

Information on Grid Forming Technologies.

1. Background Information

The energy transition period is associated with a huge decrease in traditional sources of inertia in the system due to old age decommissioning. This presents a challenge in terms of operating a reliable and secure grid. The IRP indicates that 17 GW of coal generation will be decommissioned between now and 2035, and approx. 43 GW of inverter-based resources (IBR -PV, Wind, and BESS) will be installed in the system at that time. IBR provide very little in the way of system strength and inertia and is considered a net consumer of system strength in the grid. System strength is a crucial component in ensuring local stability of the network.

2. Description of Service/ product that needs to be provided (Use high level and short text format), and if necessary, add a spreadsheet.

The request for information (RFI) is open to all manufacturers or suppliers to give NTCSA information on grid forming technologies, as it is in the process of introducing grid forming technologies in its network. This is because of the benefits linked to GFM in literature and some OEMs. To thoroughly understand the technology and its benefits NTCSA is gathering information from OEM providers of grid-forming technology, particularly when paired with a BESS.

3. Benefits to Eskom

- Ability to set its own voltage and angle – In a network with high penetration RE, it is important to have a strong voltage source, GFM BESS ability to set its own voltage and angle will benefit networks with high RE.
- Provision of system strength – Inverter based resources typical of RE consume system strength which is necessary for inverter stability and voltage stability in general, GFM BESS contributes to system strength,
- Provision of inertial response/very fast active power injection – As more conventional generation is decommissioned, system inertia is depleted, GFM BESS will contribute to system inertia and aid in frequency stability
- Damping oscillations – GFM BESS has the ability to damp oscillations in the system, this means that potential instability is mitigated,
- Black start capability – GFM BESS can be used for black start in case there is a black out, Operation in island mode – parts of the system can be switched on without synchronisation to the network, this also helps during black start,
- Stabilizing voltage – GFM contributes to voltage stability,
- Active power control over a wide range of voltage deviations – during certain disturbances, IBR can disconnect from the system, GFM BESS does not disconnect and can inject more active power resulting in a much more stable network,
- Phase jump mitigation – GFM can mitigate for phase jump.

4. Scope of work/supply requirements

Information is sought from GFM BESS OEMs on a variety of aspects pertaining to GFM and listed above, kindly respond to the queries below and provide as much information as possible to support your responses. It is important for as many grid-scale providers of this technology to respond to form a clearer picture of the general capabilities and not polarize the specifications to the few who respond.