

Distribution Network Code

Version 6.2

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This document is approved by the National Energy Regulator of South Africa (NERSA)

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1. Objectives

- (1) To set the basic rules of connecting to the *Distribution System*.
- (2) To ensure that all *users* of the *Distribution System* are treated in a non-discriminatory manner.
- (3) To specify the technical requirements to ensure the safety and reliability of the *Distribution System*.

2. Scope of Application

- (1) The Distribution Network Code shall apply to all users of the *Distribution System* including :
 - (a) *Distributors*
 - (b) *Embedded Generators*
 - (c) *End-use customers*
 - (d) *Retailers*
 - (e) *Generators*
 - (f) Any other entities with equipment connected to the *Distribution System*

3. Distribution System Connection Process and Procedures

3.1 Connection Arrangements

- (1) *Customers* seeking a new connection to the *Distribution System* shall lodge an application to connect to the *Distribution System* with the relevant *Distributor*. A sample application form is attached in appendix A. Each *Distributor* shall develop its own application form.
- (2) *Customers* applying for *MV* and *HV* supplies should provide additional information on fluctuating loads, capacitor banks and reactors that could affect the performance of the *Distribution System*.
- (3) Upon receiving the application for connection the *Distributors* shall comply with all other requirements relevant to the connection process specified in this code.

3.2 Application for Connection

- (1) Upon receipt of the application for connection to the *Distribution System*, the *Distributor* shall advise whether the *applicant* can be connected to the existing system and / or what technical improvements are required to enable the new connection.
- (2) The *Distributor* shall provide an offer to connect and if accepted by the customer, both parties shall enter into a connection agreement.
- (3) The connection agreement shall include information such as project planning data, inspection, testing and commissioning programs, electrical diagrams and any other information the *Distributor* may deem necessary to proceed with the processing of the application for connection.
- (4) If the application for connection has been declined, the *Distributor* shall advise the *customer* on the alternative options available for connection to make the connection successful.
- (5) If the *customer* and the *Distributor* cannot reach an agreement on the proposed connection, a dispute resolution process as outlined in the Governance Code will be followed by the *parties*.
- (6) Subject to clauses 3.2 (2) and 3.2 (3), the *Distributor* shall prepare an *offer to connect* to the *customer* within the period specified in *NRS 047*, unless otherwise agreed by the *participants*.
- (7) The offer to connect supplied by the *Distributor* shall be fair and reasonable and may contain alternative options available to the *customer*.
- (8) Any negotiations taking place between the *parties* shall be conducted in good faith and any information provided shall be treated in a confidential manner by both parties.

4. Responsibilities of the Distributors

- (1) The *Distributor* shall make capacity available on its networks and provide open and non-discriminatory access for the use of this capacity to all *customers* including *Embedded Generators*. In exchange for this service, the *Distributor* is entitled to a fair compensation through electricity tariffs as described the Tariff Code.
- (2) Each *Distributor* shall make available to the *customers* the Customer Connection Information Guide. This guide shall cover as a minimum:
 - a) Process to follow when applying for supply at the specific *Distributor*
 - b) Information requirements of the *Distributor* from the *customer* to effect an appropriate connection.
 - c) Process and related timeframes which follow the application.
- (3) The *Distributor* shall respond to the customer's request to connect within the period specified in *NRS047*.
- (4) The *Distributor* shall enter into a connection agreement with the *customer* prior to the actual connection to the *Distribution System*.

- (5) The *Distributor* shall advise potential *customer* of the expected reliability of its network upon request.
- (6) The *Distributor* may participate in the final inspection and testing of *customer* equipment and facilities to be connected to its network.
- (7) The *Distributor* shall maintain its *DS* in accordance with good industry practice and *NRS 082*.
- (8) The *Distributor* shall be responsible for the planning, design and engineering specifications of the work required for the distribution system connection or expansion.
- (9) The *Distributor* shall conduct Distribution System Impact Assessment studies to evaluate the impact of additional loads or embedded generator or major modification to the *Distribution System*. The assessment conducted shall include the following where relevant:
 - (a) Voltage impact studies
 - (b) Impact on network loading
 - (c) Fault currents
 - (d) Coordination of protection systems
 - (e) Impact on the system's *quality of supply*
 - (f) Strengthening of the system
- (10) The *Distributor* shall refuse to connect any facility which the Distribution Impact Assessment studies indicate will have a deleterious effect, exceeding the parameters laid down in the *NRS 048* and the *NERSA Power Quality Directive*, when connected to the network.
- (11) The *Distributor* may request the *customer* to submit design information, drawings or other relevant information to the *Distributor* if the *Distributor* believes any proposed installation or modification has the potential to adversely or materially affect the performance of the *Distribution System*.
- (12) Should the results of the Distribution System Impact Assessment Studies of proposed new or altered equipment owned, operated or controlled by the *Distributor* or another customer indicate that there will be a material effect at the point of connection; the *Distributor* shall notify all affected *customers* prior to commissioning.
- (13) The *Distributor* shall provide on request of a *customer*, design information, drawings or other relevant information of the present or proposed *Distribution* installation.
- (14) The *Distributor* shall connect the *Embedded Generator* in accordance with the requirements of section 8 of this code.
- (15) *Distributor* employees or his agent entering the *customer* premises shall comply with the *customer* safety requirements.

5. Responsibilities of *customers* and /or *users*

- (1) *Customer(s)* shall provide safe access to the *Distributor* employees to carry out the installation, operation and maintenance of the *Distributor's* electrical equipment on the *customer's* premises.
- (2) *Customers* shall ensure that there is no unreasonable delay to access to the *Distributor's* equipment.

- (3) *Customers* shall be responsible for the removal and the reinstallation of any privately owned equipment for the *Distributor* to perform the installation work that the *customer* has requested.
- (4) *Customers* (excluding domestic supplies) shall, prior to commissioning, attempt to identify if new or altered equipment owned, operated or controlled by the *customer* could have a deleterious effect at the *point of connection*. The *customer* shall advise the *Distributor* should such deleterious effect be identified.
- (5) Where the *customer* believes the present, or proposed *Distributor* installation has the potential to adversely or materially affect the performance of the *customer's* plant, the *customer* may request the *Distributor* to submit design information, drawings or other relevant information.
- (6) In addition, *Customers* shall comply with the reasonable additional requirements specified by the relevant *Distributor* in respect of the technical and design requirements of equipment proposed to be connected to the *Distribution System*.

6. Distribution System Technical Requirements

6.1 Protection Requirements

- (1) The *Distributor's* protection system shall be appropriately designed and maintained to ensure optimal discrimination, safety and minimum interruptions to *customers*.
- (2) The *customer* shall install and maintain protection, which is compatible with the existing *Distribution System* protection. The *customer's* protection settings shall ensure coordination with the *Distributor's* protection.
- (3) The *customer* shall, on request, provide the *Distributor* with test certificates, prior to commissioning, of the protection system/s that are installed at the point of interface with the *Distributor*.
- (4) *Participant's* protection system shall, where applicable, make provisions to safeguard their own equipment from faults or conditions that may occur at the point of connection including loss of one or two phases of the three phase supply and low voltages on the phases and any auto-reclosing or sequential switching features that may exist on the *Distribution System*.
- (5) Where equipment or protection schemes are shared, the *participants* shall provide the necessary equipment and interconnections to the equipment of the other party

6.2 Quality of Supply

- (1) The *Distributor* and other *participants* shall comply with *NRS048 and NERSA Power Quality Directive* regarding the parameters listed below:
 - (a) Voltage harmonics and inter-harmonics
 - (b) Voltage flicker

- (c) Voltage unbalance
- (d) Voltage dips
- (e) Interruptions
- (f) Voltage regulation
- (g) Frequency
- (h) Voltage surges and switching disturbances

Special *quality of supply* criteria will be agreed between the *Distributor* and the *Embedded Generator*.

6.3 Load Power Factor

- (1) *Customers*, except for *embedded generators*, (with demand exceeding 100kVA) shall ensure that the *power factor* shall not be less than 0.9 lagging nor shall it go leading unless otherwise agreed to with the relevant *Distributor*.
- (2) Should the *power factor* go beyond these limits, *participants* shall take corrective action within a reasonable timeframe or as agreed between the parties, to remedy the situation,
- (3) The *participant* intending to install shunt capacitors or any other equipment for the purpose of complying with the *power factor* requirements shall inform the relevant *Distributor*.

6.4 Earthing Requirements

- (1) The *Distributor* shall advise *Customers* upon request about the neutral earthing methods used in the *Distribution System*.
- (2) The method of neutral earthing used on those portions of *Customer's* installations that are physically connected to the *Distribution System* shall comply with the *Distributor's* applicable earthing standards for loads and for embedded generators.
- (3) Protective earthing of equipment must be done in accordance with the applicable national standard.
- (4) In cases where the calculated Ground Potential Rise exceeds 5kV as per *NRS 076*, the responsible party shall inform the affected *participants*.
- (5) Approved designed lightning protection requirements shall be applied to the *Distribution System* and switching yards.
- (6) Substation earthing requirement shall be in accordance with *NRS 076*.

6.5 Distribution Network Interruption Performance Indices

- (1) The *NERSA* shall be responsible for setting the format in which the Distribution Reliability Indices are reported.

- (2) Before the end of each year the *Distributor* shall publish its targets for reliability of supply for the following year.
- (3) The *NERSA* shall annually evaluate the *Distribution System Reliability Indices* to compare each *Distributor's* actual performance with the *Distributor* unique targets set by the *NERSA* and the *NERSA* shall publish these comparative results.

6.6 Losses in the Distribution System

- (1) Losses shall be classified into three categories:
 - (a) *Technical Losses*
 - (b) *Non-Technical Losses and*
 - (c) *Administrative Losses.*

6.7 Equipment Requirements

- (1) Equipment at the connection point shall comply with the *Distributor's* prescribed standards or any equivalent national standards prevailing at the time.
- (2) The *Distributor* shall upon request provide the *customer* with the necessary information to enable the *customer* to install equipment with the required rating and capacity.
- (3) The *participants* shall ensure that all equipment at the *connection point* is maintained at least in accordance with the manufacturers' specifications or an alternate industry recognised methodology.
- (4) The *participants* connected at MV and HV levels shall retain the test results and maintenance records relating to the equipment at the *connection point* and make this information available if requested.

7. Distribution System Planning and Development

7.1 Framework for Distribution Network Planning and Development

- (1) The *Distributor* shall source relevant data from various sources including the following where relevant: National Integrated Resource Plan, Local Integrated Resource Plan, Integrated Development Plan, *customer* information, system performance statistics, *Distribution* network load forecast, and government and *customer* development plans to establish the need for network strengthening.
- (2) The *Distributor* shall annually compile a 10-year load forecast at the *Distributor's* incoming *points of supply* including *Distributor's* cross-boundary connections.
- (3) The *Distributor* shall be responsible for compiling network development plans with a minimum window period of five years. These network development plans shall be reviewed at the least every 3 years. The aim of network development plans is to ensure a capable network and should therefore include all relevant activities such as electrification and refurbishment. Such plans should be drawn up taking into

account only available information. Unexpected loads or *customer* requests can be retrospectively added to the plan.

- (4) The network development plans and post release changes shall be submitted to the *NERSA* upon request.
- (5) The network development plans shall be made available to *customers* on request

7.2 Network Investment Criteria

7.2.1 Introduction

- (1) Distribution *tariffs* should be sufficient to allow the necessary investments in the networks to be carried out in a manner allowing these investments to ensure the viability of the networks.
- (2) The *Distributor* shall invest in the *Distribution System* when the required development meets the technical and investment criteria specified in this section.
- (3) The need to invest must first be decided on technical grounds. All investments must be the *least life-cycle cost* technically acceptable solution, that is, shall provide for standard supply:
 - (a) Minimum quality requirements in terms of *NRS 048*.
 - (b) Minimum reliability and operational requirements as determined by this code and by the *NERSA*.
- (4) The investment choice must be justified by considering technical alternatives on a least- life cycle cost approach. Least life cycle cost is the discounted least cost option over the lifetime of the equipment, taking into account the technical alternatives for investment, operating expenses and maintenance.
- (5) Calculations to justify investment shall assume a typical project life expectancy of 25 years, except where otherwise dictated by plant life or project life expectancy.
- (6) The following key economic and financial parameters shall be determined by a *NERSA* approved process:
 - (a) Discount rate
 - (b) Customer interruption cost (cost of unserved energy)
 - (c) Other parameters, such as *tariffs* and additional economic parameters.

7.2.2 General Investment Criteria

- (1) Investments should be prudent (that is justified) as a *least life-cycle cost* solution after taking into account, where applicable, alternatives that consider the following:
 - (a) The investment that will minimise the cost of the energy supplied and the *customer* interruption cost (cost of unserved energy).
 - (b) Current and projected demand on the network.
 - (c) Reduction of *life-cycle costs* e.g. reduction of technical losses, operating and maintenance costs and telecommunication projects

- (d) Current condition of assets and refurbishment and maintenance requirements.
 - (e) Demand and supply options.
 - (f) Any associated risks.
- (2) General (shared) network investments shall be evaluated on the *least-life-cycle economic cost*. Economic cost will consider the least life cycle total cost of the electricity related investment to *both* the *Distributor* and the customer.
- (3) Investments made by the *Distributor* dedicated to a particular customer shall be evaluated on a *least life-cycle Distributor cost*. *Distributor cost* will consider only the least-life cycle investment cost to the *Distributor*.
- (4) The *Distributor* shall evaluate investments in terms of the following categories:
- (a) *Shared network investments*
 - (b) Dedicated customer connections.
 - (c) *Statutory investments*.
 - (d) International connections (cross-border connections)

7.2.3 Least economic cost criteria for shared network investments

- (1) Shared network investments are:
- (a) Investments on shared infrastructure (not-dedicated) assets.
 - (b) Investments required to provide adequate upstream network capacity.
 - (c) Investments required to maintain or enhance supply reliability and/or quality to attain the limits or targets, determined in section 6.2 of this code, on existing network assets.
 - (d) Refurbishment of existing standard dedicated connection assets.
- (2) All shared network investments are to be justified on least *economic cost*. In determining the *least economic cost* for shared network investments the investment must be justified to minimise the cost to the electricity industry and not just to the *Distributor*.

7.2.4 Least life cycle cost criteria for standard dedicated customer connections

- (1) A standard connection is defined as the lowest *life-cycle costs* for a technically acceptable solution and will be charged for as described in the Section 11.1 in the Tariff Code.
- (2) Dedicated *customer* connections are:
- (a) New connection assets created for the sole use of a *customer* to meet the *customer's* technical specifications.
 - (b) Dedicated assets are assets that are unlikely to be shared in the distributor's planning horizon by any other end-use *customer*.
- (3) All dedicated connection investments are to be justified on the technically acceptable *least life-cycle costs*.

- (4) Where the investment meets the *least life-cycle cost*, the *customer* shall be required to pay a standard *connection charge* as described in the Tariff Code.
- (5) For certain *customer* groupings, as approved by the *NERSA*, the investments shall be justified collectively as per *customer* grouping and not per *customer*.
- (6) The *Distributor* will refurbish / replace / reconfigure all equipment in terms of its new standards to meet standard supply criteria at no cost to the customer and this will allowed to be recovered in the *use-of-system (network charges)*. This will be a non-discriminatory approach where no consideration will be given to the special or unique requirements of the customer.

7.2.5 Investment criteria for premium customer connections

- (1) The *Distributor* shall investigate these additional requirements and will provide a *least life-cycle cost* solution.
- (2) If the *customer* agrees to the solution, all costs to meet the *customer* requirement in excess of what is considered the *least life-cycle cost* investment is payable as a premium connection charge by the customer as described in section 11.2 of the Tariff Code. Such costs shall be appropriately pro-rated, if a portion of the investment can be justified based on improved reliability or reduction of costs.
- (3) The refurbishment of identified premium connection assets will occur when the equipment is no longer reliable or safe for operation. The *Distributor* must justify the need for refurbishment of the premium assets to the *customer*, and the *customer* must agree to the continuance of the premium supply.
- (4) At the time of refurbishment, should the *customer* have any requirements that cannot be met in terms of the 7.2.4 (5), any additional investment will be seen as a premium connection.
- (5) Where the refurbishment of a supply in accordance with current technical standards will result in additional cost to the *customer*, an engineering solution that minimises the sum of the *Distributor's* and the *customer's* costs will be found. This *least economic cost* option will be implemented but any expenditure in excess of the *Distributor least life-cycle cost* solution (as per 7.2.2 and 7.2.4 (5) above) will borne by the *customer* through a new premium connection charge and shall not be recovered through *use-of-system (network)* charges

7.2.6 Statutory or strategic investments

- (1) *Distributors* will be obligated to make *statutory investments* in terms of clause 7.2.6(3) below.
- (2) Statutory and strategic investments will be motivated on a *least economic cost* basis, as defined in 7.2.3.
- (3) Strategic and statutory projects include the following:
 - (a) Investments formally requested in terms of published government policy but not considered dedicated *customer* as under section 7.2.4.

- (b) Projects necessary to meet environmental legislation, e.g. the construction of oil containment dams.
- (c) Expenditure to satisfy the requirements on the *Distributor* to comply with the *Occupational Health and Safety Act of 1993*; this classification is intended to ensure the safety of operating and maintenance personnel who are exposed to possible danger when busy with activities related to electricity transmission.
- (d) Possible compulsory contractual commitments.
- (e) Servitude acquisition.
- (f) *Generators*

7.2.7 Investment criteria for international connections

- (1) The investment for international *customers* shall be in terms of the criteria set out for a dedicated connection, but the *Distributor* shall charge a *connection charge* that ensures that there is no cross border subsidies, as set out in the Tariff Code

7.3 Excluded services

- (1) Excluded services may be competitive or provided by the *Distributor* as a monopoly service.
- (2) Monopoly services are those mandatory services to ensure a standard of work that meets quality of supply, reliability and safety standards.
- (3) Excluded services include the following:
 - (a) Design and construction of dedicated *customer* connections.
 - (b) Recoverable works such as inspection and maintenance of non-*Distributor* owned installations, line relocation and other requested recoverable works.
 - (c) The construction and maintenance of public lighting assets.
- (4) For excluded services, *customers* will be allowed to choose a contractor other than the *Distributor*, provided that an agreement is reached between the *Distributor* and the *customer* prior to the project being undertaken detailing the conditions. These conditions will set out the following:
 - (a) The assets the customer is allowed to work on or not.
 - (b) The terms and conditions for the approval of the network design.
 - (c) The terms and condition for the inspection and the work done prior to any agreement to take over and/or commission the supply.
 - (d) The charges to be raised by the *Distributor* for monopoly related services.
- (5) The fees charged by the *Distributor* for excluded services may be regulated.

8. ***Embedded Generators Connection Conditions***

- (1) *Embedded Generators* shall apply for connection to the *Distribution System* to the *Distributor*. A sample application form can be found in Appendix B. Each *Distributor* shall develop and publish its own application form for connecting *Embedded Generators*.
- (2) *Embedded Generators* of nominal capacity greater than 10 MVA shall in addition to the requirements of this code, comply with section 3.1 of the Transmission Grid Code, Network Code. When interpreting that section, the following shall apply:
 - (i) *Generator* shall have the same meaning as *embedded generator*,
 - (ii) *Transmission System* shall have the same meaning as the *Distribution System*,
 - (iii) The *TNSP* shall have the same meaning as the *Distributor*,
 - (iv) The role of the *SO*, where applicable shall be interpreted to include the local *Distributor*.
 - (v) *IPS* shall include the *Distribution System*

8.1 **Responsibilities of *Embedded Generators* to *Distributors***

- (1) The *Embedded Generator* shall enter into a connection agreement with the *Distributor* before connecting to the *Distribution system*.
- (2) The *Embedded Generator* shall ensure that the reliability and *quality of supply* complies with the terms of the connection agreement.
- (3) The *Embedded Generator* shall comply with the *Distributor's* protection requirement guide detailed in this section as well as protection of own plant against abnormalities, which could arise on the *Distribution System*.
- (4) The *Embedded Generator* shall be responsible for any dedicated connection costs incurred on the *Transmission System* or *Distribution System* as a result of connection of the *Embedded Generation* facility to the *Distribution System* in compliance with the Tariff Code.
- (5) The *Embedded Generator* shall be responsible for synchronizing the generating facility to the *Distribution System* within pre-agreed settings.

8.2 **Responsibilities of *Distributors* to the *Embedded Generators***

- (1) If requested by the *Embedded Generator*, the *Distributor* shall provide information relating to the *Distribution System* capacity, fault levels and loading to enable the *Embedded Generator* to identify and evaluate opportunities for connecting to the *Distribution System*. The *Distributor* may charge the *Embedded Generator* a reasonable fee for such information.

- (2) The *Distributor* shall treat all applications for connection to the *Distribution System* by potential *Embedded Generators* in an open and transparent manner that ensures equal treatment for all *applicants*.
- (3) The *Distributors* shall be responsible for the installation of the bidirectional metering equipment between the *Distributor* and the *Embedded Generator's* generation facility.
- (4) The *Distributor* shall develop the protection requirement guide for connecting *Embedded Generators* to the *Distribution System* to ensure safe and reliable operation of the *Distribution System*.

8.3 Provision of Planning Information

- (1) Before entering into a *connection agreement*, the *Embedded Generator* shall provide to the *Distributor* information relating to the Generator plant data, location and time scale, capacity and standby requirements as detailed in the Appendix B.
- (2) The *Distributor* shall provide the *Embedded Generator* any information necessary for the *Embedded Generator* to properly design the connection to the *Distribution System*.
- (3) *Embedded Generators* shall specify, with all relevant details, in their application for connection if the generator facility to be connected shall have black-start and / or self start capabilities.

8.4 Connection Point Technical Requirements

- (1) The *Embedded Generator* shall be responsible for the design, construction, maintenance and operation of the equipment on the generation side of the *connection point*.
- (2) The *Embedded Generator* shall be responsible for the provision of the site required for the installation of the *Distributor* equipment required for connecting the generating facility.
- (3) The technical specifications of the connection shall be agreed upon by the participants based on the *Distribution System* Impact Assessment Studies.
- (4) A circuit breaker and visible isolation shall be installed at the *connection point* to provide the means of electrically isolating the *Distribution System* from the generating facility.
- (5) The *Embedded Generator* shall be responsible for the circuit breaker to connect and disconnect the generator.
- (6) The location of the circuit breaker and visible isolation shall be decided upon by the *participants*.
- (7) The *Embedded Generator* shall pay for any expenses incurred by the *Distributor* on behalf of the *Embedded Generator* in line with the Tariff Code

8.4.1 Protection Requirement for Embedded Generators

8.4.1.1 General Protection Requirements

- (1) The *Embedded Generator's* protection shall comply with the requirements of this code. ~~*Embedded Generators of nominal capacity greater than 10 MVA shall in addition to the requirements of this code, comply with section 3.1 of the Transmission Network Code*~~
- (2) Additional features including inter-tripping and generator plant status to be agreed upon by the *participants*.
- (3) The protection schemes used by the *Embedded Generator* shall incorporate adequate facilities for testing and maintenance.
- (4) The protection scheme shall be submitted by the *Embedded Generator* for approval by the *Distributor* and / or the *NTC*.

8.4.1.2 Specific Protection requirements

(1) Phase and Earth Fault Protection

- (a) The protection system of the *Embedded Generator* shall fully coordinate with the protective relays of the *Distribution System*.
- (b) The *Embedded Generator* shall be responsible for the installation and maintenance of all protection relays at the *connection point*.

(2) Over-voltage and over-frequency Protection

- (a) The *Embedded Generator* shall install over-voltage and over-frequency protection to disconnect the generating facility under abnormal network conditions as agreed between the *Distributor* and the *Embedded Generator*.

(3) Faults on the *Distribution System*

- (a) The *Embedded Generator* shall be responsible for protecting its *generation facility* in the event of faults and other disturbances arising on the *Distribution System*.

(4) Islanding

- (a) The *Distributor* shall specify when the *Embedded Generator* may remain connected if the section of the *Distribution System* to which the *Embedded Generator* is connected is isolated from the rest of the network.
- (b) The *Embedded Generation* facility shall be equipped with dead-line detection protection system to prevent the generator from being connected to a de-energised *Distribution System*. The *Distributor* shall take reasonable steps to prevent closing circuit breakers onto an islanded network.
- (c) For unintentional network islanding, the *Embedded Generator* and the *Distributor* shall agree on methodology for disconnecting and connecting the *Embedded Generator*.

8.4.1.3 Quality of Supply requirements

(1) Frequency Variations

The *Embedded Generation facility* shall remain synchronized to the *Distribution System* while the network frequency remains within the agreed frequency limitations.

(2) Power Factor

(a) The *power factor* at the *connection point* shall be maintained within the limits agreed upon by the *Participants*.

(3) Fault Levels

(a) The *Embedded Generator* shall ensure that the contractually agreed fault level contribution from the *generation facility* shall not be exceeded.

(b) The *Distributor* shall ensure that the contractually agreed fault level in the network at the *point of connection* shall not be exceeded.

8.5 Telemetry

(1) The *Embedded Generator* shall have the means to remotely report any status change of any critical function that may negatively impact on the *quality of supply* on the *Distribution System*.

9. Power Station Supplies

(1) Every new *power station supply* excluding *Embedded Generators* will be a *premium connection* from a *dedicated network*.

(2) Every *power station supply* will be designed such that it will have the highest degree of reliability and availability, and would not be impacted by maintenance activities of participants other than the specific *generator* or *embedded generator* and the relevant *distributor*.

(3) The supply will be designed, constructed, maintained and operated in such a way, that it would be likely to remain available even if the local network (either distribution or transmission) into which the *generator* or *embedded generator* supply power, would fail.

APPENDIX A: Distribution Service Customer Application Form

Note: Where indicated, shaded areas are for completion by the Service Provider. Please provide any additional detail in the areas designated for notes.

Customer Contact Person 1 Title:
Customer's preferred form of address

Customer Contact Person 1 Initials, Surname and Job Title:

Customer Contact Person 2 Title:
Customer's preferred form of address

Customer Contact Person 2 Initials, Surname and Job Title:

Company Name:

As per Company or Closed Corporation registration document issued in Pretoria

Co/CC Reg No:
Issued by Registrar of Companies or Closed Corporations in Pretoria

Person 1 Telephone 1:
Customer's contact no Dialling code Tele number

Person 1 Tele Ext:

Person 1 Telephone 2/Cell:
Alternative contact no Dialling code Tele number

Person 1 Fax:
Dialling code Fax/Telephone number

Person 2 Telephone 1:
Customer's contact no Dialling code Tele number

Person 2 Tele Ext:

Person 2 Telephone 2/Cell:
Alternative contact no Dialling code Tele number

Person 2 Fax:
Dialling code Fax/Telephone number

Person 1 e-mail Address:

Person 2 e-mail Address:

Customer's Physical Address:

Code
Customer's personal physical location

Postal Address:

Code
Customer's preferred postal contact address

Physical connection to the Transmission or Distribution System required? (Y/N):
If not, indicate nature of business (e.g. trader, retailer, etc.):

Type of quote required Feasibility: Firm:

(please tick):

Notes:

Additional customer information

The following fields will be completed by the Service Provider

Customer ID (G)	Customer Type	Existing Customer:
<small>Transmission-generated unique customer number</small>	<small>Indicate individual/company/partnership/other</small>	
Parent Customer ID	Credit Indicator	
<small>Indicates if customer is subsidiary to existing customer</small>	<small>Indicate if other account(s) outstanding</small>	

Application Date:
Customer's initial application date ccyy mmdd

Connection Voltage (kV):

MVA:
Indicate Capacity of Connection Required

Requested Completion Date:
When customer wants supply available ccyy mmdd

Estimated Monthly Consumption/Generation: MWh
Customer's projected usage/generation for this POS

Temporary Connection:
If short term: period (months) for which connection required

Owner or Tenant:
Customer owns/rents property for this application

POS/Physical Connection Address:

Longitude: **Latitude:**

Full description of the property/title deed where supply is required: street addr, lot no, etc. No postal addresses

Usage Category (Please tick):

Industrial:	Commercial:	Distribution:	<input type="checkbox"/>
Generation:	International:		<input type="checkbox"/>
Other (please specify):			<input type="checkbox"/>

Nearest Existing Distribution System Connection:
Distribution substation closest to POS

Other Distribution System Connections:
Does customer have other distribution connections/points of supply?

Standard or Enhanced Reliability Connection

Special Instructions:

Customer's additional information regarding application

Cancel Date & Reason:

Details of why application no longer required ccymdd

Note that further information may be required before a quote can be provided, as described in the Grid Code

The following fields will be completed by the Service Provider						
Application ID				POS ID		
Unique no for current application				Unique no applicable to point-of-supply		
Application Type ID	NEW	INCR	DECR	CHNGE	LINES	
	New POS/ Connection:	Increase of Connec. to:	Decrease of Connec. to:	Change of Cust only	Existing lines To be moved	
	MVA	MVA	MVA	*MVA	*MVA	
	Size supply req	Size supply req	Size supply req	Current supply	Current supply	Size supply req
Note: Only 1 (one) application type ID per application						
Priority Request Indicator			Priority Request Reason			
High/Medium/Low			Motivation required for "high" or "low" indicators			
Customer Major Activity:		File Ref		Project ID		
		For special file reference only				
Grid Region:				No of Stands		
				How many stands at POS address		
Application Remarks:						
Additional information regarding application						
Ref No(s):						
Details of any other transmission POS's linked to this customer						
Quotation Date				Agreement Date:		
Date on which application completed ccymdd				Date agreement completed ccymdd		
Connection Fee Amount				Conn Fee Rect No		
				Unique no		
Conn Fee Payment Date						
Date of receipt of cust's payment ccymdd						

10. APPENDIX B: Embedded Generator Connection Application Form

Note: This form to be completed in full and returned to the *Distributor* together with requested information for review and concurrence

1	Date :
2	Applicant Particulars Name of Applicant: Address: Telephone: Fascimile: Email:
3	Project Details Project Name: Project Location: Project Contact Name & Telephone Number: Fascimile: Project Type: (co generation, combined cycle, hydraulic etc)
4	Construction Schedule Projected Start-up of Construction: Construction Power Requirements: Projected In-Service Date of Embedded Generator:
5	Site plan Site plan to show scaled mapping of existing lot lines, road crossing etc
6	Preliminary design Design to show generators, transformer, proposed connection point, isolating devices, protection schemes etc

<p>7</p>	<p>Generator specifications</p> <p>Manufacturer:</p> <p>Fuel type:</p> <p>Rated MVA:</p> <p>Rated MW:</p> <p>Rated Voltage:</p> <p>Rated Power Factor:</p> <p>Inertial Constant:</p> <p>Maximum MVAR Limit:</p> <p>Neutral to Earth Resistance in Ohms:</p> <p>Xd – Synchronous reactance in p.u:</p> <p>X'd - Direct Axis transient reactance in p.u:</p> <p>X''d – Direct axis sub-transient reactance in p.u:</p> <p>X2 – Negative sequence reactance in p.u:</p> <p>X0 – Zero sequence reactance in p.u</p>
<p>8</p>	<p>Generator and unit transformer specifications</p> <p>Voltage and power ratings:</p> <p>Windings configuration:</p> <p>Neutral earth resistors or reactors:</p> <p>Positive and zero sequence impedances in p.u:</p> <p>R1:</p> <p>X1:</p> <p>RO:</p> <p>XO:</p>
<p>9</p>	<p>Expected Consumption (details to be clarified with the relevant <i>Distributor</i>)</p>
<p>10</p>	<p>Future Site Developments plans</p>
<p>11</p>	<p>Proposed Plant Design</p> <p>Operating characteristics :</p>

12	Any other additional information :
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I request the *Distributor* to proceed with a preliminary review of this *Embedded Generation* interconnection application and I agree to pay the cost associated with completing this review.

I further consent to the *Distributor* providing this information to the *National Transmission Company* and other *Distributors* as required.

Name: _____

Signature: _____

Title: _____

Date: _____