



Consumer Guidelines for Electric Power Generator Installation and Interconnection

Navopache Electric Cooperative, Inc. (NEC) seeks to provide its members with the best electric service possible, and at the lowest cost consistent with sound economy and good management. In some cases, cooperative members may become interested in installing their own electric power generation equipment. In these cases, NEC stands ready to work with you to ensure that your generation equipment is installed in a proper and safe manner, and in accordance with all applicable codes, standards, regulations, laws and insurance requirements. In most of these cases, you will also need to coordinate the installation and approval of your electric power generator with the local code inspection authority. NEC engineering service representatives can also help identify the appropriate contact for this purpose.

This Guideline is not a complete description or listing of all laws, ordinances, rules and regulations, nor is this Guideline intended to be an installation or safety manual. The member requesting interconnection shall follow where applicable, the current *IEEE 1547 Standard Guide for Distributed Generation Interconnection*, other IEEE standards, ANSI standards, current National Electrical Code, governmental and regulatory laws, rules, ordinances or requirements.

Any generation facilities larger than 10 MW are not covered by this Guideline and will be considered by NEC on a case-by-case basis.

Application Process for Generators

Not to be Interconnected

If your generator is not to be interconnected with the electric power system, you need to complete the attached application and provide us with the electrical capacity, manufacturer and name of your electrical installer. There is no application fee required.

To be Interconnected

If you are planning to interconnect your generator with NEC's electric power distribution system, you need to complete the attached application and submit it to us with the electrical capacity, manufacturer and name of your electrical installer. You will also be required to sign a Systems Facilities Upgrade Agreement.

Generators Not Interconnected with NEC's Distribution System

You may be planning to install a generator for isolated operation, with no connection to NEC's electric power distribution system. Find your specific situation below.

Small Generator Installation (30 kW or less and not interconnected with NEC's distribution system)

Small Emergency Generator (5,000 watts or less): If you are considering installation of a small emergency generator, typically running on gasoline or diesel fuel oil, you are probably not planning to interconnect your generator with NEC's electric power distribution system. It is important that your installation is safe to you, safe to other customers and to our utility workers. It also should not interfere with your NEC's reliable supply of electric power to your residence or other facility. To accomplish this, care must be taken to install your generator so that it will either 1) only start up to serve your entire load when you have disconnected from the electric power grid, or 2) you are only serving isolated loads where there is a choice of power supply (NEC's system or your emergency generator). Engineers are available to help you review your installation plans to ensure, to the greatest extent possible, you will not endanger safety or reliability on NEC's electrical distribution system.

Generators Up to 30,000 Watts: You may be planning to install a larger emergency generator (greater than 5,000 watts), or a generator up to 30,000 watts (30 kW) for other than emergency operation, and not planning to interconnect your generator with NEC's electric distribution system. You are required to complete Part 1 of the attached application to notify us of your plans. You should also let us know once your generator is up and running.

Generator Installation (greater than 30 kW and not interconnected with NEC's distribution system)

Installation of larger generators within a customer facility has the potential to impact distribution system operations. If you are planning to install a large generator, you must complete Parts 1 and 2 of the attached application and submit it to us so we are aware of your plans. NEC will review your plans to ensure that your installation is not interconnected, and to make certain to the greatest extent possible that your installation will not endanger safety or reliability on NEC's electrical distribution system. We want to make sure that your installation will not place our utility workers in any danger of electric shock.

Generators Interconnected with NEC's Distribution System

When installing a generator and planning to interconnect with the distribution system, NEC must review your plans to ensure that personnel safety and system reliability will not be compromised.

**Generator Installation and Interconnection with NEC's Distribution System
(all generators)**

Customers may wish to install their new generator and interconnect it with NEC's electric distribution system. In these cases, you need to complete the attached application form. If your proposed generator installation is 30,000 watts or less and no power will be exported, you only need to complete Part 1 of the application¹. If your generator is more than 30,000 watts, you must complete Parts 1 and 2. Submit your application to your NEC representative as indicated below.

Once we receive your application, we will review your proposed generator installation. If we approve your application, we will let you know if there are special steps you need to take during the generator installation process. We may request additional information regarding your planned installation. We will also ask you to sign an agreement in which you agree to operate your generator safely, maintain the unit properly, and maintain insurance as needed.

As part of our application review process, we will examine the ability of NEC's electric distribution system to accept your new power generation unit. On certain parts of our system, we may need to replace existing equipment or add some new equipment in order to accommodate customer generation. NEC will then incur costs beyond what is normally required to operate and maintain the system to benefit all members. To be fair to all members, you will need to pay for any system upgrades that will be needed. If this is the case for your planned generator installation, we will advise you of the additional cost, and seek your agreement before approving your application. You will also be asked to sign a system upgrade contract that obligates you to reimburse us for the additional expense incurred on your behalf.

* * * * *

Submit your application to the NEC representative as follows:

Navopache Electric Cooperative, Inc.
Manager of Engineering Services
1878 W. White Mountain Blvd.
Lakeside, Arizona 85929

Phone: 928-368-5118

Fax: 928-368-6038

¹ If power export is planned, you must complete Parts 1 and 2 of the Application.

Distributed Generation (DG) Application Process

The application process is the series of prescribed steps to be taken by a prospective DG owner/operator who desires to operate in parallel with NEC. NEC requires information such as location, technical and design parameters, and operational and maintenance procedures. This is a process where simpler is better: It is intended to be clear, concise and not burdensome on any party, but at the same time must protect the safety and stability of the cooperative distribution system.

This application process provides a systematic approach for the engineering review of a DG interconnection study. The application forms include the steps that must be taken to properly account for site-specific concerns and address the technical and procedural requirements of the interconnection standard. The goal of this process is to assess the impacts of distributed generation in a clear, unbiased and consistent manner, and to provide the DG applicant with a clear understanding of how the process works and how the interconnection analysis will be conducted.

When conducting the interconnection study, NEC will seek to:

- Base study scope on the characteristics of the DG at the proposed location.
- Consider costs incurred as a result of DG interconnection.
- Provide a **cost estimate** to the DG applicant prior to initiation of any studies that are to be charged to the applicant.
- Make reports and study results available to the DG applicant.
- Use best efforts to process the application in a timely manner.

In some cases, NEC may reject the proposed DG project interconnection for demonstrable reliability or safety issues. In these cases, however, NEC would work closely with the applicant to try to resolve these issues.

The application process actually consists of three fundamental process flows:

- Process 1 The application is sufficient as submitted, a system impact study is not required, and approval to interconnect is either granted or refused.
- Process 2 System impact study required, but no system upgrade is needed.
- Process 3 System impact study required and system upgrade is needed to accommodate DG.

Each of these process flows is discussed in the following pages.

Figure 1 below provides an overview of the full interconnection application process.

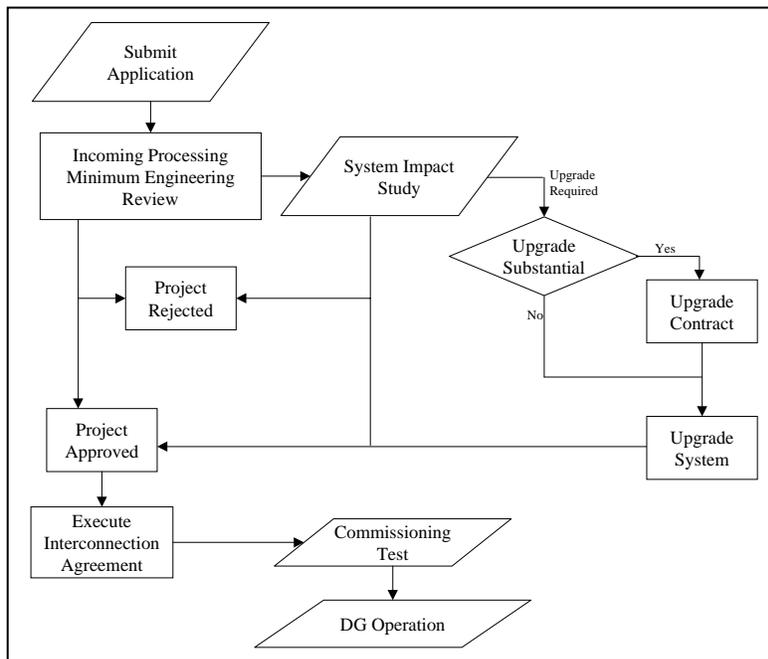


Figure 1
The Interconnection Application Process

Process Flow 1 – Application Sufficient and No System Impact Study

In this case, NEC’s engineering staff is able to determine from the application whether or not the proposed DG project can be safely interconnected with the distribution system. **This is typically the case for small PV systems, or other small systems that will have limited impact on distribution system operations.**

Figure 2 below provides an overview of the application process (Process 1) where the Application is sufficient and a system impact study is not required.

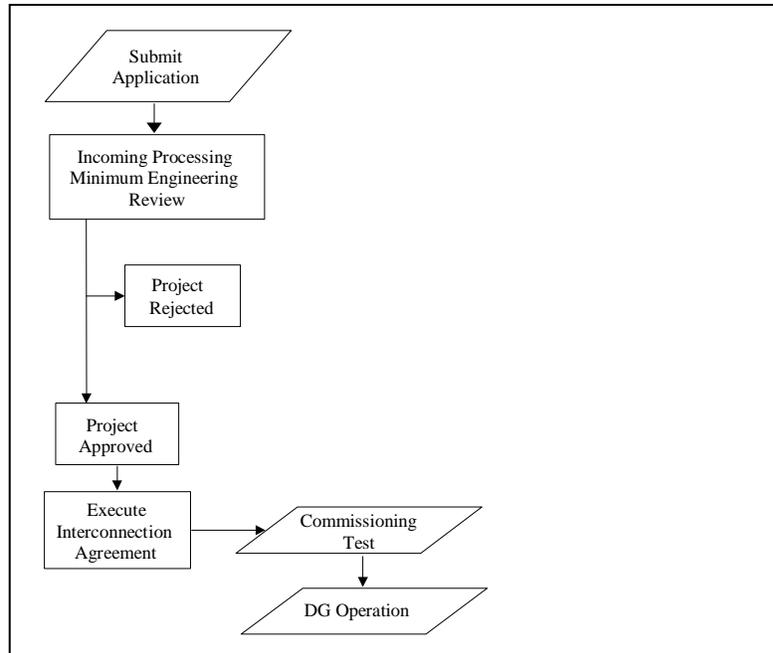


Figure 2
Process Flow 1
Application Sufficient and No System Impact Study Needed

- 1) Submit Application – The DG owner/operator submits the application to NEC. No application is required for generators up to 5 kW that are not interconnected. Completion of Part 1 of the application is only required for larger generators up to less than 30 kW, as long as there is no power export. Both Parts 1 and 2 of the application must be completed for all other applicants.
- 2) Incoming processing, minimum engineering review – Upon receipt of the application, an initial review is performed by the engineering staff at NEC.
- 3) Proposed project rejected – NEC engineering review determines that DG project is not acceptable.

- 4) Project approved – NEC engineering review determines that information about the DG project on the application is sufficient and that project may be implemented without further review.
- 5) Execute interconnection agreement – The DG owner/operator and NEC representative both sign the interconnection agreement. **NEC currently has an all power requirements agreement with a wholesale power supplier and therefore prohibited from purchasing power from another provider. The DG owner/operator will be required to also negotiate an agreement with this wholesale power supplier to purchase the DG output.**
- 6) Commissioning test – The unit is tested prior to commercial operation to ensure that it meets all safety and performance standards. In addition, the settings of the equipment being installed are to be approved by NEC prior to DG operation.
- 7) DG Operation – DG unit begins operating and supplying power to the distribution system.

Process Flow 2 – System Impact Study Required and No System Upgrade

NEC’s engineers need additional information to reach a determination on the ability of the proposed project to safely interconnect with the distribution system. Beyond the information included on the Application, the DG applicant is asked to provide a detailed one-line diagram of the proposed facility and interconnection arrangement that shall include, at a minimum, all major electrical equipment that is pertinent to understanding the normal and contingency operations, including generators, inverters, transformers, switches, circuit breakers, fuses, protective relays and instrument transformers. **The major finding in this case is that no upgrades to the distribution system are required to accommodate the DG unit.**

Figure 3 below provides an overview of the application process (Process 2) where a system impact study is required and system upgrades are not required.

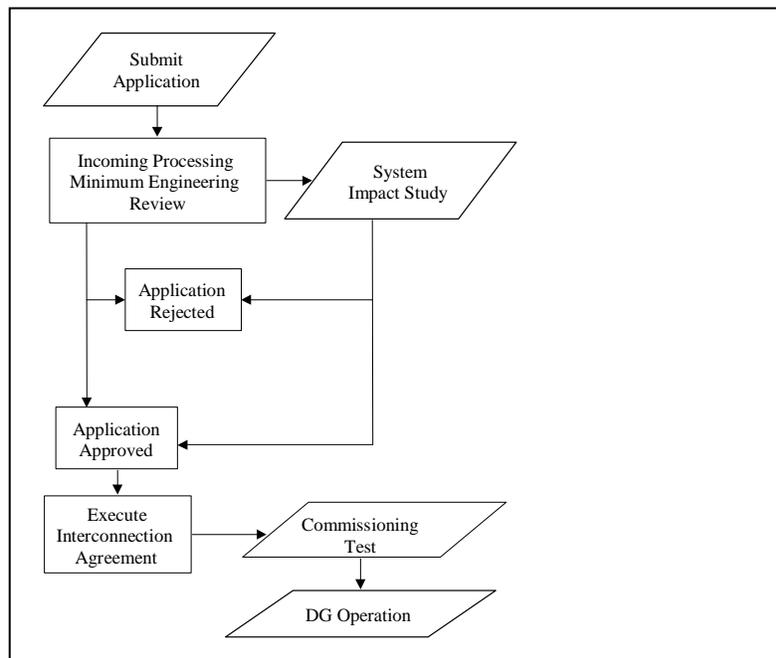


Figure 3
Process Flow 2
System Impact Study Required and No System Upgrade

- 1) Submit application – The DG owner/operator submits the application to NEC.
- 2) Incoming processing, minimum engineering review – Upon receipt of the preliminary application, an initial review is performed by the engineering staff at NEC.
- 3) System impact study needed – NEC determines that further information is necessary before approving application.

- 4) Additional information requested – The DG owner/operator submits the additional data requested by NEC.
- 5) Proposed project rejected – NEC engineering review determines that DG project is not acceptable even if distribution system is upgraded.
- 6) Project approved – NEC engineering review determines that information about DG project on application allows project to be implemented without upgrade of distribution system.
- 7) Execute interconnection agreement - The DG owner/operator and NEC representative both sign the interconnection agreement. **The DG/Owner operator will also need to negotiate an Electric supply/Purchase agreement with the current wholesale power supplier to NEC.**
- 8) Commissioning test – The unit is tested prior to commercial operation to ensure that it meets all safety and performance standards. In addition, the settings of the equipment being installed are to be approved by NEC prior to DG operation.
- 8) DG operation – DG unit begins operating and supplying power to the distribution system.

Process Flow 3 – System Impact Study and System Upgrade Required

Typically the case for larger DG units, and frequently for units planning to parallel or export power, distribution system upgrades need to be engineered to allow for the monitoring, dispatch and control of the DG.

Figure 4 below provides an overview of the application process (Process 3) where a system impact study and system upgrades are required.

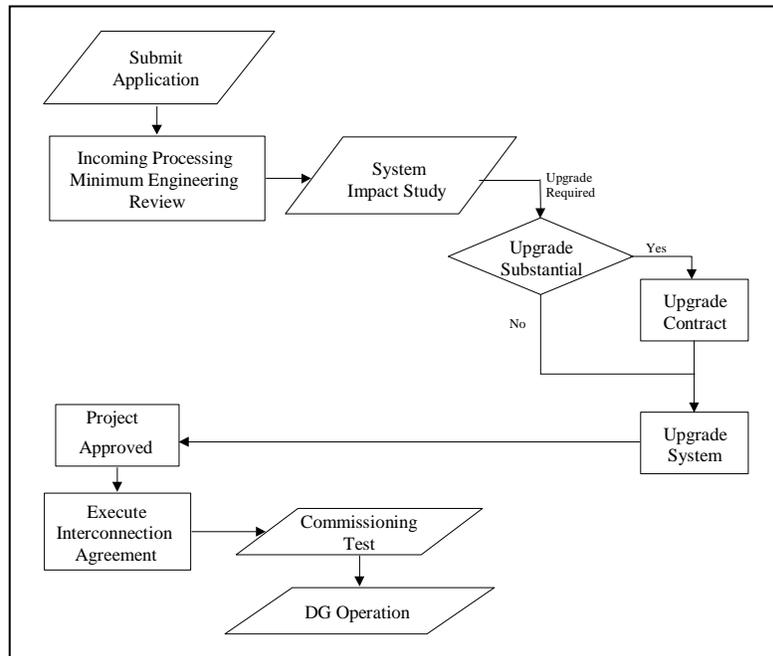


Figure 4
Process Flow 3
System Impact Study and System Upgrade Required

- 1) Submit Application – The DG owner/operator submits the application to NEC.
- 2) Incoming processing, minimum engineering review – Upon receipt of the preliminary application, an initial review is performed by the engineering staff at NEC.
- 3) System impact study – NEC determines that further information is necessary before approving application.
- 4) Additional information requested – The DG owner/operator submits the additional data requested by NEC.
- 5) Upgrade necessary – NEC determines that DG project can be implemented only after distribution system is upgraded.

- 6) Upgrade is substantial – If the upgrade is substantial, the DG owner/operator will be required to sign an Upgrade Contract and pay the cost of all system construction needed to accommodate the DG.
- 7) Proposed project approved – NEC approves project application after execution of Upgrade Contract.
- 8) Execute interconnection agreement - The DG owner/operator and NEC representative both sign the interconnection agreement. **The DG owner/operator will also need to negotiate an Electric supply/Purchase agreement with the current wholesale power supplier to NEC.**
- 9) Upgrade System – The distribution system is upgraded or modified to accommodate the DG unit. The upgrade is accomplished by NEC after the DG owner/operator has signed the Upgrade Agreement.
- 10) Commissioning test – The unit is tested prior to commercial operation to ensure that it meets all safety and performance standards. In addition, the settings of the equipment being installed are to be approved by NEC prior to DG operation.
- 11) DG Operation – DG unit begins operating and supplying power to the distribution system.

Application Processing Time

NEC has full responsibility for the review, approval or rejection of the DG interconnection application. The approval process is designed to ensure that interconnection of the applicant's DG project will not adversely affect distribution system operations.

As the application process proceeds, certain applications may require minor modifications while they are being reviewed. It is recommended that such minor modifications to a pending application shall not require that it be considered incomplete and treated as a new or separate application.

Upon receipt of a completed application, NEC will provide one of the following notifications to the DG applicant:

- Approval to interconnect;
- Approval to interconnect with a list of prescribed changes to the DG design;
- Justification and cost estimate for prescribed changes to distribution systems that are required to accommodate the DG unit; or,
- Application rejection with justification.

The interconnection process has been designed to specify the appropriate level of review and the associated technical and equipment requirements to be only as complex and expensive as required for safe operation of each DG project. The larger the project and

the more complex the interconnection scheme, the higher the costs, both for studying the interconnection scheme and for the necessary electrical equipment to interconnect.

Normally, it is anticipated that the application will be submitted, processed, and an interconnection agreement signed before construction activities begin. However, a DG applicant may choose to begin construction earlier, assuming any risk associated with possible rejection of the application. In any case, DG owners/operators must receive NEC approval before interconnection.

Study Fees

- NEC's engineering department has responsibility to evaluate the impact of a DG interconnection on the distribution system. The DG owner/operator will be required to sign an agreement to pay all costs incurred for studies and evaluation of the proposed interconnection.

NEC may reject an application for demonstrable reliability or safety issues but will work to resolve those issues to the mutual satisfaction of NEC and applicant.