



# Net metering service

Under 25 kW



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# Introduction and requirements

**Introduction** – Net Metering means to measure at a defined interconnection point the difference between the electricity supplied by the electric utility and that generated by the customer. In general, customer generation sources include small wind, solar, hydro, geothermal, agricultural biomass and other sources which prove to be safe, efficient, renewable and environmentally friendly. The net metering customer must contact the electric utility and confirm all connection requirements.

Electric utilities are responsible to make available upon request net metering services to any electric consumer that the electric utility serves. The term net metering means service to an electric customer under which the electric energy generated by the electric customer from an eligible on-site electrical generator delivers to the local electrical utility to “offset” electrical energy normally provided by the utility to the customer.

Net metering is a debit and credit electrical metering process in which a customer owns and operates an electrical generating device operated in parallel with the utility’s system. The purpose of a net meter generator is to “offset” electric energy supplied by the utility while all the utility’s fixed costs remain. The term “offset” means net metering electrical generators are relatively small and are devices which “offset” the customer’s electrical usage. Large generation units which do more than “offset” residential or commercial customer electrical usage are categorized differently and have more costly and complicated interconnection agreements.

Customers who desire to install net metering generation must obtain permission from the electric utility to connect the generation in parallel. They must supply the utility with requested information related to the generation, comply with all electrical codes and electrical tariffs and pass necessary electrical and building inspections and tests. Of most importance customers must be aware that safety is the first priority for any utility interconnections.

The “offset” reflects in the customer’s electric bill based on the non-firm avoided energy cost for the generation period during which the customer supplied energy. The “offset” does not reduce the utility’s fixed costs associated with such items as the infrastructure which connects the customer to the utility’s electrical system. Nor does it “offset” the cost of labor and equipment costs to operate and maintain the system.

**Benefits of Net Metering** – The customer is responsible to perform due diligence to confirm net metering benefits, liabilities and costs. We



encourage potential net metering customers to educate themselves about the different electrical generation sources and choose the most appropriate one for their location and needs. Customers have varied reasons for installing net metering such as their perception of reducing society or individual energy dependence and cost or environmental issues related to the electric utility industry. They may view this as a means to become more self-sufficient with or without regard to cost. If they have interest in society as a whole they may perform due diligence related to the total energy requirements to manufacture and maintain the system of their choice. For whatever reason a customer decides to install net metering facilities we encourage them to research the associated benefits, liabilities and costs.

Net metering also ensures a reliable backup connection to the power grid so net metering customers are guaranteed reliable energy service during those times when their net metering systems are not producing enough energy to meet their needs.

**Installation and Maintenance** – Except for the meter, which is owned by the utility, all equipment on customer's side of the interconnection point including the meter base shall be installed, owned and maintained by the customer. It shall always be the property and responsibility of customer. The utility shall never bear any liability for customer equipment or for consequences of its use.

**Liability** – The electric utility is not or ever shall be liable or responsible for directly or indirectly permitting or continuing to permit any net metering facility to be connected to their electrical system. The customer is and always shall be responsible for any and all liability associated with their net metering facility which shall include but not be limited to liabilities associated with power quality, power reliability, equipment damage, injury or death to any party.

**Codes and Requirements** – Any and all net metering installations shall meet or exceed all applicable safety and performance standards established by the National Electrical Code, Institute of Electrical and Electronics Engineers and Underwriters Laboratories. The customer shall provide lockable switching equipment which is manually operated and provides a visible point of isolation between the net metering generator and the utility system. The manually operated switch equipment shall be approved by the utility, mounted on the same surface and within three feet (3') of the interconnection point meter and shall be accessible by the utility at all times. The net metering generator shall be constructed and/or connected such that when the electric utility source is lost the generator shall not energize the utility's system.

**Safety** - Safety and operating procedures for all net metering equipment shall be in compliance with the Occupational Safety and Health Administration

Standards, National Electrical Code, National Electrical Safety Code and any other applicable standards or codes.

The customer shall post adjacent to the meter base and disconnects signage in accordance with National Electrical Code 110.22, 230.2(e) and 705.10 that generation is operating at or is located on the premises.

Testing – The utility may at any time disconnect the net metering generator to test the facility. They may also at any time disconnect the net metering generator to perform maintenance on the meter, secondary, service or other sections of their system.

**Access** – The customer must agree to grant the utility authorized employees the right to enter upon customer property for the purposes of testing the interconnection installation and meter.

**Pre-Operation Inspection** - Interconnection and operation of the net metering generator in parallel with the utility's electric system is expressly conditioned upon (a) customer obtaining an electrical permit and the generating facility passing an electrical inspection by qualified electrical inspector(s) having jurisdiction under applicable codes and standards, (b) passing the utility's specified and appropriate test (c) the approval of the utility's authorized representative and (d) pass any required building inspections.

At least ten (10) calendar days prior to initial paralleling of the net metering generator the customer shall provide the utility with written code inspection approval certification, referenced as Certificate of Completion, that the net metering generator and associated interconnection equipment has been installed and inspected in compliance with local and state building and/or electrical codes. This shall include the required electrical and building inspections.

**Modification of Generating Facility** - Prior to any modification or expansion of the net metering facility the customer shall obtain utility approval and shall sign a modified net metering agreement which defines the modifications. In addition at this time the customer shall provide necessary updates to bring the facility into compliance with the most recent requirements, standards and codes.

**Assignment** - The customer shall notify the utility prior to the sale or transfer of the net metering facility and the premises upon which the facilities are located. The utility does not authorize the customer to assign its rights or obligations under the net metering agreement without the prior written consent of the utility. This consent shall not be unreasonably withheld.

**Power Quality & Reliability** – In general net meter generators are small relative to the electric utility's system and should not present issues related to power quality or reliability. However if the utility determines the operation of the customer's generator adversely affects power quality and/or reliability the

customer must disconnect the generator until they have corrected the problem. The utility is not responsible to assist in finding a resolution but shall only confirm the generation does or does not create power quality and/or reliability issues.

## Net Metering Requirements

- Generating facility must have a design capacity of 25 kW or less.
- Generating facility must use as its fuel solar, wind, biomass, or hydropower.
- Generating facility must be located on the Customer's premises.
- Generating facility must operate in parallel with the Company's transmission or distribution facilities.
- Generating facility must be intended primarily to offset part or all of the Customer's requirements for electricity.
- Customer must complete the application and receive approval of application process prior to start of construction.
- Customer must comply with all interconnection guidelines (Inverter must be UL 1741 or IEEE 1547 qualified).

### References:

[www.wyoenergy.com](http://www.wyoenergy.com) (energy education, recycle, conservation, appliances)

[www.ropingthewind.org](http://www.ropingthewind.org) (wind economic calculator, small wind guide)

<http://www.eere.energy.gov> (U.S. Department of Energy)

[en.wikipedia.org/wiki/Net\\_metering](http://en.wikipedia.org/wiki/Net_metering) (Wikipedia – The Free Encyclopedia)

[www.dsireusa.org/documents/Incentives/WY01R.htm](http://www.dsireusa.org/documents/Incentives/WY01R.htm) (Wyoming Net Metering Statute)

[legisweb.state.wy.us/2001/enroll/hb0195.htm](http://legisweb.state.wy.us/2001/enroll/hb0195.htm) (Wyoming Net Metering Bill No. 0195)

# Net metering billing example

You have a 2 kW wind turbine that runs 8 hours a day at rated speed. This will generate 16 kWh a day or around 480 kWh per billing cycle. During the 8 hours a day that the wind turbine is generating electricity, you are consuming (refrigerator, freezer, computer, electronics, etc.) a portion of that electricity even if you are not home and have your lights off. Of the 480 kWh generated during the billing cycle 360 kWh were consumed and 120 kWh were put back into the distribution system. For the 16 hours a day that your wind turbine is not generating and the times when you are consuming more than you're generating you use 340 kWh from the distribution system.

## Your bill for this billing cycle would be:

Net Energy = Energy Consumed – Energy Produced  
= 340 kWh – 120 kWh = 220 kWh

Energy Charge: 220 kWh \* 0.13467 = \$29.63

Service and Facility Charge: \$13.00

Franchise Fee: \$29.63 \* 0.02 = \$0.59 (Not Applicable in the County)

Sales Tax: \$29.63 \* 0.06 = \$1.78

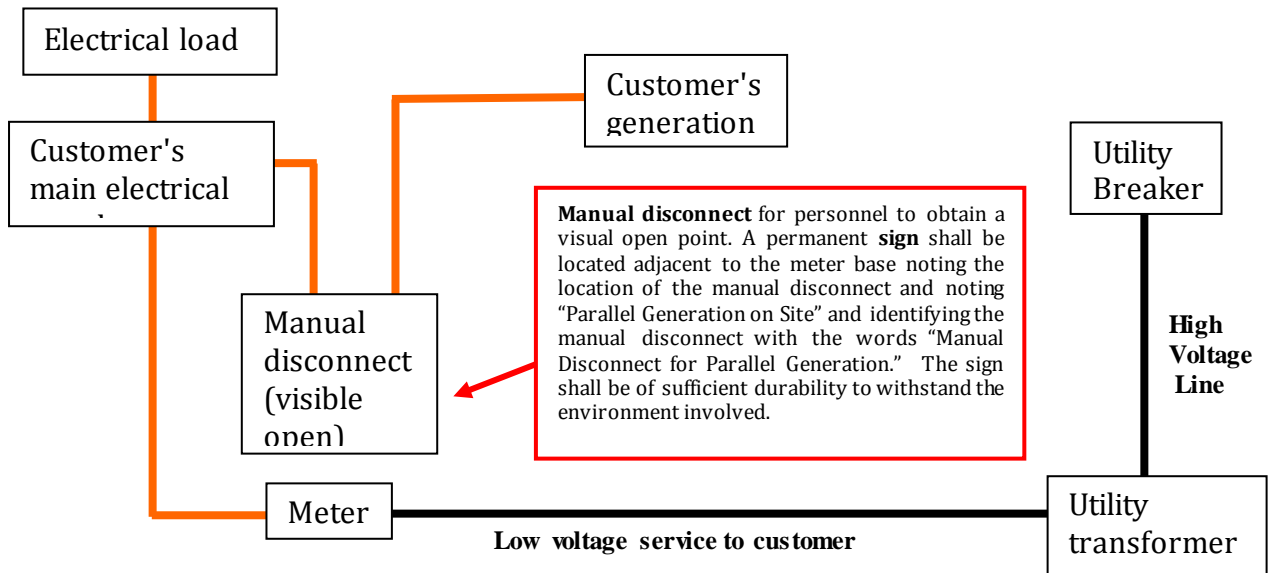
Total Bill Due: **\$45.00**

If in our example you had excess generation of 400 kWh (instead of 120 kWh), you would only be billed a \$13.00 Service and Facility Charge for that billing cycle. In addition, the net energy (340 kWh – 400 kWh = -60 kWh) would be credited to your next bill. At the beginning of each calendar year, any remaining unused kWh credit accumulated during the previous year shall be sold to Black Hills Energy at the Company's Standard Rate for Purchasing Power from Qualifying Small Power Production or Cogeneration Facilities.

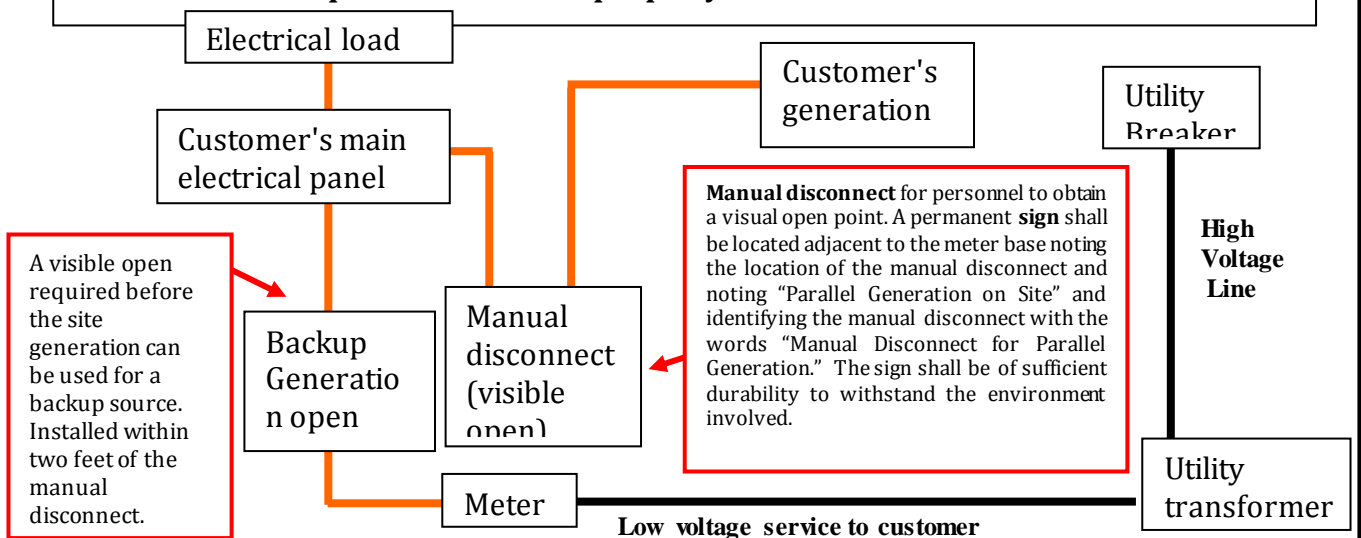
\*\* The information is only valid for Black Hills Energy's rate schedule as of April 1, 2015.

# Net metering diagram

**This is an example of using the customer generation as a parallel electrical source but not for backup. This installation must comply with all NEC and other applicable code requirements. It is the customer's responsibility to assure the installation meets all code requirements and is properly maintained.**

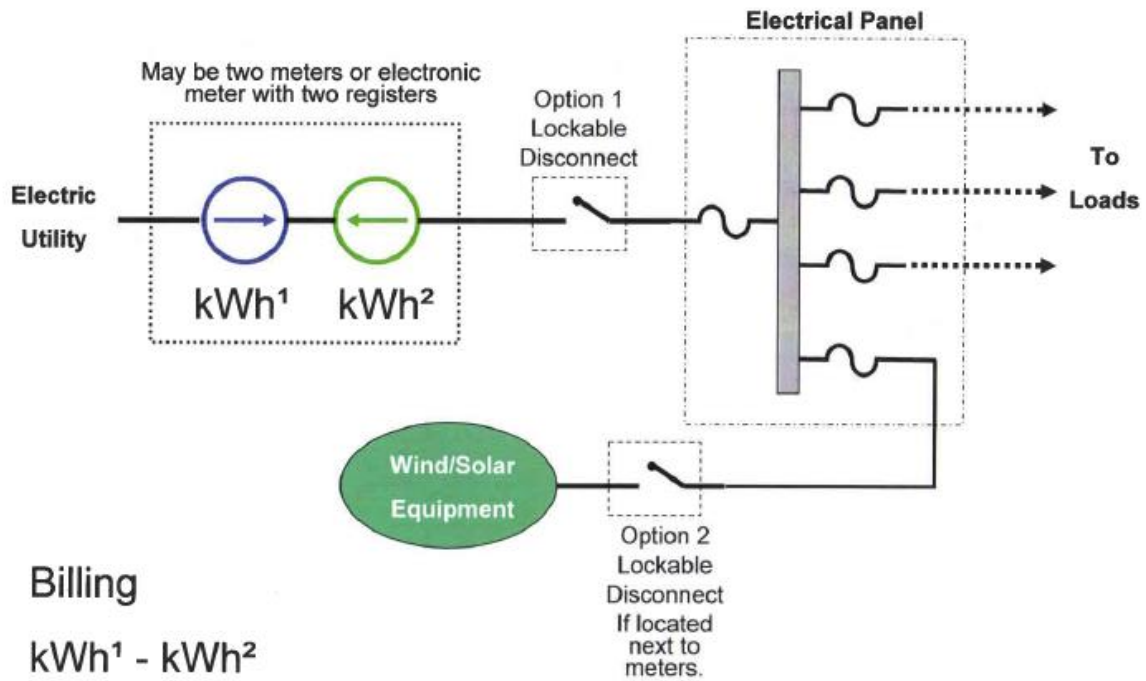


**This is an example of using the customer generation as a parallel and backup source. This installation must comply with all NEC and other applicable code requirements and must be approved by the Electric Utility. Approval by the Electric Utility means that the automatic shutdown & disconnect works and the manual disconnect and backup generation open points have been installed in the appropriate location. It is the customer's responsibility to assure the installation meets all code requirements and is properly maintained.**





# Net metering diagram



INTERCONNECTION AGREEMENT FOR NET METERING SERVICE AND PARALLEL  
OPERATION OF DISTRIBUTION GENERATION WITH THE UTILITY SYSTEM  
(UNDER 25 KW)

**Application for Net Metering Interconnection**

Customer-Generator name: \_\_\_\_\_  
Service address: \_\_\_\_\_  
City, State, Zip: \_\_\_\_\_  
Customer account #: \_\_\_\_\_  
Customer phone number(s): \_\_\_\_\_

**Section 1: To be completed by Customer-Generator** This is an example of  
using the customer generation as a parallel electrical source but not for backup.

Type of generation planned (solar, wind, hydro, etc...): \_\_\_\_\_  
Rated generation capacity (kW): \_\_\_\_\_  
Single phase or three phase: \_\_\_\_\_  
Will project be inverter-controlled, induction or synchronous generation? \_\_\_\_\_

**If inverter-controlled** (*inverter-controlled generation may be subject to Black Hills Energy's Representative review and approval*):

Inverter manufacturer and unit/model: \_\_\_\_\_  
Nameplate rating: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVa) \_\_\_\_\_ (AC volts)  
Meets IEEE Standard, 1547 and UL Subject 1741 requirements? \_\_\_\_\_

**If an induction or synchronous device** (*such generation, including protection-isolation method and interconnection characteristics, is subject to Black Hills Energy's Representative review & approval*):

Interconnection relay manufacturer and unit/model: \_\_\_\_\_  
Meets IEEE Standard 1547 and IEEE/ANSI Standard C37.90 requirements? \_\_\_\_\_

Electrical inspection approval date (*attach copies or provide to utility when obtained*): \_\_\_\_\_

*I hereby certify that the information provided in this application is true. I will provide Black Hills Energy a copy of signed government electrical inspection approval documents when obtained.*

Customer-generation owner signature & date: \_\_\_\_\_

**Section 2: To be completed by Black Hills Energy Representative, if required.**

*(Representative review and approval is required for induction and synchronous generation; Representative approval also is required for select inverter-controlled generation.)*

Net metering facility as certified by customer is approved by/title: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Section 3: To be completed by Black Hills Energy Meterman.**

Customer's account #: \_\_\_\_\_  
Served from facility point #: \_\_\_\_\_  
New net meter number: \_\_\_\_\_ Date net meter installed: \_\_\_\_\_  
Manual disconnect device permanent signage in place? \_\_\_\_\_  
Signature/title: \_\_\_\_\_ Date: \_\_\_\_\_

Return Completed Application to:           Black Hills Energy  
  Attn: John Cheeseman  
  1301 W. 24th St.  
  Cheyenne, WY 82001

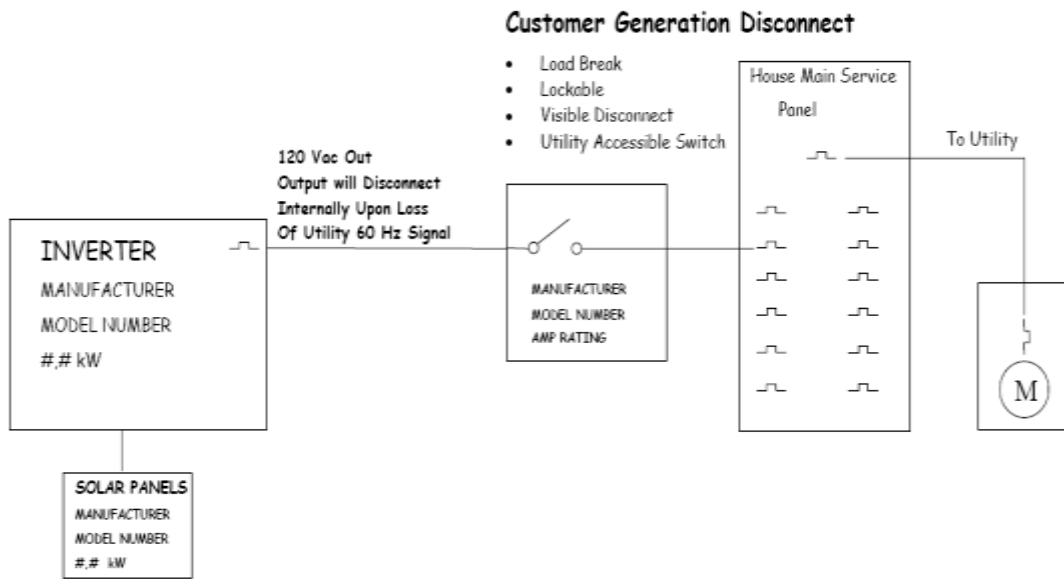
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# Sample one-line diagram

## Components and Connections Shown are for Illustrative Purposes Only

1. This illustrative sketch is not intended to specify utility interconnection or safety requirements.
2. This illustrative sketch is not intended to provide electrical design or code compliance directives.
3. Some components and connections shown may be internal to the inverter. The manufacturer and model number of the inverter must be shown on the drawing.
4. All switches, breakers, fuses, and mechanical interlock mechanisms which are part of the operating scheme to isolate the customers generating equipment (including solar panels, standby generators and batteries) from the utility during emergency or maintenance conditions must be shown on the single-line diagram.
5. The narrative description accompanying the single-line interconnection diagram must contain sufficient detail to determine if the components in, and the operation of, the interconnection and protection systems meet the utility's interconnection and safety requirements.



# Contract information

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