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Wind development, tax policy and economic development tradeoffs

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ABSTRACT

Wind energy poses an opportunity for rural communities. Many western states are currently challenged by structural economic changes and serious declines in employment and tax revenues. This opportunity has also led some state policymakers to consider wind taxation increases to create needed new revenue, which could deter such development. Such decisions must be made with a clear understanding of each state's real competitiveness, and with recognition of the potential tradeoffs such decisions could imply.

1. Introduction

Wind energy poses a major opportunity for rural communities nationwide, and in particular in the Rocky Mountain West. States in the Western Interconnection have significant wind resources and also sizeable and demonstrated demand for wind energy. Communities in the west are often eager to take advantage of their wind resource to create additional economic development, and to diversify economies often dependent on energy or agriculture, both of which are prone to economically damaging boom and bust cycles that can wreak havoc on local and regional public, as well as private revenues. The local economic impacts of wind development can be sizable, as other authors have argued (see, for example, Slattery et al. (2011), and Brown et al. (2012)) and we potentially demonstrate below. In the past several years, facing a fall in world oil and domestic natural gas prices due to rapid innovation in the industry (e.g. hydraulic fracturing and directional drilling), and/or reduced coal production from competition in the generation sector from natural gas, energy-dependent states have seen declines in traditional revenues. As such, these energy dependent regions have struggled to finance public services. They have also seen declines in private sector activity and loss of working-age population for the same reasons. Wind development could potentially provide some relief from these challenges by creating a new source of revenue for public services and an opportunity for some of these states and their rural communities to both diversify their economies and revenue structures.

Wind development creates both short- and long-term private economic benefits. In the short term, these capital-intensive projects can bring significant new economic activity to local communities during construction, creating direct benefits from construction employment and activity, and indirect demand for goods and services and employment (e.g. materials, vehicles, fuel, other consumables, and housing and lodging services). Over the longer term, during operations, wind projects may create direct benefits locally through employment and through on-going demand for materials, equipment, and services while also providing income through lease payments to landholders that allow lands to remain in traditional use, preserving a western way of life that is often perceived to be at risk due to increasing urban sprawl and gentrification of rural lands. Public revenues may also be enhanced through the collection of additional property, sales, income, and other taxes.

Exploiting this development opportunity though poses several tradeoffs. First, wind energy and its wide use of space can pose ecological challenges and changes in the landscape, threaten local use of open lands, and create local concerns regarding historical and cultural aesthetics and the connection local people have to their environment. Opposition to wind development over these concerns has often united a diverse group of stakeholders - from politically left-leaning environmentalists to conservative citizens and politicians who do not support renewable development for a wide range of ideological and political reasons. Secondly, the increased activity and employment may also cause increased demand for local public services (e.g. additional emergency services, public and education services to support new workers' family needs, and public infrastructure expansion). These increased demands may create need for additional tax revenues and may therefore create a public incentive to raise taxes on wind generation. Doing so, however, could hinder regional competitiveness to attract wind investment, thus undermining the potential ability of a region to realize the economic benefits of additional development.

Local tax environments can affect which regions successfully attract

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wind investment. Communities have grappled with trying to decide whether to welcome large-scale wind development and potentially reduce its tax burden to competitively attract projects, or to take advantage of such development as it occurs to tax it to compensate for the local costs it imposes and to supplement local, county, and state revenues, especially in regions where traditional revenue sources have been declining. No state likely epitomizes these conflicting incentives more than Wyoming.

The following presents a case study of Wyoming as it confronts the policy tradeoffs between potential development and taxation surrounding a recent tax debate that took place in the state regarding a proposed increase in its unique wind generation tax. Section 2 details the comparative competitiveness conditions to attract wind development across states in the Western Interconnection. A comparative analysis of western wind taxation is then described in Section 3. The potential tradeoff between economic development and Wyoming's proposed tax policy is then developed in Section 4, putting into context the potential conflict between increased tax revenues and the potential losses in economic activity such tax changes may result in if they cause the cancellation of some proposed wind development. Section 5 concludes. The Wyoming case presents the challenge energy-dependent regions face regarding the potential of wind development to be used to diversify local economies and their tax revenues, and the scale of what might be at stake from wind energy "tax competition" in the west.

2. Background

Wyoming's wind resources are considered among the best in the country in terms of potential electricity output. In 2015, the National Renewable Energy Laboratory (NREL) estimated that Wyoming has over 139,000 km^2 of land capable of producing wind generation at or greater than 35% gross capacity factor (GCF) using current technology (NREL, 2015).[1] This ranked the state 11th out of the 50 states, and third among Rocky Mountain and Western states, behind only Montana and New Mexico (Table 1).[2] The first commercial wind generation facilities began construction in Wyoming in the late 1990 s, with commercial wind generation beginning in the spring of 1998. Between 1998 and 2010, Wyoming wind generation grew to over 1400 MW across 21 facilities, and the state now ranks 16th in the country for installed wind capacity, and fifth among Rocky Mountain and Western states (AWEA, 2018).

Elsewhere in the Western Interconnection, wind development has also expanded over the past two decades, especially since 2010. Fig. 1 shows the annual installed wind capacity in the western states since 2000. Fig. 2 shows how state wind generation capacities have changed since 2010 in the west. Comparison of the two figures indicates a change in the pattern of wind development. In 2010, Wyoming ranked fourth among western states in wind development, trailing only California, Oregon, and Washington. By 2017, however, the state had fallen to sixth in the west, with Colorado and New Mexico surpassing Wyoming's total wind capacity. Furthermore, as shown in Fig. 2, wind capacity growth in all other states in the Western Interconnection exceeded Wyoming's despite Wyoming's superior wind potential. In this period, six states (Arizona, Colorado, Idaho, Montana, Nevada, and New Mexico) more than doubled their capacity while Wyoming added only 77 MW. Given the economic and revenue benefits new wind capacity offers both from construction and operations, Wyoming's relative lack of growth since 2010 poses an important policy question in understanding what may drive western wind development.

Despite its natural advantages, assessment of Wyoming's competitive position in terms of attracting wind development indicates several challenges. Wyoming has a small local market to use such power, and is relatively farther from the largest markets on the western grid than other western states. For these reasons, wind development in the state is dependent on transmission infrastructure to deliver power (Godby et al., 2016). Such transmission capacity out of the state, however, is currently quite limited. Several industry transmission planning reports and academic studies have discussed the need for greater transmission development if wind generation in Wyoming and the west is to be developed on much larger scales than seen today (see for example: GE Energy, 2010; and Godby et al., 2014). These concerns seem validated by some currently proposed wind development projects in Wyoming as well. Two very large proposed developments - the Power Company of Wyoming's Chokecherry and Sierra Madre project (3000 MW), and the Pathfinder Project (2100 MW) – include costly transmission expansion as part of their proposals, since current transmission infrastructure is inadequate to deliver the proposed projects' power to California markets.[3] The inclusion of such transmission capacity in wind projects is rare and increases the total cost of such development significantly.

Furthermore, technological advances in wind generation may also be reducing Wyoming's relative competitiveness among western states. Specifically, taller towers and longer blades developed for use in lower wind potential areas have improved potential capacity factors and productivity in states previously considered relatively less attractive for wind development, and have facilitated development in such areas. Wiser et al. (2017) document the convergence of capacity factors between medium, higher and highest wind resource regions

While technology, infrastructure and locational challenges may have reduced the attractiveness of developing wind in Wyoming in recent years, other states in the west also face such challenges and differences in state wind policy may also explain recent development patterns. Given all western states have locations suitable for economically competitive wind development, the competitiveness of a state to attract wind development is also affected by the policy environment it creates to incentivize such development. Such incentives can affect market demand for wind inthe state, reduce development costs or serve to reduce wind generation owners' tax liabilities and therefore increase after-tax returns for developers.

3. Tax conditions in the West

Tax conditions vary greatly with respect to types of taxes, taxation levels on wind energy, and incentives available by state to attract wind. With respect to incentives, the most common state-based incentive program is a renewable portfolio standard (RPS), requiring a certain amount of electricity generation come from renewable sources within a state. Such policies have been shown to help drive demand for wind energy development in other states (see Black et al., 2014; Hitaj, 2013; Carley, 2011; Adalaja and Hailu, 2007; and Menz and Vachon, 2006). All but three states in the Western Interconnection have an RPS standard, as shown in Fig. 3.[4] Wyoming does not provide any statewide tax incentives or credits to develop wind, nor does it have a RPS requirement. Furthermore, the RPS incentive is increasingly bolstered by technologically reduced cost per MWh. Wind is the lowest-cost source of new electricity generation in many areas of the country (Lazard, 2017).

[1] Gross capacity factor (GCF) refers to the percentage of potential output expected to be generated in a given year from a wind generator. NREL assumes current wind generation technology using towers 110m in height with current blade design technologies. Earlier technology used 80m towers. Near future technologies assume 140m hub heights with 110m blade diameter. See NREL (2015).

[2] This ranking assumes current technology. The western states shown in Table 1 comprise those in the Western Interconnection.

[3] The Power Company of Wyoming is developing what will be the largest wind project in the country at 3000 MW. The project, also includes a DC transmission line over 650 miles in length called TransWest, to deliver power to Southern California. The Pathfinder project in central Wyoming has been dormant for several years but proposed building a 525-mile transmission line to deliver power to market in Southern California.

[4] While not having an RPS standard, in 2008 Utah established a voluntary renewable portfolio goal of 20% by 2025.