



Your Touchstone Energy<sup>®</sup> Cooperative 

# Electric Service Manual

## Section 4 – Distributed Energy Resource (DER) Interconnection



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## Section 4 – Distributed Energy Resource (DER) Interconnection

### 4.1 General Information

A Distributed Energy Resource (DER) is anything which produces electricity. A DER could be a gas-powered generator, a wind turbine, batteries or a solar panel, etc. Proper interconnection of a DER to a home or commercial electrical system is extremely important. An improper installation can affect your safety, the safety of the public and the safety of Dakota Electric's employees. Knowing what you are doing may save your life or your property.

The following are requirements which must be followed to ensure a safe and reliable DER interconnection.

- All DER interconnections must follow the requirements of the National Electrical Safety Code (NEC).
- All installations must be inspected and approved by proper authorities. Contact a licensed electrician to help ensure a safe and reliable installation.
- All DER generation, that is operated in parallel with Dakota Electric's distribution system, is required to be reviewed and approved by Dakota Electric prior to interconnection. Also, most DER interconnections will require the installation of a Dakota Electric production meter. Dakota Electric will supply the meter and the member (installer) supplies and installs the meter socket. The production meters on smaller single-phase installations allows Dakota Electric to remotely shut down the operation of the DER during emergencies. The production meter is required and allows Dakota Electric to know the total load which may be applied to the distribution system after system outages. This is necessary to ensure proper capacity of the electrical distribution equipment required to supply the maximum electrical demand for each home and businesses.

The installation of a DER system can mask the peak load requirements of a home or business by supplying some of the electrical needs during maximum loads. Immediately after a power outage or during times when the DER system is unavailable, the total unmasked electrical demand is applied to the distribution system and the distribution system equipment must be sized to supply that total electrical demand.

- The requirements for the production meter and meter socket are as follows
  - The production meter socket must be installed within 10ft of the existing Dakota Electric service meter
  - The meter socket shall be labeled with "Production Meter"

- The meter shall be located on an outside wall and shall always be accessible to Dakota Electric personnel
- The mounting of the production meter must comply with the Residential Meter Location Requirements, [Section 3.1](#)
- The location of the production meter must be identified on the on-line diagram that is submitted with the generation interconnection application.



[MTR-SOLAR](#) is a diagram which provides guidance for installing a DER production meter.

**Notice to Co-generators** - in compliance with Minnesota Adopted Rules Relating to Cogeneration and Small Power Production, Chapter 7835, Dakota Electric is required to interconnect with and purchase electricity from co-generators and small power producers that satisfy the conditions of a Qualifying Facility\*.

Dakota Electric has available and will provide information to all interested members regarding rates and interconnection requirements. An application for interconnection is required for a Qualifying Facility to interconnect and operate in parallel with Dakota Electric's distribution system and is subject to approval by Dakota Electric.

*\*A Qualifying Facility is a generation system that meets the requirements of the federal PURPA rules ("Public Utility Regulatory Policies Act - 1978"). These facilities' primary energy source is renewable sources, such as solar, wind, hydro, biomass, waste or geothermal resources. Diesel fueled generators and Energy Storage (battery) systems are not qualifying facilities under the PURPA rules.*

**Portable Emergency or Standby DER Generator Installations** - Installing a temporary back-up DER generator that provides electricity during power outages and utilizes your home or business existing wiring, requires careful installation. Failure to properly interconnect the DER could result in back-feeding the utility system and energize the primary wires at thousands of volts. This could be lethal for the general public and Dakota Electric field crews working to restore your electrical service. For additional information about Portable Emergency or Standby Backup Generator see [Section 4.2](#).

### **Distributed Energy Resource Installations – Including Small Renewable Systems**

When installing a DER system that can operate in parallel with the Dakota Electric's distribution system, notification, through filing an interconnection application and coordination with Dakota Electric is required. This is due to the possibility of the DER system back-feeding the Dakota Electric distribution system and affecting the safety and reliability of the electrical distribution system. Interconnection applications are required for DER systems which temporally parallel with the distribution system, during

transitioning the load on or off of the distribution system or for DER that operate in extended parallel, as with small renewable generation systems.

Dakota Electric will work with you to ensure a safe and reliable installation. Dakota Electric has adopted the State of Minnesota Distributed Energy Resources Interconnection Process and requirements which has been established by the State of Minnesota for all DER systems that generate energy. This includes solar, wind, bio-mass, diesel, natural gas, energy storage-batteries or other fuel sources.

For more information on the process and requirements of interconnecting a DER with the Dakota Electric distribution system, see [Section 4.3](#) Distributed Energy Resource (DER) Installations. If your Distributed Energy Resource is a qualified renewable resource, rated less than 40kW and utilizes a UL 1741 certified grid tie inverter, see [Section 4.4](#) Small Renewable Energy Installations.



## 4.2 Portable Emergency or Standby Backup Generators

- **Avoid Back-Feeding Dangers / Use a Transfer Switch** – For a safe installation of portable or standby generators, a transfer switch must be installed to break the connection with the Dakota Electric electrical system before connecting the DER. This transfer switch will disconnect the DER before normal utility power is restored to the building. This transfer switch can be located between your buildings main service panel and the utility meter or between specific loads which require backup emergency power and the main service panel. For a typical home which is supplied with single phase 120/240-volt energy, this type of switch is referred to as a "double-pole, double-throw" open transition transfer switch. For more information on DER interconnection requirements see [Section 4.3](#)
- **Operating a Transfer Switch** - A transfer switch or a grid tie rated inverter are essential to safely provide back-up power to your home or business with a DER. Electric current from Dakota Electric's lines normally passes through a transformer to step 7,200 volts of electricity down to 120 and 240 volts for your home's use. Operating a DER without a properly designed interconnection may feed a 120/240-volt power back into the transformer, which will step the voltage up to 7,200 volts and potentially give a lethal shock to anyone who contacts the line. When power is restored to Dakota Electric's lines, any DER that is back-feeding the distribution system may be damaged. Because of this it is very important that the DER interconnection is designed and installed properly. When using a transfer switch, it must be sized according to the use and may need to match the rating of a home's service entrance equipment. Common sizes include 100, 150, or 200 amperes. It is

also important to understand and for the installation of the DER to comply with NEC electrical code requirements to ensure a safe and proper standby generator installation.

- **Inspection** - Make sure your local electrical inspector examines all facility wiring changes or additions. Besides coordination with Dakota Electric, Minnesota State Statutes require you have any wiring additions or changes inspected before energizing.
- **Qualified Installer** - If you are not sure your DER is installed correctly, contact a qualified electrician or your local electrical inspector. Remember, you are responsible for any damage or injuries resulting from improper installation or operation of a DER.

No matter what type of DER you are installing, including solar, wind, energy storage (battery), gas or diesel powered, proper connection is critical. Do not attempt to connect a DER within your home or business without proper equipment and knowledge. The electricity you generate will back feed to the outside utility lines, where it can kill or injure others, including utility field crews attempting to restore power. Proper installation is required to prevent the DER from sending electricity back through the wires and transformer and energizing the utility lines.

### 4.3 Distributed Energy Resource (DER) Installations

Dakota Electric has adopted the State of Minnesota process and requirements for interconnecting distributed energy resources. This process and technical requirements help to coordinate and ensure a safe interconnection between your DER system and the Dakota Electric distribution system.

**NOTICE:** Dakota Electric has changed to the new Minnesota Interconnection process, which includes updated applications and forms. Please make sure you are using the latest applications and forms when submitting documents to Dakota Electric.

**Mail all documents and payments to:**

**Dakota Electric Association  
C/O Generation Interconnection Coordinator  
4300 220<sup>th</sup> Street West  
Farmington, MN 55024**



As part of this change Dakota Electric is converting to an on-line system to handle all new interconnection applications. **Starting later in 2019, all new DER interconnection applications will ONLY be accepted through the on-line portal.** The use of the on-line

system ensures all applications receive equal treatment and are processed in the order that they are submitted. This on-line process is expected to simplify the application process and make payment of application fees easier.

Once the on-line application port is available you can access the DER Interconnection Application Portal, using the following link:

<https://www.novapowerportal.com/Home/Index/22>

### **Energy Storage Systems**

Energy Storage Systems, which are typically comprised of batteries, may be required to apply for interconnection, depending upon how they are connected or operated. An application to interconnect is required only for storage designed to operate in parallel with the electrical system. Backup energy storage systems used as a UPS and electric vehicles that do not parallel with the electrical system, do not need to apply. For more information about the interconnection requirements for Energy Storage Systems, reference the technical interconnection requirements documents, listed below.

### **Pre-Application Report Request Process**

The Pre-Application Report Request process allows an Applicant to request information about the hosting capacity for interconnecting a Distributed Energy Resource at a specific location on the Dakota Electric distribution system. This process can be used by the Applicant to learn about any significant limitations on the existing Dakota Electric distribution system which may be costly to mitigate. The pre-application report has a \$300 fee for processing the request.

**Pre-Application Request** – Is the form required to submit the request for a Pre-Application study and report. The application may be mailed to Dakota Electric along with payment, or once the on-line portal is available, you may utilize the convenient Dakota Electric on-line application portal at <https://www.novapowerportal.com/Home/Index/22> to submit and pay for the pre-application report.

### **Dakota Electric Interconnection Process**

Dakota Electric, along with the other electric utilities regulated by the Minnesota Public Utilities Commission (MN-PUC) are required to follow the Minnesota Distributed Energy Resource Interconnection Process (MN-DIP). Dakota Electric has adopted the process for use by Members of Dakota Electric. The complete Dakota Electric interconnection process, [MN-DIP-DEA](#), provides the details for interconnection of all types of DER with the Dakota Electric Distribution system. The MN-DIP-DEA includes different “process tracks” for how Dakota Electric is required to process the applications based upon the size and type of the DER. The document also includes application forms and interconnection agreements which must be used for the interconnections. Below are links to portions of the MN-DIP-DEA document, including the application forms and

agreements. The documents are also available for viewing on the Interconnection Application Portal. <https://www.novapowerportal.com/Home/Index/22>

The updated technical requirements for interconnecting DER is still being developed by a working group led by the Minnesota PUC staff. Updated technical requirements are expected to be approved later in 2019 or early 2020. Below is information about the existing technical requirements for interconnection of a DER with the Dakota Electric distribution system. All DER interconnections with the Dakota Electric distribution system, must meet the Dakota Electric requirements which include the IEEE 1547 standard requirements.

### **DER Interconnection Process Information**

The first step in the interconnection process is to submit your generation system information using the applicable application. The following links provide more information about the interconnection process and technical requirements for all types of generation.

[Summary Letter](#) – The letter summarizes the most relevant information required for interconnection of DER with Dakota Electric’s distribution system.

[Interconnection Process Flow Chart](#) – A high level flow chart showing the major steps in the interconnection process for most DER interconnections.

[Interconnection Process](#) – MN-DIP-DEA

[Simplified Application](#) for interconnection of PURPA qualified, inverter based DER rated 20kW or less. This is a short form application for the interconnection of smaller DER.

[Long Form Application](#) for interconnection of all DER with the Dakota Electric system. This is the long form application for the interconnection of all other sizes and types of DER.

Notice: Dakota Electric will be implementing an on-line DER interconnection application system. Once this is available the on-line application portal can be accessed through the Dakota Electric web site [www.dakotaelectric.com](http://www.dakotaelectric.com) by searching for “Generation” or directly by going to; <https://www.novapowerportal.com/Home/Index/22>

### **Technical Requirements for DER Interconnects**

The technical requirements for interconnecting a DER in the State of Minnesota are regulated by the [Minnesota Distributed Generation Interconnection Requirements](#). This document was created and approved in 2004 by the Minnesota Public Utilities Commission (PUC). As part of the revision of the interconnection procedures and coupled with the update to the national DER interconnection standards in 2018 (IEEE 1547-2018). A working group, organized by the Minnesota PUC, is developing a revised



set of technical standards. This section of the electric service manual will be updated with the new standards as they become available.

### **Additional Information, Forms and Documents for the Interconnection of DER**

The following links provide copies of the other documents which are part of the interconnection process. These documents are automatically selected and generated for the Applicant when using the Dakota Electric on-line application portal.

#### [Uniform Statewide Contract for Cogeneration and Small Power Production Facilities](#) –

This is the required power purchase and interconnection agreement between the DER owner and Dakota Electric. This contract is only for PURPA qualified generators, such as solar, wind, hydro, biomass, waste or geothermal resources.

[Interconnection Agreement](#) – MN-DIA-DEA - This is the agreement between the DER owner and Dakota Electric for the interconnection and operation of the DER with the Dakota Electric distribution system. This document outlines the terms of the interconnection, including operational terms and conditions. This agreement is not required for PURPA qualified inverter based DER smaller than 40kW. For these systems, it is the choice of the Applicant if they want to enter into this agreement with Dakota Electric. Otherwise the [Simplified Application Form](#), Exhibit A terms and conditions are applicable.

[Energy Storage Application](#) – This form provides required information about an Energy Storage System in addition to a completed interconnection Application. This form is required to be submitted when an Energy Storage system is part of the system being interconnected. An application to interconnect is required only for Energy Storage designed to operate in parallel with the grid. Backup energy storage systems used as a UPS and electric vehicles that do not parallel with the electrical system do not need to apply.

[Certificate of Completion](#) – This form is required to be submitted to Dakota Electric when the DER is ready for inspection and final testing by Dakota Electric personnel.

[Distribution System Impact Study Agreement](#) – This agreement is for the Interconnections Applications that did not pass the initial technical screens and require additional analysis of the impact of the interconnection. If a System Impact Study is required, Dakota Electric will notify the Applicant as part of the application review process.

[Distribution Facilities Study Agreement](#) – This agreement is for Interconnections which during the system impact study, necessary modifications to the distribution system were identified. This is a detailed study, which provides the estimated cost of the equipment and engineering, procurement and construction work needed to physically and electrically connect the DER.

Transmission Facilities Studies – If the capacity of the proposed DER, combined with all other DER on a substation is greater than the minimum substation load, it is possible the energy output from the DER may back-feed the substation and supply power to the transmission system. If this is the case transmission studies may be required to review the possible impact on the transmission system. During the interconnection review process, Dakota Electric will identify if the proposed DER may cause back-feeding of the transmission system and will work with the proposed DER applicant and the transmission provider to coordinate any required studies.

### **Modifications to Existing DER**

The DER owner/operator must receive written authorization from Dakota Electric before making any change to the Distributed Energy Resource that may have a material impact on the safety or reliability of the Distribution System. Material Modifications \*, including an increase nameplate rating or capacity, may require the DER owner/operator to submit a new Interconnection Application as described in MN DIP Section 1.6.2. If the DER owner/operator makes such modification without Dakota Electric's prior written authorization, the latter shall have the right to temporarily disconnect the Distributed Energy Resource.

*\* A Material Modification shall include, but may not be limited to, a modification from the approved Interconnection Application that: (1) changes the physical location of the point of common coupling; such that it is likely to have an impact on technical review; (2) increases the nameplate rating or output characteristics of the Distributed Energy Resource; (3) changes or replaces generating equipment, such as generator(s), inverter(s), transformers, relaying, controls, etc., and substitutes equipment that is not like-kind substitution in certification, size, ratings, impedances, efficiencies or capabilities of the equipment; (4) changes transformer connection(s) or grounding; and/or (5) changes to a certified inverter with different specifications or different inverter control settings or configuration. For Energy Storage systems changes in the modes of operation to modes which are not included as approved modes in the interconnection agreement.*

### **Contact Dakota Electric**

For questions about the process to interconnect Distributed Energy Resources (DER) to your residence, contact the Dakota Electric Residential Generation Coordinator, by emailing your questions to [ResidentialDER@dakotaelectric.com](mailto:ResidentialDER@dakotaelectric.com). For questions about interconnection of DER with a commercial or industrial electrical service, email your questions to [CommercialDER@dakotaelectric.com](mailto:CommercialDER@dakotaelectric.com), or call Dakota Electric at 651 463-6212 and ask to speak with the Residential Generation Coordinator or the Commercial Generation Coordinator.

#### 4.4 Small Renewable Energy Installations

Dakota Electric supports the interconnection of renewable generation systems such as wind or solar. As part of the interconnection process, small PURPA qualified renewable DER systems, with a DER capacity of 20kW or less, which utilize a certified inverter, qualify for the simplified process. The simplified process includes a shorter application form and shorter application review and processing times.



[Simplified Application](#) – clicking on this link will provide you with a copy of the simplified application.

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[Summary Letter – Small Renewable](#) – The letter summarizes the most relevant information required for interconnection of small renewable DER with Dakota Electric’s distribution system.

[Uniform Statewide Contract for Cogeneration and Small Power Production Facilities](#) - This is the required power purchase and interconnection agreement between the DER owner and Dakota Electric. This contract is only for PURPA qualified generators, such as solar, wind, hydro, biomass, waste or geothermal resources.

[Dakota Electric’s Residential Solar Incentive Program](#) – This information describes the solar installation rebate available to preapproved solar electricity systems which meet the qualifications of the program. Dakota Electric requires a Production Meter to be

installed for each DER and for the Solar Incentive Program. [MTR-SOLAR](#) is a diagram which provides guidance for installing a DER production meter.

[2019 Qualified Facility Rates](#) - this document describes the rate paid by Dakota Electric for excess energy generated by small qualified DER and injected back into the Dakota Electric distribution system.

It is important that all DER interconnection applicants, including smaller DER systems which are utilizing the simplified interconnection process, read and understand the interconnection process and the technical interconnection requirements described in Section 4.3 of this document.

### **Contact Dakota Electric**

For questions about the process to interconnect Distributed Energy Resources (DER) to your residence, contact the Dakota Electric Residential Generation Coordinator, by emailing your questions to [ResidentialDER@dakotaelectric.com](mailto:ResidentialDER@dakotaelectric.com). For questions about interconnection of DER with a commercial or industrial electrical service, email your questions to [CommercialDER@dakotaelectric.com](mailto:CommercialDER@dakotaelectric.com), or call the Dakota Electric offices at 651 463-6212 and ask to talk with either the Residential Generation Coordinator or the Commercial Generation Coordinator.

### **Other Sources of Information**

Minnesota Department of Commerce ([Solar Information](#)) – ([Wind Information](#))

National Renewable Energy Laboratory ([NREL](#))

American Solar Energy Society ([ASES](#))

American Wind Energy Association ([AWEA](#))