



Energy For The Future

ESWATINI'S EXPERIENCE ON EMBEDDED GENERATION: UTILITY'S PERSPECTIVE

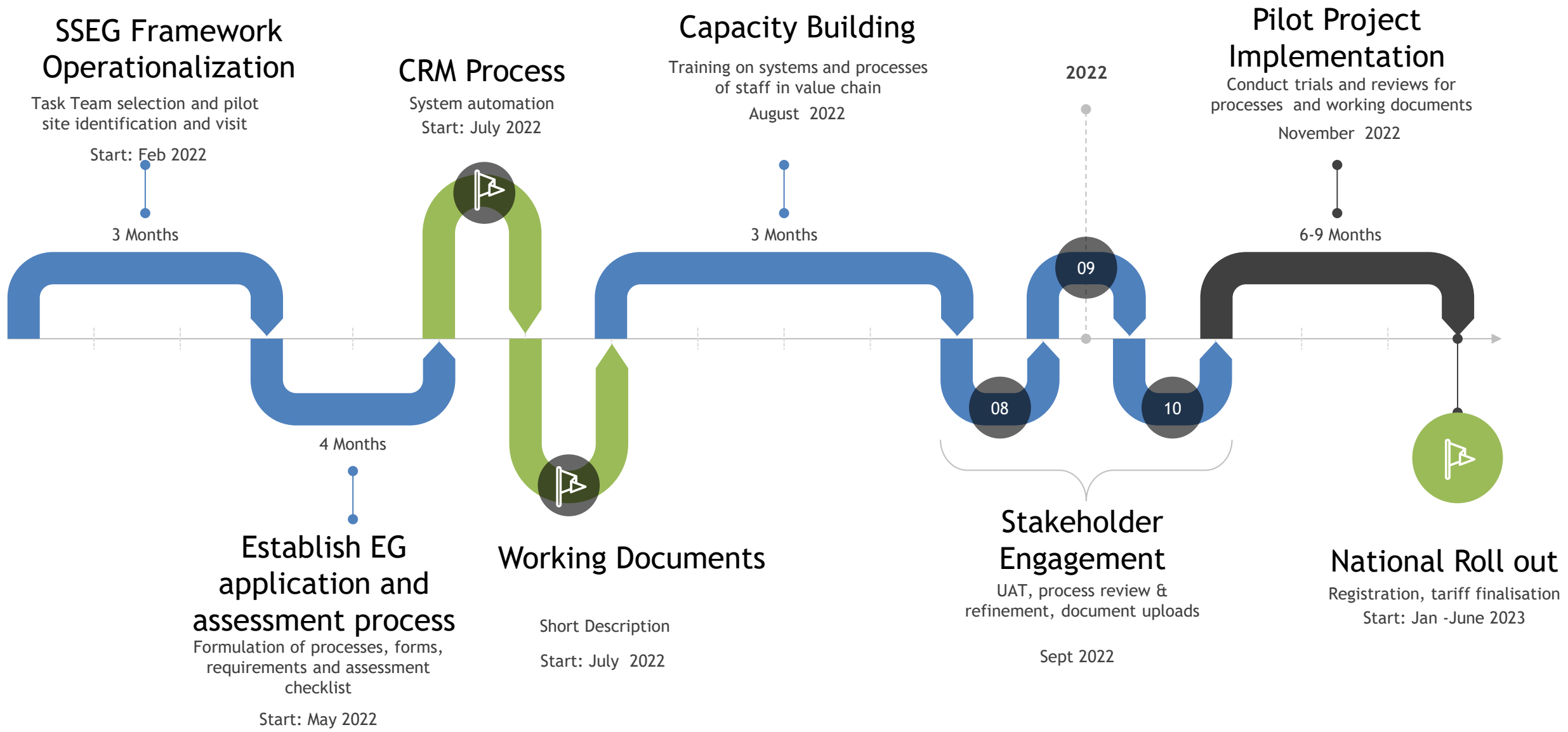
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INTRODUCTION and BACKGROUND

- In response to rapid adoption on embedded generation the **SSEG Framework and pilot project** were initiated
- **Overarching objective** of pilot project to establish systems to enable the SSEG Framework
- The framework developed to ensure **safe** and **regulated** SSEG uptake





EG/SSEG PILOT PROJECT INITIATIVE



Canterbury

Crookes Plantation

Eswatini
Electricity
Company

Ngonini Estate



REQUIREME
GE

Ngwenya Glass

Conditions and app
Tabankulu
embedded genera



Eswatini
Electricity
Company

PILOT PROJECT IMPLEMENTATION CHALLENGES

1. Pr. Eng Signoff & installer accreditation

- Lack of locally qualified Pr.Eng
- Lack of installer knowledge of requirements

2. Long convoluted process

- At least five departments are involved
- Getting support in process streamlining

3. Incomplete documentation

- Knowledge gap installers
- Delays entire process, esp.grid impact

4. Billing system challenges

- Back-end systems not yet ready
- Delays in other processes complicates

Key Observations on EG System

Grid management:

- ☑ Grid hosting capacity reaching maximum in some areas
- ☑ Improved voltage profile
- ☑ Suggests electrical infrastructure may become constrained as more EGs connect

Crookes -Feeder 5090

EG Hosting capacity	715 kW	15%
Current EG capacity	826 kW	17%

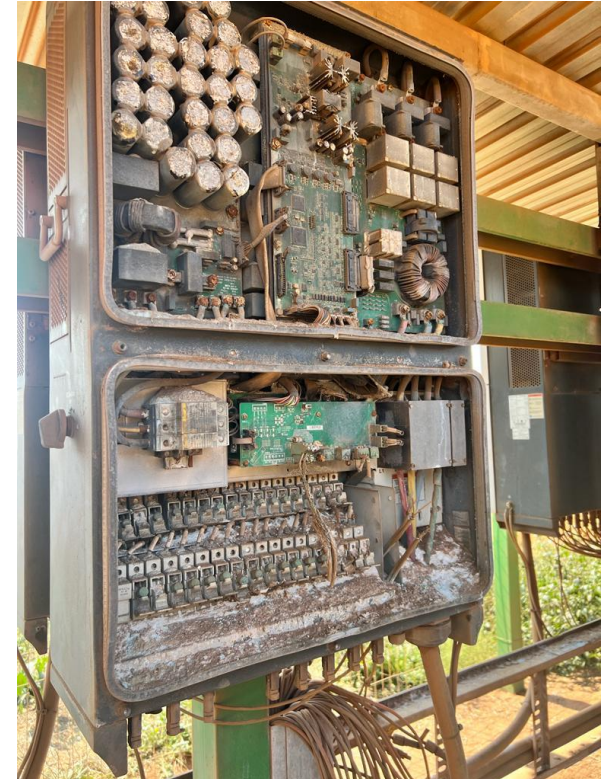
Canterbury (299kVA) -Voltage Flows @ POC

	Voltage (kV)	Voltage (p.u.)
Before the EG plant was connected	10.981	0.998
After the EG plant was connected	11.037	1.003

Key Observations on EG System

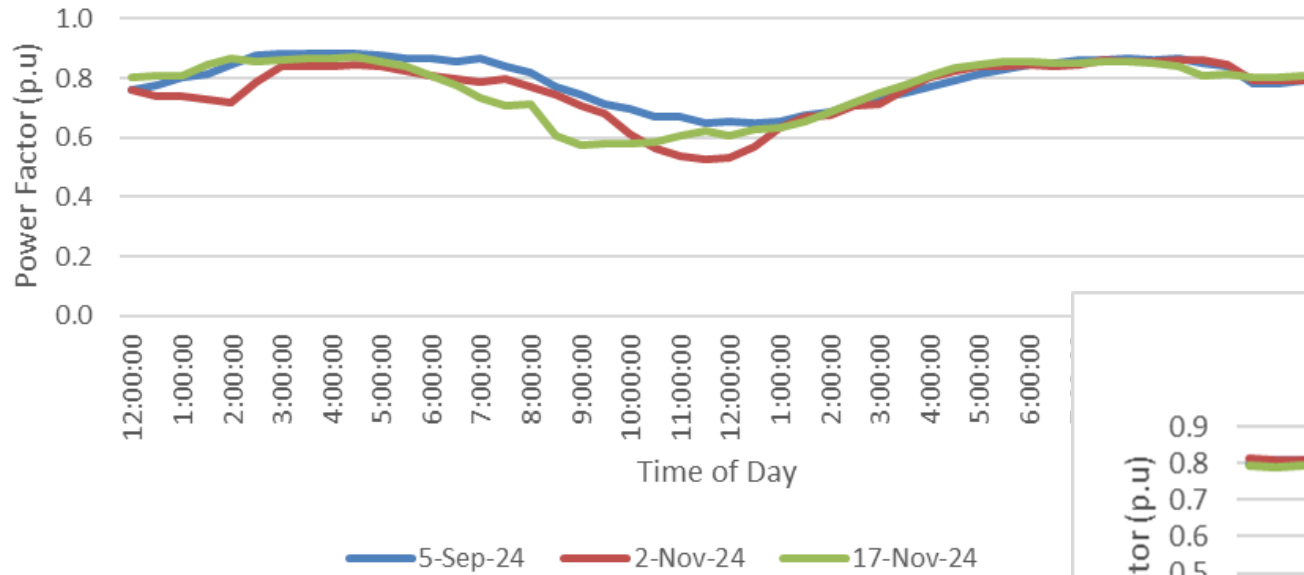
Safety:

- ☑ Poorly designed and installed systems are a real fire hazard
- ☑ Installers disappear
- ☑ Customer conceals incidents

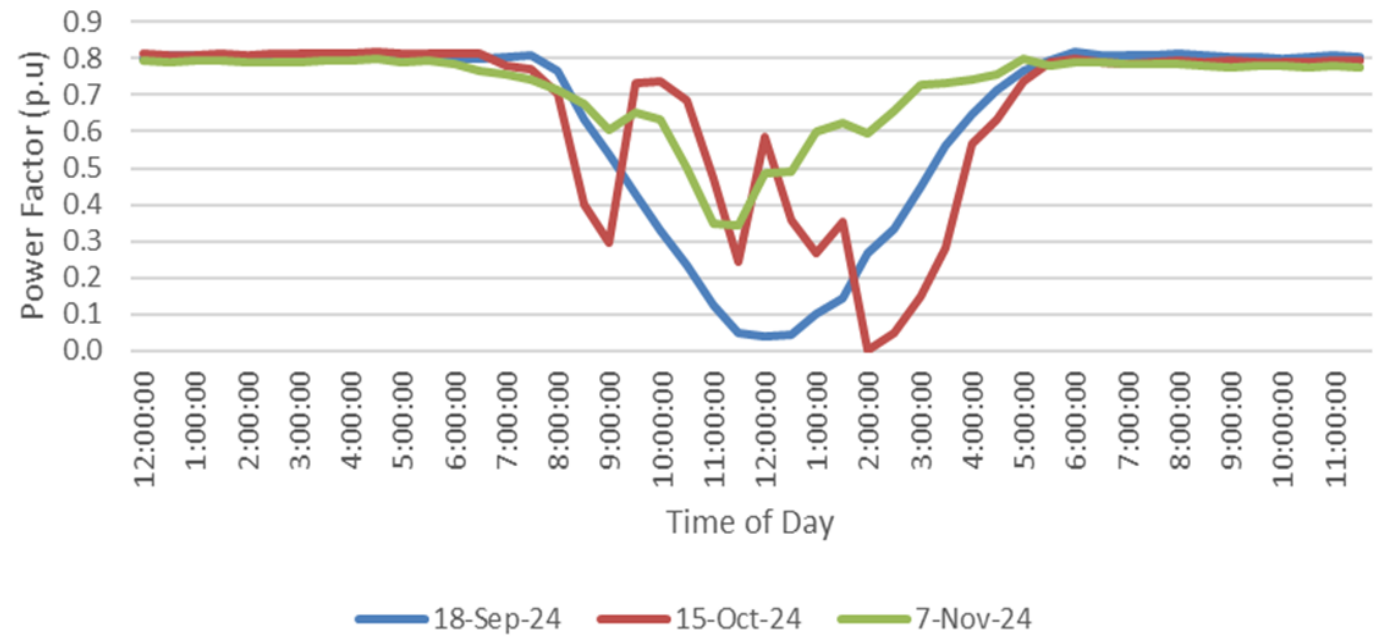


Reactive Power Imbalance

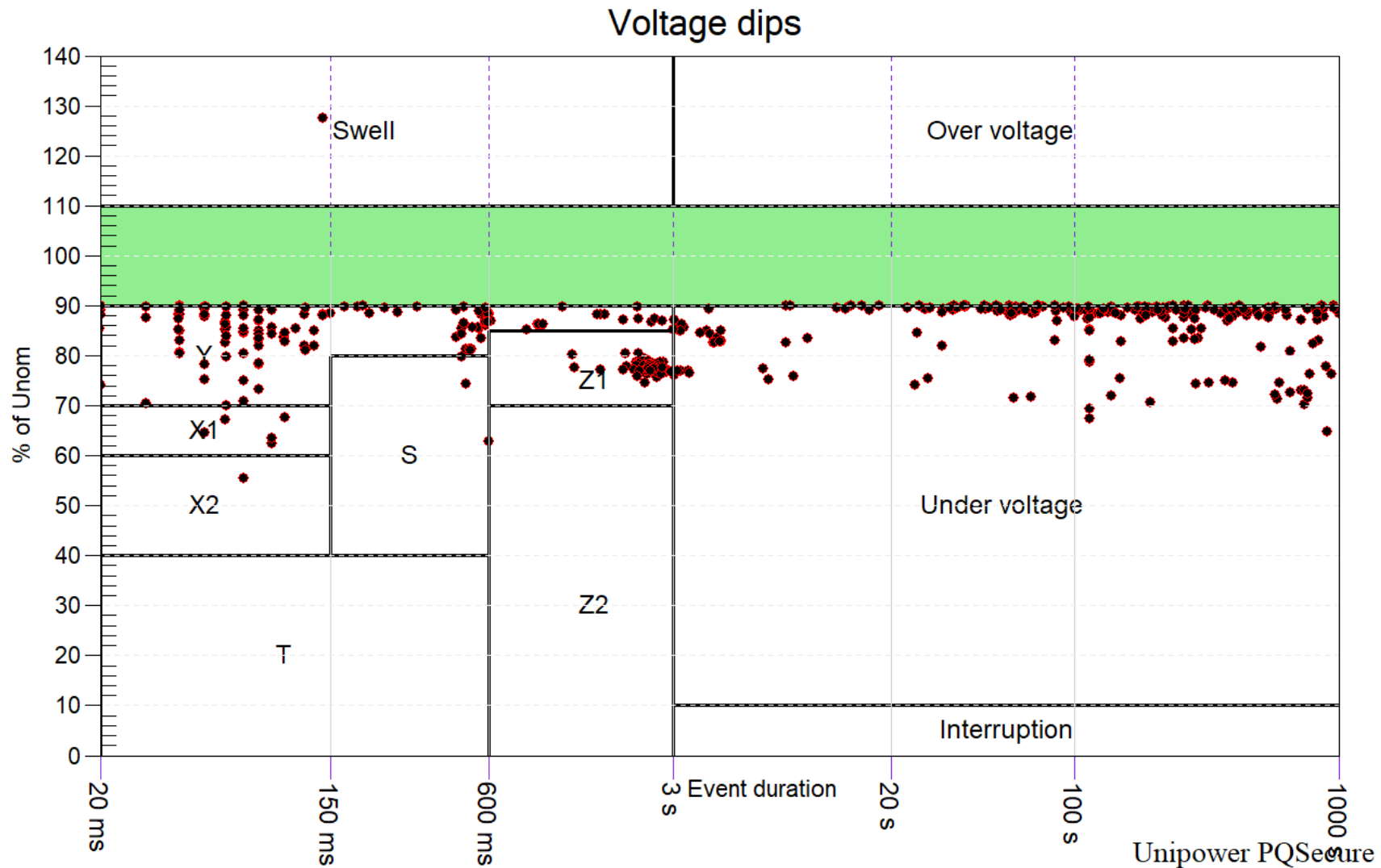
Tinkhukhu 1 Farm PF Trends



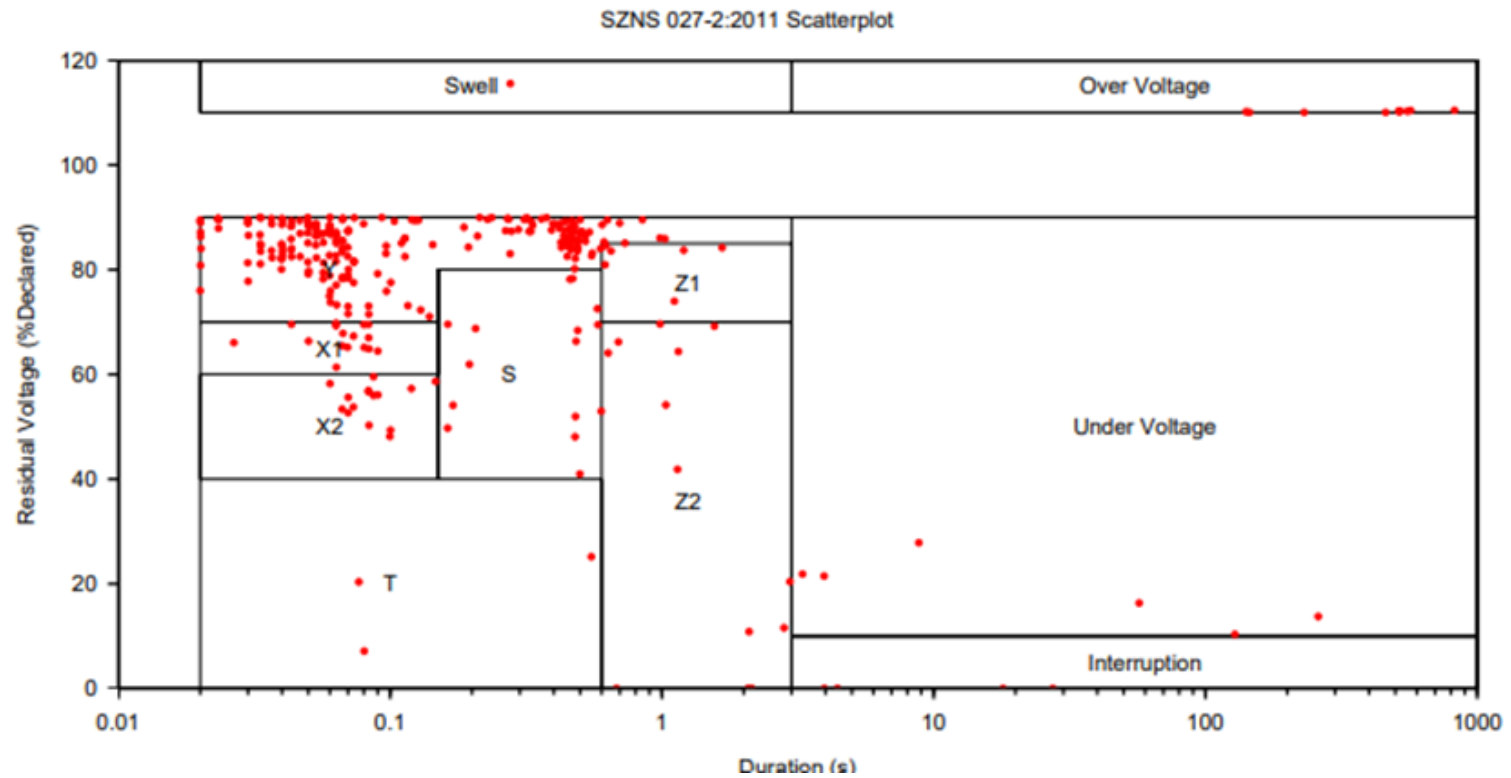
Dalcrue Upper Dam PF Trends



Wright Farm PQ Events



Malkerns Sub PQ Events



WHAT WE'RE DOING

RAISING AWARENESS

Raise awareness about requirements for safe legal connection of embedded generators both internally and externally



REGISTRATION INITIATIVE

Promoting voluntary registration of existing systems will enable the vetting process and customer information update



COLLABORATION

With other stakeholders such as installers, for awareness

WHAT WE'RE DOING



Considering investing in your own power generation?

The EEC recognises that customers are investing in their own generation. It is encouraged that this is done in a compliant and safe manner.

Factors you must consider before installing your embedded generator (EG):



Ensure compliance with legal and regulatory operating requirements.



Ensure compliance with safety regulations. Connecting without approval endangers EEC personnel, equipment and the public.



Ensure compliance with EEC network connection requirements. Connecting without approval compromises network management.

The EEC is ready to connect your embedded generator safely and legally. **Don't Compromise on Compliance!**

WHAT IS AN EMBEDDED GENERATOR?

An embedded generator is a power generating unit installed by a consumer for own consumption and is embedded in the electricity distribution network.

DID YOU KNOW?

Connecting your embedded generator without authorisation is illegal and dangerous and failure to comply could result in the disconnection of the electricity supply to your property.



IMPORTANT NOTIFICATION TO Solar PV Owners!!!

The EEC recognises that customers are investing in their own generation. It is encouraged that this is done in a compliant and safe manner.

To ensure that your system is compliant you need to register and gain approval from the EEC.

Registration can be done in 3 easy steps:

STEP 1

Download application forms from EEC website:
<https://www.eec.co.sz/electricity/production/eg/>



STEP 2

Complete forms and attach necessary documentation.

STEP 3

Email completed form and documents to:
apply.eg@eec.co.sz

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DID YOU KNOW?

Connecting your embedded generator without authorisation is illegal and dangerous and failure to comply could result in the disconnection of the electricity supply to your property.

#PhehlaSikwati

#RegisterYourGenerator - Be Visible for our Safety.

For more information contact us on the following numbers or social media platforms:

TOLL FREE: **800 9000** **2508 3333**
(STANDARD RATES APPLY)



REGISTER AND COMPLY!

The EEC recognises and supports the shift to alternative energy solutions and encourages that this is done in a compliant manner. Therefore the EEC is now promoting the registration and authorisation of all embedded generators (EGs) connected to the distribution grid. All forms of generation are considered, but the most common are solar PV systems. This document provides information on which



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systems are likely to be allowed to connect and how to go about applying for permission to install such a system, as well as other general information on EG systems in the EEC.

What is an Embedded Generator (EG)?

An embedded generator is a power generating unit, installed by a consumer for self-consumption and it is embedded in the electricity distribution network. Solar PV is the popular technology type used but also hydro, wind and biogas are forms of embedded generation.

Can I install a PV EG system without permission from the EEC?

No. National legislation prohibits the connection of EG systems to the distribution grid without specific written permission from the EEC. All systems sizes and technologies, whether exporting energy or not require permission. The EEC is obliged to disconnect customers from the grid if they have unapproved, illegal EGs.

What are the risks of connecting EG system without permission?

EG systems connected to the grid without the required approvals from EEC pose a serious risk to the environment, network, and safety of EEC workers and public. If any incident occurs, whether it involves loss of life, physical harm or damage to the equipment, the owner of the unauthorised EG will be financially and legally liable for all damages incurred or for the loss of life.

How do I register for permission to install an EG system?

Registration can be done by using this easy 3-Step process.

Step 1: Download an application form from the EEC website: https://www.eec.co.sz/electricity/production/eg/docs/Embedded_Generation_System_Application_Form.pdf or scan barcode



Or Scan Here

Energy For The Future

THE PROCESS OF REGISTERING

STEP 1

Download application forms from EEC website:
<https://www.eec.co.sz/electricity/production/eg/>

STEP 2

Complete forms and attach the necessary documentation

STEP 3

E-mail completed form and documents to apply-eg@eec.co.sz

THE GRAND PLAN

Phase 1

- Awareness Campaign
- Registration of Existing Systems
- Network Studies

Phase 2

- Vetting EG for Compliance
- Approval for compliant systems
- Testing back-end systems to enable for export

Phase 3

- Permission to Export for Compliant Systems
- Feed-in Tariff implementation
- Cost of non-compliance Charges Applied

LESSONS LEARNT SO FAR

1. Progress slow at the beginning, start early
2. Not easy to convince customers to register
- 3. Shortage of dedicated resources creates bottlenecks**
4. Stakeholder mapping needs to be done at beginning
5. Invest in power quality monitoring and data management analytics



KEY TAKEAWAYS

- 1. Pilot projects must have a different installers to spread risk**
2. Begin preparations for customer registration very early
- 3. Stakeholder engagement: EXCO, installers, marketing teams, metering, distribution**
4. Begin the export tariff studies and COS
- 5. Alignment between utility and regulator**

Thank You!

For more information on SSEG, please visit our website:
<https://www.eec.co.sz/electricity/production/eg/>

