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Access to 11kV network for small scale generation

(< 500kVA approx)

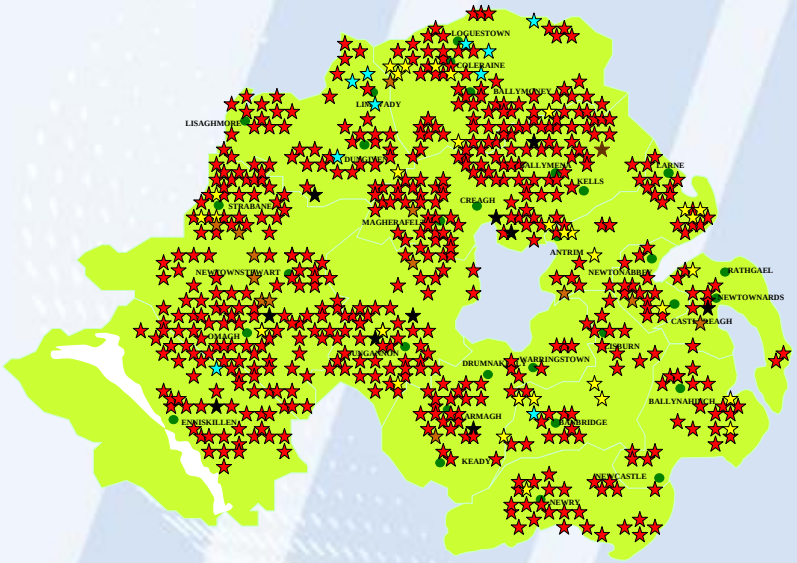
Agenda

- Limitations on access to 11kV network
- Review of present approach to design
- Scope for increased access
- Logistics of providing for increased access
- Issues to be considered
- Potential next steps

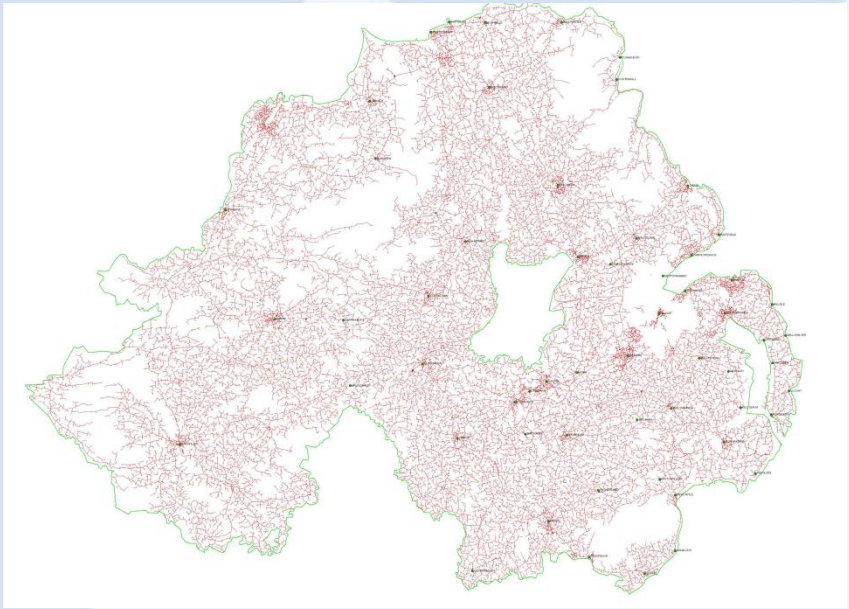
Limitations on access

- Network predominantly 25 sq mm
  - Also spurs are predominantly single phase
- Design based on enabling max export at min demand
  - Premise of design is that volt rise limited to 1% for this circumstance
- Design needs also to accommodate multiple generation on an individual circuit

Small Scale Generation V Extent of 11kV Network

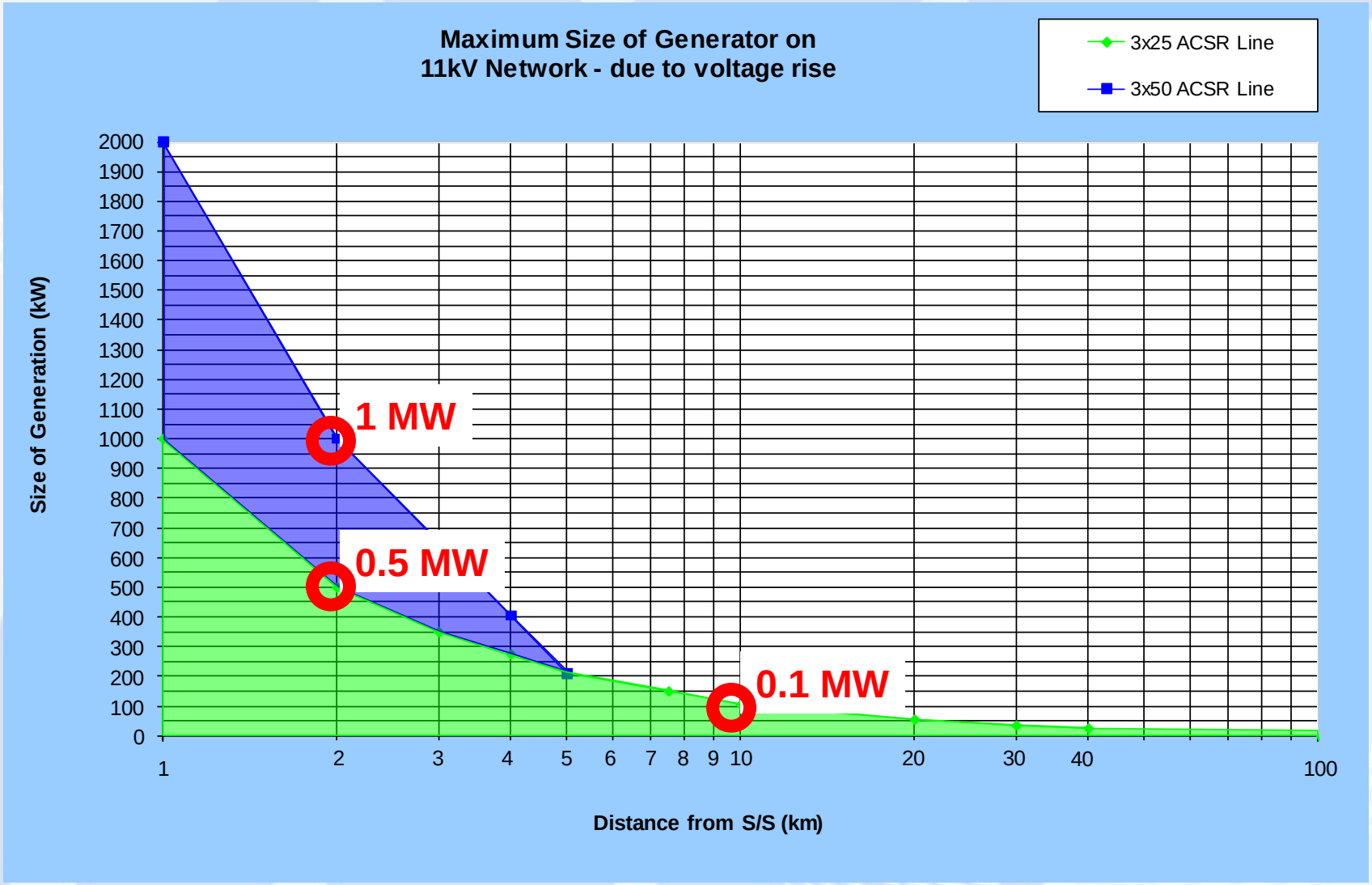


Applications in planning



Extent of 11kV network

Capacity available on 11kV circuit



Implications of limitations

- Where distant from source, often cannot connect to adjacent 11kV circuit due to risk of voltage rise
- Exacerbated where a number of generators wish to connect on the same circuit
- Options are
  - Rebuild existing circuitry to 50 sq mm
  - Build new circuitry to a point on the 11kV network where voltage is within limits
- Can be extremely costly – also timescales extended due to planning/wayleaves

Review of present approach to design

- NIE provides a design based on max gen/min demand
  - To ensure export capacity at all times (subject to normal 11kV network configuration)
  - To protect existing customers
- However:-
  - Min demand occurs infrequently
  - Max gen output occurs very infrequently
  - Probability of coincidence of above is very low

Scope for increased access

- Scope to allow generation to connect locally without upgrading if there was intervention when voltage performance is threatened
  - NIE assumes a limited level of reactive absorption however one intervention could be increased absorption at times of max gen/min load
  - Intervention could also be by reduced active power output
  - Could also be by reduction of source voltage

Logistics of providing for increased access

- Scada
  - To provide NIE visibility of gen output and local voltage
- Controllability
  - To provide the generator with scope to intervene
- SCADA and power factor controllability are covered under the D code for gen >100kW
- Controllability of active output is more difficult practically and is not covered under D code

Issues to be addressed

- Uncertainty over level of access
- Can an indicative level of access be estimated?
- Development of planning tool to study connection design
- Impact on business case of generator
- Resilience and capability of SCADA/Control to intervene
- Risk to customers if there is inadequate intervention
- Integration of gen control with network voltage control
- Implications for day to day control of the 11kV network
- D code development
- Testing and commissioning
- Conflict between generation with limited access with generation that could have assured access
- Coordination between generation on the same circuit

Potential way ahead

- To move towards a different approach to connection will need further investigation
  - Needs collaboration between NIE and generation industry
  - Needs support from parties presently working in this space
  - NIE is presently discussing this with a particular party
  - Need to develop arrangements “on paper” that consider the issues highlighted
  - Need some level of consultation
- Trial schemes could then be considered
  - Need to limit risk to participants