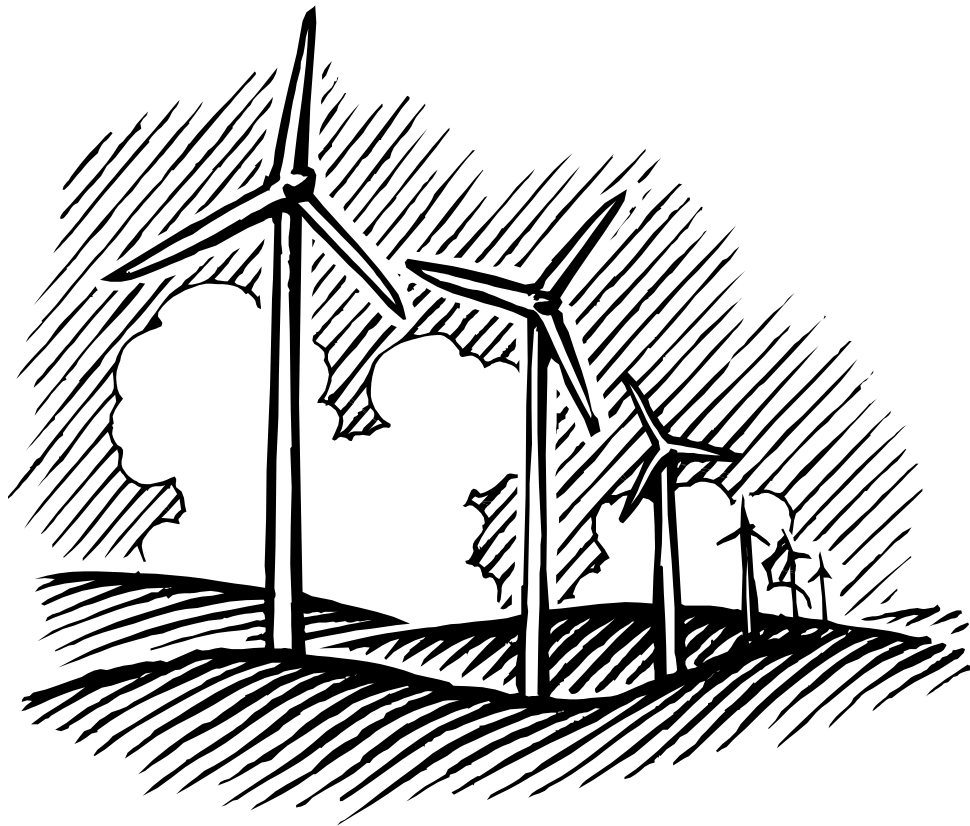



# Wind Energy



1/03/2007



**People's Cooperative Services**

Your Touchstone Energy® Cooperative 

# Wind Energy

Introduction.

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Minnesota's wind energy resources are the focus of great interest as the state looks for efficient, environmentally friendly resources to help meet future power demands as well as supplement traditional fuels to generate electricity. Wind is proving itself as a cost-effective, reliable energy resource across the US and around the world.

The basic parts of a wind machine include the blades and an electrical generator. The wind causes the blades to rotate a shaft that is connected to a generator. The generator produces electricity that can be used at the site, stored for future use, or sold to a local electric utility. The amount of energy produced depends on the wind speed and the design of the wind machine.

To determine if a wind machine is a good investment for you, it is important to have as much information as possible. The initial cost of a wind machine can be \$20,000 or more, and will provide much of the electrical energy for a typical farm or residence.

These ten steps will help you decide if wind energy is right for you.

1. **Estimate your energy requirements.** Wind is an energy source that could help reduce your electric bills. Look at your energy consumption on your last 12 months bills. How much energy in kilowatt-hours have you used? Will your consumption in the future be the same, more, or less? Perform an energy audit of your home or farm to give you a better understanding of how much electricity is needed on your property.
2. **Evaluate energy conservation measures.** Many people consider using wind machines to reduce their energy bills. Energy conservation methods and equipment may be more cost effective than buying a wind machine.
3. **Evaluate legal and environmental concerns.** Wind is a clean, safe energy source that poses little threat to the general public. However, there are some environmental and safety concerns associated with the operation of a wind machine. Included are noise, tower height, TV signal interference, location, aesthetics, building codes and permits, and lightning. These concerns should be addressed in the early stages of your investigation. The answers may affect whether you install a wind machine, and what type it can be. Don't overlook the benefits of wind energy, including economic development, fuel diversity, fuel price stability, and environmental benefits such as avoiding gas emissions.

4. **Measure your wind resource.** Wind speed at your site will determine the amount of energy that a wind machine can produce. Wind speed is extremely site-dependent due to obstructions such as hills, trees and buildings. The best method of determining wind speed is to measure it with monitoring equipment. The measurement should be taken at the height and location you would install a wind machine. A minimum of one year of wind speed information is required to have an understanding of your wind resource as it may change from season to season. It is better to spend the time and money to determine what you have than to spend a large amount of money for a wind machine that doesn't give you adequate energy. The Minnesota Department of Public Service has performed some wind testing and may provide information about wind speed in your area.
5. **Collect wind machine information.** Begin collecting information on wind machines that can meet your energy needs. There are many types and sizes available. A list of manufacturers is enclosed.
6. **Estimate miscellaneous costs.** Be sure to include cost estimates for purchase, installation, operation and maintenance of the wind system you are interested in. To these estimates, miscellaneous costs must be added, including: site preparation, zoning permits, insurance, finance charges, property tax, utility requirements and storage capabilities.
7. **Potential government incentives.** Some state and federal agencies have offered financial incentives for alternative energy development. If you own a farm or business, you may be able to depreciate all or part of the cost of a wind system as a business expense. The Minnesota Department of Public Service can provide you with information on incentives and tax credits.
8. **Estimate your energy and cost savings.** The annual savings resulting from the energy generated by a wind machine depends upon the rate your utility charges for electricity. Annual savings for each system is calculated by multiplying the yearly energy production by the cost of energy that you would have bought from the utility.
9. **Wind machine evaluation.** Because a wind system's cost is significant, look at this expenditure as a long-term investment, like a house or farm. Calculate how many years it would take for the wind machine to pay for itself. You may want to have a wind machine dealer review your calculations.
10. **Making a final decision.** If you have researched wind energy as outlined in the previous nine steps, you should have an understanding of wind energy and it's potential benefits to you.

# People's Cooperative Services Requirements for Interconnection

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People's Cooperative Services is obligated by State and Federal law to interconnect with and purchase electricity from co-generators and small power producers. For generating units less than 40 KW, People's rate Schedule P will apply. The diagram on the following page shows metering requirements for compliance.

Interested parties should contact People's Cooperative Services for copies of our Member Service Agreement for Cogeneration Facilities as well as a copy of our Application for Interconnection.

People's Cooperative Services  
3935 Highway 14 East - PO Box 339  
Rochester, MN 55903-0339  
(507) 288-4004  
fax: (507) 288-9438  
email [memberservices@peoplesrec.com](mailto:memberservices@peoplesrec.com)

## **Manufacturers of Small Wind Turbines**

The American Wind Energy Association (AWEA) has compiled the following list of U.S. manufacturers of wind turbines suitable for residential or farm applications. Many have Web sites or are accessible through E-mail links.

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### **Atlantic Orient Corporation**

*P.O. Box 1097*

*Norwich, VT 05055*

*(802) 649-5446*

*Fax (802) 649-5404*

*Email: [atlanticorient@juno.com](mailto:atlanticorient@juno.com)*

*Web: <http://www.rsvp.nrel.gov/rsvp/organizations/aoc.html>*

*Sales Contact: Peter Hughes*

Atlantic Orient Corporation manufactures the AOC 15/50, a three-bladed, 15-m rotor, 50-kW wind turbine generator. AOC is also developing a 12-kW unit, the 8/12, that it plans to bring to the market in 1998.

### **Bay Winds**

*1533 Kimball Street*

*Green Bay, WI 54302*

*(920) 468-5500 Email: [sales@baywinds.com](mailto:sales@baywinds.com)*

*Web: <http://www.baywinds.com>*

*Contact: Doug Johnson*

Bay Winds is a wind turbine dealer and installer.

### **Bergey Windpower Company**

*2001 Priestley Avenue*

*Norman, OK 73069*

*(405) 364-4212*

*Fax (405) 364-2078*

*Email: [mbergey@bergey.com](mailto:mbergey@bergey.com)*

*Web: <http://www.bergey.com>*

*Contact: Michael Bergey*

Bergey Windpower manufactures small wind systems for a variety of applications, including distributed generation (home or farm), telecommunications, village power and water pumping. Sizes range from 2.4-m to 7-m rotor diameters with power ratings from 0.85 kW to 10 kW. Complete installation and training services available.

### **Lake Michigan Wind & Sun, Ltd.**

1015 County Road "U"  
Sturgeon Bay, WI 54235  
(920) 743-0456  
Fax (920) 743-0466  
Email: [lmwands@itol.com](mailto:lmwands@itol.com)  
Sales Contact: Kim Bowker

Lake Michigan Wind & Sun (LMW&S) specializes in the repair and remanufacture of residential size wind systems, from 0.25 kW to 20 kW in size. The company can supply or fabricate parts for almost any residential wind generator, and is a dealer/distributor for all reliable small wind systems on the market today. LMW&S makes quality Sitka spruce generator blades for rotors from 1.2 m to 7.3 m. The company also offers classes on wind generator design and maintenance.

### **Northern Power Systems**

One North Wind Road  
P.O. Box 999  
Waitsfield, Vermont 05673  
(802)496-2955 Fax (802)496-2953  
E-mail: [lmotte@northernpower.com](mailto:lmotte@northernpower.com)  
Web: [www.northernpower.com](http://www.northernpower.com)  
Special Projects Director: Lawrence Mott

NPS wind turbines have been proven in severe Antarctic conditions, including 88.5 m/s winds and 80 degree C temperatures. The 3-kilowatt HR3 wind turbine is suited for telecommunications applications.

### **Southwest Windpower**

1801 W. Route 66  
Flagstaff, AZ 86001  
(928)-779-9463  
Fax (928)-779-1485  
WWW: <http://www.skystreamenergy.com>  
Contact: Andy Kruse

Southwest manufactures the Skystream residential wind system for home power, battery charging and remote applications. The Windseeker has a rotor diameter of 3.72 m (12 ft.) and a capacity of 1.8 KW.

## **Synergy Power Corporation**

*20/F Wilson House  
19-27 Wyndham Street, Central  
HONG KONG  
85-22-8463168  
Fax: 85-22-8100478  
e-mail: [100314.2615@compuserve.com](mailto:100314.2615@compuserve.com)  
Sales Contact: Manoj Dani*

Synergy Power Corporation designs and manufactures variable axis wind turbines rated at low wind speeds (4.5 m/s) for remote and grid-connected power systems and water pumping systems.

## **WindTech International, L.L.C.**

*P.O. Box 27  
Bedford, NY 10506  
(914) 232-2354  
Fax (914) 232-2356  
e-mail: [info@windmillpower.com](mailto:info@windmillpower.com)  
WWW: <http://www.windmillpower.com>  
Contact: Jeffrey Bowden*

WindTech International manufactures the high-performance OASIS water-pumping windmill, designed to pump water in wind speeds as low as 2 mph to 8 mph from depths reaching 4,000 feet. The OASIS 3, with a 3-m rotor, can draw up to 500 gallons per hour from a depth of 30 feet at a wind speed of 7 mph. The OASIS 7, with a 7-m rotor, can draw up to 2,000 gallons per hour under the same conditions. These systems can be used for irrigation, land reclamation or drinking water in remote areas. The OASIS windmill is designed for easy installation, requires minimal maintenance and is backed by complete customer support.

## **Wind Turbine Industries Corporation**

*16801 Industrial Circle South East  
Prior Lake, MN 55372  
(612) 447-6064  
Fax (612) 447-6050  
Contact: Steve Turek*

Wind Turbine Industries manufactures the 10-kW to 20-kW Jacobs wind turbines, with rotor sizes ranging from 7 m (23 ft.) to 8.8 m (29 ft.). These systems can be used in both grid inter tie (residence/farm utility bill reduction) and remote applications.

## **WindLite Corporation**

11425 State Route 1  
P.O. Box 325  
Point Reyes, CA 94956  
(415) 663-5496  
Fax (415) 663-5495  
e-mail: [sales@windlite.com](mailto:sales@windlite.com)  
Web: <http://www.windlite.com>  
Sales Contact: Robert Harmon

WindLite Corporation is a developer of small wind turbines and integrated power systems for homes, villages, and small businesses. The products can be used where no utility lines exist or they can be connected to the utility transmission system. WindLite's independent (off-grid) hybrid power systems utilize wind, solar, battery, diesel-generator, and controller technologies.

## **World Power Technologies**

19 N. Lake Avenue  
Duluth, MN 55802  
(218) 722-1492  
Fax (218) 722-0791  
Email: [wpt@cp.duluth.mn.us](mailto:wpt@cp.duluth.mn.us)  
WWW <http://www.worldpowertech.com/index.htm>  
Sales Manager: Vicki Klein

World Power Technologies manufactures the Whisper line of wind turbines, available in 600-W (2.1 m/7 ft. rotor), 1-kW (2.7 m/9 ft. rotor) and 3-kW (4.5 m/14.8 ft. rotor) low- and high-voltage models, with a choice of 2 or 3 blades. All models have an efficient permanent-magnet generator and a perfectly matched high performance propeller to create a reliable and affordable source of wind power for home, small farm or sailboat. Whisper wind generators can be used in remote areas and can withstand a variety of environments.

## For Further Information

Following are sources for additional information on wind energy. Many have Web sites or are accessible through E-mail links.

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### **Windustry**

2105 First Avenue South  
Minneapolis, MN 55404  
(800) 365-5441  
(612) 374-2261  
fax: (612) 374-2601  
email [infor@windustry.org](mailto:infor@windustry.org)  
web site [www.windustry.org](http://www.windustry.org)  
(Affiliated with Institute for Agriculture and Trade Policy)

### **American Wind Energy Association**

122 C Street NW, Suite 380  
Washington, DC 20001  
(202) 383-2500  
fax: (202) 383-2505  
email [windmail@awea.org](mailto:windmail@awea.org)  
web site [www.awea.org](http://www.awea.org)

### **National Renewable Energy Laboratory**

1617 Cole Blvd.  
Golden, CO 80401-3393  
(303) 275-3000  
web site [www.vrel.gov](http://www.vrel.gov)  
(Operated for the U.S. Department of Energy)

### **U.S. Department of Energy**

1000 Independence Ave. SW  
Washington, DC 20585  
(800) dial-DOE (343-5363)  
fax: (202) 586-4403  
web site [www.energy.gov](http://www.energy.gov)

**Minnesota Department of Commerce**

85 7<sup>th</sup> Place East, Suite 500

St. Paul, MN 55101

(651) 296-5175

(800) 657-3710

web site [www.commerce.state.mn.us](http://www.commerce.state.mn.us)

For Web site users, Click on "consumer publications"

Under "Energy", check out -

"Small Wind Energy Systems"

"Renewable Energy: Harvesting the Wind"

(when calling, request the above publications)

For information on Minnesota and Federal tax incentives, call the above number  
or [www.commerce.state.mn.us/pages/Energy/ModTech/taxincentives.htm](http://www.commerce.state.mn.us/pages/Energy/ModTech/taxincentives.htm)



**People's Cooperative Services**

**Small Power Producers**

**"Plan for Compliance"**

**PEOPLE'S COOPERATIVE SERVICES**

Minnesota 59 Olmsted  
Rochester, Minnesota

**SCHEDULE PG-1:** Cogeneration & Small Power Production

**Effective:** Rate for year 2006.

**Availability:** Available to all members where the member has qualified small power production or cogeneration facilities connected in parallel with the cooperative's facilities. The member is required to execute an electric service agreement with People's Cooperative Services.

**Service Characteristics:** Alternating current, 60 Hz, at available voltages.

**Rate:** The cooperative shall pay or credit the member monthly for all energy furnished during the month at the appropriate rate shown below. All applicable rates will be adjusted by the Power Cost Adjustment (PCA) when applicable. The rate selected shall be at the member's option and shall conform to the capacity rules established by the Minnesota Public Utility Commission. Members with qualified facilities that exceed 100 kW may agree with the cooperative to execute this standard agreement with the 'Time of Day Rate' or the parties may agree that a negotiated agreement is more appropriate.

- 1.01 Net Energy Billing Rate. Available to qualified facilities with capacity of less than 40 kW that do not select either the 'time of day rate' or 'Simultaneous Purchase & Sale Billing Rate'. The cooperative shall pay the member as follows:

<b>Type of Service</b>	<b>Rate</b>
General Service	\$0.06287
Three phase General Service	\$0.05953
Three phase General Service/demand	\$0.02031

- 1.02 Simultaneous Purchase & Sale Billing Rate. Available to qualified facilities with capacity of less than 40 kW that do not select the 'time of day rate'. The cooperative shall pay the member as follows:

- A. The energy component of the rate is specified in Exhibit A.
- B. Payment for capacity furnished on-peak will reflect the per kWh value of such capacity as shown in Exhibit B.

- 1.03 Time of Day Rate. Required for qualified facilities with capacity equal to or greater than 40 kW and less than or equal to 100 kW. 'Time of Day' rates are available with the mutual consent of the cooperative and the member for qualified facilities with capacity of less than 40 kW and with capacity greater than 100 kW when firm power is provided. The cooperative shall pay the member as follows:

<b>Energy furnished on-peak (see Exhibit A)</b>	
Summer season	\$0.01871/kWh
Winter season	\$0.02015'kWh

<b>Energy furnished off-peak (see Exhibit A)</b>	
Summer season	\$0.01243/kWh
Winter season	\$0.01429/kWh

Payment for capacity furnished on-peak will reflect the per kWh value of such capacity as shown in Exhibit B.

**People's Cooperative Services  
3935 Highway 14 East - PO Box 339  
Rochester, MN 55903-0339  
Application for Interconnection  
Member Owned Qualifying Facility**

Date: \_\_\_\_\_

Member Name: \_\_\_\_\_ Map Location: \_\_\_\_\_

Signature: \_\_\_\_\_ Type Consumer: \_\_\_\_\_

Manufacturer of Qualifying Facility: \_\_\_\_\_

Nameplate Rating: \_\_\_\_\_

UL or Other Approving Authority: \_\_\_\_\_

Energy Source: \_\_\_\_\_

Type of Generator: \_\_\_\_\_

Inverter: \_\_\_\_\_

Operational Data:

1. Voltage \_\_\_\_\_ 2. Phase \_\_\_\_\_ (single, three phase)  
3. Amperage \_\_\_\_\_ 4. Power Factor \_\_\_\_\_ (%)

Copy of Manufacturer's Technical Specifications attached? Yes \_\_\_ No \_\_\_

Description of Interconnection Equipment, including location of manual disconnect switch:

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Proposed Interconnection Date: \_\_\_\_\_

Estimated Site Energy Consumption: \_\_\_\_\_ kWH \_\_\_\_\_ kWH  
(May - Oct.) (Nov. - Apr.)  
\_\_\_\_\_ kWH  
(Annual)

Estimated Site Energy Production: \_\_\_\_\_ kWH \_\_\_\_\_ kWH  
(May - Oct.) (Nov. - Apr.)  
\_\_\_\_\_ kWH  
(Annual)

Estimated Site Demand: \_\_\_\_\_ KW/Month

Estimated Site Capacity: \_\_\_\_\_ KW/Month  
(if capable of supplementing firm power)

**MEMBER SERVICE AGREEMENT**  
**with**  
**Operator of Small Power Production Facility or**  
**Cogeneration Facility**

This Agreement, made this \_\_\_\_ day of \_\_\_\_\_ between People's Cooperative Services, hereinafter called "Cooperative", and \_\_\_\_\_ a Member of the Cooperative, hereinafter called "Member".

WITNESSETH:

WHEREAS, The Cooperative owns, operates, and maintains an electric distribution system and provides electric service to its members, and

WHEREAS, The Member desires to install and operate an electrical generating facility and to interconnect said facility to the electric system of the Cooperative, and

WHEREAS, The Member's generating facilities, hereinafter called "Qualifying Facility" or "QF", must qualify as a QF in accordance with the requirements of the Federal Energy Regulatory Commission as set forth in Title 18 Code of Federal Regulations Chapter1, Part 292 (18 CFR Part 292), and

WHEREAS, The Parties will comply with the rules governing cogeneration and small power production generators as published by the Minnesota Public Utilities Commission (MPUC) and the Cooperative's Service Rules and Regulations, and

WHEREAS, The Cooperative is willing to purchase energy and capacity from the QF that is in excess of the Member's needs, and

WHEREAS, The Cooperative is willing to interconnect and operate in parallel with the QF and to furnish parallel electric service to the Member.

NOW, THEREFORE, the COOPERATIVE and the MEMBER agree as follows:

1.1 **Point of Interconnection:** The Point of Interconnection shall mean that point at which the facilities provided by the Cooperative and the facilities provided by the Member are interconnected. The location of the Point of Interconnection is as follows:

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2.1 **Metering Diagram:** A one-line diagram that shows the metering and protective equipment installed for the QF is shown on Attachment A, attached hereto. The QF and its characteristics are also described in Attachment A.

3.1 **Electric Service Supplied to Member:** The Cooperative will supply the electrical requirements of the Member that are not supplied by the QF. Such electric service shall be supplied under the rate schedules applicable to the Consumer's class of service as revised from time to time by the Cooperative.

4.1 **Electric Service Supplied to Cooperative:** The Cooperative will purchase all energy and capacity supplied to the Cooperative by the QF under the Standard Rate set forth in Rate Schedule P, which is attached hereto as part of this Agreement. The Cooperative will at the option of the Member either:

\_\_\_ Pay the Member for electric service supplied during the previous month within fifteen (15) days after the date of the monthly recording of the meter registration.

\_\_\_ Credit the Member for electric service supplied the previous month on the Member's monthly billing date of the recorded meter registration.

The Cooperative may stop purchasing electricity to the QF when necessary for the Cooperative to construct, install, maintain, repair, replace, remove, investigate, or inspect any equipment or facilities within its electric system.

5.1 **Terms and Conditions:** The Terms and Conditions attached to this agreement are incorporated herein and made a part hereof.

6.1 **Right of Access:** The Member will give authorized agents and employees of the Cooperative the right to enter its premises at all reasonable times for the purpose of reading or checking meters; or for testing, repairing, renewing, exchanging, or removing any or all of its equipment that may be located on the property of the Member; or for performing safety checks on the protective equipment of the QF and to test the quality of electric service supplied to the Cooperative.

7.1 **Correction of Trouble:** The QF shall be operated so that it shall not cause any reduction in the quality of service provided by the Cooperative's system. If the operation of the QF causes a hazardous condition on the Cooperative's system or if any emergency arises that may result in a hazardous condition, the Cooperative has the right to open the disconnect switch that isolates the QF, without notice to the Member or liability to the Member for any loss of revenue or damage to the QF. It is the Member's sole responsibility to correct any hazardous or unsafe condition that the operation of the QF may impose on the system of the Cooperative.

8.1 **Successors and Assigns:** This Agreement shall be binding upon and ensure to the benefit of the respective successors and assigns of the parties hereto, save that no assignment hereof shall be effective without the written consent of the Cooperative being first obtained.

9.1 **Term of Agreement:** This Agreement shall become effective upon the first date above written and shall continue in full force and effect until terminated by not less than thirty (30) days prior written notice given by either party to the other party. Upon termination of this Agreement, the QF shall be disconnected from the electric system of the Cooperative.

10.1 **Regulation and Administrative Approval:** This Agreement is subject to the regulations of any regulatory body or bodies having jurisdiction thereof.

**IN WITNESS WHEREOF**, the parties have caused the Agreement to be duly executed as of the day and year first above written.

ATTEST:

MEMBER

\_\_\_\_\_

BY \_\_\_\_\_

ATTEST:

COOPERATIVE

\_\_\_\_\_

BY \_\_\_\_\_

# Small Power Production Facility or Cogeneration Facility

## Terms and Conditions

### 1.0 Requirements for Interconnection:

1.1 **Cooperative Membership:** Any Individual, or corporation, or partnership wishing to interconnect with the Cooperative's electric system shall become a Member of the Cooperative in accordance with the Bylaws of the Cooperative.

1.2 **Member Service Agreement:** The owner of a QF wishing to interconnect with the Cooperative's system will be required to sign a Member Service Agreement. The Agreement commits the Cooperative and the Member to operation under the terms and conditions of the Agreement.

1.3 **Application for Interconnection:** The Cooperative requires that all QF's file an Application for Interconnection not less than 30, nor more than 90 days, prior to the proposed date of an interconnection. The Application includes the Cooperative's Requirements for Interconnection. All QF's are required to abide by the requirements as stated and provide the Cooperative with the following information:

- A. Technical specifications of all power production and interconnection equipment.
- B. Proposed date of interconnection.
- C. Projected net output or consumption by the QF.

The Cooperative shall accept or reject the Application for Interconnection within 30 working days. Acceptance depends on the accuracy of information provided on the Application and on the QF's proposed compliance with the National Electrical Code, the National Electrical Safety Code, the Cooperative's Service Rules and Regulations, and other local codes which apply to cogeneration and small power production facilities. If, in the Cooperative's opinion, the proposed facility does not qualify, the Cooperative will provide the Member with a written explanation. Acceptance of the Application shall not be construed as permission to interconnect with the Cooperative's system.

1.4 **Inspection:** An Inspections Certificate issued by the state electrical

inspector having jurisdiction in the QF's area is required to assure wiring complies with the National Electrical Code, National Electrical Safety Code, and other applicable local electrical codes.

An Inspection Certificate issued by the local governing agency is required to assure compliance with building codes and environmental rules and regulations where applicable.

1.5 **Interconnection Costs:** The Member shall reimburse the Cooperative for its incremental cost resulting from interconnecting with the QF. The incremental interconnection cost shall include all reasonable costs of connection, switching, metering, transmission, distribution, safety provisions, and administrative costs incurred by the Cooperative directly related to the installation and maintenance of the physical facilities necessary to permit interconnected operations with the QF, to the extent such costs are in excess of the corresponding costs which the Cooperative would have incurred had it not interconnected.

1.6 **Interconnection:** Interconnection is permitted only after all of the requirements stated in Sections 1.0 and 2.0 are met and only after written authorization to interconnect is issued by the Cooperative. This authorization cannot be issued until all interconnection costs are paid and does not relieve the member from the responsibility of installing, operating, and maintaining the facilities in a responsible and safe manner.

If, in the opinion of the Cooperative, the Member fails to abide by the terms and conditions of the Member Service Agreement, including subsequent operation of his generating facilities in a nonqualifying manner, the Cooperative will no longer be obligated to operate in parallel and purchase any capacity and energy made available and may notify the Member to disconnect the generating facilities from the Cooperative's system. In the event the Member fails to immediately comply with a disconnect notice, the Cooperative reserves the right to make such disconnection including the discontinuation of electric service if necessary.

1.7 **Cooperative Access:** Employees and authorized representatives of the Cooperative have the right to enter upon the Member's property at any reasonable time to ensure continued compliance with the Cooperative's Safety and Operating Standards and the accuracy of its meters. Such inspection by the Cooperative shall not relieve the Member from the responsibility of installing, operating, and maintaining the facilities in a responsible and safe manner.

- 1.8 **Automatic Shutdown and Disconnection:** In order to provide adequate safety to the Cooperative's employees when performing certain operation and maintenance on the Cooperative's system it is essential that a means be available to automatically shut down and/or disconnect the QF from the system upon interruption of the utility source voltage such that there is no possibility that the QF could back-feed through the service transformer and energize the primary system. The Member shall furnish and install an Underwriter's Laboratory (UL) listed manual disconnect switch which shall be located between the Member's QF and the Cooperative's system and readily accessible by Cooperative personnel. The location of the switch shall be approved by the Cooperative and shall be housed in an approved enclosure which can be secured with a padlock or locking device. Where feasible and with mutual consent, the Cooperative may permit the use of a service transformer disconnect in place of the Member furnished disconnect switch.

## 2.0 **Safety and Operating Standards:**

Safety and Operating Standards under which the Cooperative operates are imposed to protect Cooperative employees and the general public and are intended to guarantee a quality of service to the consumer members. All QF's must operate in a manner that will ensure the safety of the employees and the general public and must allow electric service to other consumers to remain within prescribed limits.

- 2.1 **Isolation of Qualifying Facility:** The Cooperative reserves the right to open the disconnect switch (isolating the Member's QF) without prior notice for any of the following reasons:
- A. A system emergency and/or maintenance operations require such action.
  - B. A potentially hazardous condition relating to the QF is discovered.
  - C. The operation of the QF interferes with the quality of service provided to other Members and/or the operation of the Cooperative's system.
- 2.2 **Disclaimer:** The Cooperative does not assume any responsibility for the safety and electrical protection of the Member's facilities irrespective of the condition of the Cooperative's facilities. The Cooperative shall not be liable to the Member for any damage to the Member's facility, including damage caused by disconnection of the QF from the Cooperative's system by automatic or manual devices or

pursuant to the Safety and Operating Standards.

- 2.3 **Single Phase Limitations:** The rated capacity of the QF to be connected in parallel with a low voltage service shall be no greater than 20 KW for single phase installations, unless authorized in writing by the Cooperative consistent with the Cooperative's limitation for single phase motors. Single phase installations greater than 20KW will be permitted if engineering calculations indicate that the installation will not adversely affect the operational characteristics of the Cooperative's system.
- 2.4 **Quality of Service:** Operation of the QF must not cause any reduction in the quality of service provided to other consumers nor interfere with the operation of the Cooperative's system. The Member shall be responsible for taking whatever corrective action might be required and/or reimbursing the Cooperative for the cost of corrective action which it deems necessary to restore service to prescribed limits.
- 2.5 **Electrical Characteristics:** The electrical characteristics of the QF shall conform with standards established by the Cooperative. The standards may include voltage, current, frequency, harmonics, and automatic synchronization, etc. Wherever possible, the Cooperative will base its standards on industry wide standards.
- 2.6 **Power Factor:** The Member shall endeavor to operate the QF as near unity power factor as possible. For QF's with rated capacity above 50KW, the Cooperative reserves the right to require the Member to install power factor correction equipment or reimburse the Cooperative for its cost of installing power factor correction equipment.

### 3.0 **Metering:**

The Cooperative will meter the QF to obtain billing data and to fulfill its reporting requirements.

- 3.1 **Required Metering:** Two meters are required. One meter will be installed in such a manner that it records only the energy sold by the Cooperative to the QF. The second meter will be installed in such a manner that it records only the energy sold by the QF to the Cooperative. The QF shall pay for the requisite metering as an interconnection cost. In addition to required metering, the Cooperative, at its option but with the consent of the QF, may install additional metering equipment for the collection of data for research purposes. The Cooperative will furnish such research metering

equipment and pay all associated operation and maintenance.

- 3.2 **Meter Reading:** The meters shall be read monthly, at the same time and in the same manner as prescribed for other Members of the Cooperative in the same consumer classification. Monthly meter readings are required from all consumer classifications. Metering records shall be available for inspection at all reasonable times.

4.0 **Service Condition:**

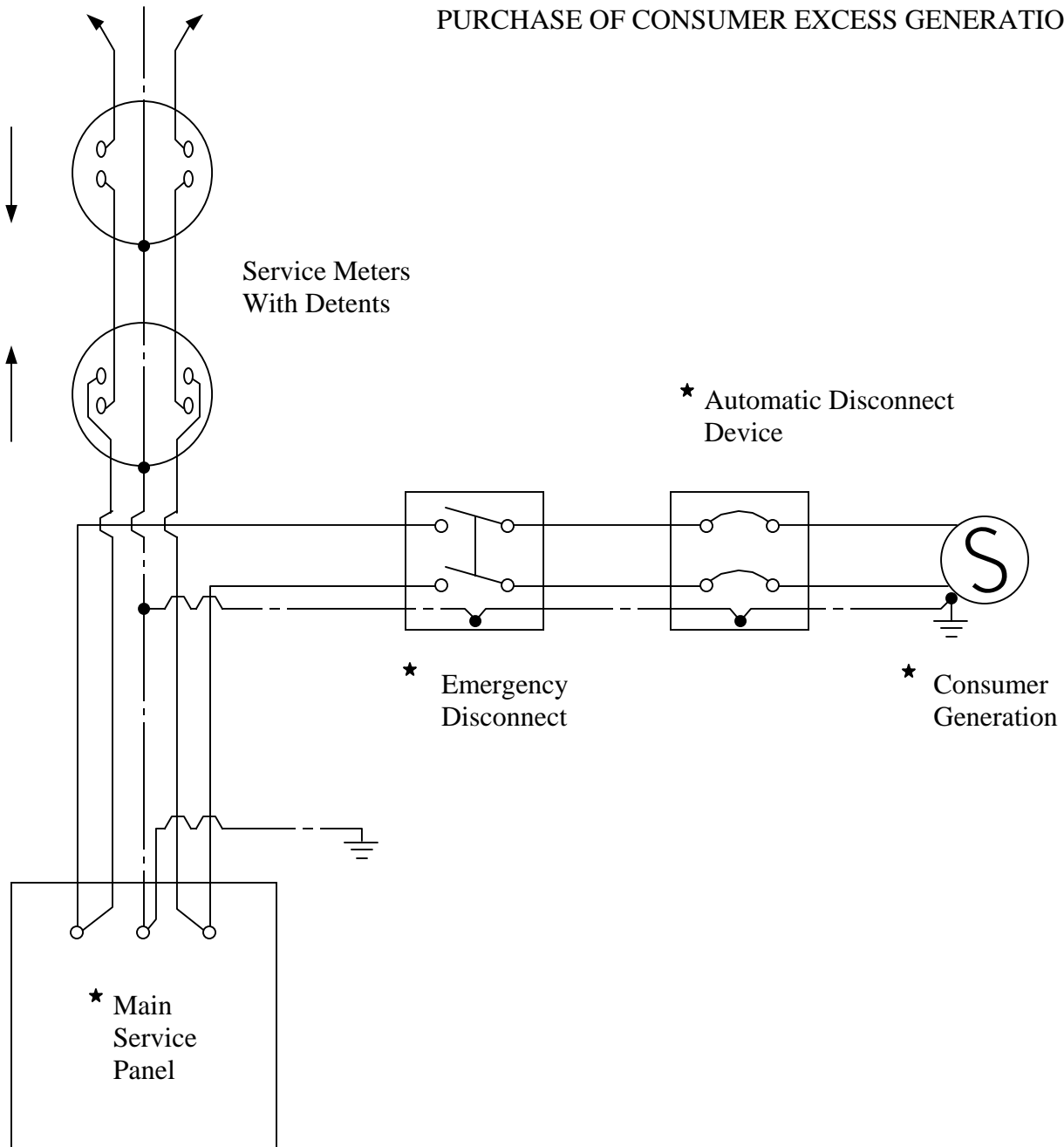
The furnishing and taking of service hereunder shall be subjected to the Service Rules and Regulations of the Cooperative. Such Service Rules and Regulations are subject to change from time to time by superseding schedules as published by the Cooperative.

5.0 **Insurance:**

The Member, at his sole cost and expense, shall obtain and maintain an insurance policy that provides liability insurance covering the operation of the QF and its associated equipment of not less than \$ 300,000. In addition, it is the Member's responsibility to consider that the liabilities of operating a QF may exceed \$ 300,000, so adequate coverage should be obtained to protect the Member's possible exposure to liability claims. Said policy shall include the Cooperative as an additional insured. Satisfactory evidence of such insurance shall be provided to the Cooperative before the QF will be allowed to operate with the disconnect switch in the closed position. The Member shall notify the Cooperative of any policy changes and of the periodic policy renewals.

# METERING DIAGRAM

## PARALLEL GENERATION INTERCONNECTION FOR PURCHASE OF CONSUMER EXCESS GENERATION



★ Consumer owned subject to Cooperative's Rules & Regulations.

For three phase installations all circuit interrupting devices shall have poles for all ungrounded circuit conductors.



**People's Cooperative Services**

Your Touchstone Energy® Cooperative

