DSO ENTITY
DSOs FOR EUROPE

Grid Forming Capabilities DSO Update
ESC SO 20 March 2025

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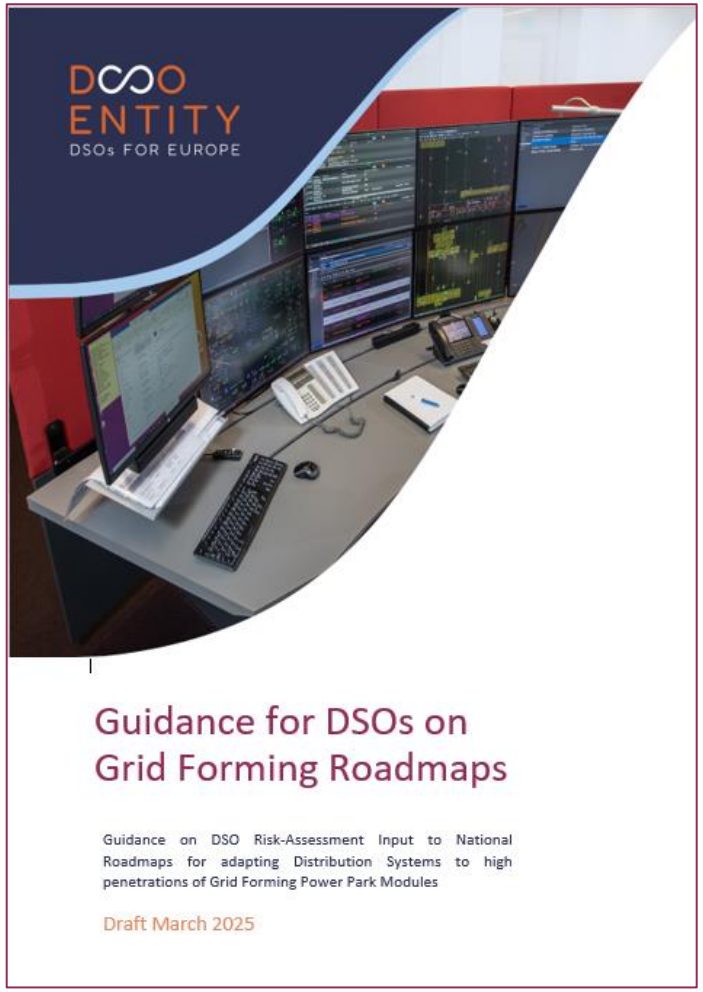
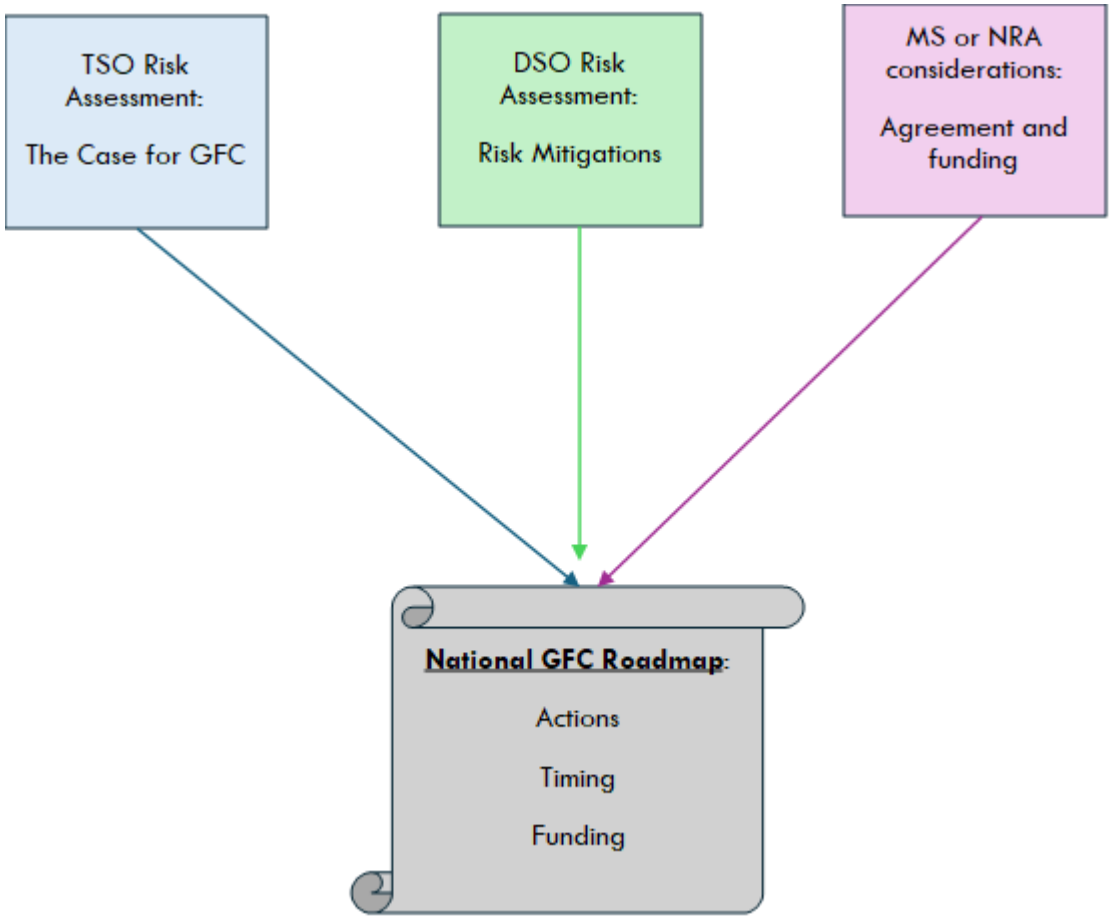
Guidance for DSOs on Grid Forming Roadmaps

- Draft of document finally circulated to ESC Members on 3-3-25.
- DSO Entity thanks members for patience and input to document thus far.
- Document contents covered in following slides, to prompt questions and reactions.



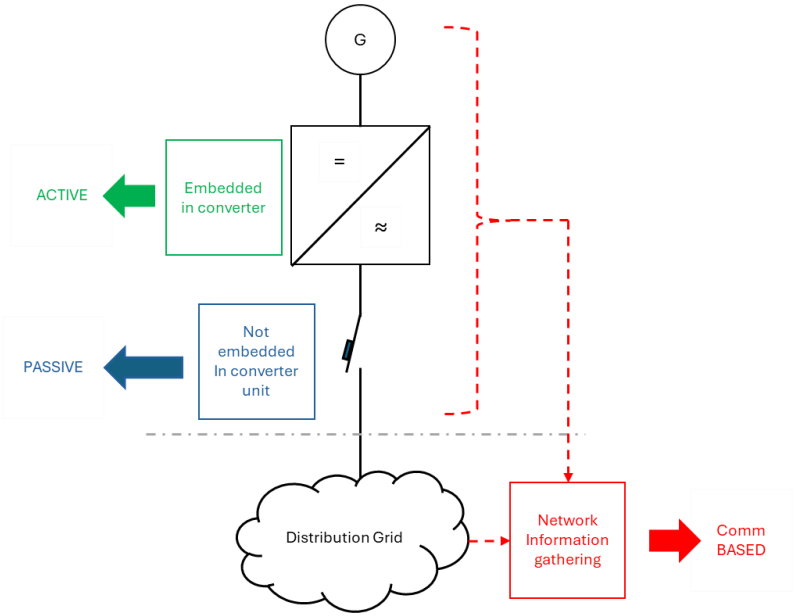
Where the document sits

- This figure depicts the EU DSO Entity's high-level assumption of how the NC RfG 2.0 road map requirements of Article Y.5 will be implemented.
- it is intended to assist DSOs in undertaking the risk assessment which the EU DSO Entity is proposing is an essential part of roadmap creation, ie the green box.
- The EU DSO Entity's view of what the road map itself should contain is attached as Appendix B.



Document Structure

- Glossary of Terms and Acronyms
- Executive summary
- Introduction and background, Target Audience, Scope
- Status of this guidance
- Methods of island detection
- Passive detectors
- Active Methods
- Methods involving Communications
- Part 1: Risk Analysis of the formation and maintaining of islands
- Part 2: Analysis: Consequences of, and potential mitigations, for island formation



Key Messages

- Various methods discussed
- Some research indicating challenges posed to traditional means of anti-islanding protection by GFC.

Document Structure

- Part 1: Risk Analysis of the formation and maintaining of islands
- General
- Initial high-level screening and baselining
- Assessment of future high penetration scenario using Network Development Plans
- Relative risk of a stable island being formed
- Relative risk of island being maintained
- The risks of a temporary island as an influence on automatic network reconfiguration
- Influence of frequency based automatic load/generation sheddi on the mismatch between generation and load

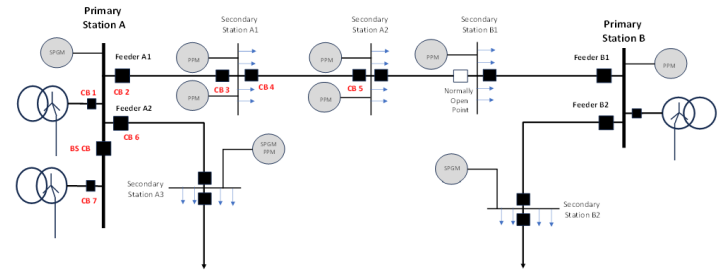


Figure 3 – Schematic of a typical radial distribution network

These relative risk categories, for guidance purposes are given in table x below.

Generation/Load mis-match [%]	Risk Category
0 % =<20%	Extremely low
>20 % =<40%	Very low
>40 % =<60%	Low
>60 % =<80%	Medium
>80 % =<100%	High
>100%	High - will need further network specific analysis.

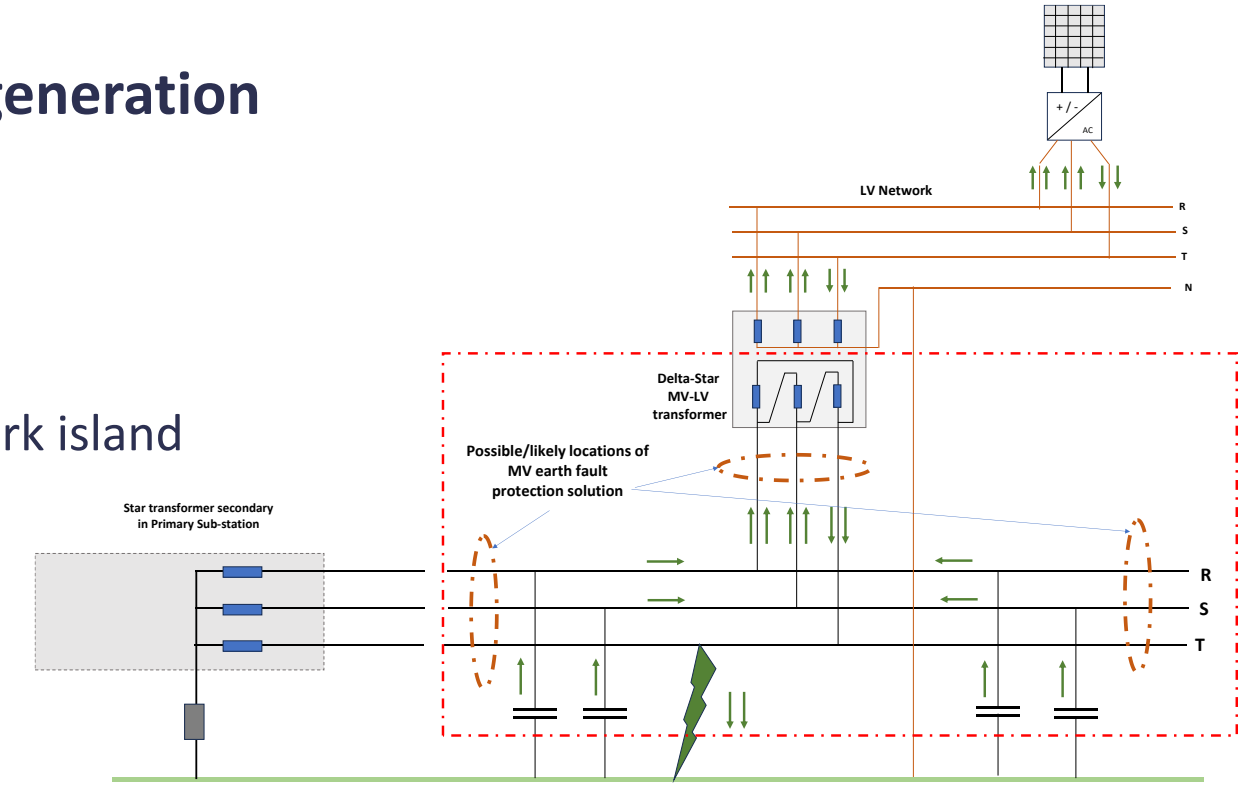
Table 2 Relative risk categories of island being maintained.

Key Messages

- Typical distribution sample networks introduced
- Methodologies for evaluations discussed
- Aim to have some uniformity of approach – notwithstanding individual policies and risk appetites of different DSOs
- Schematic and geo-spatial network representations included
- The generation/load ratio is not necessarily static and can vary over the lifetime of the island.

Document Structure

- **Impact of summated LV connected generation on MV network**
- Introduction
- General single transformer arrangement
- Single phase to earth fault on the MV network island
- Islands on LV networks



Key Messages

- Irrespective of neutral treatment in place before island formation, island will always be an isolated neutral system.
- Current based MV earth fault detection will not operate.
- In particular, fault contributions to MV earth faults in the island from LV connected generation, will not be seen by LV protection.
- This potentially necessitates dedicated NVD based protection at every MV-LV transformer site.

Document Structure

- Part 2: Analysis: Consequences of, and potential mitigations, for island formation
- Introduction
- General Format of discussions
- Appendix A:
  - Examples of islanding risk assessment for different network types/topologies/voltage
  - Various illustrative scenarios examined.

Key Messages

- Many solutions discussed
- Where speed of operation is critical, installation of an MV CB/Recloser plus NVD based protection necessary
- Cost per site is modest but number of sites could be extremely high
- Where speed is not as critical, where sufficient visibility is in place, use of an Advanced Distribution Management System [ADMS] may be helpful.

Questions?