Renewable Energy: Implications for Rural Development and Rural Policy in the Intermountain West

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Introduction
Perhaps you’ve seen them as you head down the highway or drive across the desert – the 300-foot tall, stark white towers and slowly turning blades of a wind turbine, or the glint of the sun off a field of matte black and slightly iridescent photovoltaic solar panels. If you haven’t seen these signs of renewable energy development you will likely notice them soon, as wind and solar energy facilities are expanding at a breakneck pace across much of the U.S. While it still plays a modest role in overall electrical generation capacity, growth in renewable energy production has been nearly exponential over the past decade. And, if forecasts such as those developed by the U.S. Energy Information Agency (2013) are correct, the rapid growth will continue and complexes of wind turbines and solar panels will become increasingly widespread nationally and across much of the Intermountain West.

As is the case with all large-scale industrial and technological facilities, the development of utility-scale renewable energy brings with it both "opportunities" and "threats" for the rural areas and communities where these facilities are sited (see Gramling and Freudenburg, 1992). Claims and expectations regarding the presumed environmental and economic benefits of renewable energy are counterbalanced by an equal number of concerns about their potential to have negative environmental as well as socioeconomic impacts. In this article we discuss public support as well as opposition to renewable energy, and examine both opportunities and threats that help to account for varied response to such facilities. We also selectively focus on development patterns and issues that are especially relevant to the Intermountain West, a region with considerable renewable energy development activity and potential in which the presence of extensive public land areas may influence the nature of both project effects and public response.

Opportunities and Threats of Renewable Energy Production
Future growth of renewable energy could offer economic development opportunities in places that have strong winds or many sunny days, as these facilities can create new tax revenues as well as jobs and other income opportunities. Also, with growing pressure to reduce carbon emissions from the nation’s electrical generating system, renewable technologies offer a way to expand generating capacity without releasing the pollutants produced by natural gas or coal-fired power plants.
Renewable energy production is strongly supported by the public – a March 7, 2013 national poll found that 76 percent and 71 percent of respondents think the U.S. should rely more on solar and wind energy, respectively (Gallup, 2013). As indicated in Table 1, support is also generally strong among those who live in the Intermountain West – while levels are not as high as those reported in national polls, solar and wind power are the most widely supported forms of energy production among residents of this region.

Despite strong growth, forecasts of future expansion, and broad-based public support, successful siting of renewable energy facilities is not guaranteed. Indeed, a recent study indicates that nearly half of proposed wind projects in the U.S. have been blocked at the local level (Pociask and Fuhr, 2011). While renewable energy may be broadly supported as a general idea, actual renewable projects often encounter substantial opposition. Almost invariably some local residents will resist the development of wind farms or other renewable energy facilities in places near where they live (Pasqualetti, 2011). Projects are also sometimes opposed by environmental groups, as has occurred with solar projects in the Mojave Desert that could threaten an endangered tortoise species. Public concerns about renewable projects vary widely, but most commonly include fears that they will spoil views, create unwanted noise, cause harm to wildlife (especially birds) and wildlife habitat, or lower surrounding property values. Concerns about possible human health effects from low-frequency vibrations produced by wind turbines have also been raised. Opponents sometimes object to government subsidies that renewable projects receive, or argue that these facilities are an unreliable form of energy production. In addition, opposition is often linked to concerns that local communities and rural areas bear the brunt of potentially adverse effects associated with these facilities, while most economic benefits as well as newly-generated electricity are sent to other, primarily urban, places.

While opposition to renewable projects is a common occurrence, it is by no means a universal reaction. Some proposed developments are welcomed with open arms by the local community, as was the case for the First Wind project developed during 2009-2011 in Beaver County, Utah, near the town of Milford. Some residents and local officials in Milford and Beaver County actively pursued wind power, and initiated contact with potential developers after noticing and studying just how windy the area tends to be (for more on this story see the suggested links).

Renewable energy development can bring important benefits to places like Beaver County (see Figure 1 for the location of this and other renewable energy projects in Utah). The creation of many construction-phase jobs, along with expenditures on goods and services by developers and workers during the construction period, can provide a substantial short-term boost to rural economies. And, while operations-phase jobs are few in number and most often filled by workers relocating from other areas, even a handful of new jobs for local residents can be important in places where employment opportunities are limited. In addition, such facilities have the potential to produce substantial new tax revenues for counties and other local units of government (for a more detailed overview of the economic benefits of wind energy projects see “Wind Energy Development and Education in Northeastern Colorado,” in the November 2008 edition of Rural Connections).

Especially significant for sparsely populated rural areas like Beaver County is the tax on capital investments and facilities. Wind turbines and solar arrays are expensive, and taxes on these facilities can, at least over the short term, provide considerable new revenue. For Beaver County,

| Table 1: Responses to “Which of the following sources of energy would you want to encourage the use of here in your state?” |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ENERGY TYPE                    | Arizona | Colorado | Montana | New Mexico | Utah | Wyoming |
| SOLAR POWER                    | 74%     | 56%      | 29%     | 56%         | 39%  | 21%     |
| WIND POWER                     | 43%     | 56%      | 53%     | 43%         | 47%  | 44%     |
| NATURAL GAS                    | 20%     | 24%      | 33%     | 31%         | 39%  | 42%     |
| ENERGY EFFICIENCY EFFORTS      | 18%     | 19%      | 17%     | 15%         | 14%  | 11%     |
| OIL                             | 6%      | 8%       | 28%     | 8%          | 16%  | 41%     |

in the years immediately following development, revenue from the First Wind project provided nearly two-thirds of the county’s total tax income. Almost as significant as the actual revenue is that this new money generally comes with few obligations for public services. While other large-scale developments often bring an influx of workers and their families that requires increased expenditures on roads and other public infrastructure, school programs, and services like law enforcement and public health care programs, renewable energy facilities generate few such demands.

Renewable energy development is also widely perceived as creating fewer and less severe environmental problems compared to those that can accompany the extractive and resource processing industries that remain important to many rural areas. In addition, renewable facilities carry considerably less stigma than some other industries, such as landfills or waste incinerators that are often attracted to sparsely populated rural settings.

Despite assertions regarding economic and environmental benefits and generally favorable public opinion, renewable energy development faces multiple uncertainties that may limit its potential for contributing to rural economic development. Those who expect such facilities to create major new employment opportunities are often disappointed by what actually occurs. Even very large wind or solar installations need just a few long-term employees on site. And, while there can be a short-lived employment boom during the construction phase, most of the labor needed for both construction and operation tends to be imported. In most rural areas the locally-available workforce is unlikely to have the technical expertise needed to either install or operate these highly advanced energy facilities.

Another disappointment for local governments is how rapidly the tax revenue generated by renewable energy development can decline. Renewable energy projects typically offer significant new public revenues in the short term. However, because the main source of tax revenues is the value of the solar panels or turbines, a rapid depreciation in the assessed value of this capital equipment can cause revenues generated by such projects to drop precipitously over just a few years. This can pose a challenge for local governments as they attempt to balance use of an initial fiscal windfall to address infrastructure and service provision needs against the prospect of rapidly-declining revenue flows over the longer term.

The development of renewable energy projects can also exacerbate concerns over the influence of non-local decision-making authorities. While local populations and governments are most likely to experience impacts resulting from such developments, local citizens and officials often have little influence over how, where, and when project activities occur. Corporate officers make decisions about project planning and implementation, and negotiate power purchase agreements and connection to transmission infrastructure with other corporations. The federal government sets policies that determine renewable energy subsidies, tax credits, and loan guarantees that promote or constrain development of these technologies. In areas of the West where development may occur entirely on public lands, environmental review and permitting decisions are controlled by federal agencies. Also beyond local control is the rate and schedule of taxation of these projects, as those are determined by state authorities. In addition, state governments set renewable energy goals and requirements that determine future demand for renewable energy production.

Renewable energy development is also subject to a number of larger-scale external forces that make future development prospects uncertain. One such limitation is the intermittent nature of the sun and the wind, which necessitates the continued use of traditional energy sources to provide stable base-load electric power generation. In addition, technological advances involving other energy production options can undercut the financial “bottom line” of renewable energy. For example, rapid expansion of natural gas production as a result of directional drilling and “fracking” processes is one such technological development that has shifted the landscape for U.S. energy production.
in recent years, and probably slowed the growth of renewable energy systems. Similarly, anticipation of technological innovations that could lead to better, cheaper solar panels or wind turbines can undermine the confidence of companies considering investment in renewable energy based on technologies that are now available. The enormous size of the existing electric power production and distribution system is another barrier for renewable energy. The current electrical system has been in development for over a century, and transformation to a system powered in large part by renewable energy will take considerable time – perhaps not just many years, but many decades (Smil, 2005).

The future of policies and programs that have spurred renewable energy development is also unclear. The federal government has been unwilling to commit to an extension of favorable tax credits and other renewable energy incentives for more than one year at a time. Many of the areas with the best renewable energy potential are located at great distances from urban centers where demand for new electric power supplies is greatest, and the resulting requirement for long-distance power transmission creates several important uncertainties. High power transmission lines are expensive to construct. They also often generate substantial concern about environmental effects and spawn public opposition that extends across multiple states and localities. In addition, states like California with the highest renewable mandates and demand are shifting requirements regarding the extent to which renewable power must be derived from in-state rather than out-of-state sources, contributing to uncertainty about the viability of future renewable energy development in other western states. Also, some electric utilities have been reluctant to enter into long-term power purchase agreements with renewable energy producers, and some have sought to cancel previously-established contracts as the price of electricity fluctuates and they seek cheaper sources.

Despite these limitations and uncertainties renewable energy production is expected to continue to grow for the foreseeable future. With many ideal wind and solar resources located throughout the region, residents of the Intermountain West region will almost certainly encounter growing numbers of solar and wind energy facilities. Our research has illuminated a number of ways that renewable energy might contribute positively to rural development. However, renewable energy development can also lead to unfulfilled expectations, unanticipated effects, and adverse consequences. Although there is some uncertainty about the near-term trajectory of renewable energy development, such systems will undoubtedly become more widespread as technologies improve and electric power demand continues to increase. As renewable energy development moves forward, those responsible for decisions about facility siting and regulation should carefully consider both the “opportunities” and the “threats” that accompany these systems.