizona State University) and Bud Annan (Annan Associates), February 19, 2013.

Renewable Portfolio Standard

Arizona's RPS requires 15 percent renewable energy by 2025. Facilities installed before January 1, 1997 are not eligible, with the exception of incremental generation from hydropower or hydropower output used to provide consistent back-up power to supplement intermittent renewables (DSIRE). The policy applies to investor-owned utilities, electric cooperatives, and distribution companies with the majority of their customers in Arizona. Renewable energy credits acquired in any year are eligible to satisfy the RPS requirement, but they must be bundled; renewable attributes must be attached to electricity that is interconnected to Arizona's grid (DSIRE; Holt et al. 2011).

Production Tax Credit

Arizona offers a production tax credit for renewable energy generating facilities with capacities of five or more megawatts. For wind and biomass systems, the tax credit is one cent per kilowatt hour for the first 200,000 megawatt hours of electricity produced in a calendar year for a period of 10 years. For solar, the tax credit is four cents per kilowatt hour in the first year, scaling down to one cent per kilowatt hour over 10 years. The maximum incentive for any qualified system in any one year is $2 million (DSIRE).

Property Tax Incentives

In Arizona, renewable energy equipment owned by utilities is assessed at 20 percent of the depreciated cost for the purpose of determining property tax. This includes equipment for renewable energy generation, transmission, distribution and storage (DSIRE).

Sales Tax Incentives

Arizona provides a state sales tax exemption for the retail sale of solar and wind energy devices and for the installation of these devices by contractors. Local sales taxes may still apply. In 2012 the sales tax exemption was extended so that sale of renewable energy credits is also not subject to state sales tax (DSIRE).

Colorado

In general, Colorado policies are supportive of renewable energy generation. The state has a comprehensive RPS and a suite of tax incentives. However, because the RPS does not require utilities to purchase renewable energy from in-state generators, Colorado renewable producers face competition from out of state. [11] Colorado utilities may purchase renewable energy credits to meet the requirements of the RPS, without geographic limitations (DSIRE). Furthermore, some of the larger utilities, like Xcel Energy, have already met their renewable energy requirements in Colorado, so they are not necessarily seeking out new renewable energy in state. Much of the

[11] Personal communication with Tobin Follenweider and Page Bolin, Colorado State Board of Land Commissioners, January 11, 2013.

large-scale renewable energy development in Colorado is focused on exports, which intensifies demands on transmission.[12]

Renewable Portfolio Standard

Although Colorado was not the first state to implement an RPS policy, it was the first state to create an RPS by ballot initiative in 2004. The policy sets two separate requirements: one for investor-owned utilities (IOUs), and a different requirement for electric cooperatives and municipal utilities serving more than 40,000 customers. The requirements are phased in over the period from 2007 to 2020, requiring 30 percent renewable energy from IOUs by 2020. The standard for electric cooperatives with more than 100,000 customers is 20 percent by 2020, and 10 percent for co-ops with fewer customers. Municipal utilities serving more than 40,000 customers also must meet a 10 percent standard by 2020. The policy defines carve-outs for distributed generation for IOUs: 3 percent of retail electricity sales by 2020 (DSIRE).

The Colorado RPS includes credit multipliers that essentially weight certain projects more heavily in counting towards RPS requirements. The multipliers favor in-state generation, cooperative or municipal solar projects in operation by mid-2015, and small (less than 30 megawatt capacity) projects that are either community-based or interconnected to cooperative or municipal utility systems established before 2015. These multipliers cannot be combined (DSIRE).

Colorado requires utilities to sign long-term power purchase agreements with eligible renewable energy developers. This type of policy has been correlated with more successful RPSs (Cory and Swezey 2007).

Property Tax Incentives

Property taxes for renewable energy systems in Colorado are based on installed capacity. For utility-scale facilities, taxed values are assessed as though their actual value is that of a non-renewable energy facility. This acts as an incentive for renewable energy because the value per megawatt of installed capacity of renewable facilities is always greater than for non-renewable facilities.[13] Colorado policy disregards the incremental value of renewable energy facilities above the non-renewable facilities for tax assessment purposes. In 2011 and 2012, the nonrenewable facility value was determined to be $1,068 per kilowatt for small (two megawatt) facilities and as little as $386 per kilowatt for systems over 100 megawatt (DSIRE; Environmental Protection Agency 2008).

Sales Tax Incentives

Colorado exempts all sales, storage, and components used in the production of renewable electricity from the state's sales and use tax. This includes solar, small wind, biomass, or geothermal. City or county sales tax may still apply (DSIRE).

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[12] Ibid.

[13] Personal communication with Deb Myer, Colorado Department of Local Affairs, June 10, 2013

Other Policies

In 2010, the Colorado legislature passed the Colorado Community Solar Garden Act, which allows small businesses and individuals to buy or lease a one kilowatt share of a large solar array. The law allows solar gardens with capacities up to two megawatts, which require host sites up to 20 acres. State trust lands that are located close to substations or distribution lines could be suitable sites for solar gardens in Colorado (Jaffe 2013).

Idaho

Idaho does not have a renewable portfolio standard, and in contrast to most other states in the region it has fewer policies encouraging renewable energy development. However, Idaho generates a significant amount of renewable energy—87 percent of the electricity in Idaho comes from renewable sources (U.S. Energy Information Administration).

Much of the renewable energy generated in Idaho is hydropower, although there also are 3100 megawatts of installed capacity for wind power, which amounts to 25 percent of peak load in the state. Past policies in Idaho encouraged wind development by allowing wind farms with as little as 30 megawatts installed capacity to qualify to charge attractive rates set by the Public Utilities Commission (PUC). The state was flooded with wind energy developers and the intermittency of wind-powered electricity became a concern. In response, the PUC changed its rules so that only larger wind farms, around 300 megawatts installed capacity, are eligible.[14] This policy slowed wind development, and without a RPS there is little market demand for renewable energy in the state. Idaho is well-positioned to export renewable energy to west coast markets, but transmission can be a limiting factor. [15]

Property Tax Incentives

Commercial wind and geothermal energy producers in Idaho are exempt from paying taxes on real estate, fixtures, or property related to their renewable energy systems. In lieu of property taxes, these energy producers must instead pay a tax of 3 percent of gross energy earnings. This is intended to ease the burden on energy producers during pre-operational phases by postponing tax payments until renewable projects are actually in production and generating revenue (DSIRE; Environmental Protection Agency 2008).

Montana

Montana has a RPS and property tax incentives that are attractive to renewable energy developers. [16] On state trust lands, however, requirements for environmental analyses and public bidding can be cumbersome for developers.[17] The state has tried to create policies which make it

[14] Personal communication with John Chatburn, Idaho's Office of Energy Resources, January 11, 2013.

[15] Ibid.

[16] Personal communication with Van Jamison, Gaelectric, February 2, 2013, and personal communication with Mary Sexton, former head of the Montana Department of Natural Resources and Conservation, February 20, 2013.

[17] Ibid.

easier to site renewable energy projects on state lands, which are largely scattered in a checkerboard pattern across the state. It is very common for projects to be only partially sited on state lands, yet until recently, the entirety of these projects had to undergo state review. A newly passed bill allows the state to review only the portion of the project that is actually sited on state-owned land for projects that are less than one-third on state owned land, including trust lands.[18]

Renewable Portfolio Standard

Montana's RPS requires all utilities serving 50 or more customers to obtain 15 percent renewable energy by 2015. Cooperative utilities and municipal utilities are generally exempt from RPS requirements in Montana, although those with 5,000 or more customers must work to implement standards encouraging renewable energy generation. In order to count towards the RPS, renewable facilities may be located in Montana or located in another state and delivering electricity into Montana (DSIRE).

Utilities and competitive suppliers can meet the standard by purchasing renewable energy credits (RECs) approved by the Public Service Commission (PSC). The law includes cost caps that limit the additional cost utilities may pay for renewable energy and allows cost recovery from ratepayers for contracts pre-approved by the PSC (DSIRE).

A utility unable to comply with the RPS during an annual period must pay an administrative penalty of $10 per megawatt-hour for RECs that the utility failed to procure. Penalty payments may not be recovered in electricity rates (DSIRE; Cory and Swezey 2007).

Property Tax Incentives

Renewable energy plants producing one megawatt or more are eligible for property tax reductions during the first nine years of operation, subject to local government approval. If approved, the facility is taxed at 50 percent of its taxable value in the first five years following the issuance of the construction permit. Each year thereafter, the reduction decreases until the full taxable value is attained in the tenth year (DSIRE).

The taxable value of renewable energy plants in Montana varies depending on the property ownership. Property owned by utilities or wholesale generators are normally taxed at 6 percent of assessed value; electric cooperatives are normally taxed at a rate of 8 or 12 percent of assessed value; and other businesses are taxed at 2.63 percent of assessed value (DSIRE). The renewable energy property tax reduction cuts these normal tax rates in half for the first five years (DSIRE).

New Mexico

New Mexico offers a suite of policies encouraging renewable energy development, including a RPS and a variety of tax incentives. In addition, the New Mexico State Land Office (SLO) has

[18] Personal communication with Van Jamison, Gaelectric, February 2, 2013

worked to streamline the permitting process in order to better respond to the business needs of developers. [19]

The SLO has replaced the previous system of option agreements, bid leases, and non-bid leases, with a consistent bid lease process for all new renewable energy projects. Deals are structured so that a greater portion of trust land revenues is derived from royalties rather than from an upfront cost.[20] This helps developers shift their expenses to the income-earning phases of their projects, while maintaining the overall revenue for the trust beneficiaries.

Renewable Portfolio Standard

New Mexico's RPS requires investor-owned utilities (IOUs) to generate 20 percent of total retail sales from renewable energy resources by 2020. Rural cooperatives must use 10 percent renewable resources by 2020 (DSIRE). Requirements can be met through out-of-state generation, if the energy is delivered to New Mexico (Cory and Swezey 2007).

The RPS also requires that utilities incorporate a mix of renewable energy sources. Of the 20 percent renewable energy required of IOUs, at least 20 percent must come from solar generation and 30 percent from wind. The remainder of the target can be satisfied with a combination of a variety of other resources, including biomass, geothermal, and hydropower installed after 2007 (DSIRE).

New Mexico's RPS includes a reasonable cost threshold. In any given year, if costs of meeting RPS targets exceed 3 percent of a utility's annual revenue, then the utility can be excused from the RPS requirements for that year. This exemption is provided on the condition that it will not prevent the utility from meeting RPS targets in subsequent years (DSIRE).

Production Tax Credit

The New Mexico Renewable Energy Production Tax Credit provides a tax credit against the corporate income tax of one cent per kilowatt hour for wind or biomass. Solar facilities are eligible for a tax credit with varying rates over 10 years, averaging to 2.7 cents per kilowatt hour annually. To qualify, facilities must have a capacity of at least one megawatt. For wind and biomass the credit is applicable only to the first 400,000 megawatt hours of electricity in each of 10 consecutive taxable years. For solar, the credit is applicable only to the first 200,000 megawatt hour of electricity in each taxable year (DSIRE).

Sales Tax Incentives

New Mexico assesses sales taxes for businesses based on gross receipts. Businesses are taxed on the gross amount of their business receipts each year before expenses are deducted. Revenue generated by the sale and installation of qualified renewable energy generating facilities may be

[19] Personal communication with Thomas Leatherwood and Joe Ortiz, New Mexico State Land Office, January 10, 2013.

[20] Ibid.

deducted from gross receipts before the gross receipts tax is calculated. The deductions are allowed for a 10 year period starting the year construction begins. This applies to geothermal and solar energy systems with installed capacities of one megawatt or more (DSIRE).

Other Tax Incentives

Solar and geothermal plants with capacities of one or more megawatt are also eligible for New Mexico's Advanced Energy Tax Credit. This 6 percent tax credit applies to gross receipts, withholding taxes, or income taxes associated with development and construction costs for eligible renewable facilities (DSIRE).

Utah

Utah has a renewable energy goal of 20 percent renewable energy by 2025; it is not mandatory for utilities to meet this target. This voluntary measure lacks the power that RPSs have in other states. With no RPS, there is little in-state demand for renewable energy. In addition, the Public Service Commission (PSC) requires low-cost energy for Utah consumers, which can put renewable resources at a disadvantage to many traditional energy sources.[21]

For these reasons, the renewable energy industry in Utah is largely focused on energy exports, which require transmission. There is opportunity for renewable energy development in southwestern Utah, where transmission capacity exists on high-voltage direct current lines to southern California. [22]

Utah recently passed a policy encouraging renewable energy generation by allowing renewable developers to bypass the PSC and contract directly with end users. This will let large energy users develop their own renewable energy generation facilities. [23]

Renewable Portfolio Standard

Utah's renewable energy goal maintains that utilities only need to pursue renewable energy to the extent that it is cost-effective to do so. Utilities are still required to deliver electricity at the lowest reasonable cost. Purchased renewable energy credits may count toward the renewable goal. Eligible facilities include those built after 1994 using solar, wind, certain biomass, certain hydroelectric, wave, tidal, or ocean-thermal, and geothermal (DSIRE).

Sales tax incentives

The purchase or long-term lease (seven years or more) of equipment used to generate electricity from renewable resources is exempted from state sales tax in Utah. Eligible resources include

[21] Personal communication with John Andrews, School and Institutional Trust Lands Administration, January 10, 2013, and with Luigi Resta, Satec Solar, March 8, 2013.

[22] Personal communication with John Andrews, School and Institutional Trust Lands Administration, January 10, 2013.

[23] Ibid.

wind, solar, biomass, landfill gas, anaerobic digestions, hydroelectric and geothermal. Generation facilities must have a minimum capacity of 20 kilowatts (Utah Office of Energy Development). This policy also applies to expansion of existing facilities that will increase capacity by one or more megawatts (DSIRE).

Wyoming

Of the Intermountain West states, Wyoming has the fewest policies specifically directed at encouraging renewable energy development. With no RPS and a small population, there is little in-state demand for renewable energy generation. The driver for renewable energy development in Wyoming is primarily the export of high-quality wind resources. However, export to large markets from Wyoming is limited by the long-distance transmission required. Several transmission projects are proposed or in development that would transport renewable energy out of Wyoming to markets in the Southwest and on the west coast.

The Wyoming Infrastructure Authority (WIA) and the Renewable Energy Coordination Committee (RECC) are two organizations working to support the renewable energy industry in Wyoming. The WIA is a "quasi-governmental instrumentality" of the state, and their mission is to "diversify and expand the state's economy through the development of electric transmission" (Wyoming Infrastructure Authority). The RECC includes representatives from state and federal agencies working to expedite renewable generation projects in Wyoming.

Wyoming tax policies are intended to encourage all sorts of businesses, including renewable energy;[24] there are no specific tax incentives for renewable energy generation. In fact, Wyoming is the only state in the region that charges an excise tax on wind production. Passed in 2010, and effective as of 2012, The Wind Energy Excise Tax requires wind energy generators to pay a one dollar generation tax per megawatt hour of electricity produced from wind. Companies are exempt from this tax for the first three years of generation. Counties that house the generation facilities receive 60 percent of these tax revenues, and the state of Wyoming receives the remainder (Jakle et al. 2011). Although many wind developers perceive this tax as a hindrance, overall tax rates in Wyoming are so low that the state is still attractive to wind development.[25]

State Policies on State Trust Lands

State-level incentives for renewable energy generation affect development on state trust lands in a similar manner to other large land holdings. Policies that make renewable energy generation economically viable increase the likelihood that developers will move projects forward. Given that, a range of policies including a variety of tax incentives and market drivers (like RPSs) will support the renewable energy industry in any state. Moreover, the unique nature of renewable energy projects also demands a broad range of state policies supporting the renewable energy industry to encourage a variety of renewable energy generation facilities.

[24] Personal communication with Don Threewitt, Wyoming Office of State Lands and Investments, January 4, 2013.
[25] Ibid.

However, other non-policy factors are also important. In particular, the regional market for renewable energy requires transmission infrastructure, which is often a limiting factor for renewable energy development (Bohn and Lant 2009; Hurlbut 2009).[26] In addition, administrative procedures, public bidding processes, and required environmental analyses can deter renewable energy developers considering working on state trust lands (Berry 2013; Wilson and Stephens 2009).[27]

In order to encourage renewable energy development on state trust lands, managers must address both policy and non-policy factors. This includes supporting transmission development, streamlining administrative procedures, and supporting policies that make renewable energy generation economically viable. All of these approaches should be tailored to suit local renewable resources and economic conditions. The tools and resources in Appendix 1 provide additional references and sources for comparative analysis and project modeling.

Conclusions

Although policies play a role in the renewable energy industry, it does not appear that policies alone drive the deployment of renewable resources on state trust lands. Renewable portfolio standards and tax incentives are important, but other factors, like the permitting process, transmission capacity, and the availability of renewable resources are also significant concerns.

Nationwide, the federal production tax incentive (PTC) has had an influence on renewable energy deployment. This federal policy has helped to make renewable energy generation projects economically viable. State tax incentives also make projects more attractive from an economic standpoint, but state-level tax incentives tend to be additive to the federal PTC rather than spurring the renewable industry on their own.

Renewable portfolio standards (RPS) also serve an important function. In requiring a certain percentage of energy come from renewable sources, RPS policies stimulate market demand for renewable energy. In order to effectively encourage in-state generation, RPS policies must be consistent, enforceable, and require that eligible generation facilities are in-state, or at least provide added incentives for in-state generation.

RPS policies can also stimulate regional growth in the renewable energy sector. For example, in the Intermountain West, much of the new renewable energy generation is for export to markets on the west coast. The combination of large population centers, high energy demand, and renewable portfolio standards has stimulated a regional market for renewable energy generation.

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[26] Personal communication with Tobin Follenweider and Page Bolin, Colorado State Board of Land Commissioners, January 11, 2013; John Andrews, School and Institutional Trust Lands Administration, January 10, 2013; and John Chatburn Idaho's Office of Energy Resources, January 11, 2013.

[27] Personal communication with Van Jamison Gaelectric, February 2, 2013 and with Mary Sexton, former head of the Montana Department of Natural Resources and Conservation, February 20, 2013.

With that in mind, transmission issues are of utmost importance: capacity, identification of new corridors, planning for new lines, generating revenue from new lines, and addressing any potential economic impacts on lands adjacent to these lines. States that facilitate transmission projects will see a higher likelihood that new renewable generation facilities will come into operation. For example, the Wyoming Infrastructure Authority and the Renewable Energy Coordinating Committee provide models that support transmission infrastructure and coordinate federal and state agencies for the deployment of renewable generation. Additionally, the potential exists to coordinate the build-out of both transmission infrastructure and renewable energy generation facilities on state trust lands over the coming decades.

On state trust lands, managers can work to streamline permitting requirements and to facilitate coordination between federal and state agencies. A clear understanding of renewable energy policies and incentives on the part of state trust land managers will better enable them to help renewable energy developers navigate the system. State trust land managers can also work to identify suitable sites for renewable energy developments on trust lands. For example, the Arizona office of the Bureau of Land Management's Renewable Energy Development Areas provide a model on both state and federal lands.

Future research on renewable energy generation on state trust lands should investigate the comparative advantage that state trust lands may have versus federal and private land. Best practices for marketing renewable energy development sites on trust lands, particularly in states that have identified the most suitable sites for renewable energy generation, would be especially helpful.

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Appendix 1: Tools and Resources

The Database of State Incentives for Renewable Energy

The Database of State Incentives for Renewable Energy (www.dsireusa.org) is a comprehensive and continually updated source for information about incentives and policies supporting renewable energy in the United States. This site provides information about federal and state policies, including tax incentives and RPSs, among others.

The National Renewable Energy Laboratory (NREL)

- State and Local Policy Analysis: NREL provides in-depth analysis of the effects of policy on renewable energy development at the state and local level. This research is useful for state-level comparisons of the implications of various renewable energy policies. (Available online: http://www.nrel.gov/analysis/policy_state_local.html)

- Clean Energy Policy Analyses Project: This project aims to quantify the connection between state and local policies and clean energy market development. This research provides case studies and regional analyses from across the nation. (Available online: http://www.nrel.gov/tech_deployment/state_local_activities/cepa.html)

- Renewable Resources Maps & Data: NREL compiles information on renewable resources and can help state land offices to analyze renewable energy development potential by overlaying resource maps with information on land use, transmission capacity, and load centers. This information can help land managers identify the best renewable resources on state trust lands. (Available online: http://www.nrel.gov/renewable_resources/)

- System Advisor Model: This model can help energy developers predict costs and revenues from planned energy generation facilities. It is applicable to a full range of project sizes, from small distributed generation to large-scale utility projects. To get started, model users must provide information on what type of renewable technology is involved (photovoltaics, wind, geothermal, etc), and what type of financing will be used. The model can then be tailored with specific information on location, type of equipment, costs, financing, incentives, and depreciation. The model provides a range of output, with data on projected energy production, cash flow, land use, water use, and more. State trust land managers can make this tool available to developers considering siting generation facilities on trust lands. (Available online: https://sam.nrel.gov/)