DSO ENTITY
DSOs FOR EUROPE

Grid Forming: where to next?

ESC GC meeting , 1st December 2023

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Presentation Outline

- EU DSO Entity introduction
- EU DSO Entity concerns on islanding
- Discussions and positions to date
- What would a roadmap look like?
- Conclusion

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DSO Entity
Brief introduction

DSO Entity

An EU association legally mandated by EU Regulation 2019/943

Art. 52.1: Distribution system operators shall ***cooperate at Union level through the EU DSO Entity***, in order to promote the ***completion and functioning of the internal market for electricity***, and to promote optimal management and a coordinated operation of distribution and transmission systems.

A body of cooperation and neutral expertise between all DSO in the EU

Network Codes & Guidelines

Participates in drafting of Network Codes and Guidelines relevant for DSO grids

- Joint proposal with ENTSO-E on **Network Code (NC) Cybersecurity (14/1/22)**
- **Upcoming Network Code (NC) Demand-side Flexibility**
- **Review of existing network codes (NC)**

DSO/TSO cooperation

Promotes optimal and coordinated planning and operation of DSO/TSO networks

- **MoU** with ENTSO-E (DSO-TSO work plan)
- Cooperation on **Network Codes (NC)**
- Joint initiative on **Vision 2050**

Sharing best practice

Expert Groups and forum provide expertise and enable exchange of views

- **Various forms of knowledge sharing** with DSO Entity's members
- Via **project teams** (e.g. events, expert tables)
- **DSO radar reports**

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DSO Entity
Concerns on Islanding

Illustration of un-intended islanding

- Typical Distribution primary substation
- One large generator connected directly to the lower voltage busbar

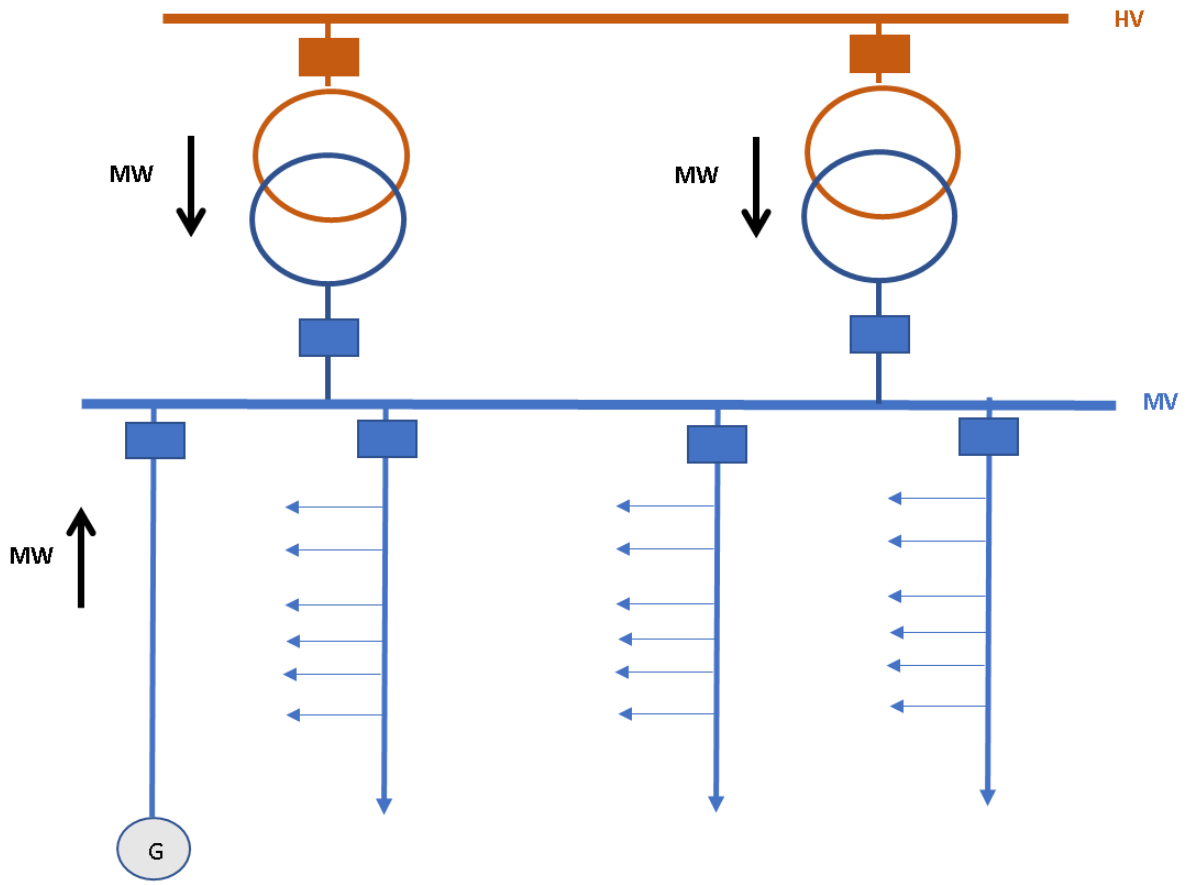
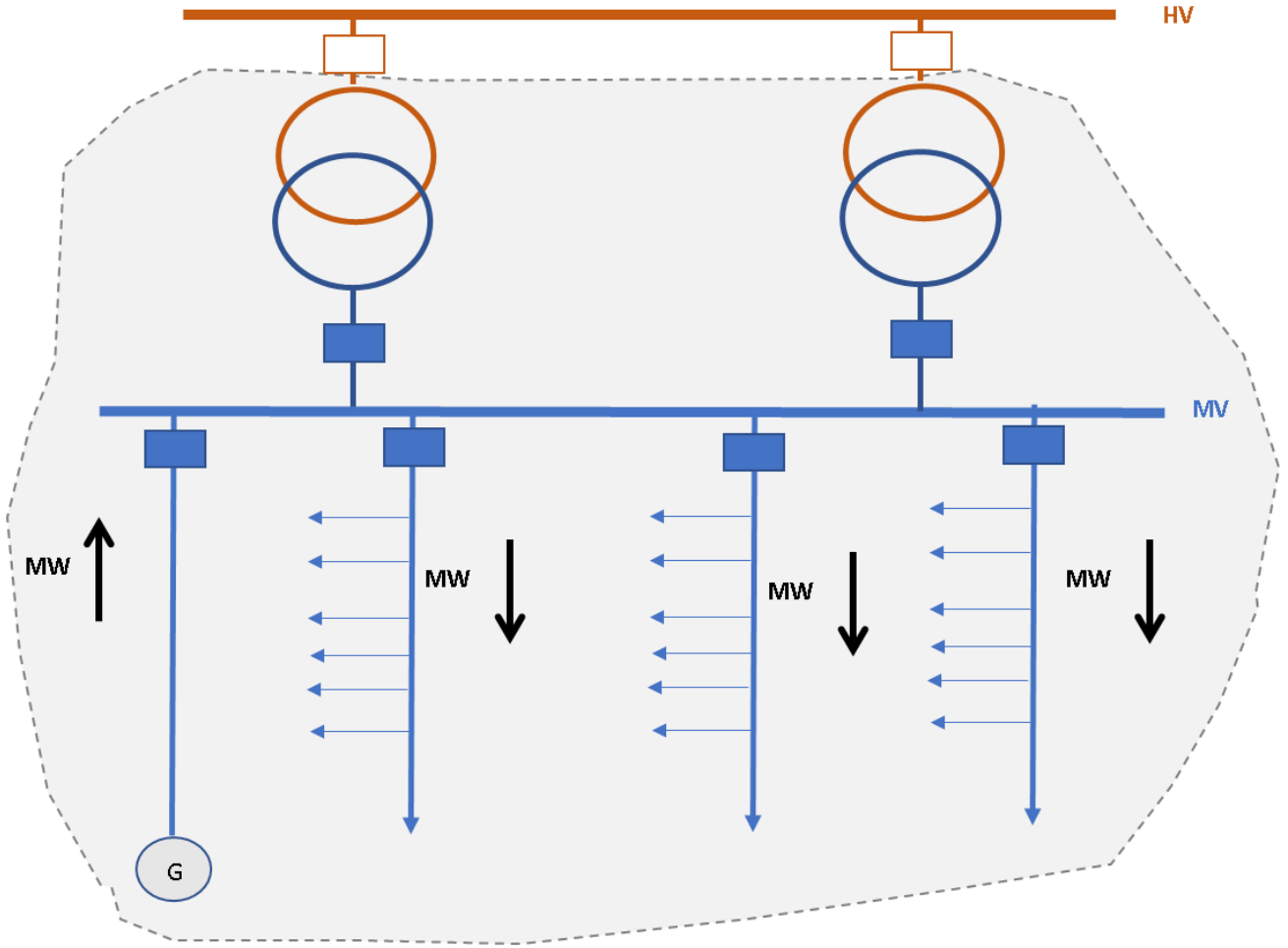


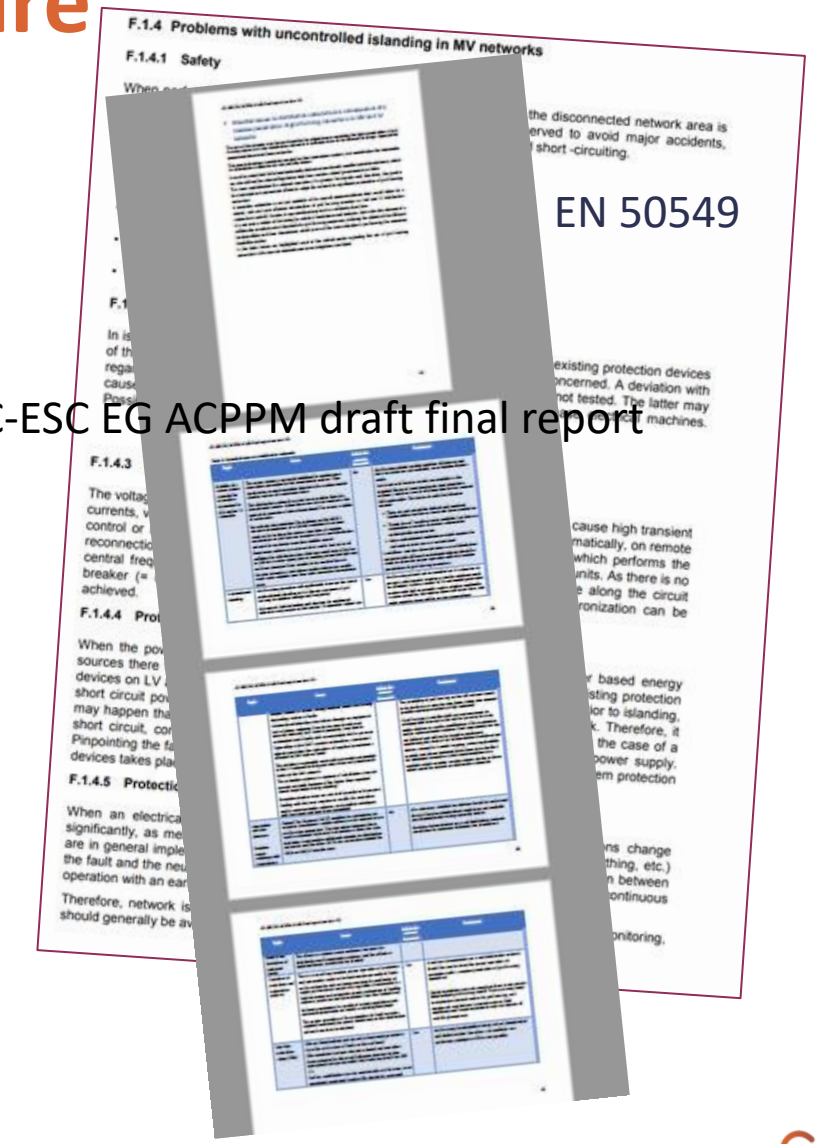
Illustration of un-intended islanding

- Transformer circuit breakers open [for whatever reason]
- All MV load now supplied by the generator.



Reasons why un-intended islands are undesirable

- Neutral earthing and compromising of earth and phase fault protection
- Quality of supply to customers
- Synchronising issues
- Compromising of automatic restoration schemes
- Regulatory and market issues; Supply-dispatch – frequency management responsibility



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Discussions and positions to date

DSO Entity
Concerns on Islanding

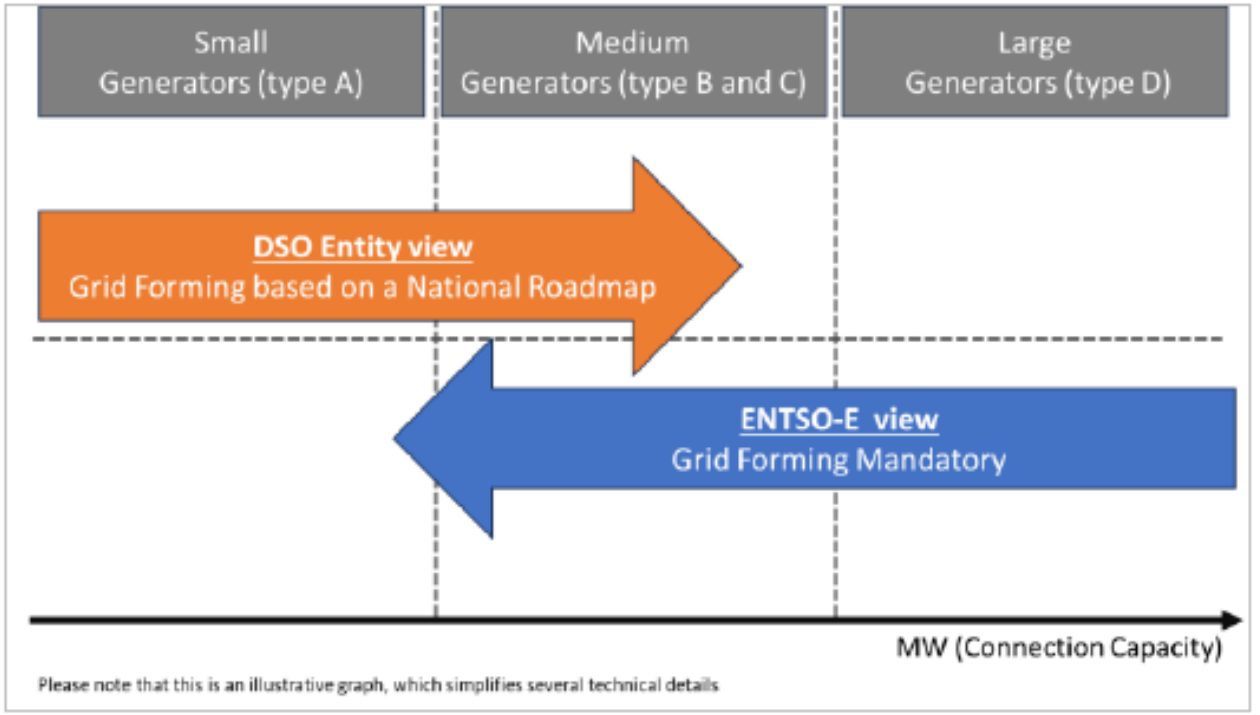
ENTSO-E are advocating mandatory GFC for Type B,C and D PPMs. They believe this and ROCOF changes are necessary to deal with system splits on the Central Europe Synchronous Area.

DSO Entity view is that taken together,

- these will make the detection and elimination of unintended islands on the distribution network, through traditional passive means, virtually impossible,
- islands are more likely to form and once formed, will stay running for longer periods of time,
- DSOs will need substantial time and investment to mitigate the effects, to seek alternate solutions and bring them into business as usual.

Discussions

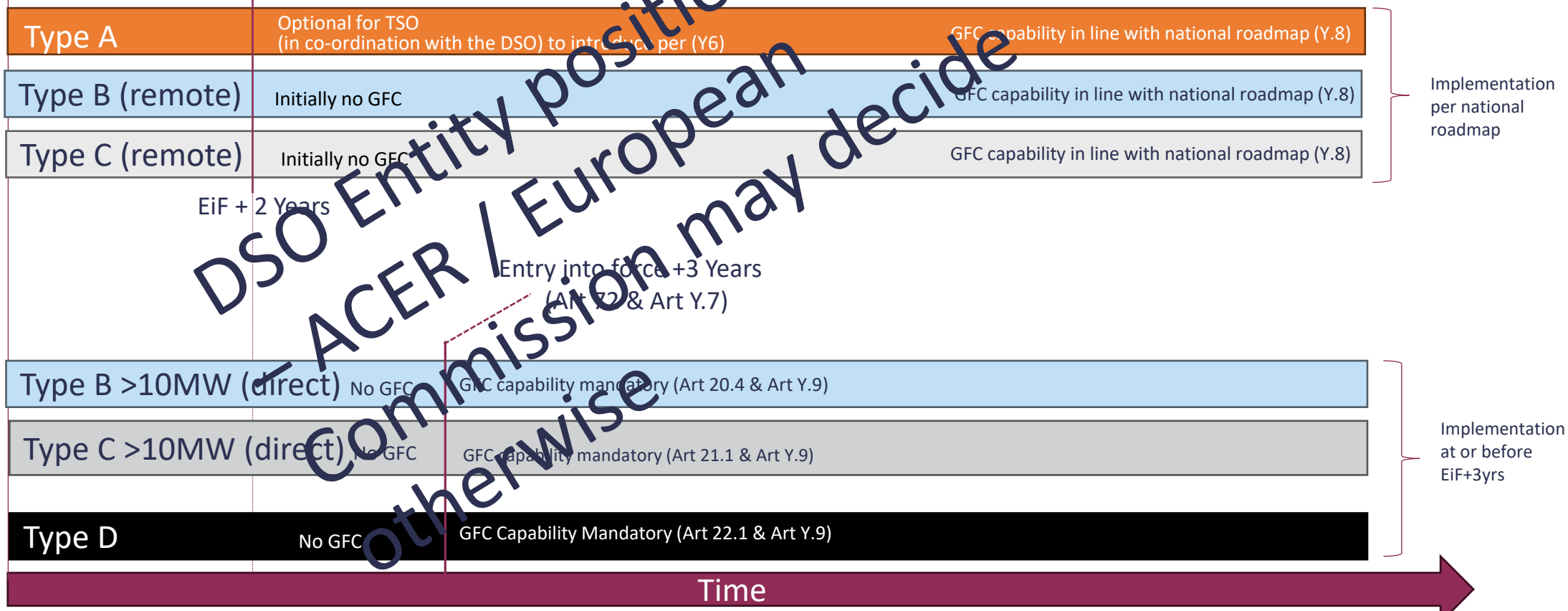
- ENTSO-E would like all Types except Type A to have mandatory GFC on Entry Into Force.
- DSO Entity want to have as much as possible of the smaller to medium PPMs covered by a National Roadmap. This is to give DSOs time and space to make necessary changes or investments.
- The positions became almost aligned but not quite!



Introduction of GFC to different PGM Types

Publish national Implementation Roadmap
(Art Y.8)
Sets national requirements, timeline and obligation for GFC for "remote" PPMs

"direct" = >10MW and connected via dedicated feeder to a substation with transformation to 110 kV or above.
"remote" = connected to MV/LV network and not "direct".



DSO Entity position only – ACER / European Commission may decide otherwise

What would a Roadmap look like?

Various strands:

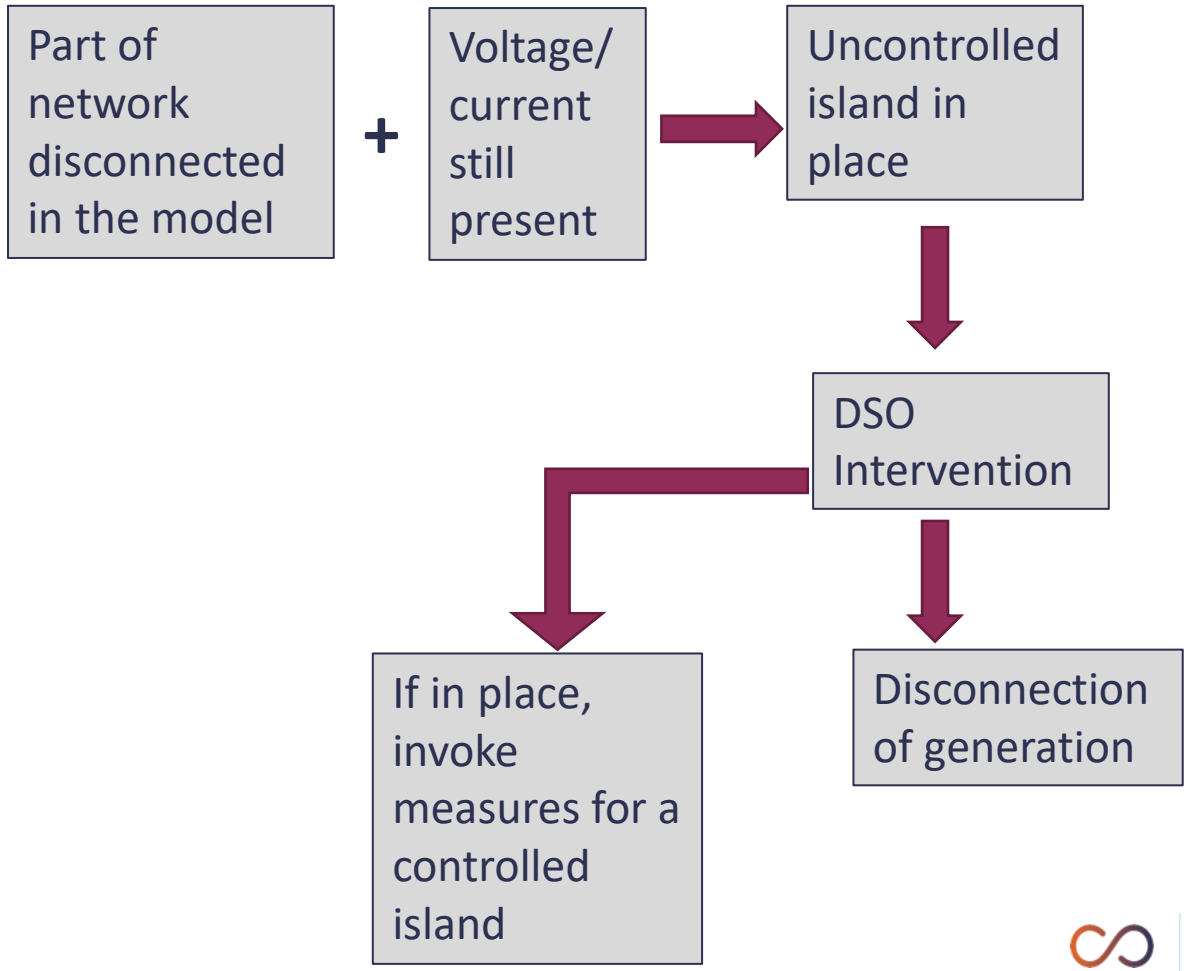
- Research
- Long term mitigations
- Short term mitigations

Research

- Studies into areas such as stability, modelling.
- Joint DSO-TSO programmes of studies
- Local distribution modelling
- Whole of distribution system modelling – inter PPM oscillations
- Needs co-ordination of DSOs and research institutions
- Needs funding

Long Term mitigations - Advanced Distribution Management Systems [ADMS]

- Many DSOs well advanced on such projects for other reasons eg flexibility etc.
- Many pre-requisites;
  - Accurate models
  - Accurate customer referencing
  - Close to real-time visibility of distribution network
- Challenge for smaller DSOs?



Short Term mitigations

- Alternate/active methods of island detection
  - effectiveness of non-RoCoF LoM
  - alternative LoM techniques
  - active injection techniques
- More advanced inter-tripping schemes
- Solutions for neutral earthing issues
  - Backup voltage-based fault detection [NVD]
  - Strategically placed switched neutral earths
  - More Reclosers/smart RMUs

Concluding remarks

- Challenges remain for DSOs to accept Grid Forming PPMs on to distribution networks
- DSO and TSO positions on text for RfG Code close but not fully aligned.
- DSOs need time and space [and funds], in the form of roadmaps, to allow for research and mitigations to be designed and installed.
- Incumbent on DSOs to use any such time/space wisely and efficiently so as to ultimately facilitate GFC introduction.