



Interconnection Process for Generation Systems

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I. INTRODUCTION

This document has been prepared to explain the process to interconnect a Generation System with Nodak Electric Cooperative, Inc. This document covers the interconnection process for all types of Generation Systems which meet the following criteria:

- A. Rated less than 10MW of total generation Nameplate Capacity
- B. Planned for interconnection with the Nodak Electric Distribution System
- C. Not intended for wholesale transactions
- D. Not anticipated to affect the transmission system.

This document does not discuss the interconnection Technical Requirements, which are covered in the “Nodak Electric Interconnection Requirements for Generation Systems” document. This document and the requirements document also provide definitions and explanations of the terms utilized throughout this process and the documents pertaining to it.

To interconnect a Generation System with Nodak Electric, there are several steps that must be followed. This document outlines those steps (see Section III.) and the Parties' responsibilities. At any point in the process, if there are questions, please contact Nodak Electric. Since this document has been developed to provide an interconnection process which covers a very diverse range of Generation Systems, the process appears to be very involved and cumbersome. But for many Generation Systems the process is streamlined and provides an easy means for interconnection.

II. GENERAL INFORMATION

A. Definitions

1. **Area EPS:** an electric power system (EPS) that serves Local EPS's. Note: Typically, an Area EPS has primary access to public rights-of-way, priority crossing of property boundaries, etc.
2. **Area EPS Operator:** the entity that operates the Area EPS.
3. **Closed Transition Transfer:** Method of transferring the local loads between Nodak Electric's system and the generator such that the generator and Nodak Electric's system are interconnected for a short time (100 msec. or less).
4. **Dedicated Facilities:** the equipment that is installed due to the interconnection of the Generation System and not required to serve other Area EPS Members.
5. **EPS:** (Electric Power System) facilities that deliver electric power to a load. Note: This may include generation units.
6. **Extended Parallel:** The Generation System is designed to remain connected with Nodak Electric for an extended period of time.
7. **Generation:** any device producing electrical energy, i.e., rotating generators driven by wind, steam turbines, internal combustion engines, hydraulic turbines, solar, fuel cells, etc.; or any other electric producing device, including energy storage technologies.
8. **Generation Interconnection Coordinator:** the person or persons designated by Nodak Electric to provide a single point of coordination with the Applicant for the generation interconnection process.
9. **Generation System:** the interconnected generator(s), controls, relays, switches, breakers, transformers, inverters and associated wiring and cables, up to the Point of Common Coupling.
10. **Interconnection Member:** the party or parties who will own/operate the Generation System and are responsible for meeting the requirements of the agreements and

Technical Requirements. This could be the Generation System applicant, installer, owner, designer, or operator.

11. **Local EPS:** an electric power system (EPS) contained entirely within a single premises or group of premises.
12. **Open Transition Transfer:** Method of transferring the local loads between Nodak Electric's system and the generator such that the generator and Nodak Electric's system are never interconnected.
13. **Nameplate Capacity:** the total nameplate capacity rating of all the Generation included in the Generation System. For this definition the "standby" and/or maximum rated KW capacity on the nameplate shall be used.
14. **Point of Common Coupling:** the point where the Local EPS is connected to an Area EPS
15. **Point of Delivery:** the point where the energy changes possession from one party to the other. Typically this will be where the metering is installed but it is not required that the Point of Delivery is the same as where the energy is metered
16. **Soft Loading Transfer:** Method of transferring the local loads between Nodak Electric's system and the generator such that the generator and Nodak Electric's system are interconnected for a limited amount of time (generally less than three minutes). If the interconnection extends beyond three minutes, the interconnection is then defined as extended parallel.
17. **Technical Requirements:** Nodak Electric Cooperative, Inc. "Interconnection Requirements for Generation Systems"; see Appendix F.

B. Nodak Electric Generation Interconnection Contacts

Questions that arise during the planning, design, and installation process of interconnecting generation to Nodak Electric's system should be directed to one of two areas depending on the nature of the question.

Areas that involve energy rates and Nodak Electric's load management program should be directed to Nodak Electric's marketing personnel. Technical questions involving areas such as the design, installation, interconnection, or operation of generation should be directed to Nodak Electric's engineering personnel.

In both instances, these people can be reached at the following address and phone number:

Nodak Electric Cooperative, Inc.
4000 32nd Avenue South
Grand Forks, ND 58208-3000

701/746-4461
800/732-4373

C. Engineering Studies

During the process of designing an interconnection between a Generation System and Nodak Electric, there are several studies which may need to be undertaken. On the Local EPS (Customers side of the interconnection) the addition of a Generation System may increase the fault current levels, even if the generation is never interconnected with the Nodak Electric grid. The Interconnection Customer may need to conduct a fault current analysis of the Local EPS in conjunction with adding the Generation System. The addition of the Generation System may also affect Nodak Electric and special engineering studies may need to be undertaken looking at the Nodak Electric grid with the Generation System included. Appendix D lists some of the issues that may need to receive further analysis for the Generation System interconnection.

While it is not a straight forward process to identify which engineering studies are required, certain criteria can help to identify which Generation Systems may require further analysis. The following is the basic screening criteria to be used for this interconnection process.

1. Generation System total Nameplate Capacity does not exceed 5% of the radial circuit expected peak load. The peak load is the total expected load on the radial circuit when the other generators on that same radial circuit are not in operation.
2. The aggregate generation's total Nameplate Capacity, including all existing and proposed generation, does not exceed 25% of the radial circuit peak load and that total is also less than the radial circuit minimum load.
3. Generation System does not exceed 15% of the Annual Peak Load for the Line Section, which it will interconnect with. A Line Section is defined as that section of the distribution system between two sectionalizing devices in the Nodak Electric grid.
4. Generation System does not contribute more than 10% to the distribution circuit's maximum fault current at the point at the nearest interconnection with the Nodak Electric primary distribution voltage.
5. The proposed Generation System total Nameplate Capacity, in aggregate with other generation on the distribution circuit, will not cause any distribution protective devices and equipment to exceed 85 percent of the short circuit interrupting capability.
6. If the proposed Generation System is to be interconnected on a single-phase shared secondary, the aggregate generation Nameplate Capacity on the shared secondary, including the proposed generation, does not exceed 20KW.
7. Generation System will not be interconnected with a "networked" system

D. Scoping Meeting

During Step 2 of this process, the Applicant or Nodak Electric has the option to request a scoping meeting. The purpose of the scoping meeting shall be to discuss the Applicant's interconnection request and review the application filed. This scoping meeting is to be held so that each Party can gain a better understanding of the issues involved with the requested interconnection.

Nodak Electric and the Applicant shall bring to the meeting personnel, including system engineers, and other resources as may be reasonably required, to accomplish the purpose of the meeting. The Applicant shall not expect Nodak Electric to complete the preliminary review of the proposed Generation System at the scoping meeting. If a scoping meeting is requested, Nodak Electric shall schedule the scoping meeting within the 15 business day review period allowed for in Step 2.

Nodak Electric shall then have an additional 5 days, after the completion of the scoping meeting to complete the formal response required in Step 2. The Application fee shall cover Nodak Electric's costs for this scoping meeting. There shall be no additional charges imposed by Nodak Electric for this initial scoping meeting

E. Insurance

1. In connection with the Interconnection Customer's performance of its duties and obligations under this Agreement, the Interconnection Customer shall maintain, during the term of the Agreement, general liability insurance, from a qualified insurance agency with a B+ or better rating by "Best" and with a combined single limit of not less than:
 - a. Two million dollars (\$2,000,000) for each occurrence if the Gross Nameplate Rating of the Generation System is greater than 250KW.
 - b. One million dollars (\$1,000,000) for each occurrence if the Gross Nameplate Rating of the Generation System is between 40KW and 250KW.
 - c. Three hundred thousand (\$300,000) for each occurrence if the Gross Nameplate Rating of the Generation System is less than 40KW.
 - d. Such general liability insurance shall include coverage against claims for damages resulting from:
 - i. bodily injury, including wrongful death
 - ii. property damage arising out of the Interconnection Customer's ownership and/or operating of the Generation System under this agreement
2. The general liability insurance required shall, by endorsement to the policy or policies:

- a. Include Nodak Electric as an additional insured
 - b. Contain a severability of interest clause or cross-liability clause
 - c. Provide that Nodak Electric shall not by reason of its inclusion as an additional insured incur liability to the insurance carrier for the payment of premium for such insurance
 - d. Provide for thirty (30) calendar days' written notice to Nodak Electric prior to cancellation, termination, alteration, or material change of such insurance.
3. If the Generation System is connected to an account receiving residential service from Nodak Electric and its total generating capacity is smaller than 40KW, then the endorsements required in Section E.2 shall not apply.
 4. The Interconnection Customer shall furnish the required insurance certificates and endorsements to Nodak Electric prior to the initial operation of the Generation System. Thereafter, Nodak Electric shall have the right to periodically inspect or obtain a copy of the original policy or policies of insurance.
 5. Evidence of the insurance required in Section E.1. shall state that coverage provided is primary and is not in excess to or contributing with any insurance or self-insurance maintained by Nodak Electric.
 6. If the Interconnection Customer is self-insured with an established record of self-insurance, the Interconnection Customer may comply with the following in lieu of Section E.1 – 5:
 - a. Interconnection Customer shall provide to Nodak Electric, at least thirty (30) days prior to the date of initial operation, evidence of an acceptable plan to self-insure to a level of coverage equivalent to that required under section E.1
 - b. If Interconnection Customer ceases to self-insure to the level required hereunder, or if the Interconnection Customer is unable to provide continuing evidence of its ability to self-insure, the Interconnection Customer agrees to immediately obtain the coverage required under section E.1
 - c. Failure of the Interconnection Customer or Nodak Electric to enforce the minimum levels of insurance does not relieve the Interconnection Customer from maintaining such levels of insurance or relieve the Interconnection Customer of any liability

F. Non-Warranty

Neither by inspection, if any, or non-rejection, nor in any other way, does Nodak Electric give any warranty, expressed or implied, as to the adequacy, safety, or other characteristics of any structures, equipment, wires, appliances or devices owned, installed or maintained by the Applicant or leased by the Applicant from third parties, including without limitation the Generation System and any structures, equipment, wires, appliances or devices pertinent thereto.

G. Required Documents

The following chart lists the Nodak Electric documents required for each type of generation system proposed for use in conjunction with Nodak Electric’s system. By following the steps outlined in this process document and the subsequent documents listed for each type of generation connection transfer type, the Interconnecting Member will assure them of keeping within Nodak Electric’s policy as it relates to the use of a generator in conjunction with receiving electric service from Nodak Electric.

Open Transition	Closed Transition	Soft Loading	Extended Parallel
Nodak Electric Interconnection Process.....			
Nodak Electric Interconnection Requirements for Generation System.....			
	Nodak Electric Application for Interconnection of Generation System.....		
	Nodak Electric Engineering Data Submittal.....		
	Nodak Electric Interconnection Agreement.....		
	Nodak Electric Operating Agreement for Interconnected Generation Systems.....		
	Nodak Electric Maintenance Agreement for Interconnected Generation Systems.....		
			Electric Service Agreement

III. PROCESS FOR INTERCONNECTION

A. Step 1 Application (By Applicant)

Once a decision has been made by the Applicant that they would like to interconnect a Generation System with Nodak Electric, the Applicant shall supply Nodak Electric with the following information:

1. Completed Generation Interconnection Application (Appendix B), including:
 - a. One-line diagram showing the Point of Common Coupling (PCC).
 - b. Site plan of the proposed installation
 - c. Proposed schedule of the installation
2. Payment of the application fee, according to the following sliding scale

Application Fees for Generation System Interconnection Applications				
Project Size/Type	Open Transition	Closed Transition	Soft Loading	Extended Parallel
< 21 KW	N/A	N/A	N/A	\$250
21 – 500 KW	N/A	\$100	N/A	\$250
501 – 750 KW	N/A	\$100	\$100	\$500

751 – 1,000 KW	N/A	N/A	\$100	\$500
> 1,000 KW	N/A	N/A	\$100	\$500

This application fee is to partially offset Nodak Electric’s labor costs for administration, review of the design concept, and preliminary engineering screening for the proposed Generation System interconnection.

3. Completed Engineering Data Submittal (Appendix C) (if applicable), including:

- a. One-line diagram of the generation system showing:
 - i. The generator installation
 - ii. Transfer switch/switchgear
 - iii. Service Entrance
 - iv. Lockable and visible disconnect
 - v. Protection and metering CTs and VTs
 - vi. Protective relaying and generator control system
- b. Detailed information on the proposed equipment, including:
 - i. Wiring Diagrams
 - ii. Models and Types
- c. Proposed relay settings for all interconnection required relays
- d. Detailed site plan of the Generation System

4. Proof on insurance (if applicable):

- a. See Appendix E: XI. Insurance, for detailed requirements

B. Step 2 Preliminary Review (By Nodak Electric)

Within 15 business days of receipt of all the information listed in Step 1, Nodak Electric shall respond to the Applicant with the information listed below. (If the information required in Step 1 is not complete, the Applicant will be notified within 10 business days of what is missing and no further review will be completed until the missing information is submitted. The 15 day clock will restart with the new submittal)

- 1. Contact names with Nodak Electric for this project
- 2. Approval or rejection of the generation interconnection request
 - a. Rejection – Nodak Electric shall supply the technical reasons, with supporting information, for rejection of the interconnection Application
 - b. Approval - An approved Application is valid for 6 months from the date of the approval. Nodak Electric may extend this time if requested by the Applicant
- 3. If additional specialized engineering studies are required for the proposed interconnection, the following information will be provided to the Applicant. Typical Engineering Studies are outlined in Appendix D.
 - a. General scope of the engineering studies required
 - b. Estimated cost of the engineering studies
 - c. Estimated duration of the engineering studies

- d. Additional information required to allow the completion of the engineering studies
- e. Study authorization agreement

4. Comments on the schedule provided

As part of Step 2 the proposed Generation System will be screened to see if additional Engineering Studies are required. The base screening criteria is listed in the general information section of this document.

C. Step 3 Go/No-Go Decision for Engineering Studies (By Applicant)

In this step, the Applicant will decide whether or not to proceed with the required engineering studies for the proposed generation interconnection. If no specialized engineering studies are required by Nodak Electric, this step will automatically be skipped by Nodak Electric and the Applicant.

If the Applicant decides NOT to proceed with the engineering studies, the Applicant shall notify the Nodak Electric Generation Interconnection Coordinator, so other generation interconnection requests in the queue are not adversely impacted. Should the Applicant decide to proceed, the Applicant shall provide the following to Nodak Electric:

1. Payment required by Nodak Electric for the specialized engineering studies
2. Additional information requested by Nodak Electric to allow completion of the engineering studies

D. Step 4 Engineering Studies (By Nodak Electric)

In this step, Nodak Electric will be completing the specialized engineering studies for the proposed generation interconnection, as outlined in Step 2. These studies should be completed in the time frame provided in Step 2 by Nodak Electric. If additional time is required to complete the engineering studies, Nodak Electric shall notify the applicant and provide the reasons for the time extension.

If Nodak Electric determines that the actual costs for the engineering studies will exceed the estimated amount by more than 25%, the Applicant shall be notified. Nodak Electric shall provide the reason(s) for the studies needing to exceed the original estimated amount and provide an updated estimate of the total cost for the engineering studies. The Applicant shall be given the option of either withdrawing the application, or paying the additional estimated amount to continue with the engineering studies.

E. Step 5 Study Results and Construction Estimates (By Nodak Electric)

Upon completion of the specialized engineering studies, or if none was necessary, the following information will be provided to the Applicant:

1. Results of the engineering studies, if needed

2. Monitoring & control requirements for the proposed generation
3. Special protection requirements for the Generation System interconnection
4. Comments on the schedule proposed by the Applicant
5. Interconnection Agreement (if applicable).
6. Cost estimate and payment schedule for required Nodak Electric work, including, but not limited to:
 - a. Labor costs related to the final design review
 - b. Labor & expense costs for attending meetings
 - c. Required dedicated facilities and other Nodak Electric modification(s)
 - d. Final acceptance testing costs

F. Step 6 Final Go/No-Go Decision (By Applicant)

In this step, the Applicant shall again have the opportunity to indicate whether or not they want to proceed with the proposed generation interconnection. If the decision is NOT to proceed, the Applicant will notify Nodak Electric so that other generation interconnections in the queue are not adversely impacted. Should the Applicant decide to proceed, a more detailed design, if not already completed by the Applicant, must be done, and the following information is to be supplied to Nodak Electric:

1. Applicable up-front payment required by Nodak Electric per Payment Schedule provided in Step 5 (if applicable)
2. Signed Interconnection Agreement (if applicable)
3. Final proposed schedule incorporating the Nodak Electric comments. The schedule of the project should include such milestones as foundations poured, equipment delivery dates, all conduit installed, cutover (energizing of the new switchgear/transfer switch), Nodak Electric work, relays set and tested, preliminary vendor testing, final Nodak Electric acceptance testing, and any other major milestones.
4. Detailed one-line diagram of the Generation System, including the generator, transfer switch/switchgear, service entrance, lockable and visible disconnect, metering, protection and metering CTs / VTs, protective relaying and generator control system.
5. Detailed information on the proposed equipment, including wiring diagrams, models and types.
6. Proposed relay settings for all interconnection required relays
7. Detailed site plan of the Generation System
8. If applicable, drawing(s) showing the monitoring system as specified by Nodak Electric including a drawing which shows the interface terminal block with the Nodak Electric monitoring system

9. Proposed testing schedule and initial procedure, including:

- a. Time of day (after-hours testing required?)
- b. Days required
- c. Testing steps proposed

G. Step 7 Final Design Review (By Nodak Electric)

Within 15 business days of receipt of the information required in Step 6, Nodak Electric will provide the Applicant with an estimated time table for final review. If the information required in Step 6 is not complete, the Applicant will be notified within 10 business days what information is missing. No further review may be completed until the missing information is submitted. The 15 business day clock will restart with the new submittal. This final design review shall not take longer than 15 additional business days to complete, for a total of 30 business days.

During this step, Nodak Electric shall complete the review of the final Generation System design. If the final design has significant changes from the Generation System proposed on the original Application which invalidate the engineering studies or the preliminary engineering screening, the Application for Interconnection of the Generation System request may be rejected by Nodak Electric and the Applicant may be requested to reapply with the revised design.

Upon completion of this step, Nodak Electric shall supply the following information to the Applicant.

1. Requested modifications or corrections of the detailed drawings provided by the Applicant.
2. Approval of and agreement with the Project Schedule. (This may need to be interactively discussed between the Parties during this Step)
3. Initial testing procedure review comments. (Additional work on the testing process will occur during Step 8, once the actual equipment is identified)

H. Step 8 Order Equipment and Construction (By Nodak Electric /Applicant)

The following activities shall be completed during this step. For larger installations this step will involve much interaction between the Parties. It is typical for approval drawings to be supplied by the Applicant to Nodak Electric for review and comments. It is also typical for Nodak Electric to require review and approval of the drawings which cover the interconnection equipment and interconnection protection system. If remote control and/or monitoring are also required by Nodak Electric, those drawings are also exchanged for review and comment.

1. By the Applicant's personnel

- a. Ordering of Generation System equipment
 - b. Installing Generation System
 - c. Submit approval drawings for interconnection equipment and protection systems, as required by Nodak Electric
 - d. Provide final relay settings provided to Nodak Electric
 - e. Submit Completed and signed Engineering Data Submittal form (Appendix C)
 - f. Submit proof of insurance as required by Nodak Electric interconnection agreements
 - g. Submit required State of North Dakota electrical inspection forms filed with Nodak Electric
 - h. Inspecting and functional testing Generation System components
 - i. Work with Nodak Electric personnel and equipment vendor(s) to finalize the installation testing procedure
2. By Nodak Electric personnel
- a. Ordering any necessary Nodak Electric equipment
 - b. Installing and testing any required equipment
 - i. Monitoring facilities
 - ii. Dedicated Equipment
 - c. Assisting Applicant's personnel with interconnection installation coordination issues
 - d. Providing review and input for testing procedures

I. Step 9 Final Tests (By Nodak Electric / Applicant)

(Due to equipment lead times and construction, a significant amount of time may take place between the execution of Step 8 and Step 9.) During this time the final test steps are developed and the construction of the facilities are completed. Final acceptance testing will commence when all equipment has been installed, all contractor preliminary testing has been accomplished and all Nodak Electric preliminary testing of the monitoring and dedicated equipment is completed. One to three weeks prior to the start of the acceptance testing of the generation interconnection the Applicant shall provide a report stating:

- ✓ That the Generation System meets all interconnection requirements
- ✓ All contractor preliminary testing has been completed
- ✓ The protective systems are functionally tested and ready
- ✓ Provides a proposed date that the Generation System will be ready to be energized and acceptance tested.

For smaller systems, scheduling of this testing may be more flexible as less testing time is required than for larger systems. In some cases this testing may be done after hours to ensure no typical business-hour load is disturbed. If acceptance testing occurs after hours, Nodak Electric's labor will be billed at overtime wages. During this testing Nodak Electric will typically run three different tests. These tests can differ depending on which type of communication / monitoring system(s) Nodak Electric decides to install at the site. For problems created by Nodak Electric or any Nodak Electric equipment that arise during testing, Nodak Electric will fix the problem as soon as reasonably possible. If problems arise during testing which are caused by the Applicant or Applicant's vendor or any vendor

supplied or installed equipment, Nodak Electric will leave the project until the problem is resolved. Having the testing resume will then be subject to Nodak Electric personnel time and availability.

J. Step 10 (By Nodak Electric)

After all Nodak Electric's acceptance testing has been accomplished and all requirements are met, Nodak Electric shall provide written approval for normal operation of the Generation System interconnection, within 3 business days of successful completion of the acceptance tests.

K. Step 11 (By Applicant)

Within two (2) months of interconnection, the Applicant shall provide Nodak Electric with updated drawings and prints showing the Generation System as it was when approved for normal operation by Nodak Electric. The drawings shall include all changes which were made during construction and the testing process.

IV. ATTACHMENTS

Attached are several documents which may be required for the interconnection process. They are as follows:

Appendix A: Flow chart showing summary of the interconnection process

Appendix B: Generation Interconnection Application Form

Appendix C: Engineering Data Submittal Form

Appendix D: Engineering Studies: Brief description of the types of possible Engineering Studies which may be required for the review of the Generation System interconnection

Appendix E: Nodak Electric Interconnection Agreement for Generation Systems

Appendix F: Nodak Electric Interconnection Requirements for Generation Systems