



SUSTAINABLE
ENERGY
AFRICA



Distributed Generation Regulations Benchmarking

*Facilitating the integration of Distributed Generation
in sub-Saharan Africa*

23 June 2026, Cape Town

Objectives of the DG Regulations

National: Implementation of policy objectives.

Prosumers

- Allow non-discriminatory access to the grid
- Allow generation for self consumption.
- Enable export of excess electricity to the grid
- Enable compensation for electricity exported

Utilities

- Provide pricing principles for DG tariff setting
- Establish utility methodology and requirements for prosumer permitting
- Clarify the technical requirements and compliances to be adhered to.

Template Distributed Generation Regulatory Rules



ABOUT THE DISTRIBUTED GENERATION TEMPLATES:

THIS DOCUMENT IS PART OF A SET OF TEMPLATES TO ESTABLISH AN ENABLING ENVIRONMENT FOR DISTRIBUTED GENERATION. THE TEMPLATES SHOULD BE CUSTOMISED AS NECESSARY BY REGULATORS AND UTILITIES IN DIFFERENT COUNTRIES. THE TEMPLATES INCLUDE:

1. DISTRIBUTED GENERATION CONNECTION AND NET BILLING REGULATORY RULES
2. REQUIREMENTS FOR DISTRIBUTED GENERATION: CONDITIONS AND APPLICATION PROCESS TO BECOME A DISTRIBUTED GENERATOR IN THE UTILITY
3. APPLICATION FORM TO BECOME A DISTRIBUTED GENERATOR
4. COMMISSIONING REPORT
5. CONTROL DOCUMENT
6. AGREEMENT BETWEEN THE UTILITY AND CUSTOMER FOR DISTRIBUTED GENERATION

THE TEMPLATE DOCUMENTS HAVE BEEN DEVELOPED UNDER THE GET-TRANSFORM DISTRIBUTED GENERATION SUPPORT PROGRAM FOR SUB-SAHARAN AFRICAN COUNTRIES (www.dg-africa.net).

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Outline:

- Defining distributed generation
- DG integration processes.
- Technical considerations
- Tariffs, compensation and billing

Distributed Generation Definition

How to define distributed generation



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Factors in DG definition

General definition: “Any generator connected to the Distribution Network”

Additional Factors

Behind the customer meter

Self-consumption vs ‘pure’ generator/IPP (for export only)

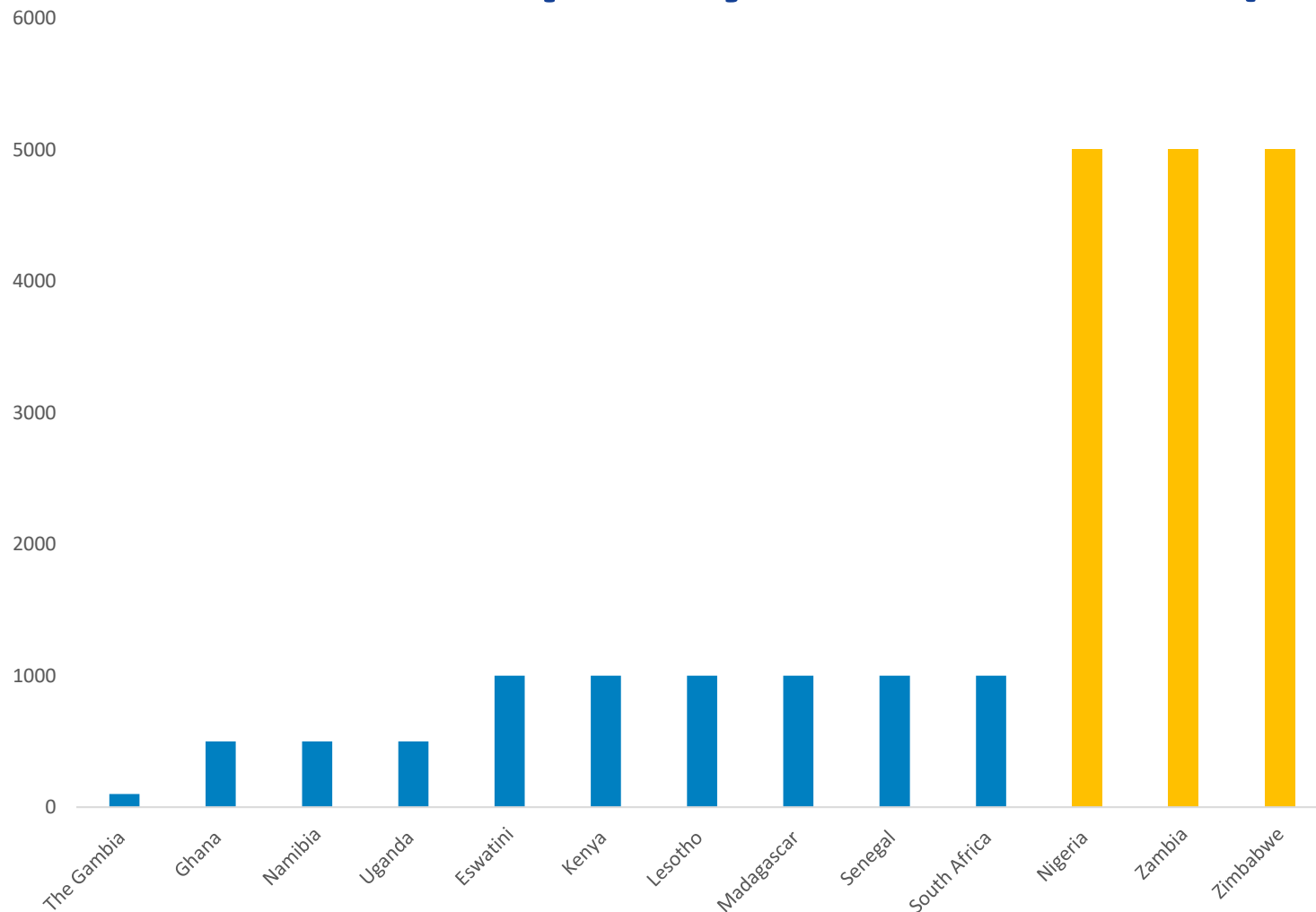
Limited to customer supply capacity (kW)

Total generation (kWh) limit compared with customer annual consumption

Export limits (kW)

Nationally set size constraints

Maximum Capacity Benchmarks (kW)



Maximum Capacity

Malaysia

Residential: 1- phase: 12kWp, 3- phase: 72 kWp

Commercial: up to 1 MWp or 75% of their maximum demand (whichever is lesser)

Industrial: 60% of the fuse rating

Pakistan

1 MW

Indonesia

No individual cap (annual quota)

Vietnam

No individual cap (national total capacity)

Definition proposal

"**Distributed Generator**" means a facility that generates electricity, often from renewable energy sources, such as solar PV, wind, biomass and hydro, with or without storage systems, which is connected to and synchronized with the Distribution grid, and with a generation capacity of up to (...500kW? 1000kW?).

These facilities are located on residential, commercial, rural, public or industrial consumer sites, generate power mainly for self-consumption, and may or may not inject surplus electricity into the distribution electricity network.

Not included: Total generation limit compared with customer annual consumption (kWh/year)

Utility Processes and Requirements

What process should be followed when DG is integrated on to utility networks?

DG Permitting Process

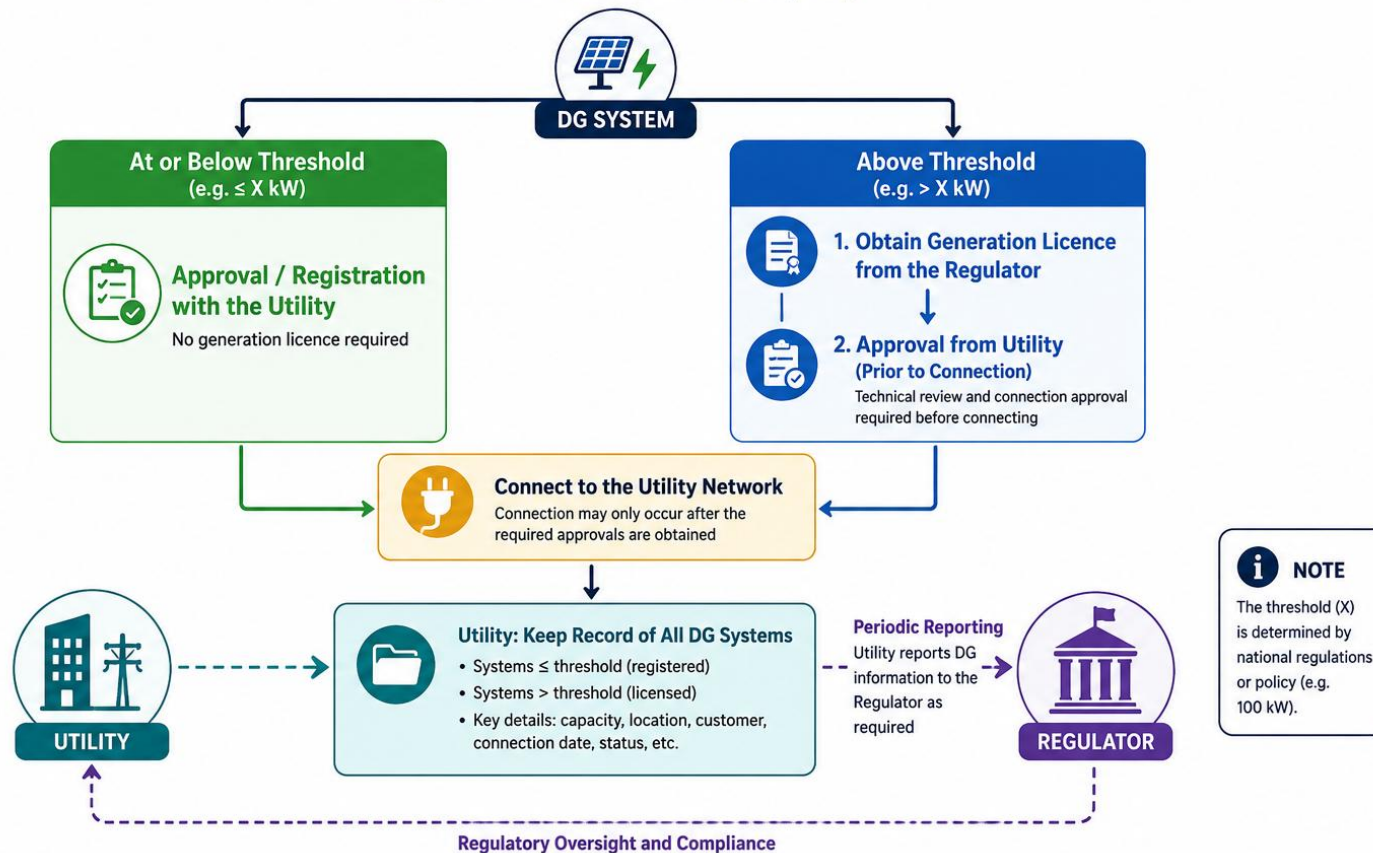


DG Permitting Process

What is the role of the regulator ?

DG SYSTEMS: APPROVAL AND LICENSING FRAMEWORK

Requirements based on installed capacity



LEGEND: — ≤ Threshold Path (Registration with Utility Only) — > Threshold Path (Licence + Utility Approval) - - - Reporting & Oversight

Licensing Exemption Thresholds

Eswatini and Botswana	< 100 kW
Thailand	< 1MW
Namibia	All generators
South Africa	All generators

Summary and Recommendations

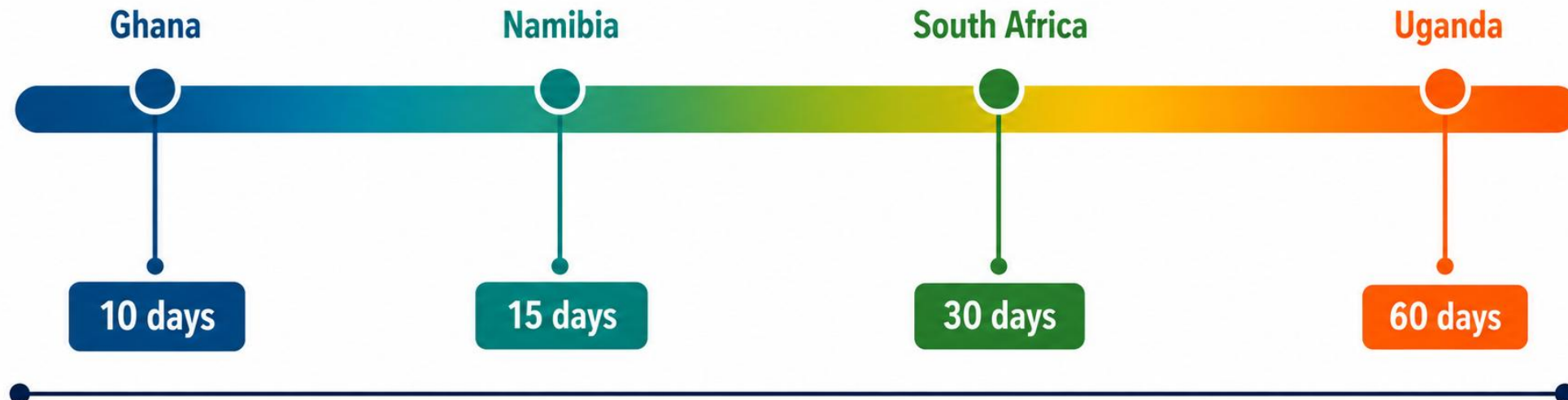
(avoid duplication, efficiency of permitting process)

ISSUING ENTITY		< 20..? KW	20 KW – 1000 KW?	> 1000 KW
Permit for DG Connection (technical checks - PoC, network...)	Utility	✓	✓	✓
Building permit (<i>optional</i>)	Local Municipality		✓	✓
License	Regulatory Authority. <i>Applications may however be submitted via the utility</i>	(potentially exempt?)	(potentially exempt?)	✓

DG Permitting Process

How long should the process take?

TIME TO APPROVE DG CONNECTION APPLICATIONS



Technical Considerations

What are the technical considerations for incorporating distributed generation?

Key Technical Considerations for DG Regulations

- Interconnectivity Standards, Operations and Requirements.
- Metering Infrastructure.
- Technical Network Impact Checks

Benchmarking Analysis

- Bi-directional / four-quadrant meter is mandatory
- The utility owns the meter, even on customer premises
- The customer pays for the meter and connection

Recommendation:

The Utility shall install relevant Bi-directional meters for Prosumers which enable Net Billing. These should be:

- Capable of measuring forward and reverse electricity flow in separate registers;
- Comply with any prescribed requirements of the Utility.

The Bi-directional metering equipment shall be procured, installed and maintained by the Utility or by a duly authorized third party.

The Utility may levy charges on the Prosumer to cover associated costs.

Inverter Recommendations

Recommendation

The design and installation of the Distributed Generator is to comply with the specifications of the Grid Code and published requirements of the Utility, including the nominated Interconnection Standards.

- Anti-islanding
- Power quality

Example Standards:

- IEC 61727
- IEC 62116
- IEEE 519
- NRS – 097-2-1
- Local Distribution/Grid Codes

Technical Network Impacts

Recommendation

Generation capacity of a Prosumer's Distributed Generator shall not exceed the lower of:

- a) the Customer main electricity supply circuit breaker current rating converted to the kW of the supply, or
- b) Maximum Installed Capacity for DG

Technical Network Impacts

Recommendation

Generation capacity limits shall be subject to the cumulative generation capacity limits of multiple DG facilities (which shall be determined by the Utility in accordance with:

a) Simplified Connection Criteria which specify parameters within which Distributed Generators can connect without adverse network impacts

or,

(b) the Utility electrical infrastructure equipment ratings and operating characteristics upstream of Prosumer's Distributed Generator as determined by network impact studies.

Technical Network Impacts

Generation capacity shall also be subject to limits imposed by the stability requirements of the Electricity Grid as determined by technical studies performed by the Regulator or the Utility, and network performance observed by the Utility.

Tariff and Revenue Impacts

How can utilities mitigate revenue impacts, whilst fairly compensating their DG customers.

Benchmark: Compensation for DG Exports

Most markets somewhere on the following spectrum:



- Uganda discounts exports 20% before netting;
- Zambia applies a tiered reference tariff (50–100%) based on export behaviour
- Zimbabwe nets exports at a 0.8–0.85 factor.
- None of the seven countries analysed paid exports out in cash.

Tariffs and Billing Recommendation:

The Utility must:

- provide a Net-Billing Tariff for all Prosumers; and
- not allocate disproportionate or unjustified cost burdens to Prosumers.

The Regulator shall approve the Tariff to be charged to the Prosumer by the Utility annually, and the methodology used in Tariff setting.

The Export Tariff is to be based on the Avoided Cost to the Utility of electricity not sourced from the Distributed Grid as a result of receiving such export from the Prosumer. The Utility is to provide the Avoided Cost Calculation Methodology to the Regulator for approval.



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Thank You for your Attention!

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Key Elements of a DG Regulatory Framework

REGULATORY

DG Connection and Net Billing Rules:

Definition of DG

Tariff setting principles

Technical Standards for connection
(Codes, specifications etc)

Application and
permitting process

Billing

Metering

Record keeping

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Unused Credits: expiring at the end of the year



**Forfeited at the distributor's
financial year-end**

SZ

Eswatini

NA

Namibia

ZA

South Africa

UG

Uganda

31

Lapses at calendar year-end

GH

Ghana



**Annual reconciliation + 90-day
inactivity rule**

ZM

Zambia