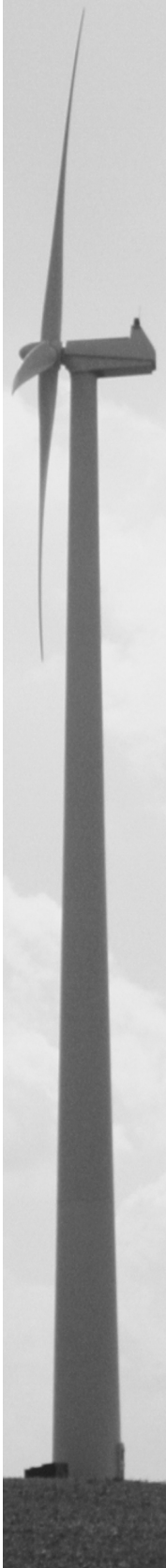

Chapter 7

On-Farm Small Wind Development

Small-scale wind turbines—roughly defined as turbines with a nameplate capacity of 100 kW or less—are intended primarily to generate enough electricity to provide for a single home, farm, or small business.[1] In most cases, small on-farm wind projects will not provide the farmer with a new source of income.

However, small farm wind turbine projects can be economical, especially if located at a site with excellent wind and installed in combination with other energy efficiency measures. Small-scale turbine owners can also seek to improve their project's economics by interconnecting with the electric grid. This enables the farmer to use the utility's electricity as backup power when the wind is not blowing, and in some cases, to sell excess generated electricity back to the utility through the electric grid. The amount of electricity that can be generated and sold from these small turbines is relatively small, though, so a farmer's savings from reduced electricity purchases from the utility are usually the most significant economic benefit.

After a brief review of some of the practical considerations that should affect the decision whether to invest in an on-farm turbine, this chapter highlights some of the legal issues involved with installing a wind turbine to offset a farm's use of electricity.

I. Determining Whether Wind Energy Is Right for Farm Use

Even "small" wind turbines require a substantial investment, and a farmer should carefully consider the costs and benefits of the project before getting too far along in the process. In many cases, it may be more economical to invest in energy efficiency measures than to purchase and install a wind turbine.

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[1] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 3 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

Because the majority of the benefits of an on-farm turbine come in the form of increased energy independence, farmers should start by analyzing their current electricity use, including average daily consumption, highest and lowest consumption, monthly and yearly consumption, and average daily peak energy use.[2] Any likely changes in the farming operation that could affect energy consumption should also be evaluated.

Farmers should also carefully evaluate the on-farm wind resource. This process is discussed further in the chapter on siting (Chapter 4). Although exact wind measurements may not be required for a project of this size, farmers should be sure there is a sufficient supply of wind to produce consistent amounts of electricity. Roughly 10 mph or more is a general rule of thumb for projects of this size.[3]

With this information in hand, farmers can complete an economic evaluation of the proposed project and compare the viability of different project sizes. There are several on-line worksheets and calculators available to help with this process.[4] Many are designed to calculate how long it will take for a small wind turbine to pay for itself, if it ever will.[5]

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[2] Iowa Department of Natural Resources, *Iowa Wind Energy Checklist* 2 (2003), *available at* http://www.iowadnr.com/energy/renewable/files/windchecklist.pdf (last visited June 15, 2007).

[3] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 15 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[4] *See, e.g.*, Iowa Department of Natural Resources, *Iowa Wind Energy Checklist* 23 (2003), *available at* http://www.iowadnr.com/energy/renewable/files/windchecklist.pdf; American Wind Energy Association, *The Economics of Small Wind*, http://www.awea.org/smallwind/toolbox/TOOLS/fs_economics.asp (both sites last visited June 15, 2007).

[5] The American Wind Energy Association estimates that a well-sited wind turbine can pay for itself in about 15 years, which is less than the expected lifespan of most turbines. American Wind Energy Association, *Wind Web Tutorial: Small Wind Energy Systems*: *How Much Does a Wind System Cost?*, http://www.awea.org/faq/wwt_smallwind.html#Will%20a%20small%20wind%20turbine%20save%20me%20money (last visited June 15, 2007).

Turbines used on-site by a residence or farm typically range in size from 400 watts to 100 kW, depending on the amount of electricity needed. The cost of a total installed system ranges from $3,000 to $5,000 for every kW of capacity; for example, a 10 kW system might cost about $40,000.[6] Rebates and tax credits are available in some states for small wind systems to help improve the project's economics. State and federal incentives for wind development are discussed in Chapters 12 (Incentives) and 13 (Tax Benefits and Obligations) of this guide.

II. Siting

In addition to evaluating the available wind resource, a farmer interested in installing an on-farm wind turbine should consider the various siting issues discussed in Chapter 4 of this guide. These include distance from neighbors, the amount of land available to site the turbine, local land use permitting or zoning requirements, and whether there are private restrictions on wind development on the proposed site, such as pre-existing restrictive covenants or negative easements.

Land use permitting issues in particular may affect the choice of turbine for the project. For example, zoning codes may prohibit lattice-structure supports, requiring the farmer to purchase a tubular model instead.[7]

As a general rule, small turbines are less likely to raise some of the other siting concerns, such as noise or television reception interference, that may create obstacles for larger projects. These risks are greatly minimized by the small size of the on-farm turbines.[8]

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[6] American Wind Energy Association, *Wind Web Tutorial: Small Wind Energy Systems*: *How Much Does a Wind System Cost?*, http://www.awea.org/faq/wwt_smallwind.html#Will%20a%20small%20wind%20turbine%20save%20me%20money (last visited June 15, 2007).

[7] *See, e.g.*, Murray County, Minn., Zoning Ordinance § 12, subd. 4(6) (2007), *available at* http://www.murray-countymn.com/php/pdfs/mczoning05-08-07.pdf (requiring tubular towers but only for wind turbines over 100 kW) (last visited June 20, 2007).

[8] American Wind Energy Association, *Wind Web Tutorial: Small Wind Energy Systems*: *Do wind turbines make noise or interfere with TV reception?*, http://www.awea.org/faq/wwt_smallwind.html#Do%20wind%20turbines%20make%20noise%20or%20interfere%20with%20TV%20reception; *see also* American Wind Energy Association, *Wind Web Tutorial*, http://www.awea.org/faq/ (providing

III. Grid-Connected Small Wind Systems

If a farmer chooses to connect a small wind project to the electric grid, at any given time the farm's electricity needs will be supplied by either the wind turbine or the utility, depending on how windy it is. When the wind is not blowing, all of the farm's electricity will come from the utility. When the wind is blowing, the farm's electricity will come from the turbine, with electricity from the utility supplementing the turbine generation as needed.

> ***Off-Grid Small Wind Systems***
>
> The remainder of this chapter focuses exclusively on wind facilities that are connected to the electric grid. An *off-grid wind project*, however, is another option that farmers can consider. Sometimes connecting to the grid will be impractical or impossible due to the remote location of the turbine or other technical barriers. Many of the issues discussed here and in other chapters in this guide—feasibility, siting, turbine purchase, maintenance, insurance, and installation—are equally relevant for on-grid and off-grid wind projects. However, owners of off-grid projects do not need to concern themselves with the interconnection, power sales, and utility issues discussed in this section. Nor do off-grid turbines allow the farmer to sell excess generated electricity to the utility for income.

Farmers with small grid-connected wind turbines have two general options for dealing with the excess electricity available during those times when the turbine is generating more power than the farm is using.

Single Meter. The first, and almost always best, option for dealing with excess generation is called *net metering*. Net metering is a method of measuring on a single meter the electricity consumed from the grid and the electricity produced by the turbine. With net metering, any excess electricity produced by the wind turbine spins the farm's existing electric meter backwards, allowing the farmer to bank credits for the excess electricity and offset future amounts of electricity that must be purchased from the utility. In effect, this provides the customer with full retail value for at least a portion of the electricity produced.

Separate Meters. If net metering is not available or is not feasible for a given project, farmers with small grid-connected wind turbines may instead seek to install their turbines on a separate meter. In this scenario, the farmer

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information about bird impacts, safety, and property values, none of which are considered major concerns for small turbines) (both sites last visited June 15, 2007).

continues to purchase any of his or her backup electricity from the utility on his or her original meter. Any electricity the turbine produces that the farm cannot use is then fed into the grid and measured on a separate second meter. Unless a better arrangement can be negotiated, the farmer's excess electricity is most likely purchased by the local utility at a rate that is significantly lower than the full or partial retail rate that would be credited through net metering.

Both of these options are discussed in more detail in the remainder of this chapter.

A. Net Metering

A majority of states require net metering for wind systems under a certain size, but the exact terms vary by state. Each state that offers net metering has different rules for who qualifies for net metering, how payments for excess energy are calculated, and details of interconnecting the project to the electric grid.

1. Rights to Net Metering

Currently, 37 states have rules requiring some or all of the utilities within the state to offer net metering for certain types of small energy generators, including wind projects.[9] These state net metering rules can be established either through the legislative process or by a state regulatory agency, such as the public utilities commission.

It is important to check which utilities are covered by a state's net metering rules. Many states' net metering rules apply only to investor-owned utilities (also called rate-regulated utilities), and not rural electric cooperatives or municipal electric utilities. However, some states, including Minnesota, do extend their net metering rules to rural electric cooperatives and municipal utilities.[10]

One way states regulate net metering is to set limits on the size of facility that is eligible to net meter. The range of maximum facility size eligible for

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[9] *See* Interstate Renewable Energy Council, *State and Utility Net Metering Rules and Programs Table*, http://www.irecusa.org/fileadmin/user_upload/ConnectDocs/IREC_NM_table.pdf; Interstate Renewable Energy Council, *State-by-State Net-Metering Map*, http://www.irecusa.org/index.php?id=105 (both sites last visited June 15, 2007).

[10] Minn. Stat. § 216B.164, subd. 2 (2006).

net metering includes 15 kW or less in Kentucky,[11] less than 40 kW in Minnesota,[12] 100 kW or less in North Dakota,[13] and 2 MW or less in Colorado.[14]

Farmers should also be aware that some states actually have different net metering limits based on the type of customer installing the generator. For example, in Arkansas, net metering is available for residential renewable energy systems of not more than 25 kW in capacity, but the capacity limit is 300 kW for renewable energy systems for any other use.[15] And both New York and Vermont have specifically established multi-tiered net metering rules, with limits that are higher for farm-based net metering systems.[16]

Iowa's net metering rule is also unique in that it does not limit the size of eligible projects.[17] However, in 1997 and 1998, three customers of MidAmerican, Iowa's largest investor-owned utility, brought complaints before the Iowa Utilities Board challenging MidAmerican's refusal to enter into net metering agreements. After protracted litigation, a settlement was reached in 2002 limiting the capacity of generators that must be net metered by MidAmerican to 500 kW or less.[18] Iowa's other major utility, Interstate Power and Light Company, received a similar size limit change in 2004.[19]

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[11] Ky. Rev. Stat. Ann. § 278.465 (2006).

[12] Minn. Stat. § 216B.164, subd. 3(c) (2006).

[13] N.D. Admin. Code § 69-09-07-09 (2005).

[14] 4 Colo. Code Regs. § 723-3 at R. 3664(a) (2007).

[15] 2007 Ark. Acts 1026 (to be codified at Ark. Code Ann. §§ 23-18-603 and 23-18-604). *See also*, Arkansas Public Service Commission, *In the Matter of a Generic Proceeding to Establish Net Metering Rules*, Docket No. 02-046-R, Order No. 3 (July 3, 2002).

[16] N.Y. Pub. Serv. Law § 66-*ℓ* (2007) (allowing net metering for on-farm wind systems up to 125 kW); Vt. Stat. Ann. tit. 30, § 219a (2006) (allowing net metering for on-farm systems up to 150 kW).

[17] Iowa Admin. Code r. 199-15.11(5) (2006).

[18] Iowa Utilities Board, *In re: MidAmerican Energy Company*, Docket Nos. TF-01-293, WRU-02-8-156, Order Granting Waiver and Approving, with Clarifications, Tariff (Mar. 8, 2002).

[19] Iowa Utilities Board, *In re: IES Utilities, Inc., and Interstate Power Company n/k/a Interstate Power and Light Company*, Docket Nos. TF-03-180, TF-03-181, WRU-03-30-150, Order Approving Tariffs with Modification and Granting Waiver (Jan. 20, 2004).

These two utilities together serve most of Iowa's electric customers, with the others largely served by cooperatives that are not subject to Iowa's net metering rule. Practically speaking, therefore, net metering in Iowa is now only available to facilities of 500 kW or less.

Farmers in states that do not have net metering rules, or who are served by a rural electric cooperative or municipal electric utility not covered by a state's net metering rules, should nonetheless check with their local utility about the possibility of net metering. Some utilities may voluntarily offer net metering, or the farmer may be able to negotiate a net metering agreement. In addition, the federal Energy Policy Act of 2005 directed state regulatory authorities and unregulated utilities to consider adopting net metering rules if they have not already done so.[20] Therefore, new net metering rules may be developed in the future.

An Iowa Farmer Fights His Rural Electric Cooperative for Net Metering

The question of whether rural electric cooperatives must provide net metering in Iowa has been the subject of an historic dispute between an Iowa farmer, Greg Swecker, and his rural electric cooperative, Midland Power Cooperative. In 1998, Mr. Swecker installed a 65 kW wind turbine on his farm. Midland refused to net meter the facility, and there were further disputes about the appropriate fees Midland could charge and the price it would pay for the electricity generated. Mr. Swecker argued that the Public Utility Regulatory Policies Act (PURPA) required Midland to interconnect his system and to offer net metering. Midland responded that, as a rural electric cooperative in Iowa, it is not subject to Iowa's net metering rules. The case has moved among the Iowa Utilities Board, Iowa state courts, federal district court, and the Federal Energy Regulatory Commission (FERC). The latest determination by FERC, which was upheld in March 2007 by the Iowa Court of Appeals, was that the decision whether to net meter should be left to Midland's discretion. *Swecker v. Midland Power Coop.*, 114 FERC ¶ 61,205 (2006); *Windway Tech. v. Midland Power Coop.*, Nos. 6-836, 06-0276, slip op. 11-12 (Iowa Ct. App. Mar. 14, 2007) (not yet published).

[20] Energy Policy Act of 2005, 109 Pub. L. 58, Title XII, Subtitle E, § 1251, 119 Stat. 962 (Aug. 8, 2005). Some experts believe that these and other amendments to the Public Utility Regulatory Policies Act (PURPA) could significantly change the net metering

2. Credit or Payment for Excess Energy Produced

In most states, the electricity used and electricity generated by the net-metered facility are totaled at the end of each billing cycle, usually monthly.[21] If the wind facility produced more electricity than the farm used in the month, the additional energy is called *net excess generation*.

There is great diversity among states in how a utility must compensate wind facility owners for net excess generation. The most common requirement is that the utility must credit the farmer's account for the net excess generation on a monthly basis at the utility's retail price for electricity. These credits are then used to offset the farmer's future energy demand on the utility; however, any of the farmer's credits that remain unused at the end of each 12-month period typically go back to the utility.[22] Montana has such a law, and the only protection for the farmer is that he or she picks the date that the 12-month accounting period begins—the first day of January, April, July, or October. The astute wind system owner will pick the date that occurs after the least-windy part of the year, so that the credits are at the lowest level.[23]

The next most common arrangement for net metering compensation is to credit the farmer each month for any net excess energy generated and use the credits to offset the farmer's future need for electricity from the utility, but with no limit on the amount of time that the utility can roll the farmer's credits forward to keep them available if needed in the future. In Iowa, for example, the net metering size limits granted to the two regulated utilities also allow them to roll net excess generation forward indefinitely from

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landscape. Future actions at the state and federal levels should be watched closely to see how this develops.

[21] For a table of net metering laws in each state, see Interstate Renewable Energy Council, *State and Utility Net-Metering Rules and Programs* (updated May 2007), *available at* http://www.irecusa.org/fileadmin/user_upload/ConnectDocs/IREC_NM_table.pdf (last visited June 15, 2007).

[22] *See, e.g.*, Mont. Code Ann. § 69-8-603 (2005).

[23] NorthWestern Energy, *Montana Wind Power: A Consumer's Guide to Harvesting the Wind* 21 (Dec. 2004), *available at* http://www.montanagreenpower.com/pdf/montanawindpowerpub.pdf (last visited June 15, 2007).

month to month, creating a situation where the utility has no real obligation to pay the wind project owner for any excess generation.[24]

Colorado, on the other hand, credits the net excess generation to the farmer's account at the retail rate, but then requires the utility to purchase from the farmer at the utility's *avoided cost rate* any credits remaining at the end of the calendar year.[25] Avoided cost is a concept that derives from the federal Public Utility Regulatory Policies Act (PURPA) and basically reflects the cost the utility would have incurred to generate or purchase an equivalent amount of power but for the customer's contribution of his or her own generation.[26]

A less common arrangement requires the utility to purchase the farmer's net excess generation each month at a defined rate. Some states require the utilities to purchase the excess at avoided cost. In other states, like Minnesota, utilities must purchase or credit a small generator's net excess generation at the utility's average retail rate, which is significantly higher than an avoided cost rate and a strong incentive to net meter.[27] Minnesota's standard net metering contract allows the customer to choose whether the purchased amount will be credited to future electricity bills or paid for by a monthly check.[28]

3. Interconnection Procedures for Net Metering

Interconnection will also be an important issue for small, on-farm wind projects seeking to connect their turbines to the electric grid. Interconnection

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[24] Iowa Utilities Board, *In re: MidAmerican Energy Company*, Docket Nos. TF-01-293, WRU-02-8-156, Order Granting Waiver and Approving, with Clarifications, Tariff (Mar. 8, 2002).

[25] 4 Colo. Code Regs. § 723-3 at R. 3664(b) (2007) (avoided cost rate is defined as the utility's average hourly incremental cost for the prior 12-month period).

[26] Both PURPA and avoided cost rates are discussed in much more detail in the "Separate Meter" discussion later in this chapter, as well as in the power selling (Chapter 9) and interconnection chapters (Chapter 11) of this guide.

[27] Minn. R. 7835.3300 (2006).

[28] Minn. R. 7835.9910 (2006) ("Uniform Statewide Contract; Form"), *available at* http://www.state.mn.us/mn/externalDocs/Commerce/Solar_Electric_Interconnection_Packet__Other_Utility_Customers_031704115402_utilitypacket.pdf (last visited June 15, 2007).

refers generally to the physical and legal process by which new power generators, like wind turbines, are "plugged in" to the existing electric grid.

To interconnect an on-farm wind turbine with the electric grid, the farmer will need to work closely with the utility that owns the local power lines. Interconnection typically requires satisfaction of a series of technical engineering requirements so that the wind facility can be safely connected to the grid, and an *interconnection agreement* that will articulate the terms and conditions of the legal arrangement. This section focuses on the technical procedures of interconnection, and the next section explains some of the legal agreements needed for net metering.

Interconnection can actually be a very complicated and daunting process for many wind projects. In fact, all of the complexities of interconnection are addressed in a separate chapter later in this guide (Chapter 11). However, farmers seeking to install a small on-farm wind turbine often benefit from simplified and streamlined procedures.

States with net metering can require utilities to implement specific, standardized procedures for interconnection, which determine how the utility must respond to a request for interconnection.[29] As discussed in more detail in the chapter on interconnection (Chapter 11), standardized interconnection procedures typically require a utility to make decisions within a certain timeframe and designate a utility representative responsible for interconnection issues.[30] Standardized interconnection procedures may also set out the technical standards that will determine whether a wind project can be safely interconnected with the electric grid.[31]

Many states' standardized interconnection procedures cover projects up to 10 or 20 MW in nameplate capacity. Those procedures are typically more complex than those necessary for a small net-metered facility; therefore, farmers should investigate whether their states have other, more expedited procedures for smaller turbines.

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[29] *See* Interstate Renewable Energy Council, *Interconnection Standards for Distributed Generation* (updated May 2007), *available at* http://www.irecusa.org/fileadmin/user_upload/ConnectDocs/IREC_IC_Table.pdf (last visited June 15, 2007) (providing a state-by-state list of standards).

[30] *E.g.*, Wis. Admin. Code PSC §§ 119.03, 119.04 (2006) ("Rules for Interconnecting Distributed Generation Facilities").

[31] *See, e.g.*, Wis. Admin. Code PSC §§ 119.20 to 119.27 (2006).

4. Standard Net Metering Contracts

Most states with net metering require regulated utilities to offer a standard contract to customers who want to net meter a small electric generation facility. These standard contracts are typically filed with the state utility regulatory authority and must conform with state law regarding net metering terms.[32] Standard contracts are beneficial to farmers because they help to minimize the time and expense associated with negotiating individual interconnection and net metering agreements. Even if a particular state does not have a law requiring utilities to develop net metering standard contracts, a utility may nonetheless offer a standard contract. If no standard contract is available, farmers can look at other standard contracts for guidance when negotiating with a utility.

A standard net metering contract typically covers two main topics: (1) interconnection with the utility, and (2) accounting for net excess generation delivered to the utility. Among other things, the interconnection agreement will address necessary improvements to the utility's electric system, and who pays for them, and safety requirements, which are typically based on nationally recognized standards and third-party certification of the wind turbine and interconnection equipment.[33] The interconnection portion of the standard contract will also contain some basic contract terms addressing dispute resolution, assignments, and termination and default.[34]

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[32] *See, e.g.*, 4 Colo. Code Regs. 723-3 at R. 3664(c) (2007) (tariff required); Minn. Stat. § 216B.164, subd. 6 (2006) (uniform contract required); N.D. Admin. Code § 69-09-07-09, subd. 3(b) (2005) (standard contract required).

[33] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 17 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007); *see, e.g.*, Minn. R. 7835.2100 (2006) (requiring the interconnection to comply with the requirements of the National Electrical Safety Code).

[34] *See, e.g.*, Minnesota Public Utilities Commission, *In the Matter of Establishing Generic Standards for Utility Tariffs for Interconnection and Operation of Distributed Generation Facilities under Minnesota Laws 2001, Chapter 212*, Docket No. E-999/CI-01-1023, Attachment 5 (Interconnection Agreement) (Sept. 28, 2004), *available at* http://www.puc.state.mn.us/docs/orders/04-0131.pdf (last visited June 20, 2007).

Insurance and liability can be other major issues in the interconnection agreement. The interconnection agreement will have some terms regarding liability for any injuries arising out of the interconnection, and the state or utility may require farmers to carry a certain amount of liability insurance. For larger commercial-scale projects connecting to the grid, the insurance coverage required may be up to $1 million or more, but such large policies are considered excessive for smaller projects, which have a good track record for safety. According to the U.S. Department of Energy, there have been no liability claims relating to electrical safety since utilities have been required to allow small wind systems to interconnect with the grid.[35] Some states prohibit utilities from requiring insurance for small systems that are eligible for net metering,[36] and others limit the amount of insurance that utilities can require to a standard residential or commercial property policy (for example, $100,000 to $300,000).[37] Minnesota law, for example, prohibits a utility from requiring an indemnity clause as a condition of the interconnection, and allows the utility to require up to $300,000 of liability insurance.[38]

The part of the net metering contract addressing delivery of electricity to the utility concerns the rate farmers will be credited with for their net excess generation and how payments, if any, will be calculated and structured. As discussed above, in most states the rate for net excess generation is set at the utility's avoided cost, but it may be higher in some states.[39]

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[35] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 17 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[36] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 17 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[37] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 18 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[38] Minn. R. 7835.2400 (indemnity clause), R. 7835.2300 (liability insurance) (2006).

[39] Minn. R. 7835.9910 (2006) ("Uniform Statewide Contract; Form"), *available at* http://www.state.mn.us/mn/externalDocs/Commerce/Solar_Electric_Interconnection

5. Fees and Other Charges

The federal Public Utility Regulatory Policies Act (PURPA) prohibits utilities from imposing discriminatory rates on net metering customers.[40] States have also set out similar rules, but the range of protections offered to net-metered customers varies. California has an example of a very protective state rule, as it prohibits a utility from charging any additional fees that would increase the net-metered customer's costs beyond those of other customers in the same rate class.[41]

Many experts and wind advocates advise small wind turbine owners to challenge net metering fees that may be discriminatory. However, net-metered customers may face some interconnection charges, metering charges, standby charges, and other fees.[42] In general, the net-metered facility owner is responsible for all equipment needed to carry out the interconnection, such as an inverter, and any upgrades needed to the power lines up to the point of interconnection.[43] Minnesota's standard net metering contract does not explicitly limit interconnection costs, but it does require the utility to estimate those costs and include them in the contract terms.[44]

Metering charges might include meter calibration fees or the cost of an additional meter, which some states allow the utility to install only if the utility pays the costs. Standard electric meters are capable of rotating in both directions and normally will not have to be replaced to start net metering. However, some meters register rotations but not direction, and it may be

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_Packet__Other_Utility_Customers_031704115402_utilitypacket.pdf (last visited June 15, 2007).

[40] 18 U.S.C. § 824a-3(b)(2) (2006).

[41] Cal. Pub. Util. Code § 2827(g) (2006).

[42] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 18 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[43] *See, e.g.*, Minn. R. 7835.2700 (2006).

[44] Minn. R. 7835.9910 (2006) ("Uniform Statewide Contract; Form"), *available at* http://www.state.mn.us/mn/externalDocs/Commerce/Solar_Electric_Interconnection_Packet__Other_Utility_Customers_031704115402_utilitypacket.pdf (last visited June 15, 2007).

necessary to install a new meter capable of registering the difference between electricity being drawn from the grid and electricity entering the grid.[45]

Standby charges (sometimes called *backup charges*) are a fee to ensure that the utility can obtain backup power if a wind system does not provide the expected net excess generation. The utility must always have enough capacity to meet its normal demand, plus any added demand created when a generator is down and the farmer needs electricity. Because net-metered facilities are relatively so small, and it is understood that the farmer will be drawing additional power from the grid, the utility's reliance on the net excess generation is quite limited. Therefore, the utility's need to secure a backup power source should also be limited, and any standby charge the utility imposes should be small. If a standby charge seems out of proportion to the size of the wind project, the farmer should discuss this charge with the utility and state utility regulatory agency.[46]

A *demand charge* might refer to a monthly charge imposed on all customers in a rate class and used to pay for a utility's fixed assets. Wind turbine owners will generally be subject to the same minimum monthly service charge that all customers in that rate class pay. As long as all customers in the rate class are subject to the charge, the utility may also apply the charge to a net-metered facility.[47]

The fees that the utility may require for interconnection and service can be significant. It is important to collect as much information as possible about

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[45] NorthWestern Energy, *Montana Wind Power: A Consumer's Guide to Harvesting the Wind* 19 (Dec. 2004), *available at* http://www.montanagreenpower.com/pdf/montanawindpowerpub.pdf (last visited June 15, 2007).

[46] U.S. Department of Energy, *Small Wind Electric Systems: A U.S. Consumer's Guide* 18 (Mar. 2005), *available at* http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/small_wind/small_wind_guide.pdf (last visited June 15, 2007).

[47] *See* Mark Bolinger, et al., *A Comparative Analysis of Community Wind Power Development Options in Oregon* 32-33 (Energy Trust of Oregon July 2004), *available at* http://www.energytrust.org/RR/wind/OR_Community_Wind_Report.pdf (last visited June 7, 2007).

the fees to be incurred, and factor that information into any decision about whether a wind project will be economical.

B. PURPA Rights to Interconnect and Sell Electricity

As mentioned earlier, farmers who are not able to use net metering for their small on-farm wind facilities but wish to be linked to the electric grid may seek to install a separate meter for wind turbines. Electricity would continue to be purchased from the utility, when needed, through the original meter, while the new meter would measure the wind facility's sales of generated energy back to the utility. Although this method is less streamlined than net metering, and requires the farmer to negotiate complicated interconnection and power purchase agreements for a relatively small amount of energy output, it may still allow farmers to earn energy credit or cash revenue for the net excess generation from a small on-farm wind facility.

As discussed in several places throughout this guide, the Public Utility Regulatory Policies Act (PURPA) is a federal statute enacted to ensure a market for the electricity produced by small renewable energy facilities (so-called *Qualifying Facilities* (QF)).[48] Although subject to some exceptions, PURPA requires utilities to interconnect with QFs and purchase their electricity at the utility's *avoided cost rate*.[49] As discussed earlier in this chapter, this is the rate the utility would otherwise have had to pay to obtain the energy, whether through its own generation or purchase from a traditional source. A utility's avoided cost rate is typically significantly lower than its retail rate, which is the rate commonly used in net metering, at least for the portion of the turbine's output that offsets other electric use.[50] For example, a typical retail rate of 9 cents per kWh could correspond to an avoided cost rate of around 2 cents per kWh.[51] Each state may have specific rules about how the utility calculates its avoided cost.[52]

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[48] 16 U.S.C. § 824a-3(a) (2006). A "qualifying facility" generates electricity using renewable sources and has a capacity under 80 MW. 18 C.F.R. §§ 292.203(a), 292.203(c), 292.204 (2007).

[49] 16 U.S.C. § 824a-3(a) (2006).

[50] Or. Rev. Stat. § 757.300(3)(c) (2005); 4 Colo. Code Regs. § 723-3 at R. 3664(b) (2007); Minn. Stat. § 216B.164, subd. 3(b) (2006); N.D. Admin. Code § 69-09-07-09 (2006).

[51] Interstate Renewable Energy Council, *Connecting to the Grid: A Guide to Distributed Generation Interconnection Issues* 20 (2004), *available at*

Small on-farm wind facilities qualify as QFs under PURPA and therefore benefit from its guarantees of interconnection and utility purchase of electricity, where available. PURPA's guarantees are somewhat more complicated than they appear on the surface. Nonetheless, farmers who are considering a small on-farm wind project and have doubts about the availability of net metering should explore whether PURPA's interconnection and purchase requirements would present a feasible option for their proposed facility.

PURPA's interconnection and purchase guarantees are discussed in much more detail in the chapters later in this guide about selling power (Chapter 9) and interconnecting projects to the grid (Chapter 11). Farmers interested in setting up a separately metered on-farm wind system should consult those chapters for more information.

http://www.irecusa.org/fileadmin/user_upload/ConnectDocs/ModelICGuide.pdf (last visited June 15, 2007).

[52] 16 U.S.C. § 824a-3(a) (2006); 18 C.F.R. § 292.304 (2006). *See, e.g.*, Oregon Public Utilities Commission, *Staff's Investigation Relating to Electric Utility Purchases from Qualifying Facilities*, Order No. 05-584, at 20-27, (May 13, 2005), *available at* http://www.oregon.gov/ENERGY/RENEW/Wind/OWWG/docs/OPUC_PURPA_order_5-584.pdf (last visited June 21, 2007).