# Resilience of Load Shedding Schemes – Readily Available Improvements

## C1 –Power System Development and Economics
PS 1: System transition resilience & asset management response
Question 1.1.2: Have others identified ways to integrate grid forming or smart load shedding / non-firm connection capacity to improve resilience?

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# Challenges to Traditional Under Frequency Load Shedding Schemes

- *Traditional UFLS scheme characteristics:*
  - Static - i.e. measures local frequency
  - Typically implemented at HV → *not very selective*
  - Fixed settings - Load shedding blocks and time delays → *relatively inflexible*

- *Changing system conditions:*
  - DGs and DERs operating 'behind' the relays
  - Faster frequency dynamics
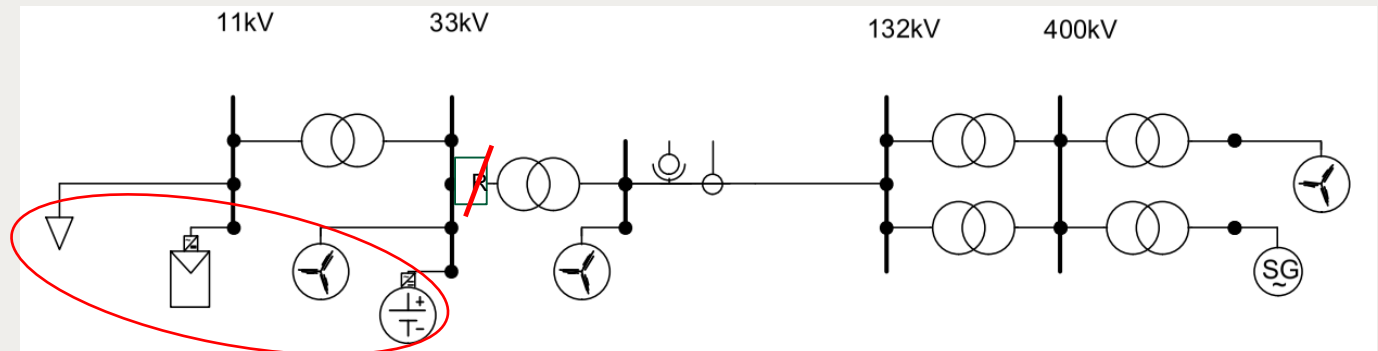
# Improving UFLS

- *Smart Load Shedding Schemes:*

- Are either semi - or fully – adaptive.

- Proposals often require improved network monitoring and communication systems

- *Can present barriers for adoption by DSO/ESO*

- *More readily available 'interim' solutions, e.g.:*
  - Relocate relays closer to demand
  - Adjust time delays
  - We find these actions can improve the effectiveness of the current scheme.
  - **But neither perfect nor fully future proof**

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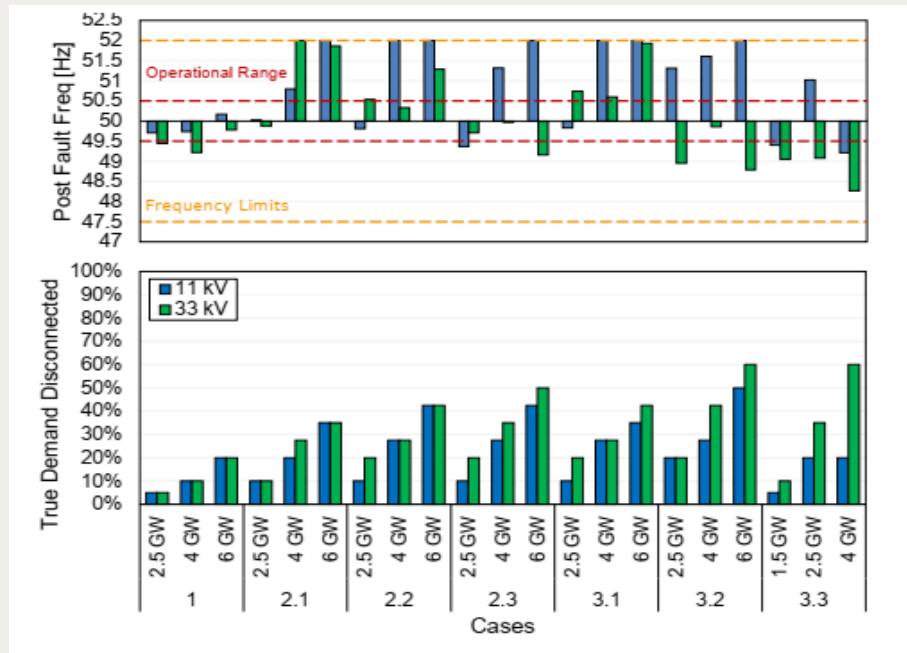
## Summary

- *Some systems may be already facing challenges to the resilience of the UFLS scheme*

- *Smart load shedding schemes are unlikely to be ready for implementation in some national power systems (such as GB)*

- It may be necessary to amend the codes governing the implementation of UFLS in two stages:
  - in the near-term to make LFDD more suitable for the system changes that have already occurred,
  - Then, following suitable research and testing, implementation of a smarter load shedding for a more robust scheme in the longer term