SOLAR POWER AFRICA

Grid Reliability: Challenges and opportunities

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IN PARTNERSHIP WITH SOLAR POWER EVENTS

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The Role of the VRE Grid Codes in Scaling Up PV integration

- The Role of the Grid Codes
- The Evolution of the Grid Codes
- Requirements for high RE Integration
- Challenges
- Compliance Enforcement
- Looking Ahead

The Role of Grid Codes

Grid codes set the rules and technical requirements for power system and energy market operation.

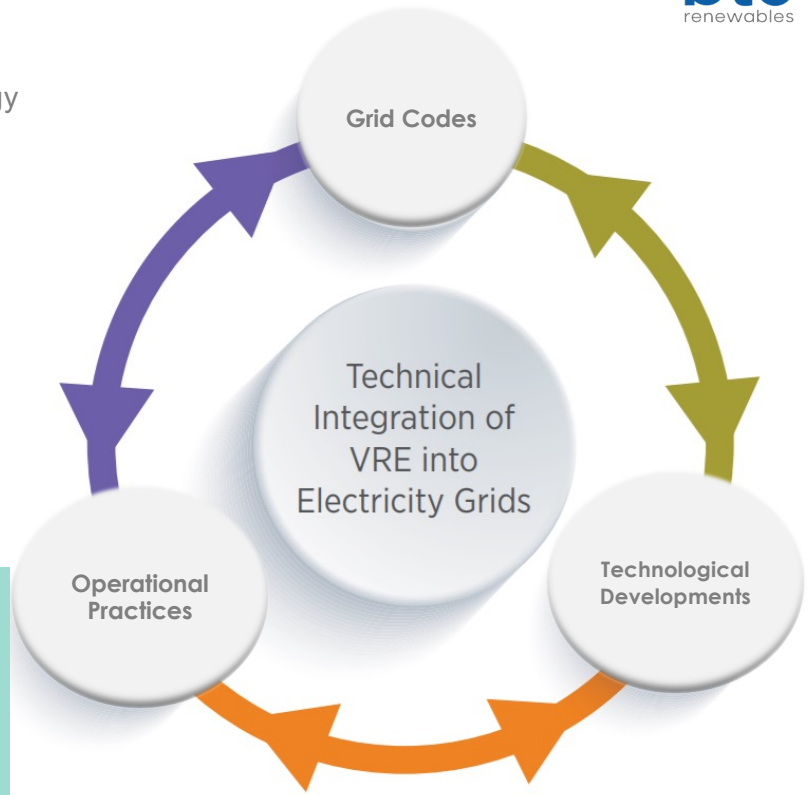
The key main drivers for renewable energy integration;

- ✓ **Grid Codes**
- ✓ Technological Developments
- ✓ Evolving Power System Operational Practices

Reconciliation of important objectives

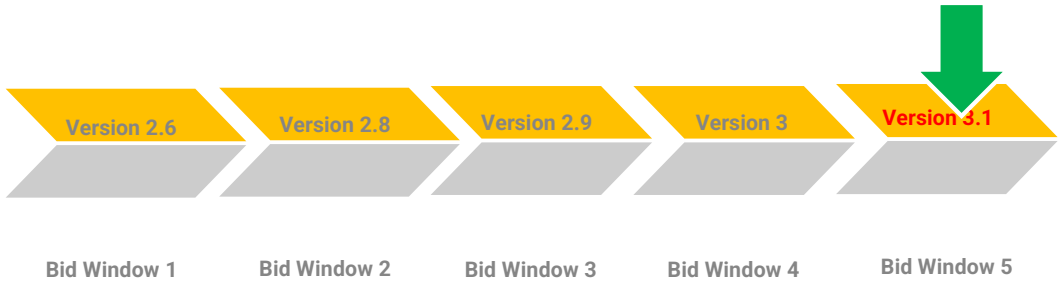
Ensure reliable, secure and quality power supply to users

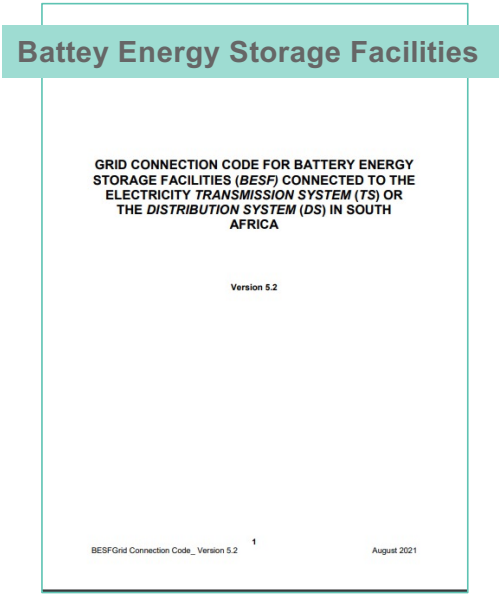
Increase the share of renewables in the power system and reduce reliability on coal



The Evolution of the Grid Codes

- ✓ The Grid connection code for renewable power plants has evolved since Bid Window 1, along with technologies and operational practices.





- ✓ Anticipate requirements of a **dynamic changing system**

- ✓ Complying with the grid code regulations is vital for grid stability , and the ability and commitment by RPPs to comply with the grid codes plays a significant role in having large renewable energy penetration to the grid

Increasing share of PV Penetration on the Network

- The grid has been experiencing a deep transformation with the penetration of renewables (PV and wind) and that raises concerns for system operators. With the new licensing requirements, system stability and resilience is something that needs to be given critical attention.
- Renewables are increasingly required to be more grid friendly and provide regulation and flexibility to the power system where they are connected.
- PV power plants are not required only to generate power when the resource is available, they have to be operated as power plants supporting the power system
- System support main requirements include
  - voltage support,
  - active and reactive power management
  - frequency support
  - inertia emulation
  - fault-ride through.

From PV farms to PV power plants!

Challenges

- As RPPs , we often focus on what we can and cannot do, and not necessarily what the network needs.
- Grid codes are not user friendly and often need guidelines (testing and compliance.
- In Germany some guidelines are produced by industry associations in line with the grid codes. This is something we still lack and are very much reliant on the System Operator.
- We lack a focus/working group where the system operator and all stakeholders engage on the challenges and possible solution to high RE integration. The challenges of the future grid need an industry collaboration.

We need to look into the needs of the future power system

Compliance Enforcement

- By complying with requirements, RPPs can contribute to system stability.

In other European countries, non-compliance with grid code requirements counts as a civil penalty, which can result in fines.

The case for South Africa - the requirements are only a precondition for the network operator to connect the facility, there are no consequences for non-compliance afterwards.

Extensions to existing exemptions are presented to the advisory committee every second month, RPPs take way too long to resolve non-compliances.

Commitment to comply after COD is important as compliance for COD, the grid codes only serve their purpose if they are adhered to.

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Looking Ahead

01

The commitment to comply to the requirements is the first step to a stable and reliable grid. Grid stability should be much of a priority and concern to generators and it is to Eskom.

02

No grid code is perfect

- Too lax requirements can cause reliability or stability issues if renewable installations surpass expectations.
- Too onerous requirements can prevent reaching energy policy targets.

03

We need to stop working as silos and work together , all stakeholders in order to understand and come up with creative solutions to the problems of the future.