TABLE OF CONTENTS

Page

1.0 INTRODUCTION 3

1.1 Purpose 3
1.2 Scope 3
1.3 Deviation 3
1.4 Insurance 3
1.5 Safety 4

2.0 DEFINITIONS 4

3.0 SYSTEM VOLTAGES 5

4.0 RIGHT TO DISCONNECT 6

5.0 PRE-INTERCONNECTION STUDIES. 6

6.0 GENERATORS PERMITTED 7

6.1 Limits on Three Phase Generators 7
6.2 Limits on Single Phase Generators 7

7.0 GENERAL INTERCONNECTION REQUIREMENTS 7

7.1 Customer's Equipment and Interconnection Standards 7
7.2 Protection of Customer's Equipment 8
7.3 Drawings 8
7.4 Changes to Company Facilities 8
7.5 Power Factor 8
7.6 Voltage Regulation 8
7.7 Interrupting For Faults 8
7.8 Voltage Flicker 9
7.9 Frequency 9
7.10 Harmonics 10
8.0 Transformer Connections 10

9.0 INSPECTION AND TESTS 12

10.0 CUSTOMER RESPONSIBILITIES 12

10.1 Operations 12
10.2 Maintenance 12
10.3 Load Shed 12

11.0 PROTECTION REQUIREMENTS 13

11.1 Changes to Company Fault Interruption Equipment 13
11.2 Protection Equipment 13
11.3 Disconnect Switch 13
11.4 Energizing Dead Circuits 13
11.5 Protection from Automatic Reclosing 13
11.6 Synchronous Generators 14
11.7 Induction Generators and Inverter Systems 14
11.8 Requirements for Units 10 kW or Less 14
11.9 Requirements For Units 11 kW to 500 kW 14
11.10 Requirements For Units 501 to 1,000 kW 15
11.11 Requirements for Units 1,001 to 20,000 kW. 15

12.0 METERING REQUIREMENTS 15

13.0 MODIFICATIONS TO COMPANY OR CUSTOMER FACILITIES 16

13.1 Company Changes to Distribution System 16
13.2 Customer Changes to Interconnection 16

14.0 REFERENCES 16

15.0 ATTACHMENTS 17

15.1 Metering Arrangements 17
15.2 Customer DG Technical Requirements Checklist 19
15.3 Application For Distribution Interconnection 20

1.0 Introduction

Customer owned generating equipment may be operated in parallel with the distribution system pursuant to an interconnection agreement, provided that the equipment meets the requirements of this standard.

1.1 Purpose

The purpose of this standard is to set forth the requirements, application procedure, and procedures for connection and safe operation of distributed generation in parallel with the distribution system. There may be costs to the generator owner associated with the interconnection. This standard identifies the nature of those costs.

1.2 Scope

This document sets forth the requirements for interconnection of customer owned, single and three phase distributed generation, up to 20,000 kW, that operates in parallel with the Company's distribution system at voltages up to and including 34.5 kV. This standard describes typical interconnection requirements. Some installations may have additional requirements.

The rules of Federal, state or local regulatory agencies shall take precedence over these requirements.

Requirements for customer owned emergency or standby generators using closed transition automatic transfer switches that parallel with the distribution system for no more than 100 milliseconds **are not** addressed by this document. These are covered by other Company policies.

1.3 Deviation

In the event that requirements for a specific unit or facility are not set out in this document, the Customer may interconnect a facility using requirements authorized by the Corporate Manager of Distribution. Deviation from this document may be made only with the consent of the Corporate Manager of Distribution or his designee.

If the Company concludes that an application for parallel operation describes facilities that may require additional devices and operating schemes, the Company shall make those additional requirements known to the Customer before the application can be approved and before interconnection can be made.

1.4 Insurance

Insurance may be required as part of the interconnection contract.

1.5 Safety

The safety of the general public, Company employees and equipment shall in no way be reduced or impaired as a result of the interconnection. In general, the Customer's facilities will be held to the same standard of care that the Company is required to maintain.

2.0 Definitions

Abnormal operating conditions – A situation in which the Company is operating the distribution system in other than normal configuration, or under conditions that do not normally exist. Examples of abnormal operating conditions are: (1) high usage days when Customers are requested to conserve energy or, (2) switching feeders out for repairs and switching in alternate feeders.

Application for Distribution Interconnection - The form to be used to apply for approval to connect generation facilities to distribution systems. See attachment, item 15.3.

Company – any of the Southern Company operating subsidiaries.

Customer - Customer, his agent or partner connected to the Company's distribution system for the purpose of receiving or exporting electric power through the Company's distribution system.

Distributed generation (DG) - electric generation connected to a utility electric distribution system.

Distribution system – The Company's wires, equipment and facilities, with a voltage below 44 kV, to which the generation equipment is interconnected.

Facility - An electrical generating installation consisting of one or more on-site distributed generation units.

Interconnection - The physical connection of distributed generation to the distribution system so that parallel operation can occur.

Interconnection agreement – The document that sets forth the contractual conditions under which the Company and a Customer agree that a facility may be interconnected with the Company's distribution system.

Interconnection equipment - All equipment installed solely to interconnect and exchange power between the Customer's generation facility and the Company's distribution system.

Metering, bi-directional - A method of metering that allows the customer to reduce energy usage with energy generated simultaneous with the usage, measuring purchased electric energy and electric energy delivered to the Company separately so that purchased energy and energy sold are at different rates. This method allows the customer to sell only the electric energy generated in excess of his usage. See 15.1, Metering Arrangements, Category 2.

Metering, independent - A method of metering, that independently measures purchased electric energy and generated electric energy, allowing the total generated electric energy to be sold to the Company at a different rate than the purchased electric energy rate. See 15.1, Metering Arrangements, Category 4.

Metering, net - A method of metering that allows for the electric energy delivered to the Company at any time during the billing cycle to be subtracted from a customer's purchased electric energy during the same billing cycle, thus compensating the customer for generated electric energy at the same retail rate that electric energy is purchased. This method of metering is not permitted.

Network secondary distribution system – a system of distribution in which the secondary of distribution transformers are connected to a common network for supplying electric power to consumers.

Parallel operation - The operation of electric generation connected to the utility electric distribution system.

Point of interconnection - The point of connection of the customer's service equipment to the utility electric system.

Power delivered – energy supplied by the utility to the customer (generator owner).

Power received – energy supplied by the customer (generator owner) to the utility.

Telemetering- Communications equipment used to obtain information or control the generator, including, but not limited to an RTU, antenna, pole for the antenna, telephone etc.

3.0 System Voltages

The Company's distribution systems available for parallel generation operations are grounded wye configuration of various voltage levels up to 34.5 kV (phase to phase).

The voltage level available for connecting the DG to the system depends on the location and the size of the generation.

4.0 Right to Disconnect

The Company may disconnect a distributed generation unit from the distribution system for any of the following conditions:

1. Expiration, termination or lack of interconnection agreement.
2. Non-compliance with the technical requirements.
3. System emergency.
4. Situations when continued interconnection will endanger persons or property.
5. Routine or emergency maintenance, repairs, or modifications to the distribution system.
6. Violation of environmental laws or regulations.
7. Decrease in the quality or reliability of electric service to other customers due to Customer equipment.
8. Hazardous conditions.

5.0 Pre-Interconnection Studies.

Pre-interconnection study - A study by the Company of a proposed interconnection with the utility distribution system. Pre-interconnection studies may include, but are not limited to:

(a) **Site visit** – A review to determine the system voltage and interconnection requirements at the proposed site of the distributed generation (DG).

(b) **Coordination study**- An engineering analysis that determines whether the presence of the DG unit at a particular location would interfere with the protective fusing and relaying on the distribution system. It includes a review of the fault current contribution by the DG unit and the effects on the Company distribution system.

(c) **Distribution system study** – An engineering analysis that models the distribution system with the proposed DG in place to determine whether the feeder will support the DG unit without reliability problems or interruptions in service to other customers. The analysis includes a review of the DG contribution to power flow, and the effects on the distribution system voltage.

(d) **Network study** – An engineering analysis to determine whether a distributed generation facility can be added to a network secondary distribution system.

The Company may, at the Customer's expense, conduct pre-interconnection studies prior to interconnection of a distributed generation facility. Inverter and other types of generators, that are single phase and smaller than 10 kW, or three phase, smaller than 75 kW, and are listed to UL 1741 will not require studies.

Aspects of network secondary distribution systems are unique and present technical difficulties to interconnection. In all cases the Company will conduct pre-interconnection studies to determine if distributed generation may be connected to the network secondary distribution system as defined in section 2.0.

6.0 Generators Permitted

Single and three-phase alternating current generating units, including synchronous, induction, and various inverter controlled systems, can be operated in parallel with the distribution system. The total connected capacity shall not exceed 20,000 kW.

6.1 Limits on Three Phase Generators

If three-phase service is not available in the area, or if Company facilities must be upgraded to enable the Customer to interconnect, the Customer may incur additional cost for such service or improvements as determined by the Company. The Company reserves the right to refuse three-phase service.

6.2 Limits on Single Phase Generators

Where necessary, to avoid the potential for a generating facility to cause problems with the service of other Customers, the Company may limit the capacity and operating characteristics of single-phase generators in a manner consistent with its existing limitations for single-phase motors. Ordinarily, single-phase generators shall be limited to a capacity of 10 kW or less.

7.0 General Interconnection Requirements

The Customer's distributed generation facilities shall meet the technical requirements as prescribed in this section. The Company reserves the right to impose additional requirements as necessary.

7.1 Customer's Equipment and Interconnection Standards

The Customer's generation and interconnection installation must meet all applicable federal, state, and local construction and safety codes.

The Customer shall be responsible for the design, installation, operation and maintenance of all equipment and facilities installed or that will be installed on the

Customer's side of the point of interconnection. Such design shall meet the latest standards of IEEE, NEMA, ANSI, NEC, other national codes and any local codes pertaining to the design and construction of electrical facilities. The facility shall be subject to the requirements of all authorities having jurisdiction and shall comply with all applicable codes and ordinances.

7.2 Protection of Customer's Equipment

The Customer will be responsible for protecting its generating equipment in such a manner that distribution system outages, short circuits or other disturbances do not damage the Customer's generating equipment.

7.3 Drawings

Adequate drawings of the Customer's proposed generation facility, which include a one line diagram and diagrams of the relay system, may be required for review. Additional drawings may also be required.

7.4 Changes to Company Facilities

The Customer may be responsible for the cost of additional equipment that must be installed by the Company on its distribution system to allow parallel operation.

7.5 Power Factor

The power factor at the point of interconnection shall be according to the rate schedule for the installation.

7.6 Voltage Regulation

Unless otherwise specified by the PSC or other applicable regulatory authority, the Customer will operate his generating equipment within the ranges specified by ANSI C84.1 Table 1, Range A, measured at the point of interconnection. On a 120 volt basis, this range is 114-126 volts.

7.7 Interrupting For Faults

The Customer's equipment shall automatically disconnect the generation from the distribution system, within the times shown, if the voltage falls within those shown in Table 1 below.

Table 1

Response to Abnormal Voltages Under Fault Conditions	
Percent of Normal Voltage	**Clearing Time in Seconds**
Below 50	0.16
50 to 88	2.0
110 to 120	1.0
120 and above	0.16

In the event the Customer's generator fails to disconnect, creating a hazardous condition on the Company's system, the customer shall be liable for resulting damage and injuries.

Unless otherwise agreed to, reconnection shall be permitted 5 minutes after the utility voltage and frequency return to normal range.

7.8 Voltage Flicker

The generation shall not create objectionable voltage flicker for other customers, as determined by Southern Company. Failure to meet these limits may result in immediate disconnection by the Company until corrected. For additional guidance see the Southern Company Flicker Policy.

7.9 Frequency

When the system frequency is in a range shown in Table 2, the Customer's generating equipment shall automatically disconnect from the distribution system as indicated. Where adjustable clearing times are shown, the settings will be coordinated with the Company.

Table 2

Response to Abnormal Frequency Conditions		
Generator Size	**Frequency Range (Hz)**	**Clearing Time in Seconds**
30 kW and smaller	Below 59.3	0.16
	Above 60.5	0.16
Larger than 30 kW	Below 57.0	0.16
	57.0-59.8	Adjustable 0.16 to 300
	Above 60.5	0.16

7.10 Harmonics

The Customer must comply with the Southern Company Harmonics Policy. Generally, equipment that is certified as meeting UL 1741 requirements will comply with this policy.

8.0 Transformer Connections

Six interconnection transformer configurations are used to interconnect generators with the utility system; each has inherent advantages and disadvantages. Regardless of which party owns the interconnection transformer, it is important that the impacts to the distribution system be considered. The interconnection transformer connection can adversely affect the utility feeder protection scheme, and can have adverse effects on the lightning arresters on the feeder. When the transformer is customer owned, it is important that the connection type be provided to the Company so that the impacts to the utility electric system can be considered. Additionally, the use of neutral resistors at the transformer, generator, or both, has impacts that must be considered. Certain configurations may not be acceptable depending on the effect it has to the distribution system, while others may require modifications to the distribution system. Table 3 shows six configurations, noting problems and advantages of each type.

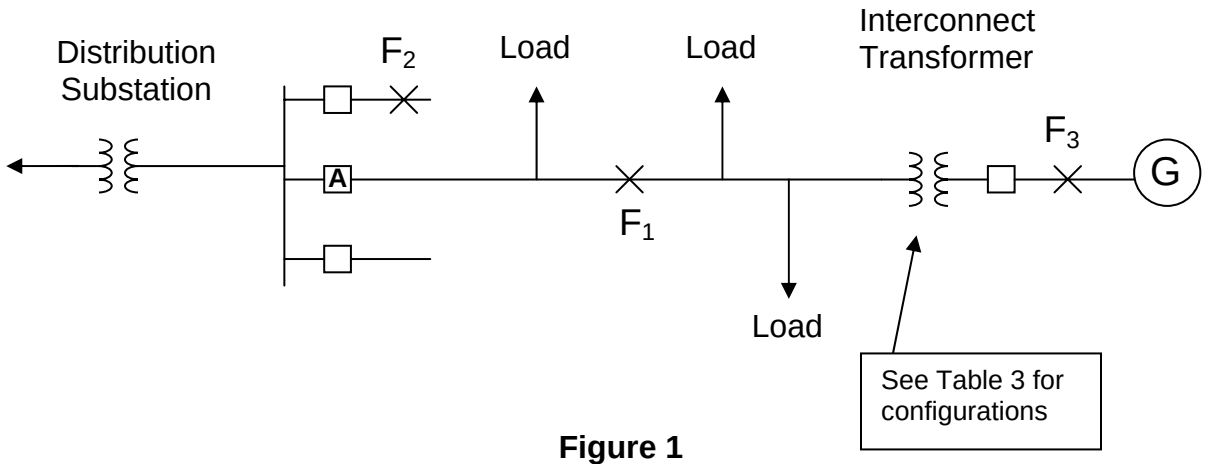
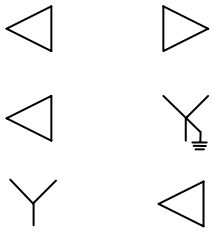


Figure 1

Table 3

Interconnect Transformer Connections High Voltage Low Voltage	**Problems**	**Advantages**
	Can supply the feeder circuit from an ungrounded source after substation breaker **A** trips causing overvoltage.	Provides no ground fault backfeed for fault at F_1 & F_2. No ground current from breaker **A** for a fault at F_3.
	Provides an unwanted ground current for supply circuit faults at F_1 and F_2, and reduces ground current at breaker **A** for restricted faults at F_1	No ground current from Breaker **A** for faults at F_3. No overvoltage for ground fault at F_1.
	Allows source feeder relaying at **A** to respond to a secondary ground fault at F_3.	No overvoltage for ground fault at F_1.
 Resistance grounded neutral	Can supply the feeder circuit from a resistance grounded source, after substation breaker **A** trips, causing overvoltage.	Provides reduced ground fault backfeed for fault at F_1 & F_2. Reduced ground current from breaker **A** for a fault at F_3.

9.0 Inspection and Tests

The Company reserves the right to inspect and/or observe the testing, of any of the Customer's protective equipment that is essential to the interconnection, including relays, circuit breakers, protective devices and related equipment, but has no responsibility either actual or implied to do so. Inspection may include simulated test tripping of the Customer's interconnection breakers by the protective relays to verify all protective set points and relay/breaker trip timing prior to connection to the Company system. Unless waived, this inspection and testing shall be performed prior to interconnected operation of the generator.

The Customer shall provide the Company with notice at least two weeks before the initial energizing and start-up testing of the Customer's generating equipment so that the Company may witness the testing of any equipment and protective systems associated with the interconnection.

The Company reserves the right to perform additional inspections or tests of the Customer's protective equipment any time a system emergency develops, safety issues arise, or the quality of service to other Customers deteriorates, as deemed necessary by the Company.

10.0 Customer Responsibilities

10.1 Operations

The customer is solely responsible for proper operation of the customer's generation facilities.

10.2 Maintenance

The Customer may be required to maintain records of maintenance activities, which the Company may review at reasonable times. Maintenance records should be made available for the Company's inspection upon request. The Company reserves the right to inspect the records, but has no responsibilities for maintenance either actual or implied.

10.3 Load Shed

If the generator drops off line, an automatic load shed scheme may be required to shed the Customer's load should this additional load exceed the available capacity of or cause excessive voltage sag on the distribution circuit. Such requirements shall be noted in the contract and communicated to the appropriate Distribution Operations Center.

11.0 Protection Requirements

11.1 Changes to Company Fault Interruption Equipment

A customer generator on the distribution system is an additional source of fault current. The Customer may be required to limit the fault current. Should the Company be required to make changes due to the additional fault contribution, the Customer may have to pay the cost of the required changes.

11.2 Protection Equipment

The necessary protective equipment shall be established in the design phase and confirmed prior to start-up of the Customer's generation facilities. The Company has the right to require certain protective devices, including relays that the Customer must install. Settings of interconnection protective devices on the Customer's system will be specified by the Customer, but will be reviewed by the Company. The Company may request changes to the Customer's relay settings.

11.3 Disconnect Switch

The Customer's generation facilities shall have a visible break, lockable, manually operated disconnect switch, at the service entrance, in a location accessible to Company personnel. The Company reserves the right to open the disconnect switch without prior notice for any of the reasons noted in item 4.0. At the Company's discretion, the revenue meter may serve as the disconnect switch, for use only by Company personnel.

11.4 Energizing Dead Circuits

The Customer shall not energize a de-energized Company distribution circuit.

11.5 Protection from Automatic Reclosing

The Company normally applies automatic reclosing after fault clearing on all overhead distribution lines. The duration of outages due to clearing temporary faults is most frequently in the range of 0.1 - 2.0 seconds, but varies depending on many factors. The automatic reclosing schemes often assume that the circuit is dead and do not employ any voltage check, phasing, or synchronization schemes. The customer must insure that his generation is disconnected from the distribution system prior to automatic reclosing. The Company will assume no responsibility for damage to the customer's equipment due to out–of–phase reclosing.

It is possible to install voltage check schemes at some locations on the Company system to prevent automatic reclosing. At the discretion of the Company, these voltage check schemes may be installed at the customer's expense. When these

schemes are contemplated, both the preferred and the alternate circuits that can supply power should be considered.

11.6 Synchronous Generators

Overcurrent devices (circuit breakers) for synchronous generators shall be three-phase devices with electronic or electro-mechanical control. The Customer is solely responsible for properly synchronizing its generator with the distribution system.

11.7 Induction Generators and Inverter Systems

Induction generation may be connected and brought up to synchronous speed as induction motors if it can be demonstrated that the initial voltage drop measured on the distribution system at the point of interconnection is within the limits stated in the Southern Company Flicker Policy. The Customer may be required to install equipment or employ other techniques to bring voltage fluctuations to acceptable levels.

Self-commutated inverters, whether of the utility-interactive type or stand-alone type, shall be used in parallel with the distribution delivery system only with synchronizing equipment. Line-commutated inverters do not require synchronizing equipment.

11.8 Requirements for Units 10 kW or Less

These Facilities shall have:

a. Accessible, lockable, visible break disconnect switch at the service entrance.

b. Over-current protection.

c. Over/under voltage trip.

d. Over/under frequency trip.

e. Manual or automatic synchronizing (may omit if not capable of stand alone operation).

Note: Inverter based units that meet the non-islanding requirements of UL 1741 will satisfy requirements b-e.

11.9 Requirements For Units 11 kW to 500 kW .

These facilities shall have:

a. Accessible, lockable, visible break disconnect switch at the service entrance.

b. Over-current protection.

c. Over/under voltage trip.

d. Over/under frequency trip.

e. Manual or automatic synchronizing (may omit if not capable of stand alone operation).

f. Ground fault detection and tripping.

g. Reverse power tripping, if not exporting.

Note: Inverter based units that meet the non-islanding requirements of UL 1741 will satisfy requirements b-g.

11.10 Requirements For Units 501 to 1,000 kW.

These facilities shall have:

a. Accessible, lockable, visible break disconnect switch at the service entrance.

b. Over-current protection.

c. Over/under voltage trip.

d. Over/under frequency trip.

e. Automatic synchronizing (may omit if not capable of stand alone operation).

f. Ground fault detection and tripping.

g. Reverse power tripping, if not exporting.

11.11 Requirements for Units 1,001 to 20,000 kW.

These facilities shall have:

a. Accessible, lockable, visible break disconnect switch at the service entrance.

b. Over-current protection.

c. Over/under voltage trip.

d. Over/under frequency trip.

e. Automatic synchronizing (may omit if not capable of stand alone operation).

f. Ground fault detection and tripping.

g. Reverse power tripping, if not exporting.

h. Automatic voltage regulation, with settings determined by the Company.

12.0 Metering Requirements

Section 15.1 outlines four metering arrangements utilized by the Company. Net metering is prohibited unless provided for by state law or regulation.

Telemetering may be required depending on the output or the application of the Customer's generating facility. Generally, generators smaller than 500 kW will not require telemetering. The customer may be required to reimburse the Company for telemetering.

13.0 Modifications to Company or Customer Facilities

13.1 Company Changes to Distribution System

The distribution system is a dynamic and changing system. The Company reserves the right to make changes from time to time. The Customer may be responsible for paying for some or all modifications required for reconnecting to the Company's reconfigured distribution system.

13.2 Customer Changes to Interconnection

The Customer shall notify the Company to obtain prior approval for any proposed modifications to the interconnecting scheme.

14.0 References

IEEE Std. C37.95, Guide for Protective Relaying of Utility-Consumer Interconnection (Latest revision)

IEEE Std. 519-1992, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems,

IEEE Std. 141-1993 Recommended Practice for Electric Power Distribution for Industrial Plants,

IEEE Std. 929 Recommended Practices For Utility Interface of Photovoltaic (PV) Systems

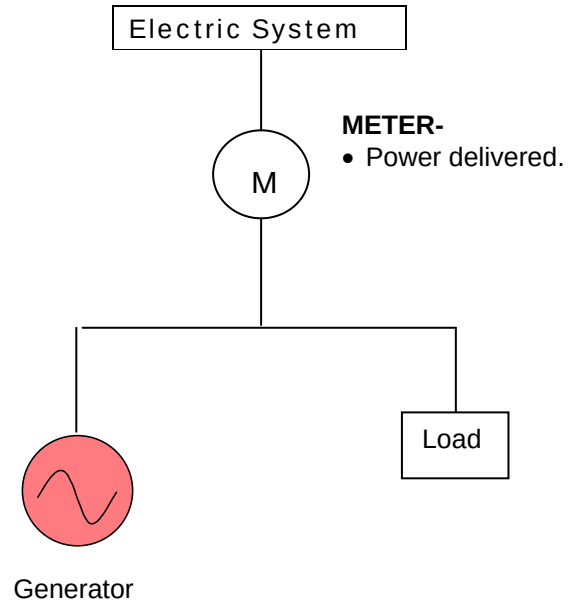
UL 1741 Standard for Inverters, Converters, and Controllers for Use in Independent Power Systems

IEEE Std. 1547-2003 Standard for Interconnecting Distributed Resources With Electric Power Systems

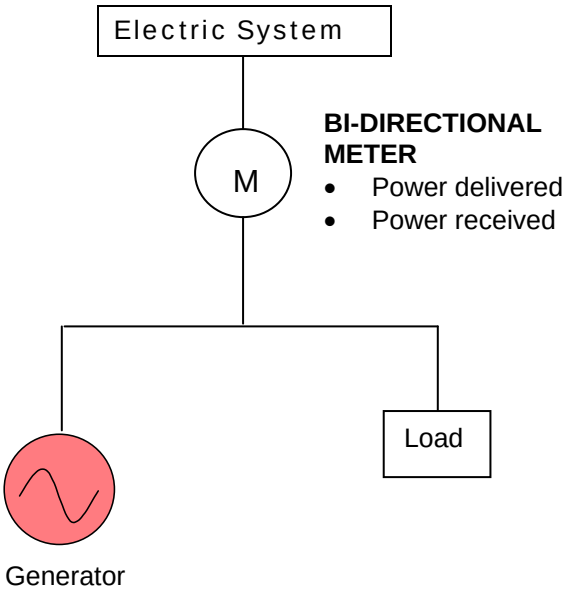
15.0 Attachments

15.1 Metering Arrangements

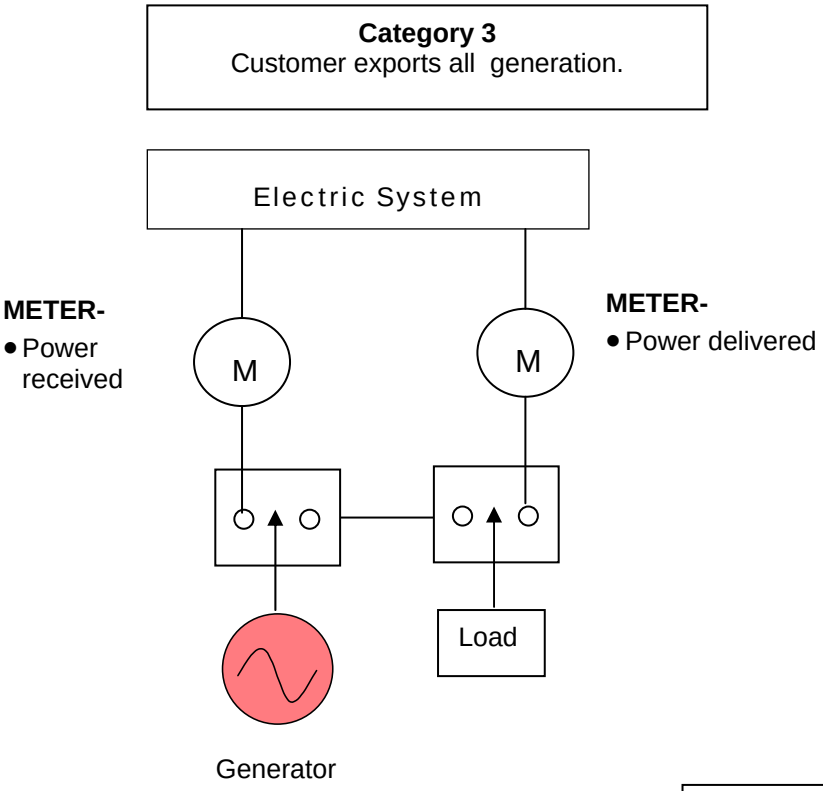
Category 1
Customer does not export power.

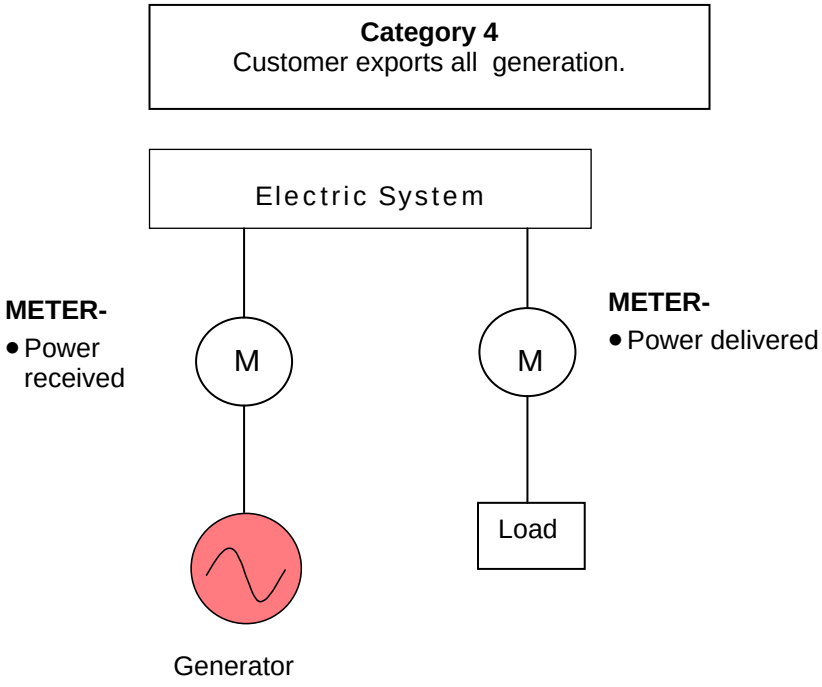


Category 2
Customer may export.



15.1 Metering Arrangements (Continued)





15.2 Customer DG Technical Requirements Checklist

This is a summary of the requirements.

Requirement	Comments
a. Accessible, lockable, visible break disconnect switch at the service entrance.	
b. Overcurrent protection.	
c. Over/Under voltage tripping.	
d. Over/under frequency tripping.	
e. Manual or auto synchronizing.	
f. Ground fault detection.	
g. Reverse power tripping, if not exporting.	
h. Automatic voltage regulation.	

15.3 Application For Distribution Interconnection

The Customer or his designated representative shall supply the following information.

Customer Name: _____

Service Address: _____

No. of Generators _____ Manufacturer _____ Model No: _____

kW Rating _____ kVA Rating _____Power Factor_____

Voltage Rating: _____ Number of Phases: _____Frequency: _____

Type (Synchronous, Induction, photo-voltaic, micro-turbine, fuel cell etc.) _____

Amount of power to be exported. _____kW

Description of normal operation of distributed generation: (examples: provide power to meet base load, demand management, provide standby power)

_____

_____

_____

Is one line diagram attached?_____ Is disconnect device location shown?_____

Is list of specifications on protective devices attached? _____

Expected Start-up Date: _____

Submitted by: _____Title: _____

Signature _____Date: _____

Address _____

Phone Number: _____e-mail: _____

Fax: _____

Return completed application to your local contact: