Commercial Wind Energy Development in Wyoming: A Guide for Landowners

Second Edition

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Table of Contents

List of Figures

List of Tables

Abbreviations and Acronyms

AWEA	American Wind Energy Association
BLM	Bureau of Land Management
CRP	Conservation Reserve Program
CSP	Conservation Security Program
DEQ	Wyoming Department of Environmental Quality
DSIRE	Database of State Incentives for Renewable Energy
EQIP	Environmental Quality Incentives Program
FAA	Federal Aviation Administration
FRPP	Farm Ranch Land Protection Program
FSA	Farm Service Agency
GRP	Grassland Reserve Program
ISC	Industrial Siting Council
ISD	Industrial Siting Division
ITC	investment tax credit
kWh	kilowatt-hour
LLC	limited liability corporation
LWA	landowner wind association
MARCS	Modified Accelerated Cost-Recovery System
mph	miles per hour
m/s	meters per second
MW	megawatt
MWh	megawatt-hour
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
OSLI	Wyoming Office of State Lands and Investments
PTC	production tax credit
REAP	Renewable Energy for America Program
RFP	request for proposals
RPS	renewable portfolio standard
SHPO	Wyoming State Historic Preservation Office
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WERA	Wind Energy Rights Act
WIA	Wyoming Infrastructure Authority
WGFD	Wyoming Game and Fish Department
WHIP	Wildlife Habitat Incentives Program

Foreword

Wyoming is a state of energy booms: oil, coal, natural gas, uranium, and most recently, wind energy development. Wind energy capacity in Wyoming has increased from 288 megawatts (MW) in 2007 to over 1,400 MW at the end of 2010—an increase of almost 500 percent. In addition, nearly 7,900 MW of new wind projects are in the queue. Wind facilities are being built every year, as can be seen by the towers and turbines transported along the Interstate 80 corridor. Recent Wyoming legislative sessions have had multiple bills introduced relating to wind energy, resulting in new and different regulations, taxation structures, and assurances and procedures for wind developers, landowners, and counties hosting wind farms.

To keep on top of these developments, the Ruckelshaus Institute of Environment and Natural Resources, the School of Energy Resources, the Cooperative Extension Service, and the College of Law at the University of Wyoming have updated this guide for landowners seeking information on commercial wind energy development. The guide maintains the original aim of the 2009 edition, in that it outlines the process of wind energy development for landowners and highlights some of the key issues that they may face throughout the wind energy development process. It expands on this, however, to provide important updates on the growing practice of landowner wind energy associations and the changing legislative landscape in the state. For example, in 2011 the Wyoming State Legislature passed the Wind Energy Rights Act, which provides more certainty to both landowners and developers by defining the nature of wind energy rights and attaching those rights to surface property.

It is our hope that this guide will inform not only landowners but also other stakeholders in wind energy in Wyoming so that we can continue to develop wind in our state in a way that is beneficial to landowners, communities, and the environment.

Indy Burke
Director, Ruckelshaus Institute of Environment and Natural Resources

Mark Northam
Director, School of Energy Resources

1 The Role and Context of Wind Energy

1.1 United States Wind Energy Development

The United States is the second largest global developer of wind energy. At the end of 2010, the U.S. had over 40,000 megawatts (MW) of cumulative wind capacity installed, or 21 percent of the world's installed wind capacity (Figure 1).[1] Wind energy has expanded rapidly in the United States, and:

- From 2007 through 2010, wind represented 35 percent of new U.S. electricity-generating capacity installed, second only to natural gas; and
- From 2000 through 2010, the installed capacity of wind energy increased over 1,482 percent, from 2,539 MW in 2000 to 40,180 MW in 2010.[2]

Despite its rapid growth, wind energy still remains a small portion of total electricity generation in the United States. As of the end of 2010, wind energy composed 2.3 percent of total U.S. electricity generation.[3]

Federal Drivers of Wind Energy Development

The two primary policy drivers of wind energy development in the United States are: 1) financial incentives, including tax credits and deductions; and 2) renewable portfolio standards.

Financial Incentives. Federal incentives for wind energy development include a production or investment tax credit (PTC or ITC) and accelerated depreciation. The PTC provides wind developers who have their projects in service before December 31, 2012, with $0.022 per kilowatt-hour (kWh) of electricity generated for the first 10 years of operation.[4] The 2009 American Reinvestment and Recovery Act provided an alternative incentive for commercial renewable energy developers, who, if construction begins prior to December 31, 2011, can take an ITC of 30 percent of capital costs

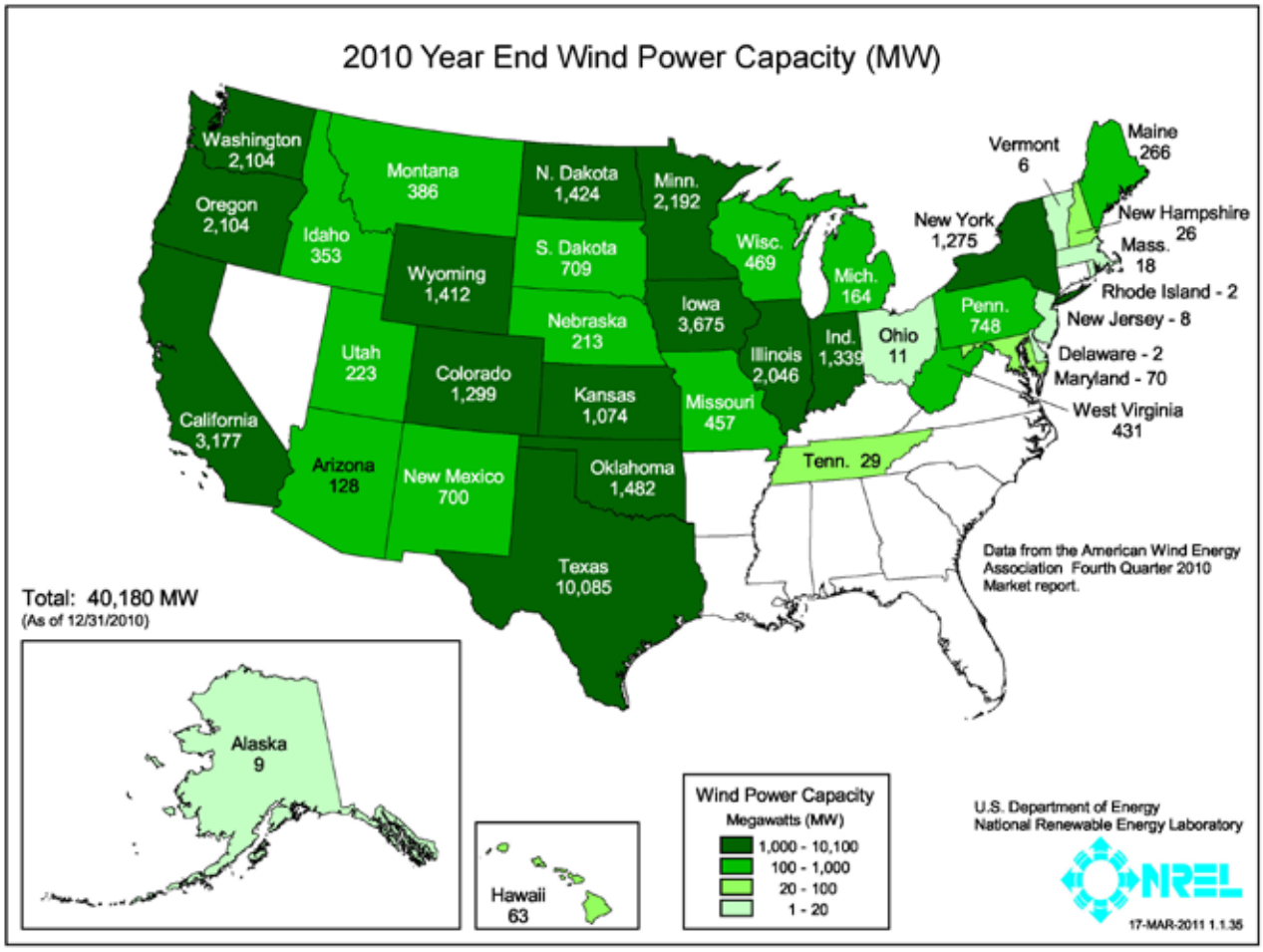

Figure 1. U.S. wind energy installed capacity at the end of 2010. (Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.)

in lieu of the PTC.[5] The status of these tax credits beyond their expiration dates is uncertain, although the PTC has been renewed continuously over the last decade. In addition, through the Modified Accelerated Cost-Recovery System (MARCS) wind developers can depreciate the cost of the wind facility over five years (other non-renewable electricity generating facilities generally depreciate capital costs over 20 years), and they may also be eligible for an additional bonus depreciation.[6]

Renewable Portfolio Standards. Renewable portfolio standards (RPSs) dictate a certain percentage of total electricity production that will come from renewable sources by a designated year. Although no federal RPS exists, 29 states, the District of Columbia, and Puerto Rico currently have binding standards, while another eight states have non-binding goals (Figure 2). Wyoming does not have an RPS, although wind energy developers hope to supply Wyoming's wind-generated electricity to buyers in states that have adopted RPSs.

1.2 Wyoming Wind Energy Development

Wyoming currently ranks tenth in the nation for overall installed wind capacity, and the state has the eighth highest potential wind energy resources.[7] From 2000 to 2010, the amount of wind energy installed in Wyoming increased from 90 MW to 1,412 MW,[8] and wind energy now comprises over 5 percent of electricity generated in the state.[9] Consistent, strong wind continues to attract wind energy developers to Wyoming (Figure 3).

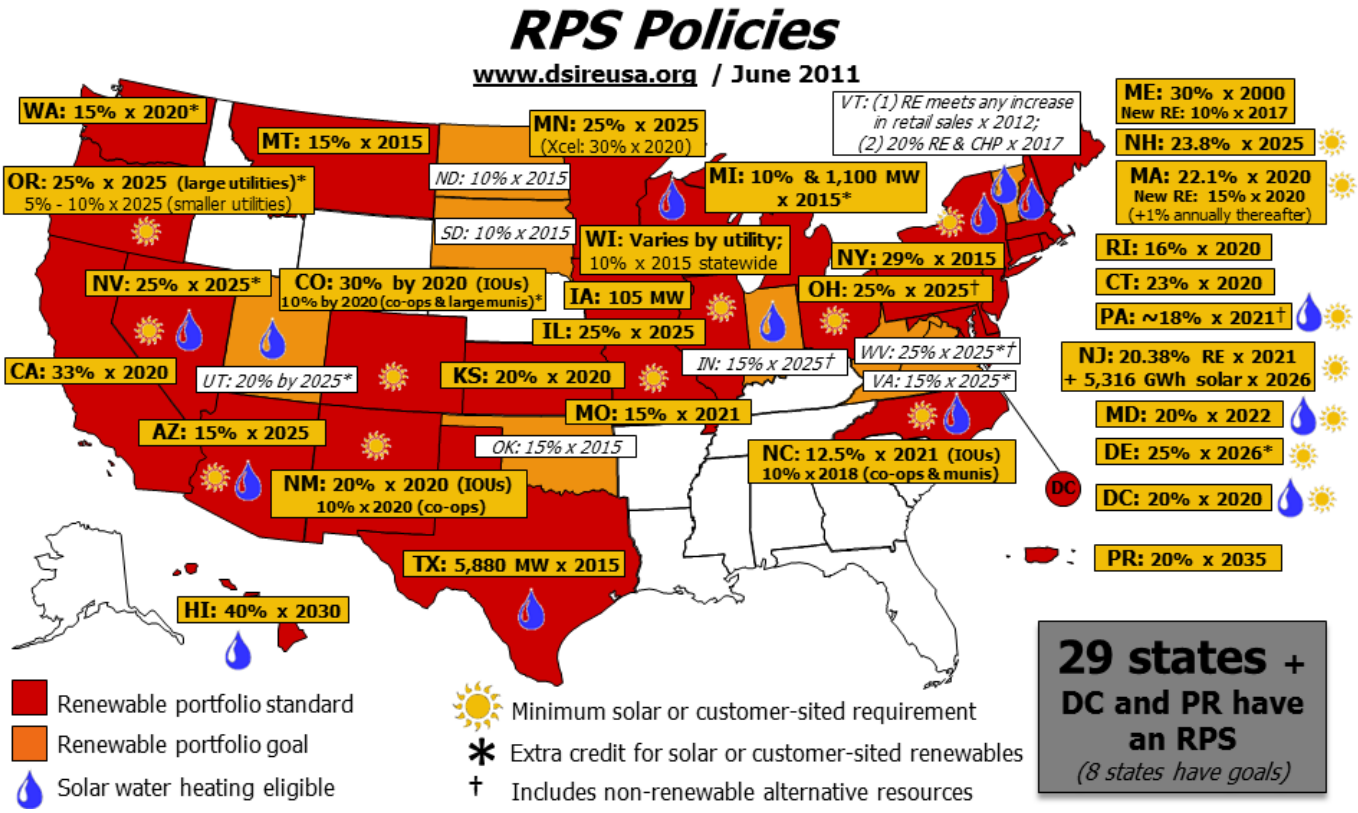

Figure 2. State renewable portfolio standards (RPSs), as of June 2011. (Source: Database of State Incentives for Renewables and Efficiency (DSIRE). DSIRE is a comprehensive source of information on state, local, utility, and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the North Carolina Solar Center and the Interstate Renewable Energy Council.)

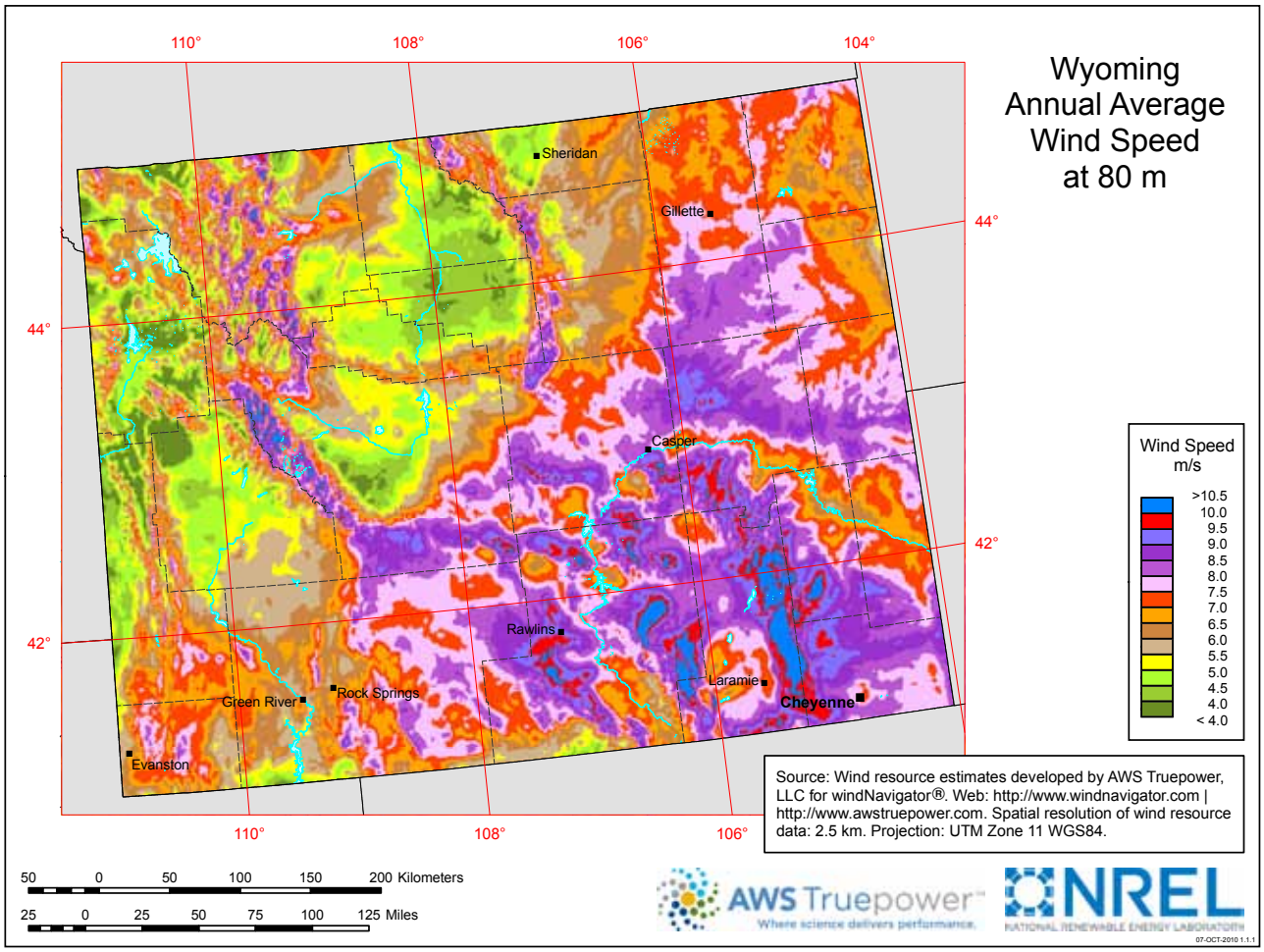

Figure 3. Distribution of wind resources in Wyoming. Areas suitable for commercial wind energy development have an average of 6.5 meters per second (m/s) wind speed and above and are represented by the areas shaded from orange to blue. (Source: National Renewable Energy Laboratory.)

2 Stages of Wind Energy Development

2.1 Overview of the Development Processes

There are several discrete stages of commercial wind energy development (Figure 4), some of which the landowner is directly involved in. These stages include:

Pre-Feasibility Assessment (Section 2.2): The establishment of a viable and profitable wind resource is an essential first step to wind energy development. In this stage, landowners often sign a short-term agreement with a wind developer.

Development Option Selection and Compensation (Sections 2.3 and 2.4): Landowners have multiple choices for developing and receiving compensation for their wind resource, including direct development, assignment of easements, or entering into a lease. Landowners primarily pursue leasing through either an individual lease or an agreement among a collection of landowners (i.e., a landowner wind association).

Full Feasibility Assessment: This important planning step is completed by the developer. A full feasibility assessment will include a site-specific evaluation of resources, an assessment of permitting constraints, examination of transmission access, identification of power markets, exploration of potential environmental issues, and estimation of costs for project development. Landowners will likely receive payments during this stage of development but will want to be informed about how long this process will take, as the most significant opportunity for revenue comes from actual development, not simply lease payments.

Development: If the project is deemed feasible, the development stage will include obtaining a market for the electricity (power purchase agreement), finalizing permits (which includes adhering to any local planning and zoning changes), and formalizing the project size and turbine supplier. The wind developer is responsible for all steps in this stage.

Engineering/Construction: This step involves the actual installation of the turbines and associated road building and collector line construction. In this stage, landowners must ensure that the terms of the lease agreement are enforced, including reclamation and disturbance mitigation.

Commissioning: This vital step for the developer includes verifying that all equipment is functioning properly at anticipated specifications. Landowners are generally not involved in commissioning.

Operation: Landowners will receive compensation during this stage based on agreed-upon terms (see Section 2.4). The operators of the wind facility conduct maintenance and repairs on the turbines, necessitating continued access to the project, and landowners should maintain communication with the operator and any subcontractors to ensure that the terms of the lease are honored during operation of the wind facility. It is possible for the initial wind developer to sell the facility to a utility or another party during its operational phase, and landowners should be aware that they may not deal with the original developer throughout the lifetime of a project.

Decommissioning: As relatively few wind facilities have been totally decommissioned, this process relies on best practices developed from other industries. The expected useful life of the equipment is generally 20–25 years. Wind facilities in California built in the 1980s have been repowered as opposed to being decommissioned. This may occur with Wyoming projects as well, but landowners may wish to be proactive when developing the lease agreement to ensure that adequate decommissioning provisions are included. The wind developer is required to record a release of the lease at the end of its term.

Unless a landowner wishes to develop or own the wind energy project, the most important steps of this process are the initial pre-feasibility assessment and development option and compensation structure selection. These steps are discussed in more detail in Sections 2.2, 2.3, and 2.4.

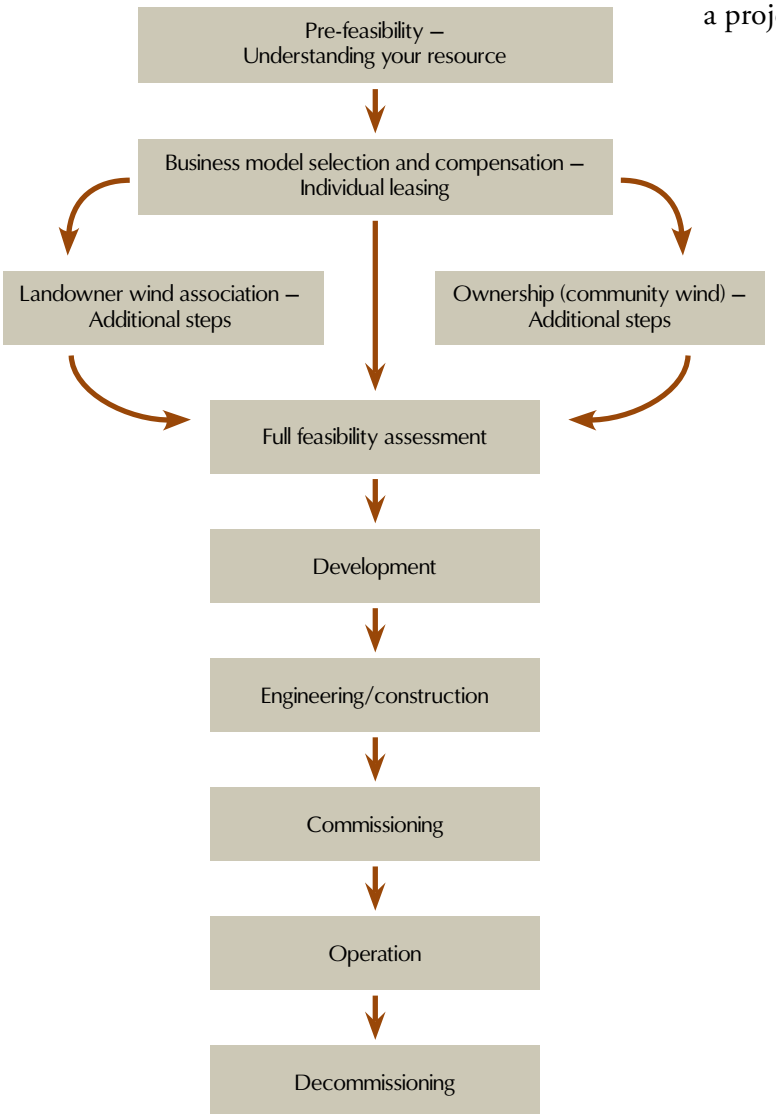

Figure 4. Steps of the wind energy development process.

2.2 Pre-Feasibility: Assessing Wind Resources

The most vital component of any wind energy project is access to a quality wind resource. The quality of a wind resource is determined by wind power density, wind speed at a certain height above ground, and wind variability. The energy that can be extracted from the wind is determined by cubing average annual wind speed (V^3).[10] For example, access to a wind resource with a 19 mile per hour (mph) average wind speed will have more than twice the energy available than an area with a 15 mph average wind resource.

Wind maps. The most basic evaluation of wind resources a landowner can undertake is to reference publically available wind energy power maps. The most commonly used public resource is the National Renewable Energy Laboratory (NREL) 80-meter wind resource map (see Figure 3). Landowners can also seek meteorological information collected at nearby sites, such as airports or weather stations. Map data may provide an initial estimate of the quality of a wind resource, but is not detailed enough for commercial wind developers to obtain financing.

Site-specific data collection. Large-scale wind energy projects are not constructed solely on the basis of estimates from wind energy resource maps and average data for an area; site-specific data is required. Site-specific data are generally acquired through the installation of meteorological (met) towers on the area where wind energy development is being considered (see Box 1 and Figure 5). Landowners can either pay for a met tower to be installed prior to entering a contract with a wind developer, or they can allow the wind developer to install the met towers.

The installation of a single met tower can cost from $10,000 to $50,000—a significant upfront cost for landowners, who have no guarantee of recouping their investment through wind project development.[11] Previously, landowners had access to the Wyoming State Energy Office's Anemometer Loan Program, but the program was discontinued in 2010. A list of companies in Wyoming that currently provide meteorological analysis services is provided online at: www.uwyo.edu/renew-energy.[12]

An alternative program that could help fund wind data collection is the United States Department of Agriculture's (USDA) Renewable Energy for America Program (REAP). This program has funds available via competitive grants (up to $50,000 per grant for a maximum of 25 percent of the project cost) for agricultural producers and rural small businesses to conduct feasibility studies for renewable energy systems. The grants stipulate, however, that the landowner must own the renewable energy system if one is subsequently developed, so these grants may not be appropriate for landowners considering commercial wind energy development.

Many landowners choose to sign an option agreement with wind developers for a wind resource assessment instead of paying for the met tower, particularly since industry standards on wind data collection are increasingly stringent for a developer to obtain financing, and data that a landowner collects may not be useful to a wind developer. This agreement gives a developer access to the land for testing and rights to secure the land if the project goes forward. Developers often pay modest fees to landowners for the right to place the measurement equipment on the site. Before the term of the option agreement ends, the developer can lease the land, request an extension to the option agreement, or let the option expire. Within this type of agreement, both the landowner and developer are protected if a wind project is not developed.

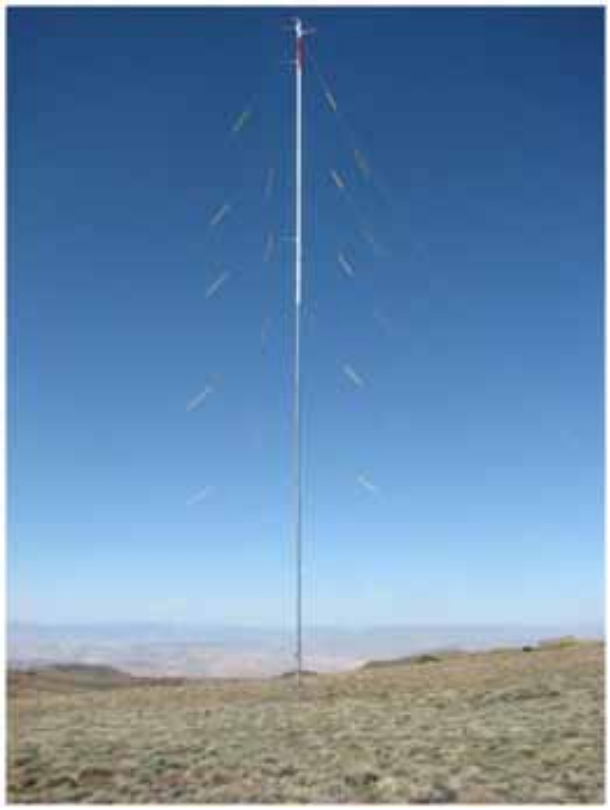

Figure 5. Typical 60-meter met tower found in Wyoming, which includes guy wire reflectors and a painted top for aviation visibility.

Box 1: What is a Met Tower?

Met towers are 50–80 meter (160–260 feet) guyed meteorological towers that measure wind speed, air pressure, and temperature. Anemometers provide wind readings at several heights on the tower. The towers are generally unlit, unless they exceed the Federal Aviation Administration (FAA) height requirement. To account for the seasonality of wind resources, met towers are typically installed for at least one year, although a longer duration of data collection provides a more thorough assessment of the wind resource.

Value of a wind resource. Landowners should also remember that the most valuable, and not necessarily the strongest, wind resource will be the first targeted for development. Factors such as access to existing or proposed transmission capacity, environmental considerations, tax rates, regulatory burden, and cost of leasing land all influence where the most profitable place for wind energy development will be.

2.3 Development Agreements and Options

Once landowners have established the presence of a potentially viable wind energy resource, they must decide how they wish to develop wind energy. Most generally, the options include:

Individual agreements – An individual lease is the most common method of wind energy development and is based upon the right of landowners to lease their resource to wind energy developers. In an individual lease, landowners negotiate directly with the wind developer to grant them the right to construct and operate a wind energy facility. The wind energy developer will then own the project located on leased land. The landowner has the right to receive rent and/or royalties, as well as payments for surface damages. A lease is granted for a certain number of years. When the lease terminates, the property right reverts back to the landowner.

Another option is to grant an easement for development. An easement is typically perpetual for some portion of land for a particular use. Easement payments are also determined through negotiations and can be anywhere from a one-time initial payment to annual access payments and may include royalties.

A landowner may also grant a license for construction and operation of a wind energy facility. A license does not grant a property right to the extent of a lease or easement. Rather, it gives permission to a developer to engage in specific activities that benefit the landowner or developer. A landowner should engage an attorney to negotiate the terms of any development agreement prior to entering into one.

Landowner wind associations – Many Wyoming landowners have chosen to modify the standard individual lease by working together as groups of landowners to negotiate collectively with wind energy developers. Wind associations seek to reduce transaction costs, such as legal fees for both the landowner and developer, while increasing the value of wind resources for landowners.

Community wind – In this model, ownership is locally based, although outside development assistance is often used to complete the project. No lease agreement is signed, as the landowner and local community members retain ownership of the wind facility. An individual landowner becoming a developer of one's own land requires an enormous amount of capital and is generally not an option for most landowners.

Individual Agreements

Individual leases are the least complicated of any wind development option, and involve individual landowners and their legal counsel negotiating with a wind developer to obtain satisfactory compensation for the right to develop wind energy on their property. The 2011 Wyoming Wind Energy Rights Act describes a "wind agreement" as a "lease, license, easement or other agreement" granting or reserving the right to "develop or participate in the income from or development of wind powered energy generation" (see Section 3.1 for further information and Appendix II for the full text of the Act). Terms of the agreement are often confidential, so neighbors cannot discuss what individual developers are offering as compensation. An attorney who is knowledgeable about wind energy development should be consulted prior to signing any contract or agreement with a wind energy developer to ensure landowner interests are represented adequately.

In addition to the amount of monetary compensation received for use of the land (see Section 2.4), when negotiating a lease agreement landowners may wish to consider:

- The length of arrangement and any provisions for automatic renewals to the lease;
- Amount of area leased;
- Liability structures and insurance;
- Permits required prior to construction;
- Activities that may be disturbed during construction or due to the presence of wind turbines;
- Access points for wind company staff during construction and operation of the wind facility;
- Noise restrictions during the development and decommissioning phases of a project, such as hours of operation;
- Hunting privileges they wish to retain;
- Continued agricultural needs;
- Anticipated building needs;
- Desired setbacks from any residences or property lines;
- Provisions for water rights; and
- Stipulations for reclamation and decommissioning.

Landowner Wind Associations

Numerous landowner wind associations (LWAs) have been established in Wyoming, particularly in the southeastern portion of the state (see Box 2). A LWA is a group of landowners that work together to gain greater control over the wind energy leasing process. Through cooperation, the landowners can create large blocks of land available for wind development and potentially receive higher and more equitable compensation for the use of their land. In addition, wind associations limit the information advantage of wind developers offering different lease rates with different confidentiality clauses to neighbors. Through this collective form of development, however, an individual landowner's ability to negotiate independently with the developer is limited by the association's cooperative terms.

Although the structure varies, LWAs typically are limited liability corporations (LLCs). Members must sign a binding agreement to be part of the association and contribute a payment to help fund initial activities. The LWAs are administered by a board that organizes the request for proposal (RFP) to solicit interest of wind energy developers. In this process, the LWA typically highlights the relative benefits of the area, such as wind resource, lack of potential environmental issues, and/or access to transmission infrastructure. Once a preferred proposal is selected by the board, the individual landowners in the association sign identical agreements with the wind developer. In a practice that is unique to LWAs, the contract typically specifies that all landowners involved in the LWA will receive some compensation, not just those landowners who receive turbines. Once the agreement is signed, the LLC can be structured in one of two ways: it either ceases to exist, or it continues for the length of the project, assisting the developer in bringing the project online and disbursing payments. The association of landowners can also continue to cooperate on issues related to development after the LLC is dissolved, such as best practices, policy issues, and local public relations.

As of 2011, there are 14 active LWAs in Wyoming. Landowner associations also hold promise for transmission development, as landowners can work together to create attractive areas for developers to construct new transmission corridors that suit wind development.

Additional information concerning the steps to forming a landowner wind association and the southeastern Wyoming model are available online at: www.uwyo.edu/renew-energy.

Community Wind

In the two development scenarios described above—individual agreements and landowner wind associations—the developer owns the wind facility and temporarily leases land from the landowner. An alternative scenario is "community wind," which is a model where members or sectors of a community, such as individual business owners, universities, or rural electric cooperatives, own the wind facility. While this model of wind development distributes more risk to community members than typical land-lease ownership models, there is potential for greater benefits to the community. Community wind projects are often smaller than commercial projects, and they are typically less than 20 MW. For more information on community wind development, see Windustry's "Community Wind Toolbox" online at: www.windustry.org/CommunityWindToolbox.

Box 2: Landowner Wind Associations in Wyoming

Landowner wind associations (LWAs) first rose to prominence in southeast Wyoming in a partnership between private landholders and the local USDA Natural Resource Conservation District, Resource Conservation and Development office. They emerged in response to rapid wind energy development and concerns regarding confidentiality agreements and compensation rates.

The Platte County Slater Wind Energy Association, LLC is considered the first of its kind. This LWA, which is located southeast of Wheatland, consists of 28,000 acres of range and cropland divided among approximately 40 landowners. After forming in 2006, the Slater LWA distributed a request for proposals (RFP) in August 2007 to more than 50 developers, and it received 18 responses. A sample proposal included the following terms:

- Initial development phase: $7 per acre;
- Construction phase: $4,500 per MW, plus fees for roads, buildings, and connection lines;
- Operational phase: each 640 acres with two turbines would receive a minimum of $39,000 per year, and each 320 acres without turbines would receive a minimum of $6,000 per year.

Thirty of the original Slater LWA members, who represented 20,000 acres, signed an agreement with a wind developer. The developer is currently conducting environmental assessments, securing transmission access, and negotiating a power purchase agreement, and the project is projected to go online in 2016. The other 10 members withdrew from the association, and some of them signed individual leases with another developer.

Source: T. Frank and B. Midcap, 2008, "Landowner Associations in the West: A Model for Facilitating Gigawatt-Scale Development," Rocky Mountain Farmers Union (November); Gregor Goertz, Chairman of the Slater Wind Energy Association, personal communication, 14 April, 2011.

2.4 Compensation Arrangements

There are advantages and disadvantages to each compensation structure that can be negotiated as part of a wind energy agreement (Table 1). In Wyoming, payment arrangements for wind energy lease agreements are typically a combination of escalating royalties and a minimum guarantee.

In addition to compensation for turbine siting and power generation, there are other opportunities during each stage of the development process for a landowner to reap economic benefits from a commercial wind project on his/her land (Figure 6).

Other financial matters to be aware of when negotiating a lease or easement agreement are:

- Stipulations for financial default of the developer;
- Provisions for sale to another utility or independent power producer;
- Protection against liens by a developer or a developer's subcontractors;
- Protection against subordination of any lien or leaseholdings on the property;
- Protection against options on the real property; and
- Definition of the calculation for "gross revenue."

Table 1. Advantages and disadvantages of compensation structures.

Arrangement	Advantages	Disadvantages
Royalties	• Take into account varying productivity • Give a landowner an incentive to work with the developer to place the turbines on the most productive locations • Give landowners and developers incentives to ensure continuous power generation • Easy to verify if based on gross revenue	*Landowner-specific disadvantages:* • Difficult to verify electricity and revenue generated by each turbine because: - Individual turbine generation information is hard to obtain - Individual monitors on turbines do not reflect the energy sold; they do not account for energy losses in the electrical system - Developers generally do not like to share turbine productivity data • Payments can be low if the turbines are curtailed or down for operation and maintenance • Turbines that produce more power may be run while others are not, creating an uneven balance of payments among landowners; royalties paid on the net of the whole project addresses this concern • Royalty payments may be lower than anticipated if "gross revenue" is not defined in the lease agreement
Royalty/Minimum Guarantee Combination	• Same as above, with additional benefits from an upfront fee or a minimum guarantee • Minimum level of compensation ensured if project is sold	• Same as first bullet above
Flat or Fixed Fee Each Year (per turbine, per acre, or per MW installed)	• Can be used to compensate a landowner for use of land for an access road crossing the property, even if a turbine is not installed on the land • Clear and transparent • Easy to verify *Landowner-specific advantages:* • Provides steady, predictable income stream • Protected in years of low power generation and/or revenue *Developer-specific advantages:* • Does well in high production/revenue years	• Payments do not mirror actual revenue generated • Eliminates the economic incentive for the landowner to cooperate with the developer to ensure maximum power generation *Landowner-specific disadvantages:* • Forgoes a potentially higher, if fluctuating, level of income associated with royalty payments *Developer-specific disadvantages:* • Expenses are harder to bear in years of low power generation and/or revenue
Lump Sum	*Landowner-specific advantages:* • Source of immediate cash *Developer-specific advantages:* • Does not have to provide payments in subsequent years	• It is not ideal to have the financial transaction complete but physical use ongoing over many years *Landowner-specific disadvantages:* • Does not provide steady income stream • Value of the project does not stay tied to the land • All the payment occurring in one year may have negative tax implications *Developer-specific disadvantages:* • Must provide lump sum upfront • Landowner has no stake in the long-term success of the project

Source: New York State Energy Research and Development Authority (NYSERDA), 2009, Wind Energy Toolkit (May), http://www.powernaturally.org/programs/wind/toolkit.asp.

Figure 6. Possible payments to a landowner for each stage of development.

2.5 Transmission and Collector Lines

The placement of wind turbines is not the only impact of wind energy development. Wind energy will require large-scale electric transmission lines for Wyoming to provide its export market (or load centers such as California and other southwestern states) with power. Transmission lines may impact landowners far removed from wind projects. Transmission developers are required to seek easements and offer compensation to landowners hosting a transmission line (see Section 3.1). The compensation and easement agreements for transmission are usually very different from those offered for wind development, though the basic steps of transmission development are much the same (Figure 7).

The process for acquiring rights-of-way for electricity transmission is outlined in the Wyoming Eminent Domain Act (see Appendix I for link to Act). Briefly, the Act describes that:

- Transmission developers have the right of eminent domain for transmission lines when they can show that lines are reasonably necessary;
- The width of condemned land may not exceed 100 feet;
- Payment for the condemned land is based on fair market value upon the landowner's proof of highest and best use of the land;
- The party bringing condemnation action must have negotiated in good faith;
- If the condemning party is a public utility, it must hold a certificate of public convenience and necessity from the Public Service Commission; and
- Payment may be made in lump sum or on an amortization schedule.

Closer to wind energy projects, collector lines are required to gather the electricity provided by groups of turbines and supply it to a main transmission hub. As a result, landowners outside the wind leasing area or landowner wind associations may be affected by this type of development.[13]

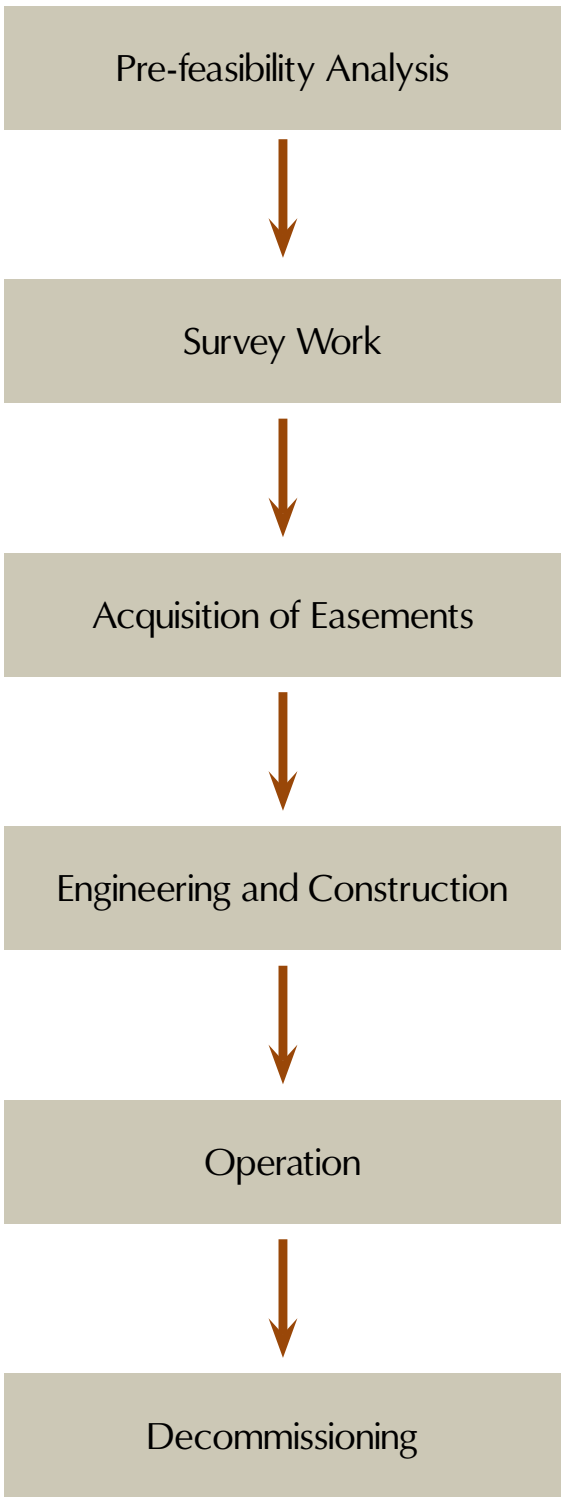

Figure 7. Steps of transmission line development.

3 Legal Considerations of Wind Energy Development

A landowner's agreement with a commercial wind energy developer will determine not only payment structures, but possible restrictions on the use of land. Every contractual agreement between a landowner and a developer has unique possibilities that differ across regions and operations and must be negotiated with the help of legal counsel. A landowner's first step when pursuing commercial wind development should be to hire a lawyer who is experienced with wind development issues.

3.1 Property Rights

The Wind Energy Rights Act (WERA), enacted in 2011, brings more certainty to both wind energy developers and landowners (see Appendix II for full text of WERA). WERA provides a framework from which landowners may negotiate with developers for wind energy development on their land. It also supports the wind industry by recognizing wind as a viable energy resource in Wyoming.

Wind Energy Rights and Agreements

As defined under WERA, a "wind energy right" means "a property right in the development of wind-powered energy generation." Wind ownership, as well as the rights that are incidental to the use and development of wind, are part of the surface estate and cannot be severed. WERA also recognizes that landowners have the legal right to develop their wind resources.

The act also provides for wind energy to be developed through a "wind energy agreement."[14] Through a wind energy agreement, a landowner can determine which development option is optimal for him/her, including granting an easement or entering into a lease to develop wind energy while reserving a royalty interest from wind energy production. Both landowners and developers have a right to assign or transfer their interest in the agreement, including a landowner's royalty interest. This allows landowners to pledge income from wind development agreements or as a bequest in estate planning.

For landowners who may have already severed the wind from the surface of their land through a contract, lease, memorandum, or other means prior to April 1, 2011, WERA provides a grandfather clause, which permits those previous agreements to remain valid. Any of these contracts or agreements must be recorded at the county clerk where the land under agreement is located no later than July 1, 2011. If a landowner severed the wind estate from the surface, full disclosure must be provided to a prospective buyer.

Just as for any other interest in real property, a wind energy agreement should be recorded in the county clerk's office where the land is located both upon creation and termination. However, a wind energy agreement is terminated if energy production ceases for 10 continuous years, or if no energy production takes place 20 years after the initial agreement. The parties may agree to different termination terms within the agreement.

Surface Use Agreement. Similar to other forms of resource development, a landowner may wish to consider negotiations for a surface use and damages agreement or surface impact payments as the means for addressing impacts on operations and improvements during the construction process. These agreements should be negotiated along with the lease agreement to ensure adequate compensation and protection of the landowner. The surface use agreement or impact payments can be included in a wind energy lease or agreement, can be created as an addendum to a lease, or can be a separate agreement.

Mineral Rights and Wind Energy

WERA also specifies that minerals rights are dominant to wind energy rights. This means a mineral interest owner has a right to be notified prior to state or county permitting. Since the wind rights are part of the surface estate, the wind developer and mineral owner are required to reasonably accommodate their respective activities, as is required with any surface activities.

Eminent Domain

Eminent domain refers to the right to seize land for a public use, such as telephone, power, water, or gas lines. If eminent domain is exercised, landowners are entitled to "just compensation," which is usually defined as the fair market value of the property. The act of taking land under eminent domain is done through a "condemnation" action in court.

Wyoming currently has a moratorium in place on eminent domain powers of wind energy developers to site collector lines that bring electricity generated from a wind facility to transmission lines. This moratorium will extend until June 30, 2013. Public utilities still retain authority to exercise condemnation, and a public utility can be a wind energy developer and could condemn land for a wind energy collector system. As of the publication of this guide, however, no public utility developing wind energy projects in the state has condemned any land for a wind energy collector system. The eminent domain moratorium does not apply to siting and building transmission lines (see Section 2.5).

State Lands and Commercial Wind Energy

Wind energy developers considering siting a commercial facility on state lands that have existing surface leases must negotiate surface impact payments directly with the lessee. Often a state land lessee owns lands adjacent to a state parcel and negotiations pertain to a larger commercial wind facility that encompasses both private and state lands. The surface impact payment compensates the lessee for damages or loss of income that may occur from wind energy development. The Wyoming Office of State Lands and Investment (OSLI) also requires compensation to the state for any negative impacts to state lands in the form of an installation/construction fee. Under previous OSLI Chapter 5 rules, which were in effect until July 2010, the surface impact payment was divided between the State of Wyoming and the existing surface lessee for any wind energy development on State Trust Land. Under current Chapter 6 rules, the surface impact payment is negotiated and paid directly to the surface lessee, but recorded with OSLI.[15] The impact payment distribution schedule, recording form, and Chapter 5 and Chapter 6 rules are available at: http://lands.state.wy.us.

Box 3: Major Wind Energy Legislation in Wyoming

Wyoming Wind Energy Act (2011)

Provides clarity for wind energy developers and landowners by defining "wind energy rights" and "wind energy agreements." Wind energy rights are defined as real property that is part of the surface estate. The legislation also provides requirements for wind energy agreements and for a reversion of interests. In addition, it clarifies the dominance of mineral rights over wind energy rights and provides a means for compensation when leasing wind energy rights.

Wind Energy Facilities Act (2010)

Sets minimum and consistent standards for the county-level commercial wind permitting process. It also allows for county commissioners to refer a project for permitting under the Industrial Siting Council. The act allows for individual counties to create more stringent regulations.

Wind Energy and Eminent Domain (passed in 2010, extended in 2011)

Prohibits wind energy developers from exercising eminent domain authority when siting wind collector lines (to bring wind electricity from a facility to transmission lines). It expires on June 30, 2013.

Wind Energy Excise (Generation) Tax (2010)

Requires wind generators to pay a $1 generation tax per megawatt hour (MWh) of electricity produced from wind beginning January 1, 2012. A company is exempt from this generation tax for the first three years of wind electricity production. The county—or if a wind facility spans two counties, the counties that house the wind facility—receives 60 percent of the tax collected; the state receives 40 percent.

Wind Energy Equipment Sales Tax Exemption (2003)

Exempts sales tax for equipment used in a wind energy project up to the point of transmission interconnection. This tax incentive expires December 31, 2011.

Note: See Appendix I: Additional Resources for links to full text of all referenced legislation.

3.2 Permitting

Every commercial wind energy project in the state must go through a regulatory or permitting process. These may include state agency approval and permits from multiple divisions within the Wyoming Department of Environmental Quality (DEQ). Other permits or approval must come from the counties where a wind energy project will be developed. If a project includes any federal lands, transmission lines, or wetlands, federal permits will likely be required.[16]

Federal Permitting

A Special Use Permit must be obtained by a wind energy developer for projects on U.S. Forest Service (USFS) lands. The Bureau of Land Management (BLM) requires a wind energy lease for a right-of-way. Federal permits are required for any wind energy project connecting to a federally managed or owned transmission line. The Army Corp of Engineers is responsible for issuing permits involving interstate rivers and streams. Every project on federal land, tied into federal transmission, or that receives direct federal funding must undertake a National Environmental Policy Act (NEPA) assessment. This entails first completing an Environmental Assessment (EA), which, if impacts are found, is followed by an Environmental Impact Statement (EIS) of the proposed project. These analyses can be time consuming and require environmental consultants to access all lands

leased for the project to conduct environmental studies on wildlife and habitat. Once a final decision has been made regarding environmental impacts, a federal agency may issue a permit for the project.

State of Wyoming Permitting

Any wind energy project with 30 or more wind turbines must be permitted by the Industrial Siting Council (ISC), a division within DEQ. The ISC determines if the proposed wind energy project poses any major environmental, social, or economic threats to an area. The ISC can also determine the proportion of impact assistance payments to be paid to local governments in counties that are primarily affected by a project. For example, two wind facilities that were completed in 2008, Seven Mile Hill and Seven Mile Hill Phase II, resulted in $1.3 million in impact assistance payments distributed between Albany and Carbon Counties;[17] due to how these payments are calculated, wind project impact assistance payments will likely increase when the sales tax exemption sunsets at the end of 2011. In addition to the ISC, numerous other state organizations play a role in wind energy development or transmission (see Table 2).

County Permitting

In 2010, the Wyoming Legislature passed legislation that created a statutory framework to guide counties in permitting any wind energy facility.[18] A wind energy developer must now obtain a permit from the board of county commissioners in each county where a facility will be located.

A county may require more stringent regulations than those required by the 2010 legislation. As of June 2011, the following counties have enacted regulations for wind energy development within a land use plan and/or zoning regulation (see www.uwyo.edu/renew-energy for links to specific county regulations):

- Albany County
- Carbon County
- Converse County
- Laramie County
- Lincoln County
- Natrona County
- Park County
- Platte County
- Sweetwater County

Table 2. Wyoming state agencies or organizations involved in wind energy development.

Wyoming Department of Environmental Quality (DEQ)/Industrial Siting Division (ISD)	Responsible for permitting all wind energy facilities with 30 or more turbines. Designates impact assistance payments for counties affected by a project. Ensures a project will pose no serious environmental, social or economic threat to an area.
Wyoming Department of Revenue and Taxation	Collects sales and use tax and wind energy generation taxes.
Wyoming Game and Fish Department (WGFD)	Publishes guidelines for adequate wildlife protection within wind energy projects. These recommendations cover big game winter ranges, greater sage-grouse habitat (including sage-grouse core areas), priority watersheds, and other important habitats.
Wyoming Infrastructure Authority (WIA)	The agency responsible for transmission infrastructure in the state. Can participate in planning, financing, constructing, developing, acquiring, maintaining, and operating electric transmission facilities and their supporting infrastructure.
Wyoming Office of State Lands and Investment (OSLI)	Oversees wind energy leases on state lands and requires a negotiated agreement for surface impact payments between a wind energy developer and an existing surface lessee of state lands.
Wyoming Public Service Commission	Reviews filings for Certificates of Public Convenience and Necessity, and oversees rate base filings and tariffs of net metering and rates, where appropriate.
Wyoming State Historic Preservation Office (SHPO)	Reviews permits for protection of historical or cultural resources. Negotiates with developers for mitigation of cultural impacts.

County regulations are subject to change and should be reviewed for an understanding of the most recent wind energy siting requirements.

3.3 Taxes

Private property owners are not responsible for any taxes associated with a commercial wind energy facility on their land, other than those associated with their own increased income from rents or royalties received. Developers pay any additional property taxes incurred and all sales and generation tax associated with a wind facility.

Property Tax

A property owner who chooses to lease land to a wind energy developer for wind energy production will not pay additional property taxes for the increased property value from the wind energy facility. The wind energy company pays the property tax to the county based on the fair market value of the facility. In Wyoming, industrial properties are assessed at 11.5 percent of taxable value and then subject to the mill levy of the county.[19] A 100 MW project in Wyoming in its first year of operation will pay roughly $1.5–2.0 million in property tax.[20]

Generation Tax

A wind energy company is also required to pay an additional $1 generation tax per megawatt hour (MWh) of electricity produced from wind beginning January 1, 2012. Companies are exempt from this generation tax for the first three years of wind electricity production. The county in which the wind facility is located and the state share wind generation tax revenues. Each county receives a proportionate amount based on the percentage of assessed value from the wind energy facility, totaling 60 percent of the tax collected. The state receives 40 percent of the tax income, which is placed in Wyoming's General Fund.

Sales Tax

Wyoming exempts sales tax for equipment used in a wind energy project up to the point of transmission interconnection. The state has set a repeal date for this provision of December 31, 2011. To take advantage of this benefit, developers must have had a written agreement in place with a landholder for a wind facility before January 1, 2010. They must also have purchased the equipment and have it physically located in Wyoming before the sunset date. After the sunset date, all wind energy equipment will be subject to the statewide 4 percent sales tax, plus any additional county sales and use taxes.

4 Living with Wind Development

4.1 Lifestyle Impacts

Most wind turbines in Wyoming are located in rural areas where ranching or farming is taking place or where there is low-density housing development. While wind energy projects can benefit landowners, there is potential for negative impacts as well, and disrupted viewsheds, increased noise, and decreased privacy can be a concern. Maintenance employees must access turbine sites, production areas, and storage areas via a network of roads, and for landowners accustomed to living in isolated areas, acceptance of some level of disruption may be necessary. The risk of lifestyle or other land-use disruptions from wind energy development can be reduced, although not eliminated, by careful planning and foresight by the landowner and developer.

Wind and Agriculture

Landowners and developers must consider the compatibility of commercial wind energy development with existing uses of agricultural land. While proponents of wind energy highlight its compatibility with crops and grazing livestock, noting that these activities can take place right to the base of a wind turbine, there may be other disruptions to landowners that lease lands for wind projects. For instance, each tower requires an access road for maintenance and repair that could reduce efficiency of field operations. It is important to note that landowners participating in a variety of USDA programs should consult with USDA before entering into a wind energy agreement (see Box 4).

Mitigation of agricultural impacts. Landowners can negotiate with wind developers for reimbursement for livestock and crop displacement costs. Loss of field efficiency can be minimized if roadways run the same direction that field operations are conducted. Landowners should also negotiate reclamation provisions into their lease agreements to mitigate land disturbance. Landowners may also wish to consider language in the lease agreement that addresses gate closures or provisions for sensitive areas, such as riparian areas, that they would like to remain protected.

Noise, Lighting, and Property Access

Wind turbine operation and construction are associated with noise, lights, and regular maintenance visits by wind facility personnel. These impacts can alter the environment of those living in rural or exurban areas.

Noise. For some turbines, noise production has decreased as the technology has advanced, and wind itself is often sufficient to mask sounds generated by a wind development; however, individuals vary widely in their tolerance for noise and may be annoyed by turbine

Box 4: Wind Energy Development on Agricultural Lands Enrolled in USDA Programs

Landowners who hold a mortgage from the Farm Service Agency (FSA) are subject to restrictions and a rigorous approval process to site a wind facility on their property. Participants in any of the following U.S. Department of Agriculture (USDA) programs must gain USDA approval to enter a wind energy lease agreement while continuing participation in the program:

- **Conservation Reserve Program (CRP).** Up to five acres of wind turbines can be approved on CRP lands, providing environmental impacts have been considered, without a termination penalty. Additional acreage could be approved if the state FSA office appeals to the federal office. The five acre figure is cumulative and is derived by totalling the square footage of land area devoted to the footprint of the wind turbine. Access roads, transformers, and other equipment are not included in the five acre figure.
- **Commodity program payments.** Wind development would have an effect on commodity program payments if base acreage is taken out of production.
- **Farm Ranch Land Protection Program (FRPP).** Landowners with easements should consult with the National Resources Conservation Service (NRCS) if considering commercial wind development.
- **Grassland Reserve Program (GRP).** Wind development cannot be authorized on GRP lands unless environmental impacts to the land are evaluated through the National Environmental Policy Act (NEPA) process and it is demonstrated that no reasonable alternatives exist.

The following USDA programs do not have any restrictions on wind energy development:

- **Environmental Quality Incentives Program (EQIP),**
- **Conservation Security Program (CSP),** and
- **Wildlife Habitat Incentives Program (WHIP).**

Wind development in wetlands could impact a landowner's ability to participate in other USDA programs. Landowners should consult with the USDA (either NRCS and/or FSA) before agreeing to development on wetlands.

Source: Gregor Goertz, Wyoming State Executive Director of the Farm Service Agency, U.S. Department of Agriculture, personal communication, 5 April 2011.

"whooshing." The noisiest times of a wind project are generally during the months of construction and decommissioning when there is increased construction noise, personnel, and truck traffic.

Lighting and shadow flicker. Modern commercial-scale wind turbines are generally tall enough to enter airspace and therefore are subject to Federal Aviation Agency (FAA) regulations. To indicate the location of the turbines, the FAA requires developers to mark them with pulsing red or white warning lights that impact nighttime viewsheds. A different lighting impact of turbines is "shadow flicker," which is when turbine blades pass in front of the sun to create a recurring shadow.

Interference and property access. Other issues may arise because of potential landowner obligations to the developer to avoid interfering with turbine energy production. "Interference" includes constructing buildings or planting trees above a certain height within a certain distance of a turbine. Wind facility personnel must also access a property for regular maintenance. In addition, developers may prefer to restrict hunting on the lands they are leasing to protect turbines and operational equipment. In general, if a use is not expressly stated in a lease agreement it is assumed not to exist, so if a landowner wishes to retain certain land uses (such as hunting) the land use should be explicitly stated in the lease agreement.

Mitigating issues of noise, lighting, and property access. Sound standards can be negotiated with the developer for construction and personnel activities, including reasonable hours of activity. In addition, permitting for wind projects includes complying with local government sound ordinances that will set an acceptable decibel level for all activities.

Light disturbances, such as pulsing nighttime lights, are difficult to avoid, and a landowner will experience some degree of lighting impact from the turbines. There is, however, a new technology that detects the presence of an aircraft and only illuminates the turbines in its presence; as of the publication of this guide, one wind developer operating in Wyoming has proposed to include this technology as part of its wind facility. To minimize shadow flicker, computer models can predict where it may occur so that developers can design the wind development in such a way that lessens the disturbance.

Property access mitigation measures can take the form of landowners negotiating setbacks from residential areas and property lines and also general exclusion areas that the developer or operator has no right to access. Landowners and developers can also work together in the lease negotiation process to determine access routes and access points. Landowners should also carefully consider their future building needs when negotiating any building restrictions that may be part of a wind energy agreement. Landowners who value hunting as part of their lifestyle or as an economic activity may wish to consider their willingness to cede hunting rights prior to entering a wind energy lease agreement. It is important for both the landowner and his or her legal counsel to understand the degree of flexibility s/he is willing to offer when negotiating these issues.

Wind and Land Conservation

Typically, the overarching purpose of a conservation easement is to protect open space, wildlife habitat, visual quality and aesthetics, and traditional land uses such as agriculture. Since conservation easements are intended to protect these resources through limiting development on the land they protect, landowners who place easements on their land agree to give up some or all development rights in perpetuity. It may be possible to structure a conservation easement agreement to allow the construction and use of small-scale wind turbines or towers for personal ranch use, but land trusts will generally include provisions in an easement that prohibit construction of industrial or commercial facilities, which includes commercial wind facilities. Landowners who have an interest in hosting a commercial wind facility and are also interested in conservation easements should consider protecting important habitat areas, such as riparian corridors or winter range, through a conservation easement and leaving other land open for wind energy development.

Environment and Wildlife

Wind turbines have the potential to impact wildlife. The severity of impacts depends primarily on the animals and habitat present and also on how the wind development is designed and sited. The primary wildlife impacts of wind developments are likely to be:

- Direct fatalities, such as bird and bat collisions with turbines.
- Possible loss of and fragmentation of habitat due to turbines and roads.
- Possible indirect effects, such as wildlife avoidance of an area due to disturbance.

Because most research has been conducted on measuring direct fatalities of bird and bat species, impacts to other species are largely unknown at this time.

Birds and bats. While bird and bat mortality is the greatest wildlife impact of wind turbines, in 2006 the National Academy of Sciences estimated that wind energy is responsible for fewer than 3 of every 100,000 bird deaths caused by human (and feline) activities.[21] However, wind developments can still substantially impact resident or migrating bird and bat populations when there are site-specific conditions, such as a large population of golden eagles, a migration pathway for songbirds, or hibernation sites or migration pathways for bats. Of particular concern in Wyoming is impact on the greater sage-grouse (see Box 5).

While today's turbines move at a slower rate than those of the past, and tubular-tower structures provide fewer perching opportunities for birds than previous lattice-tower models, impacts can still be relatively high at some sites. Golden eagle mortality is an increasing concern for wind energy development, and the U.S. Fish and Wildlife Service (USFWS) in January 2011 released "Draft Eagle Conservation Plan Guidance" to provide guidelines on how to evaluate potential impacts on eagles from proposed wind energy projects.[22]

Big game. Wyoming is home to large big game populations of pronghorn antelope, mule deer, white-tailed deer, bighorn sheep, and elk, among others. The effects of wind energy development on large ungulates remain largely unknown. The primary influence of wind projects on big game species may be the effects of habitat fragmentation and disturbance that causes animals to avoid an area. This is particularly a concern if big game species are displaced from important seasonal habitats such as winter ranges, parturition areas, or migration corridors.[23]

Vegetation. Other potential environmental concerns include invasive plant species and weed control associated with disturbance from construction and road development. Landowners may consider a contractual provision in the wind energy lease agreement that provides for an annual weed abatement program.

Mitigating impacts to wildlife. During the investigative stages of commercial wind energy development, developers are responsible for conducting an environmental assessment. Proper siting is the best way to reduce the potential for bird collisions; migratory pathways and areas that are heavily used by endangered species are probably unsuitable for wind development. To that end, development—while not prohibited—is "not recommended" in designated sage-grouse core areas. The Wyoming Game and Fish Department has published guidelines for wind energy development that cover big game winter ranges, sage-grouse habitat, priority watersheds, and other important habitats.[24] The USFWS draft "Land-Based Wind Energy Guidelines" suggest avoiding high bird concentration areas, such as wetlands and bird refuges; avoiding known daily flyways, such as between roosting and feeding areas; and avoiding bat migration corridors.[25] In addition, developers may wish to avoid siting wind energy facilities within crucial big game ranges including winter, identified parturition, and migration corridors.

Cultural and Historical Resources

The environmental assessment conducted by the developer will identify and consider cultural and historical resources. The presence of archaeological sites or the listing of property on the National Register of Historic Places can have implications for wind energy development. If part of a property is listed or is eligible for listing on the National Register of Historic Places, developers will be required to avoid the property or to mitigate the effects of the development on the site.[26]

Box 5: Greater Sage-Grouse Core Areas

In Wyoming, wind energy development is constrained by sage-grouse core areas, as delineated in the Governor of Wyoming's Executive Order #2011-5. Many of the most attractive wind development sites are within sagebrush ecosystems inhabited by the greater sage-grouse, a species of conservation concern. Wind development is not recommended in core areas, and when greater sage-grouse protection areas coincide with private lands, developers may be denied permits or held to more stringent requirements concerning the collection of baseline data and monitoring. The core areas are regularly updated, and landowners should check the Wyoming Game and Fish Web site (http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/index.asp) for the most recent version of the map.

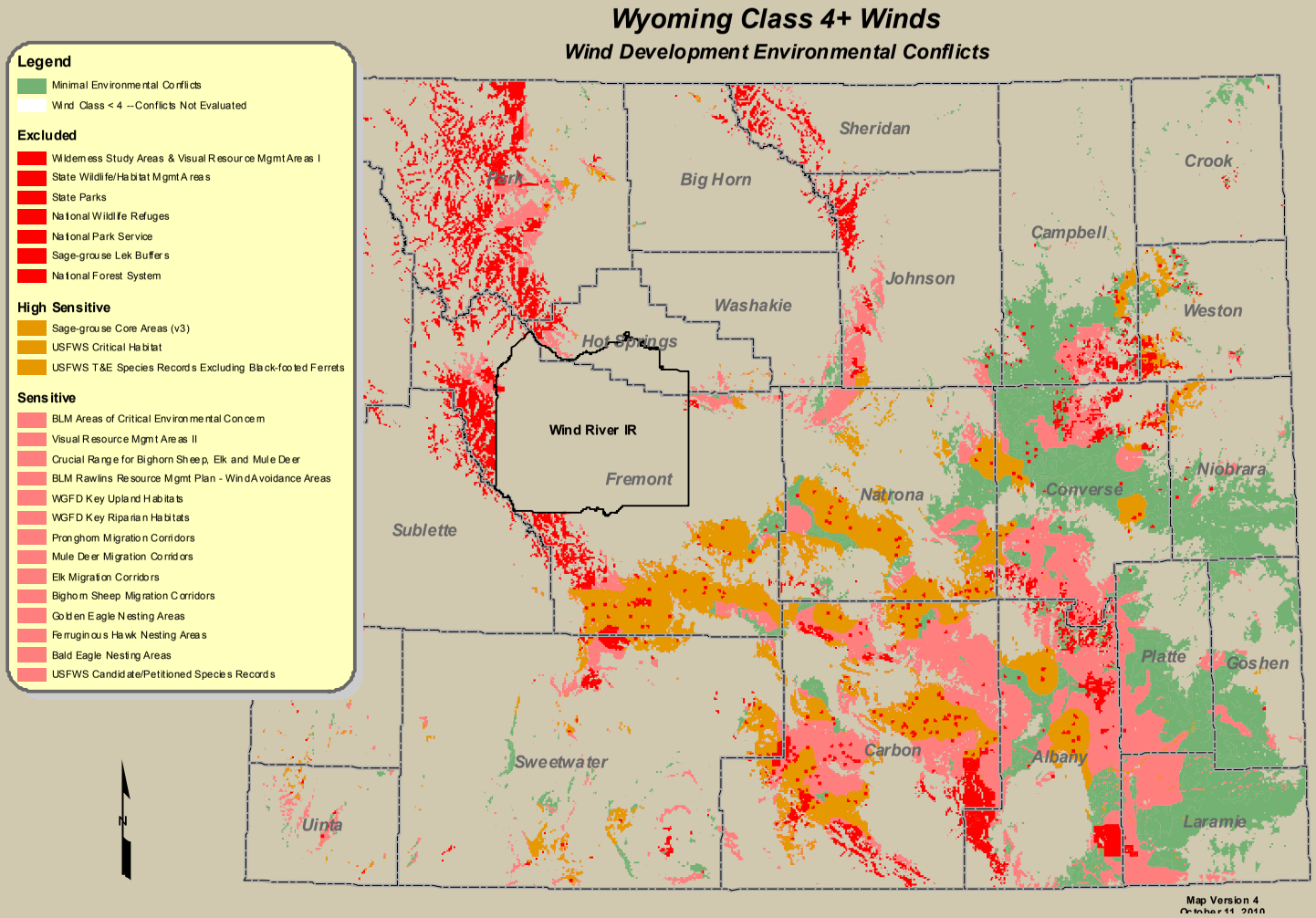

Figure 8. Wyoming greater sage-grouse core areas (Version 4). The colored areas represent locations with commercial wind energy development potential. Areas in green are lands on which there is little conflict identified. Areas represented in red indicate state or federally protected land and will likely be excluded from development; those in orange have been designated sage-grouse buffers or critical habitat. (Source: Wyoming Game and Fish.)

4.2 Community Impacts

Communities impacted by a variety of electricity-producing technologies struggle with the local costs of energy development while the primary benefits (i.e., electricity) are generally exported. These projects do, however, benefit communities that house them through increased jobs, greater tax revenue, and, at times, investments by energy developers directly into the community. As wind energy continues to post record growth in Wyoming, some communities are experiencing more collector or transmission lines, turbines that affect viewsheds, an uneven distribution of payments among landowners, as well as noise, light, and wildlife disturbances.

Public costs of wind energy projects include those associated with road improvement or maintenance from increased trucking or increased stress on community services, such as schools and law enforcement, which occurs when there is an influx of construction workers and their families. To address these costs, any project greater than 30 turbines must go through the industrial siting permitting process, and the Industrial Siting Council will assess the project's impacts and can choose how to distribute impact assistance funds to counties (see Section 3.2). In addition, many counties' bonding requirements include compensation for road damage.

Economic Impacts

Wind energy development brings economic gain to a community during construction through direct impacts, such as job creation, and indirect impacts, such as increased business for motels/hotels, restaurants, and other local businesses. Jobs demanded during the construction phase of a wind energy facility include truck drivers, crane operators, and personnel for earth moving, cement pouring, management, and other support tasks. After construction, wind energy facilities also require full-time employees, and there are typically four to eight jobs created per 100 MW of installed capacity.[27]

Social Impacts

Visual impacts of wind turbines are generally the largest source of contention within communities. Landowners adjacent to wind projects who are not directly receiving economic benefits, in particular, may object to their presence. Neighbors to wind facilities may be particularly sensitive to a drop in property value if they are sited near a wind development, and their objections can lead to project delays or litigation.

Mitigating Community Impacts

Because of possible impacts on others in the area, landowners who are considering a commercial wind project may wish to communicate with neighbors and local community members about the possibility of the development early in the process. It is also important that, when assessing the impacts of wind energy projects, consideration is given not only to the landowners who lease the land for the project but also to other affected but uncompensated landowners. Landowner wind energy associations (see Section 2.3) are one way to address these concerns.

When seeking to mitigate visual impacts on a community, it is possible to evaluate the importance of a landscape to the surrounding community in advance. It is also important to integrate the project into the surrounding landscape and consider landscape elements in wind project design. Additional mitigation strategies for visual impacts include:

- Designing for visual order and avoiding clutter;
- Constructing facilities away from ridgelines and steep slopes;
- Clustering turbines and providing breaks in arrangement;
- Using color treatment on towers to reduce visual impact; and
- Burying lines and cables to minimize surface disturbance.[28]

Conclusion

This guide outlines the process of commercial wind energy development on private lands and provides landowners with a reference for some considerations that should be taken into account when contemplating wind energy development on their land. When engaging in the commercial wind development process, landowners should consult additional resources (see Appendix I) and seek knowledgeable legal counsel.

Endnotes

[1] This represents approximately 3 percent of total U.S. installed nameplate electricity generating capacity; U.S. Energy Information Administration, 2011, Table 1.2. Existing Capacity by Energy Source, 2009 (November), http://www.eia.doe.gov/cneaf/electricity/epa/epat1p2.html; Global Wind Energy Council (GWEC), 2011, Annual Market Update 2010, Brussels, Belgium: GWEC, http://www.gwec.net/index.php?id=8; American Wind Energy Association (AWEA), 2011, U.S. Wind Energy Industry Market Report, Year Ending 2010, Washington D.C.: AWEA.

[2] AWEA, 2011, Industry Statistics, http://www.awea.org/learnabout/industry_stats/index.cfm.

[3] AWEA, 2011, U.S. Wind Energy Industry Market Report, Year Ending 2010, Washington D.C.: AWEA.

[4] Database of State Incentives for Renewable Energy (DSIRE), 2010, Renewable Energy Production Tax Credit (PTC), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=0.

[5] DSIRE, 2010, Business Energy Investment Tax Credit (ITC), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F&re=0&ee=1.

[6] DSIRE, 2010, Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation (2008–2012), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US06F&re=1&ee=0.

[7] AWEA, 2011, State Energy Facts: Wyoming, http://www.awea.org/learnabout/publications/upload/4Q10-Wyoming.pdf; National Renewable Energy Laboratory (NREL), 2010, Estimates of Windy Land Area and Wind Energy Potential by State for Areas – 30 percent Capacity Factor at 80 m, http://www.windpoweringamerica.gov/docs/wind_potential_80m_30percent.xls.

[8] AWEA, 2011, Industry Statistics, http://www.awea.org/learnabout/industry_stats/index.cfm.

[9] AWEA, 2011, U.S. Wind Energy Industry Market Report, Year Ending 2010, Washington D.C.: AWEA.

[10] Available wind energy is based upon the following equation:

$AEO\ (kWh/yr) = K \times C_p \times D^2 \times V^3$

Where

AEO = Annual Energy Output

K = 0.4574 (a constant to convert metric to standard units and output to kilowatt hours per year),

C_p = the power coefficient,

D = rotor diameter in feet, and

V = average annual wind speed (mph)

[11] Windustry, 2008, Community Wind Toolbox, http://www.windustry.org/CommunityWindToolbox.

[12] In addition, Doppler SODAR (SOnic Detection and Ranging) is a technology that is gaining acceptance in the wind industry for measuring wind speed. This technology utilizes a high frequency sound pulse to gather meteorological data. The system consists of a digital acoustic signal processor, audio power amplifier, fiberglass enclosure, steered beam speaker array antenna, and associated cables and connectors. At most entire system is 10 feet by 10 feet and 20 feet high and can be mounted on a portable trailer secured by anchors or transported by pickup. Units are powered by a bank of 12 volt DC batteries that are recharged by solar cells.

[13] Presenting a detailed process of transmission development and impacts of transmission lines on private landowners is outside of the scope of this publication. For more information, visit the Kansas Farm Bureau publication "Negotiating Transmission Line Easements"(http://www.kfb.org/views/irvintransmissionlines.htm) and Texas A&M University's guide to negotiating transmission line easements (http://recenter.tamu.edu/pdf/1928.pdf). See also the Western Area Power Administration's (WAPA's) "Working with Landowners Eastern Plains Transmission Project" (http://www.wapa.gov/transmission/archive/EPTP/landowner.htm).

[14] As mentioned in Section 2.3, the definition of a "wind energy agreement," as stipulated by the Wind Energy Rights Act, is a "lease, license, easement or other agreement" granting or reserving the right to "develop or participate in the income from or development of wind powered energy generation."

[15] See Rules and Regulations Board of Land Commissioners, Chapter 6, Wind Energy Leasing, Section 12, http://soswy.state.wy.us/Rules/RULES/7904.pdf.

[16] This is not a complete list of potential federal issues requiring a federal permit. An attorney should be consulted about any potential federal issues with a proposed wind energy project.

[17] CH2M Hill, 2009, "Wyoming Industrial Development Information and Siting Act: Section 109 Permit Application, Dunlap Wind Energy Project" (15 June), http://deq.state.wy.us/isd/downloads/Campbell_Hill_All_Combined_Final_010709.pdf.

[18] See Wyoming Statutes, Title 18, Chapter 5, Article 5, "Wind Energy Facilities," http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title18/Title18.htm.

[19] For more information on property taxes and wind energy, see the Wyoming Department of Revenue guide on the "Valuation of Wind Farms" at http://revenue.state.wy.us/uploads/WindFarmBrochure.pdf.

[20] Calculation based on average assessed values in Wyoming and the industrial property tax rate of 11.5 percent of assessed value at 65 mils.

[21] National Research Council, 2007, Environmental Impacts of Wind-Energy Projects, Washington, D.C.: NRC (May).

[22] See http://www.fws.gov/windenergy/ for more information.

[23] Wyoming Game and Fish Commission, 2010, "Wildlife Protection Recommendations for Wind Energy Development in Wyoming" (17 November), http://gf.state.wy.us/downloads/pdf/Final%20WGFC%20Approved%20Wind%20Recommendations%2011-17-10.pdf.

[24] See Wyoming Game and Fish Commission, 2010, "Wildlife Protection Recommendations for Wind Energy Development in Wyoming" (17 November), http://gf.state.wy.us/downloads/pdf/Final%20WGFC%20Approved%20Wind%20Recommendations%2011-17-10.pdf.

[25] See http://www.fws.gov/windenergy/ for more information.

[26] See the National Trust for Historic Preservation Web site (http://www.preservationnation.org/issues/public-lands/renewable-energy.html) for more information and best practices on siting wind energy development in areas where there may be historical or cultural resources.

[27] Job range obtained from the NREL JEDI (Jobs and Economic Development Impact) model; see http://www.windpoweringamerica.gov/economics_jedi.asp.

[28] R. Phadke, et al., 2009, Wind Energy and Scenic Considerations in Wyoming: Workshop Report (4 August), http://www.macalester.edu/windvisual/workshops/WindEnergyScenicConsInWY.pdf.

Appendix I: Additional Resources

The Role and Context of Wind Energy

American Wind Energy Association (http://www.awea.org)
Includes a wind energy resources library that offers publications and reports about basic wind information, small wind energy systems, how to finance wind projects, wind industry statistics, the integration of wind and utilities, and proceedings from workshops.

U.S. Department of Energy, Wind Powering America (http://www.windpoweringamerica.gov/)
Provides wind energy basics, landowner information, and links to published research and wind energy resource maps.

Stages of Wind Energy Development

Windustry (http://www.windustry.org/your-wind-project/your-wind-project)
Information about leasing land to developers, lease and payment structures, community wind, and landowner wind associations.

- *Wind Energy Easement and Lease Agreement Guidelines* (http://www.windustry.org/sites/windustry.org/files/LandEMain.pdf)
  Covers wind energy land leases as well as wind energy easements, and features information on provisions, recommendations, and items to watch out for.
- *Compensation Packages for Wind Energy Land Agreements* (http://www.windustry.org/sites/windustry.org/files/Compensation-2009-07-06.pdf)
  Surveys the factors that drive compensation levels with a summary of data from published sources, and also presents stories of landowner and community experiences.
- *Best Practices and Policy Recommendations for Wind Energy Land Agreements* (http://www.windustry.org/sites/windustry.org/files/LandEBestPractices.pdf)
  Recommended policies and practices to protect landowners, enhance economic development opportunities, and broaden access to wind energy market information.
- *Wind Energy Easement and Lease Bibliography* (http://www.windustry.org/sites/windustry.org/files/LandEBibliography.pdf)
  Lists a variety of useful resources related to wind energy lease and easement agreements.
- *Community Wind Toolbox* (http://www.windustry.org/CommunityWindToolbox)
  Comprehensive guide that walks through all stages and details of community wind development.

University of Wyoming Cooperative Extension Service (http://www.uwyo.edu/renew-energy)
Landowner-oriented, Wyoming-specific information about small- to commercial-scale wind energy development.

University of Wyoming College of Law, Wind Energy Project (dstickl2@uwyo.edu)
Information about state and federal legislation and regulations regarding wind energy development.

Montana State University (MSU) Extension: Wind Energy Resources
(http://www.msuextension.org/energy/wind/index.cfm)
Provides links to information on community wind, leasing land for commercial wind development, and transmission issues.

New York State Energy Development Authority (NYSERDA) Wind Energy Toolkit
(http://www.powernaturally.org/programs/wind/toolkit.asp)
Contains information about the process for siting wind energy facilities and considerations during each stage of development.

Northwest SEED (Sustainable Energy for Economic Development) (http://www.nwseed.org/default.asp)
Provides information on community wind energy development, including publications on financing community-scale clean energy projects.

Legal Considerations of Wind Energy Development

Relevant Legislation/Rules/Regulations:

- Wyoming Wind Energy Act: http://legisweb.state.wy.us/2011/bills/SF0022.pdf
- Wyoming Statutes, Title 1, Chapter 26 "Eminent Domain," Article 8: http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title1/T1CH26.htm
- Wyoming Statutes, Title 18, Chapter 5, Article 5 "Wind Energy Facilities:" http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title18/Title18.htm
- Wyoming Statutes, Title 39, Chapter 22 "Tax upon Production of Electricity from Wind Resources:" http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title39/Title39.htm
- Wyoming Office of State Lands and Investments (OSLI) Rules and Regulations Board of Land Commissioners. Chapter 6, Wind Energy Leasing: http://soswy.state.wy.us/Rules/RULES/7904.pdf

Living With Wind Energy Development

National Research Council, Environmental Impacts of Wind Energy Projects
(http://www.nap.edu/catalog.php?record_id=11935)
Study of environmental impacts of wind energy, including aesthetic concerns and other community development issues.

Wyoming Game and Fish (http://gf.state.wy.us/)
Links to "Wildlife Protection Recommendations for Wind Energy Development in Wyoming" and sage-grouse core area guidance and maps.

U.S. Fish and Wildlife Service (http://www.fws.gov/windenergy)
Best practices to mitigate wind energy's effects on wildlife and guidelines for minimizing impacts to bald and golden eagles.

National Trust for Historic Preservation
(http://www.preservationnation.org/issues/public-lands/renewable-energy.html)
Information and best practices on siting wind energy development in areas where there may be historical or cultural resources.

Appendix II: Wind Energy Rights Act

ORIGINAL SENATE
FILE NO. 0022

ENROLLED ACT NO. 3, SENATE

SIXTY-FIRST LEGISLATURE OF THE STATE OF WYOMING
2011 GENERAL SESSION

AN ACT relating to property; providing wind energy rights are real property appurtenant to the surface estate; defining terms; providing for wind energy agreements; specifying requirements for agreements; specifying applicability of act; providing for reversion of interests; and providing for an effective date.

Be It Enacted by the Legislature of the State of Wyoming:

Section 1. W.S. 34-27-101 through 34-27-107 are created to read:

CHAPTER 27
WIND ENERGY RIGHTS

34-27-101. Short title.

This act may be cited as the "Wind Energy Rights Act."

34-27-102. Definitions.

(a) As used in this act:

(i) "Wind energy agreement" means a lease, license, easement or other agreement, whether by grant or reservation, to develop or participate in the income from or the development of wind powered energy generation;

(ii) "Wind energy developer" means the owner of the surface estate or the lessee, easement holder, licensee or contracting party under a wind energy agreement;

(iii) "Wind energy right" means a property right in the development of wind powered energy generation;

(iv) "This act" means W.S. 34-27-101 through 34-27-107.

34-27-103. Declaration of wind energy rights.

(a) Wind energy rights shall be regarded as an interest in real property and appurtenant to the surface estate.

(b) Wind energy rights shall not be severed from the surface estate, except that wind energy may be developed pursuant to a wind energy agreement.

(c) A wind energy agreement is an interest in real property. A wind energy agreement or a notice or memorandum evidencing a wind energy agreement shall:

(i) Be recorded in the office of the county clerk where the land subject to the agreement is located; and

(ii) Shall include a description of the land subject to the agreement.

(d) After a wind energy agreement has terminated, the surface owner may request the wind energy developer to record a release of the wind energy agreement in the office of the county clerk where the land subject to the wind energy agreement is located. The request shall be in writing and delivered to the wind energy developer by personal service or registered mail at the wind energy developer's last known address. The wind energy developer shall record the release within twenty (20) days after receipt of the request. If the wind energy developer fails to record the release within twenty (20) days after the receipt of the request, the wind energy developer shall be liable to the surface owner for all damages caused by the wind energy developer's failure. A copy of the written request shall have the same force and effect as the original in an action for damages.

(e) Wind energy becomes personalty at the point of conversion into electricity.

(f) Nothing in this act shall alter, amend, diminish or invalidate wind energy agreements or conveyances made or entered into prior to April 1, 2011 provided that a contract, lease, memorandum or other notice evidencing the acquisition, conveyance or reservation of the wind energy rights is recorded in accordance with subsection (c) of this section no later than July 1, 2011.

34-27-104. Dominance of mineral estate.

Nothing in this act shall be construed to change the common law as of April 1, 2011 as it relates to the rights belonging to, or the dominance of, the mineral estate.

34-27-105. Compensation for taking of wind energy rights.

Nothing in this act diminishes the right of the owner of the surface estate to receive compensation under W.S. 1-26-701 through 1-26-714 for the taking of wind energy rights incidental to the exercise of eminent domain.

34-27-106. No restriction on transfer of wind energy agreement.

Nothing in this act shall be construed to restrict the transfer of a wind energy agreement, including the transfer of the surface owner's right to receive payments under the wind energy agreement.

34-27-107. Reversion of easements.

Unless otherwise agreed between the surface owner and wind energy developer, all easement interests acquired after April 1, 2011 for the purpose of producing wind energy shall revert to the owner of the surface estate if wind energy production has ceased for a continuous period of ten (10) years or if the generation of electricity by a turbine has not commenced within twenty (20) years after the execution of a wind energy agreement. Reversion of an interest under this section does not transfer any obligation to restore or reclaim the surface estate.

Section 2. This act is effective April 1, 2011.

(END)

Notes