

Reviewing the Prerequisites to Installing a Small Wind System

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Reviewing the Prerequisites to Installing a Small Wind System

- Investigating land use and zoning restrictions
- Obtaining a wind energy assessment
 - Finding a wind consultant
 - Making sure you receive a comprehensive assessment.
- Working with your local utility
 - Interconnection Agreement
 - Availability of net metering
- Obtaining rebates, incentives, and tax credits

Reviewing the Prerequisites to Installing a Small Wind System

- **Investigating land use and zoning restrictions**
 - Cities have heat domes over them
 - Lots are usually 50' by 100' or smaller
 - Cities usually have height restrictions for towers
 - There is lots of turbulence close to the ground

Reviewing the Prerequisites to Installing a Small Wind System

- Contact you local zoning board to find out if there are any zoning restrictions
- Contact city or County engineer
- Contact local electrical inspector
 - Local electrical Inspector is the final word.
- **Consider it an opportunity to educate local officials on the benefits of Renewable Energy.**

Obtaining a Wind Energy Assessment

Rural locations are a better Choice for Wind

– **County Government's usually do not have rules restricting tower height**

- Lots are usually one acre or larger
- County's usually do not have electrical codes or an electrical inspector.
 - **National Electrical code prevails in this situation**
- Contact county engineer and make sure he understands what you want to do. Keep County engineer in the loop.

Obtaining a Wind Energy Assessment

– Finding a Wind Consultant

- Iowa Department of Natural Resources

- Consumer Guide to Wind Energy

- » http://www.iowadnr.gov/energy/newfiles/new_wind.pdf

- Wind Energy Check List

- » http://www.iowadnr.gov/energy/newfiles/new_checklist.pdf

- State Organizations

- Illinois -- Illinois Renewable Energy Assoc

- » <http://www.illinoisrenew.org/>

- Iowa -- I-Renew

- » <http://www.irenew.org/>

- Wisconsin – Midwest Renewable Energy Association

- » <http://www.the-mrea.org/>

Obtaining a Wind Energy Assessment

- Check with Wind Turbine manufactures for authorize dealers
 - www.bergey.com
 - www.windenergy.com
- How long they have been performing assessment and where did they received their training
 - MREA
 - Solar Energy International
 - Local Community College
 - » Eastern Iowa Community College
 - » Black Hawk Community College

Obtaining a Wind Energy Assessment

- **Making sure you receive a comprehensive assessment**
 - **At least one year's worth of data from a anemometer located at the height of the proposed Wind Turbine is best**
 - Often not practical for small turbines
 - Iowa Energy Center has a calculator
 - <http://www.energy.iastate.edu/>
 - **Elevation is where its at:**
 - Check out Google Earth
 - A site visit is next
 - Do they have a altimeter and compass with them?
 - Are you on a hill inside of a valley?
 - Prevailing wind direction
 - Are there higher elevations to the South and to the West?
 - How high are the trees?
 - What type of soil do you have?
 - Distance from the tower to the inverter

Working with your local utility

- Availability of Net Metering

- Alliant Energy --- Required
- Mid American --- Required
- Munies ----- Not Required
- REC's ----- Not Required

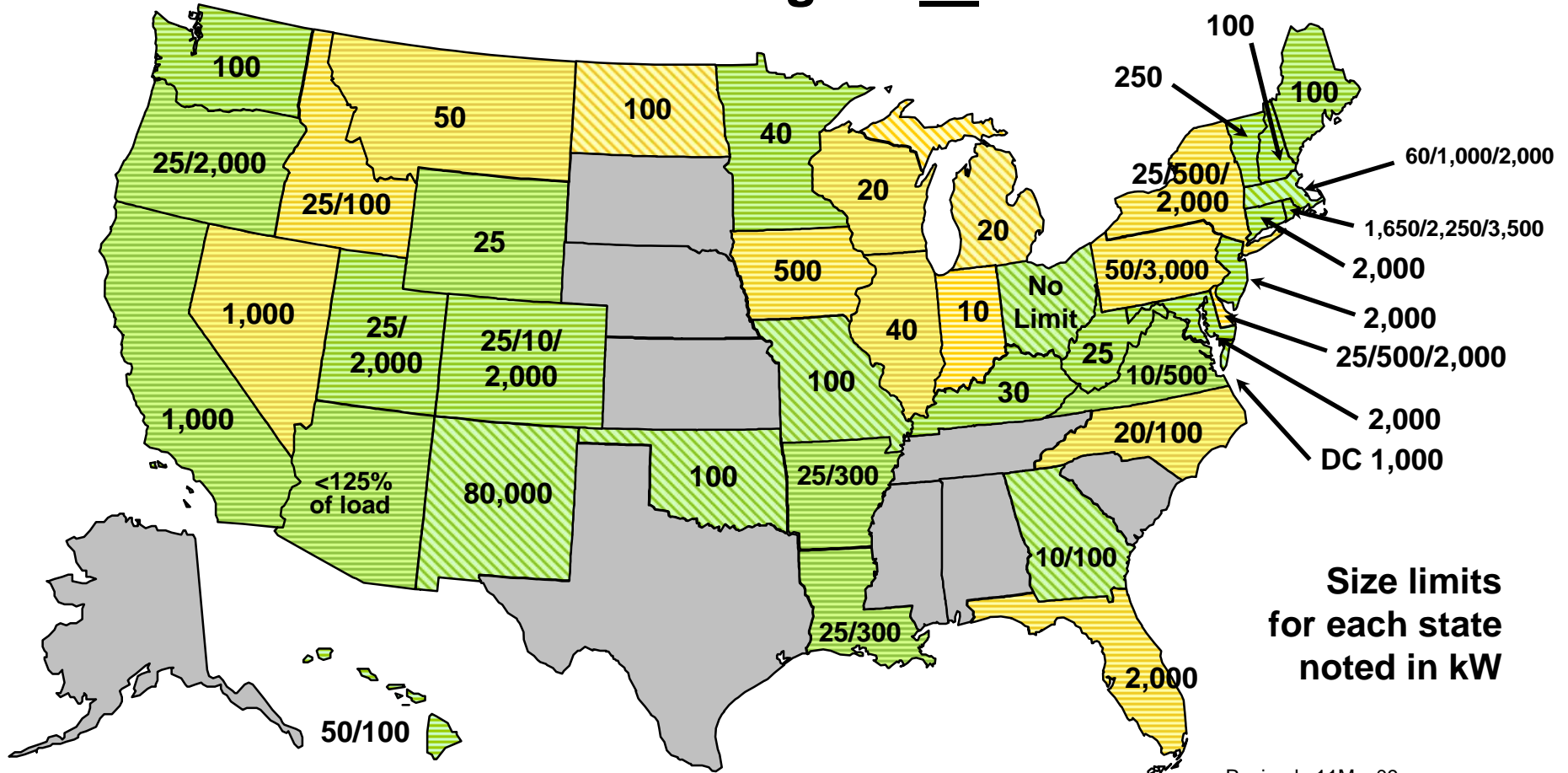
Net Metering Policies

- Net metering programs serve as an important incentive for consumer investment in renewable energy generation. Net metering enables customers to use their own generation to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of their demand. This offset means that customers receive retail prices for the excess electricity they generate. Without net metering, a second meter is usually installed to measure the electricity that flows back to the provider, with the provider purchasing the power at a rate much lower than the retail rate.




Net metering is a low-cost, easily administered method of encouraging customer investment in renewable energy technologies. It increases the value of the electricity produced by renewable generation and allows customers to "bank" their energy and use it a different time than it is produced giving customers more flexibility and allowing them to maximize the value of their production. Providers may also benefit from net metering because when customers are producing electricity during peak periods, the system load factor is improved.





Net Metering for Wind

27 states have net metering for all rural consumers



Treatment of Net Excess Energy:

-  Monthly
-  Annual, or monthly @ retail rate
-  Varies by utility

-  None
-  Individual Utilities
-  Investor-Owned Utilities Only, Not Rural Cooperatives
-  Investor-Owned Utilities and Rural Cooperatives

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Source: www.dsireusa.org

Working with your local utility

- **Find out who is responsible for your utility's renewable energy program**
 - Meet with them to discuss your project
 - **Ask for a copy of their interconnection agreement.**
 - IDNR and others are trying to develop a single interconnection agreement to be used state wide.
 - The Feds are trying to develop a single interconnection agreement to be use nation wide.

Understanding an Interconnection Agreement

- Muscatine Power and Water (Muni) (138)
- Maquoketa Valley (REC) (37 Distribution Cooperatives and 4 Transmission Cooperatives)
- Alliant Energy (Investor owned Utility)
- Mid American (Investor owned Utility)
- **Everyone has their own versions of an Interconnection Agreement**

Understanding an Interconnection Agreement

- **Muscatine Power and Water** (Draft Agreement)
 - 10 KW systems and less
 - The Customer and the RE System must comply with:
 - All applicable current, locally accepted National Electric Code (NEC) and ANSI requirements at the time of construction/installation of the RE System, including, but not limited to NEC Articles 690 and 705
 - All building codes
 - All applicable Underwriters Laboratories (UL) requirements and standards (e.g. UL 1741)
 - The RE System must comply with all Institute of Electrical and Electronics Engineers (IEEE) Standards 929-2000 (*Recommended Practice for Utility Interface of Photovoltaic Systems*) and IEEE Standards 1547 (*Standard for Interconnecting Distributed Resources With the Electric Power System*), as of the Effective Date, for parallel operation with MPW.

Understanding an Interconnection Agreement

- **Muscatine Power and Water** (Draft Agreement)
 - 10 KW systems and less
 - Flicker
 - Any voltage flicker resulting from the connection of the inverter to MPW's electric system at the PCC cannot exceed the limits defined by the maximum borderline of irritation curve identified in IEEE Std. 519-1992.
 - **Frequency**
 - The RE System must be designed to operate on a 60Hz electrical system.

Understanding an Interconnection Agreement

- **Muscatine Power and Water** (Draft Agreement)
 - 10 KW systems and less
 - Waveform Distortion
 - Harmonic distortion must be less than 5% of the fundamental frequency current at rated inverter output.
 - Power Factor
 - The RE System must operate at a power factor > 0.95 (leading or lagging) when output is $\pm 5\%$ of the RE System
 - Islanding Protection
 - The RE System must cease to energize the utility line when the inverter is subjected to islanding conditions.

Understanding an Interconnection Agreement

- **Muscatine Power and Water** (Draft Agreement)
 - 10 KW systems and less
 - **Voltage**
 - Iowa Administrative Code 199-20.5(2)d. states that the voltage must be maintained according to ANSI C84.1. This requirement states that the voltage shall be maintained between +/-5% of nominal voltage (126-114 VAC at a nominal voltage of 120 VAC).

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- Manual Disconnect

- A manual, lockable load-break disconnect switch that provides a clear indication of the switch position must be available with the RE System at or near the Customer's main point of service from MPW electric system to provide a point of electrical separation between the Customer's RE System and MPW electric system.



Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

– Circuit Breaker

- The Customer's over-current protective device (Breaker) at the service panel must be dedicated and must be capable of interrupting the maximum available fault current. The Breaker shall be clearly marked to indicate power source and connection to MPW electric system. MPW will provide and attach an additional label to the manual load-break disconnect switch, which is described in Subsection 5.2 above.



Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **Additional Equipment (Monitoring Equipment)**

- The Customer, at their own expense, must pay for any additional equipment required to connect the RE System to MPW electric system, and to meet all requirements within this document. At its sole expense, the Customer must: 1) obtain all necessary electrical permit(s) for the installation of the RE System and have a licensed electrician perform the work, and 2) obtain and maintain any governmental authorizations or permits that may be required for the operation of the RE System. The Customer must reimburse MPW for any and all losses, damages, claims, penalties, or liability MPW incurs as a result of the Customer's failure to obtain or to maintain any governmental authorizations and permits that may be required for construction and operation of the Customer's RE System

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **The Customer or its contractor must fill out Exhibit A and B, found within APPENDIX B, and construct the RE System as specified in their provided Exhibit A.**
- **The Customer may not connect the RE System to the MPW electric system until**
 - this Agreement has been executed by the parties
 - the RE System has been tested
 - signed, written MPW authorization (Exhibit C) to connect the RE System has been given to the Customer by MPW

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **Changes to System**

- After written authorization (signed Exhibit C) to connect the RE System to MPW electric system has been given, the Customer shall make no changes or modifications in the RE System or of its mode of operation without the prior written approval of MPW.

- **LOCATION OF SYSTEM**

- The RE System will be installed at the Customer's premises located at in the physical location specified or depicted in the attached Exhibit A. The Customer cannot relocate the RE System to another premises or physical location without the prior written approval of MPW. In the event that such approval is given, any relocation and installation of the RE System will be at the Customer's sole expense.

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- NET METERING

- The term “Net Metering” as used within this Agreement refers to the use of a single electric meter (no second meter required) that can run forward and backward.
- Net Monthly or Annually
 - » Monthly requires more bookkeeping and does not adjust for seasonal variation in production.
 - » Annual requires less bookkeeping and allows for seasonal variations in production. **It’ a win/win**

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **ACCESS TO PREMISES**

- The Customer shall allow access to its premises and to the RE System by MPW personnel in accordance with the MPW Service Rules: (i) to inspect the Customer's RE System, (ii) to read and to replace meters; (iii) to open the load-break disconnect switch, and (iv) to disconnect the interconnection facilities at MPW meter or transformer

- **DISPUTE RESOLUTION**

- Should a dispute arise between the parties with regard to the Service provided under this Agreement, any such dispute may be reviewed and determined in accordance with the Dispute Resolution Procedure as provided in MPW Tariff and Electric Service Rules, Utilities Rules and Regulations

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **SURVIVAL**

- The provisions of this Agreement with respect to indemnification and liability will survive the termination of this Agreement

Understanding an Interconnection Agreement

Muscatine Power and Water (Draft Agreement)

– 10 KW systems and less

- **SAFETY**

- The Customer agrees to install, operate and maintain the RE System in a safe and prudent manner and in conformance with all applicable laws, codes and regulations including, but not limited to, those contained within Section 4 above. The Customer is encouraged to notify MPW of any maintenance of the system and keep detailed records of all maintenance which may be asked for review by MPW

- **SEVERABILITY**

- If any provision of this Agreement is found to be illegal or unenforceable, then the remaining provisions of this Agreement will remain in full force and effect, and such term or provision will be deemed stricken for as long as it remains illegal or unenforceable

Understanding an Interconnection Agreement

- Allient Energy (Investor owned Utility)
 - *Bring up Allient's interconnections agreement*

Understanding an Interconnection Agreement

- Mid American (Investor owned Utility)
 - *Bring up Mid American's interconnection Agreement*

Obtaining Rebates, Incentives, and Tax Credits

- <http://www.dsireusa.org/>

Items Covered

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Questions

Small Wind Turbines

The Right Choice for Iowa, America
and the World

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