

MINNESOTA

QUICK START – SUMMARY OF PROCESS AND REQUIREMENT

The interconnection process is designed to accomplish three goals: safety, economics, and reliability. The first and foremost important issue is safety; safety for you and your project, safety for our other customers, and safety for our employees working on the electrical system. Second is economics; the interconnection design must be affordable, while maintaining safety and a reliable electrical system. The final item is reliability; your project and the electrical system should be reliable.

Interconnecting to the electrical system entails four basic phases:

1. Determine interconnection type and data gathering
2. Application for interconnection
3. Sign agreements
4. Construction

It should be noted that for a very basic installation, the minimum time to complete steps 1 through 3 is 30 days and could take longer for a more complex project.

There are a number of options and subset of options for interconnecting a generator to the Area Electric Power System (EPS), Area Electric Power System or the local electric utility's distribution system. This packet of information will help inform you of these options and the associated requirements, so you can make an informed decision on how to develop your project. The key to the interconnection process is gathering the necessary information, as this will reduce your time to get an interconnection.

This information can also be found on the web at:

<http://www.otpc.com/NewsInformation/GeneratorInterconnectDist.asp>

PHASE 1

One of the first decisions to make is the type of interconnection. There are different types of interconnection, from having a generator that is isolated from the Area EPS to selling all generation. Below is a summary table of Section 3 of Distributed Generation Interconnection Requirement, for the full document see Tab 2, indicating the types of interconnections available.

TYPES OF INTERCONNECTIONS

	Time connected to Area EPS	Sale to Otter Tail Power	Sale to other than Otter Tail Power
Open Transition Mechanically Interlocked	Not allowed	Not allowed	Not allowed
Quick Open Transition Mechanically Interlocked	Not allowed	Not allowed	Not allowed
Closed Transition	<11 millise	Not allowed	Not allowed
Soft Loading Limited Parallel Operation	<2 mins	Not allowed	Not allowed
Soft Loading Extended Parallel Operation	Continuous	Allowed	Allowed **
Inverter Connection	Continuous	Allowed	Allowed **

Once the type of interconnection is determined, the next step is to understand the issues and technical requirements. Once these requirements are understood, one can start gathering the necessary information for the interconnection application and agreements. The tables on the next few pages are a summary of the technical requirements in the Distributed Generation Interconnection Requirement.

ISSUES & TECHNICAL REQUIREMENTS

Section	Visual Disconnect 4.A.i	Energization of Equipment 4.A.ii	Power Factor 4.A.iii	Grounding 4A..iv	Fault/ Line Clearing/ Interference 4.B	Synchronization 4.B.v
Open Transition Mechanically Interlocked	N/A	N/A	N/A	X	N/A	N/A
Quick Open Transition Mechanically Interlocked	X	X	N/A	X	N/A	X
Closed Transition	X	X	>90%	X	X	X
Soft Loading Limited Parallel Operation	X	X	>90%	X	X	X
Soft Loading Extended Parallel Operation	X	X	90% lag to 95% lead	X	X	X
Inverter Connection	X	X	90% lag to 95% lead	X	X	

N/A – Not Applicable

X - Required

Your equipment supplier or Professional Engineer should be able to provide you with the necessary documentation.

Metering, Monitoring and Control Requirements			
Section 5			
Generation System Capacity at Point of Common Coupling	Metering	Generation Remote Monitoring	Generation Remote Control
<40 kW with all sales to Otter Tail Power	Bi-Directional metering at the point of common coupling	None Required	None Required
<40 kW with sales to a party other than Otter Tail Power	Recording metering on the Generation System and a separate recording meter on the load	Interconnection Customer supplied direct dial phone line.	None Required
40 – 250 kW with limited parallel	Detented Otter Tail Power Metering at the Point of Common Coupling	None Required	None Required
40 – 250 kW with extended parallel	Recording metering on the Generation System and a separate recording meter on the load	Interconnection Customer supplied direct dial phone line. Otter Tail Power to supply it's own monitoring equipment	None Required
250 – 1000 kw with limited parallel operation	Detented Otter Tail Power Metering at the Point of Common Coupling	Interconnection Customer supplied direct dial phone line and monitoring points available. See B(i)	None Required
250 – 1000 kw with extended parallel operation	Recording metering on the Generation System and a separate recording	Required Otter Tail Power remote monitoring system.	None Required

	meter on the load	See B(i)	
>1000 kw with limited parallel operation	Detented Otter Tail Power Metering at the Point of Common Coupling	Required Otter Tail Power SCADA monitoring system. See B(i)	None Required
>1000 kw with extended parallel operation	Recording metering on the Generation System and a separate recording meter on the load	Required Otter Tail Power SCADA monitoring system. See B(i)	Direct Control via SCADA by Otter Tail Power of interface breaker.

“ Detented” = A meter which is detented will record power flow in only one direction.

SUMMARY OF RELAYING REQUIREMENTS

SECTION 6

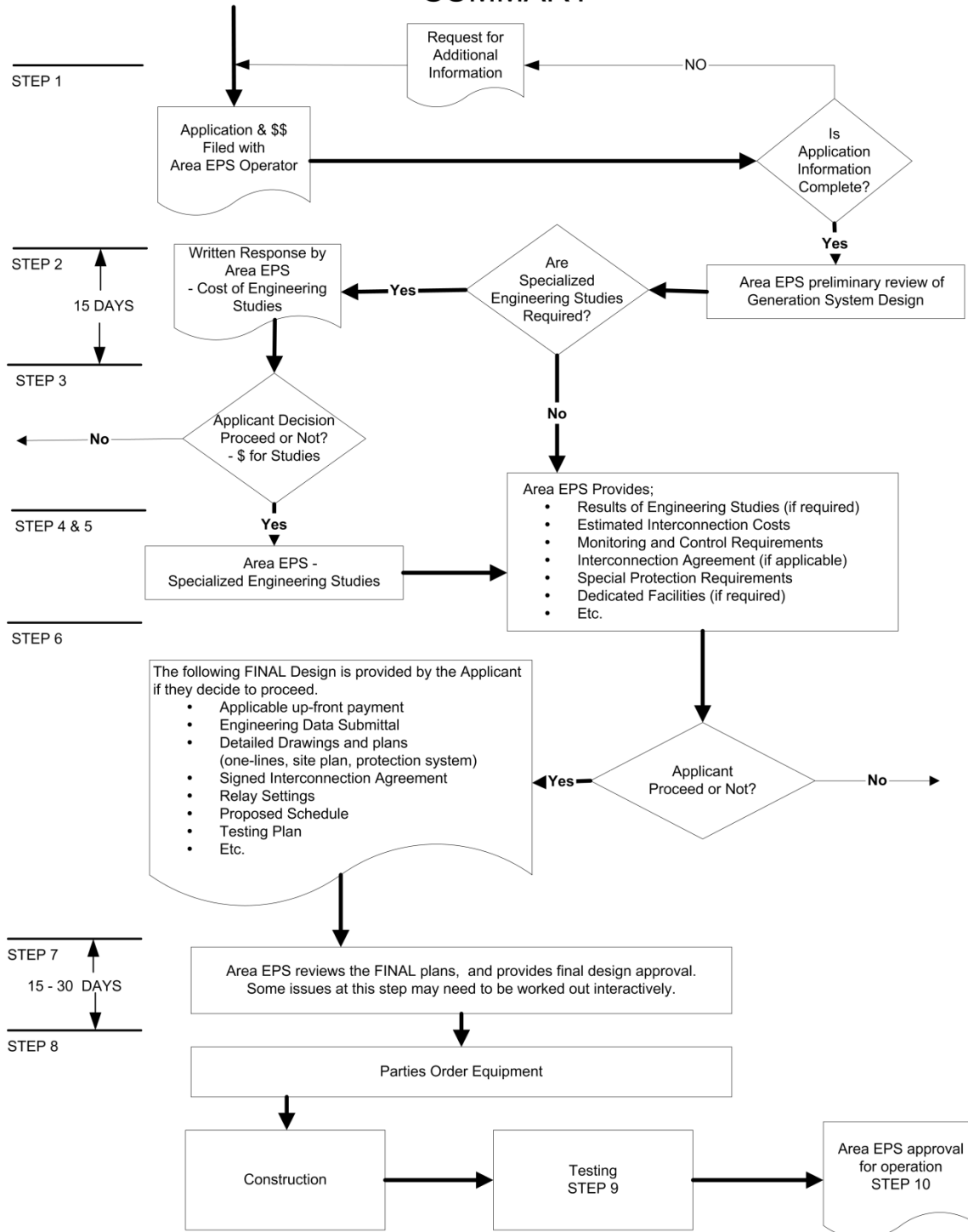
Type of Interconnection	Over-current (50/51)	Voltage (27/59)	Frequency (81 O/U)	Reverse Power (32)	Lockout (86)	Parallel Limit Timer	Sync-Check (25)	Transfer Trip
Open Transition Mechanically Interlocked	—	—	—	—	—	—	—	—
Quick Open Transition Mechanically Interlocked	—	—	—	—	Yes	Yes	Yes	—
Closed Transition	—	—	—	—	Yes	Yes	Yes	—
Soft Loading Limited Parallel Operation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Soft Loading Extended Parallel Operation <250 kW	Yes	Yes	Yes	—	Yes	Yes	Yes	—
Soft Loading Extended Parallel	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes

Operation >250kW								
Inverter Connection								
<40 kW	Yes	Yes	Yes	—	Yes	—	—	—
40 kW–250 kW	Yes	Yes	Yes	—	Yes	—	—	—
>250 kW	Yes	Yes	Yes	—	Yes	—	—	Yes

PHASE 2

The chart below is a summary of the Interconnection Process for Distributed Generation Systems, see Tab 2 for a complete step-by-step description. This phase is set up so that you can make an informed decision on your project before starting the next step. For example, the first step, after having your application deemed complete, is for the Area EPS to perform a preliminary screening study to determine if there are any issues identified with interconnecting your project to the Area EPS. By understanding if there are any potential issues, you can make an informed decision whether you would like to continue on to the next step or not. If you do decide to continue on, your project may have additional studies conducted depending on the results of the preliminary study. If additional study work is required, you will again have the opportunity to make an informed decision on your project before signing any interconnection agreements.

DISTRIBUTED GENERATION INTERCONNECTION PROCESS SUMMARY



To start this process, use the information gathered in step 1 and fill out an application form and send it, along with your application fee, to the Interconnection Coordinator. The table below shows you what the initial fee is. It should be noted that if additional engineering studies are required, additional fees may be required.

APPLICATION FEE

Interconnection Type	< 20kW	>20 kW & < 250 kW	>250 kW & < 500 kW	>500 kW & < 1000 kW	>1000 kW
Open Transfer	\$0	\$0	\$0	\$100	\$100
Quick Closed	\$0	\$100	\$100	\$250	\$500
Soft Loading	\$100	\$250	\$500	\$500	\$1000
Extended Parallel (Pre Certified System)	\$0	\$250	\$1000	\$1000	\$1500
Other Extended parallel Systems	\$100	\$500	\$1500	\$1500	\$1500

PHASE 3

During this step, there are a number of agreements that need to be in place before construction can begin. Most of these use information gathered during the application stage. The agreements include:

- Interconnection Agreement (IA)
- Operating Agreement (Exhibit to IA)
- Maintenance Agreement (Exhibit to IA)
- Uniform Statewide Contract for Cogeneration and Small Power Production Facilities

PHASE 4

Area EPS will start to construct the necessary facilities required for your project.