

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.

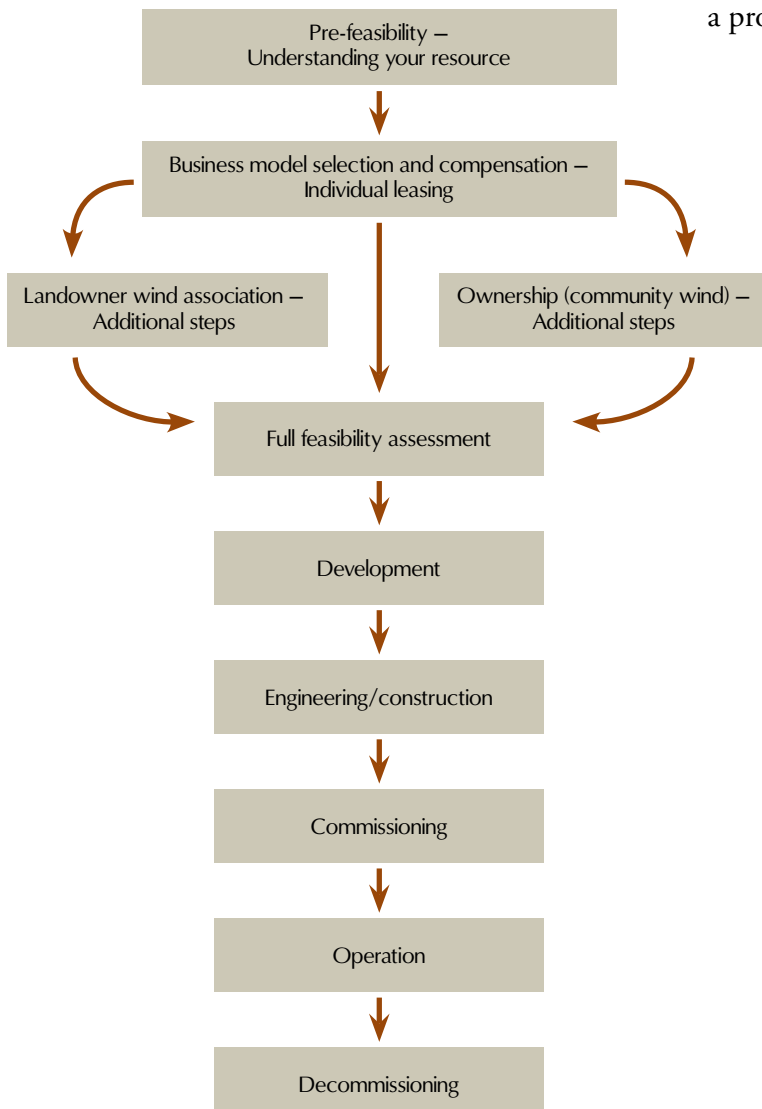


Figure 4. Steps of the wind energy development process.

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.

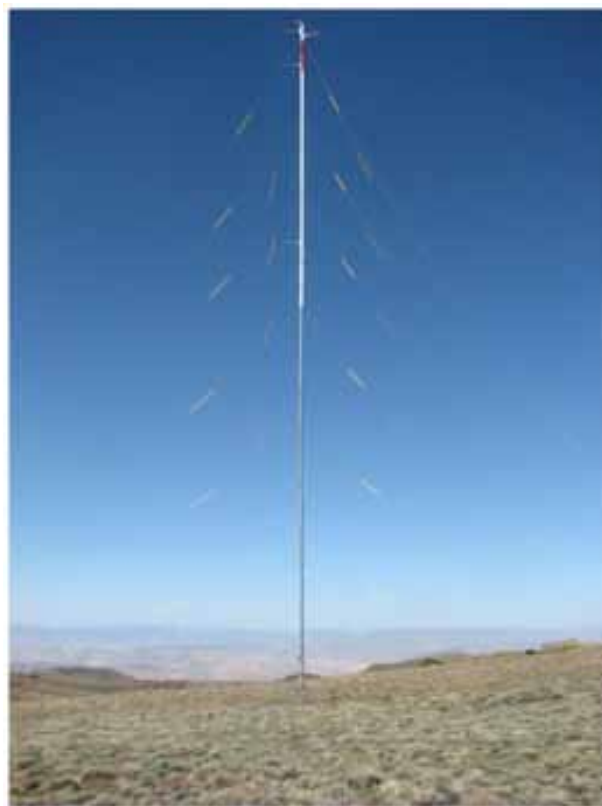


Figure 5. Typical 60-meter met tower found in Wyoming, which includes guy wire reflectors and a painted top for aviation visibility.

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	<ul style="list-style-type: none"> • 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 	<p><i>Landowner-specific disadvantages:</i></p> <ul style="list-style-type: none"> • Difficult to verify electricity and revenue generated by each turbine because: <ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> • Same as above, with additional benefits from an upfront fee or a minimum guarantee • Minimum level of compensation ensured if project is sold 	<ul style="list-style-type: none"> • Same as first bullet above
Flat or Fixed Fee Each Year (per turbine, per acre, or per MW installed)	<ul style="list-style-type: none"> • 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 <p><i>Landowner-specific advantages:</i></p> <ul style="list-style-type: none"> • Provides steady, predictable income stream • Protected in years of low power generation and/or revenue <p><i>Developer-specific advantages:</i></p> <ul style="list-style-type: none"> • Does well in high production/revenue years 	<ul style="list-style-type: none"> • Payments do not mirror actual revenue generated • Eliminates the economic incentive for the landowner to cooperate with the developer to ensure maximum power generation <p><i>Landowner-specific disadvantages:</i></p> <ul style="list-style-type: none"> • Forgoes a potentially higher, if fluctuating, level of income associated with royalty payments <p><i>Developer-specific disadvantages:</i></p> <ul style="list-style-type: none"> • Expenses are harder to bear in years of low power generation and/or revenue
Lump Sum	<p><i>Landowner-specific advantages:</i></p> <ul style="list-style-type: none"> • Source of immediate cash <p><i>Developer-specific advantages:</i></p> <ul style="list-style-type: none"> • Does not have to provide payments in subsequent years 	<ul style="list-style-type: none"> • It is not ideal to have the financial transaction complete but physical use ongoing over many years <p><i>Landowner-specific disadvantages:</i></p> <ul style="list-style-type: none"> • 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 <p><i>Developer-specific disadvantages:</i></p> <ul style="list-style-type: none"> • 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

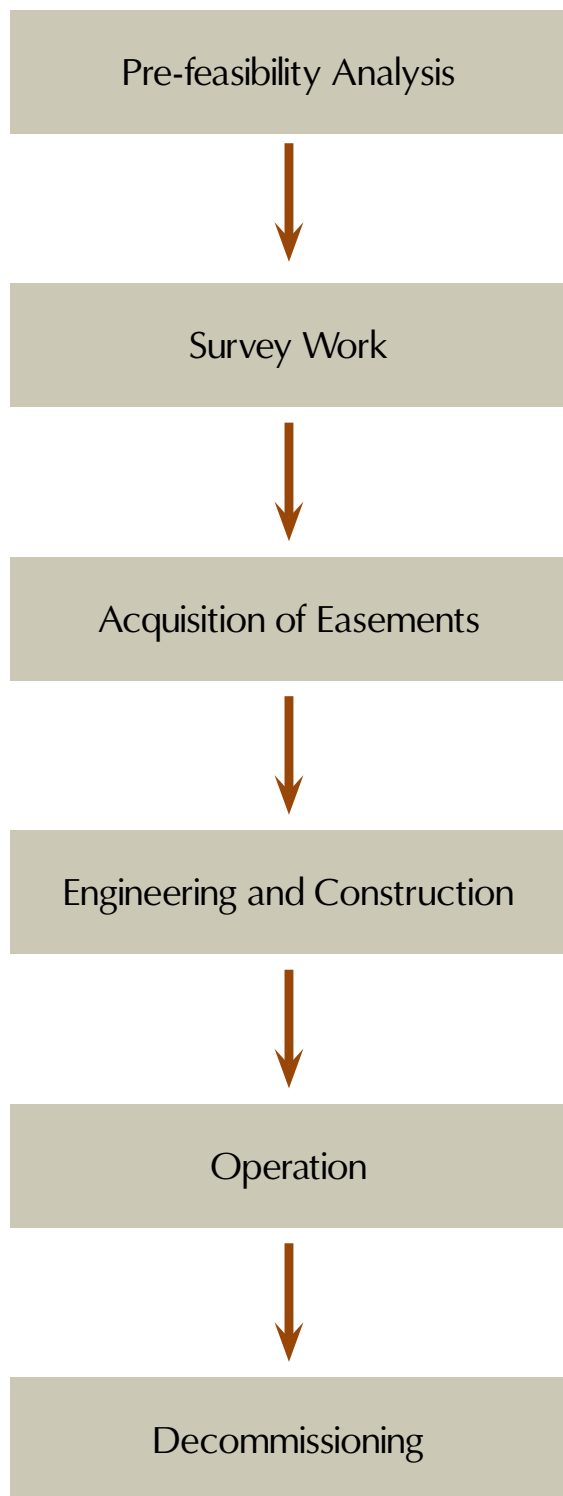


Figure 7. Steps of transmission line development.

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.