Fundamental NETS SQSS Review

Industry Review Group

Progress Update & Consultation Report Briefing

Scottish and Southern Energy

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Outline

- Introductions
- Background Drivers
- Open Letter (including Revised Workplan)
- Update & Consultation Document
  - Revised Minimum Generation Connections
  - Contingency Criteria
  - Voltage Criteria
  - Embedded Generation
  - Intertrip Schemes
  - Stability Criteria
  - Clarifications
- Work in Progress
- Integration of Wind

Background – Drivers for the Review

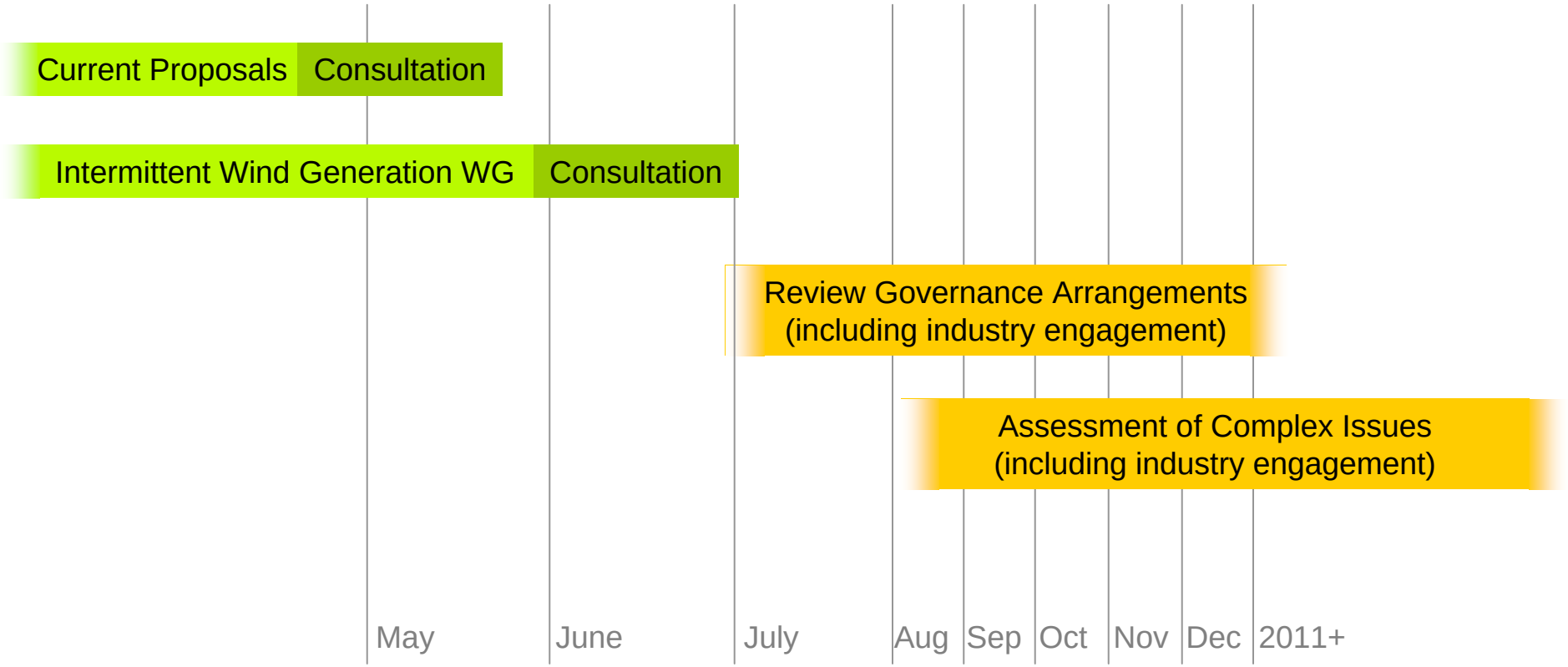
- Growth in intermittent generation
- Increase in external interconnections
- Development of offshore networks
- SMART transmission and distribution technologies
- TSORG review
- Regional Inconsistencies

Open Letter

- Significant work accomplished… but much remains
- Benefit in implementing work done so far, and establishing an ongoing programme of work
- Differentiate between immediate issues and complex longer-term considerations
- Enhanced engagement with industry
  - Review governance arrangements
  - Consultation on different phases of work
  - Increased customer engagement

Revised Workplan

Two phases of work: **Immediate Focus** & **Longer Term Focus**



Fundamental Review - Update & Consultation

- Published April 23
- Presents the findings of the five working groups:
  - WG1 – International Benchmarking
  - WG2 – Transmission Entry & Exit Principles
  - WG3 – Main Interconnected Transmission System Principles
  - WG4 – Planning and Operational Contingency Criteria
  - WG5 – Offshore Transmission Systems
- Contains several major proposals

Revised Minimum Generation Connections

- One size doesn't fit all
- Basing **minimum generation criteria** on the **aggregate generation capacity** and expected **source fuel load factor** of new generation:
- Implementation would follow a review of charging procedures

Generation Group	Group Aggregate Generation Capacity (TEC)		Source Fue Load Factor	Connection Type
	Minimum	Maximum		
A	0	< 50	<= 40%	A
			40 – 70%	A
			70 – 100%	A
B	>=50	< 100	<= 40%	B
			40 – 70%	B
			70 – 100%	B
C	>=100	<300	<= 40%	C
			40 – 70%	C
			70 – 100%	D
D	>=300	<700	<= 40%	D
			40 – 70%	D
			70 – 100%	E
E	>=700	Normal Infeed Loss (1,320)	<= 40%	E
			40 – 70%	E
			70 – 100%	F
F	>=Normal Infeed Loss (1,320)	<Infrequent Infeed Loss Risk (1,800)	<= 40%	F
			40 – 70%	F
			70 – 100%	G
G	> =Infrequent Infeed Loss Risk (1800)	<2 x Infrequent Infeed Loss Risk (3,600)	<= 40%	G
			40 – 70%	G
			70 – 100%	G
H	> =2 x Infrequent Infeed Loss Risk (3,600)	-	<= 40%	H
			40 – 70%	H
			70 – 100%	H

Revised Minimum Generation Connections

Possible implementation:

Minimum	Maximum		Timescale	Planned outage of a single transmission circuit or single section of busbar	Planned outage of a single generator circuit	Fault of a single transmission circuit
>=50	< 100	<= 40%	Immediately	Nil	Nil	Nil
			In time to restore outage	Total Group Generation Capacity	Total Group Generation Capacity	
			In time to restore fault			Total Group Generation Capacity
		40 – 70%	Immediately	Nil	Nil	Nil
			In time to restore outage	Total Group Generation Capacity	Total Group Generation Capacity	
			In time to restore fault			Total Group Generation Capacity
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			In time to restore outage		Total Group Generation Capacity	
			In time to restore fault			

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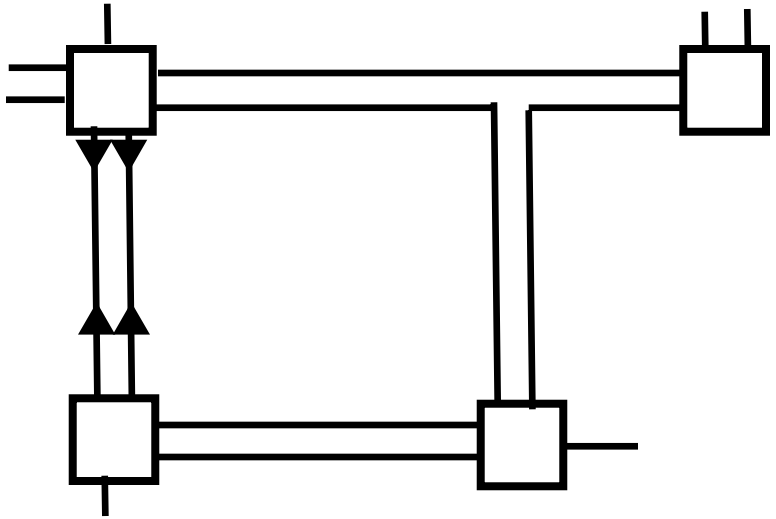
Contingency Criteria

- Existing criteria is largely appropriate and consistent with comparable overseas networks, except for…
- the ‘N-1-1 at peak demand’ criteria that applies to the MITS within England & Wales in design timescales
- Propose to remove this requirement, except for circuits containing transformers or cable outside a substation



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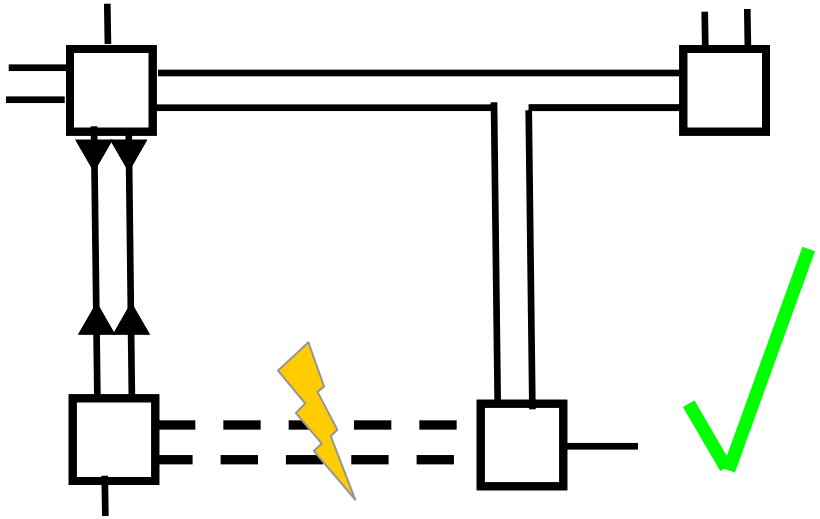

Remains a secured event

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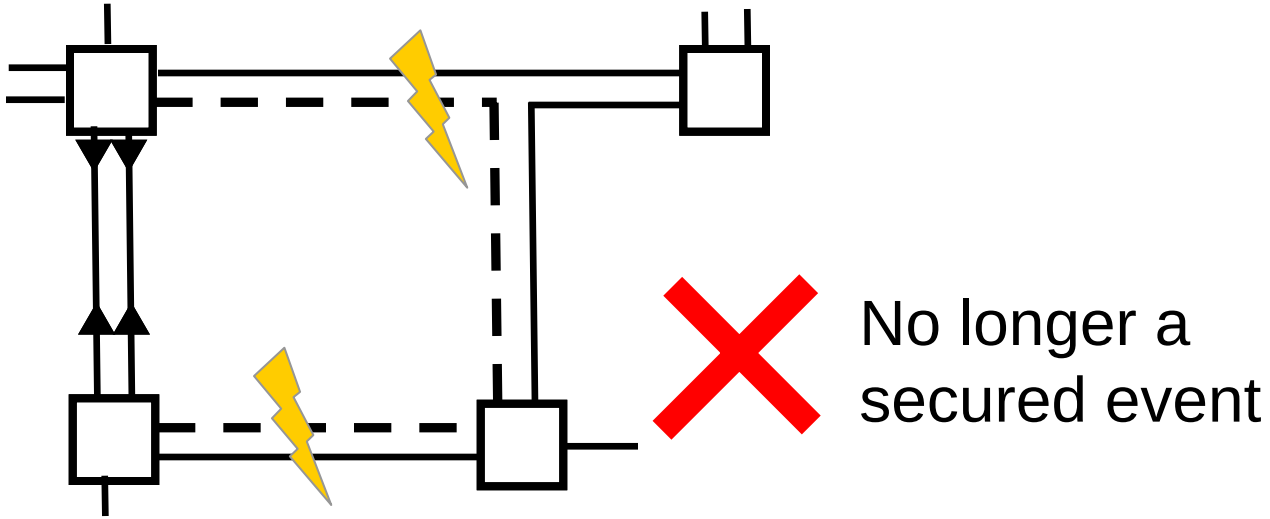

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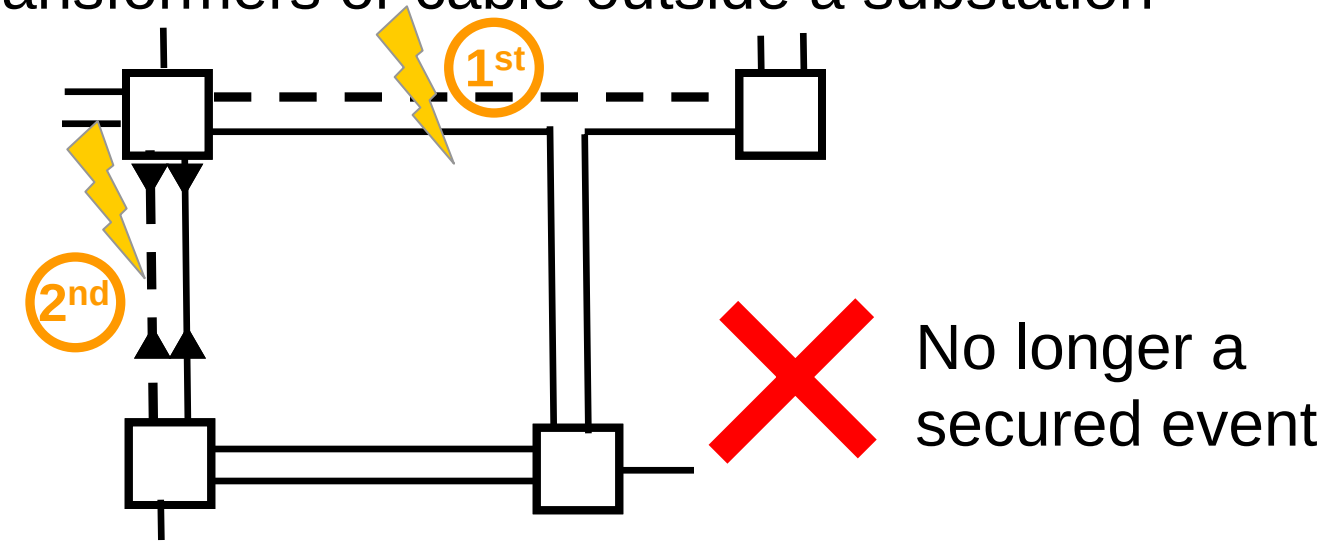

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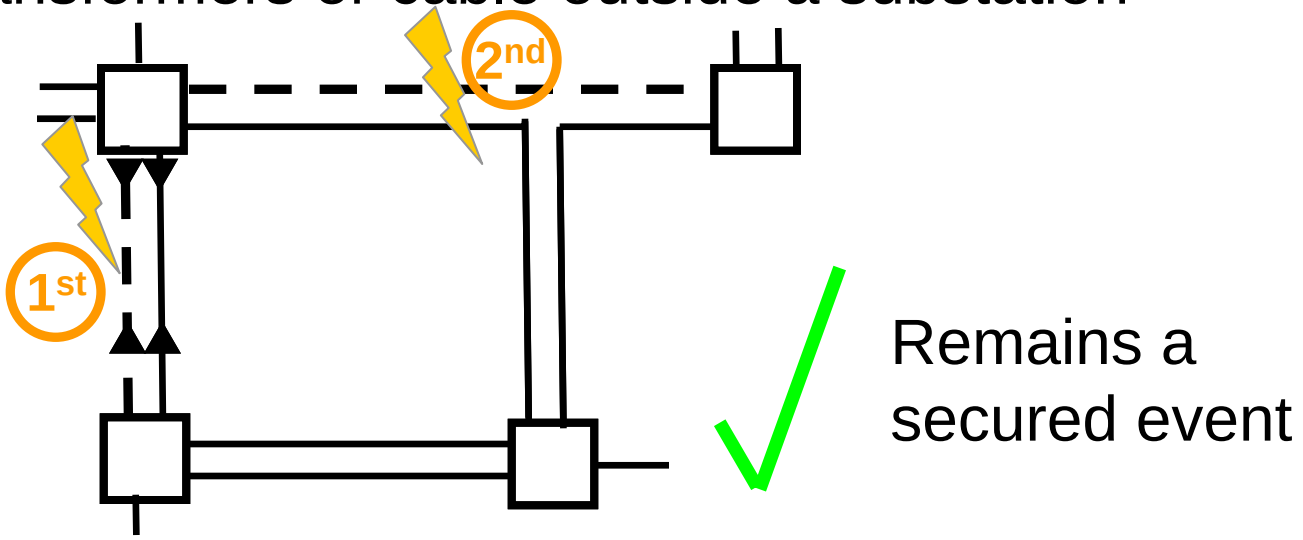

Voltage Criteria

- ‘Hard Limits’ and ‘Soft Limits’
- Greater flexibility in operational pre-fault voltage
- GB-wide step-change limits for operational switching
- Consideration of the loss of a generating unit and failure of a circuit breaker as secured events where this could cause the voltage to increase beyond the upper planning limits.

Demand Groups / Embedded Generation

- Recommend procedural changes to:
  - improve transparency in the estimation of demand group requirements,
  - introduce a more thorough assessment of the contribution of embedded generation to demand security
- Followed by a joint review with the P2/6 standard, to improve harmonisation of the two standards

Stability Criteria

- Considered opportunities to increase network utilisation by relaxing stability criteria:
  - Assuming single-phase-to-earth or two-phase-to-earth faults, rather than three-phase faults
  - Reducing the assumed fault clearance time (i.e. utilising faster protection)

→ GB power system already fully utilising its stable operating envelope. No material benefit to be gained by relaxing stability criteria.

Intertrip Schemes

- Demand and generation intertrip schemes already used extensively (~30 schemes in operation)
- Generally only of benefit in managing outages
- Need to ensure the network retains sufficient flexibility to accommodate outages offpeak to facilitate maintenance and development

→ Retain current practice, that intertrips do not generally provide an alternative to reinforcement to support winter peak demand, but should be considered to support year-round operation.

SMART Networks

- Recognise the increasing role of:
  - Demand management
  - Dynamic circuit ratings

  in providing additional network capability
- Proposals to reflect this in the SQSS where these services can be reasonably relied upon to be available throughout the timeframe under consideration

Work in Progress

- Balance between costs of developing and operating the network and the level of service it provides
- Procedures for deciding inputs to cost benefit analyses
- Ensuring alignment of SQSS with charging & access arrangements
- Determining the appropriate balance between user commitment and anticipatory investment
- Managing greater interconnection and market-coupling with Europe

Work in Progress

- Increased availability of demand side management
- Managing the risk associated with increasing levels of complexity within the power system
- The risks & costs associated with low-likelihood but high-impact cascading faults
- The implications of other industry initiatives (e.g. Ofgem's RPI-X@20 review)
- Ongoing consideration of emerging technologies

Wind Integration - background

GSR001 consultation

- Proposal to maintain current SQSS approach:
  - Scale wind by 40% in ranking process – 120% margin
  - Scale wind by 72% as input to studies
  - Scale all generation to Gen = Demand
- But merit in applying different factors in export/import groups
- Other options needed further work
- Consultation responses:
  - Not well understood
  - Scaling factor not right
- Work became part of Fundamental Review

Wind Integration – current position

- Limited progress to date
- Agreement with OFGEM to report on recommendations in July 2010
- Working group established – TOs + economic consultants
- Will hold industry review group meeting late May / early June
- Intend to consult with industry throughout June

Wind Integration considerations

- Recognition that wind contribution to demand security is limited
- Pros and cons of CBA
- Can snapshot studies be sufficient?
- How should generation group size be accounted for?
- Is the current ranking process appropriate?

Wind integration analysis

- Actual wind data / anticipated generation
  - Annual / seasonal energy
  - Averaging across different area sizes
  - Informs profiles for CBA and scaling factors for snapshot
- Economic analysis
  - Comparison of economic transmission with scaling option results
  - Sensitivity to input assumptions

Wind integration next steps

- Development of options – mid May
- Write consultation report – end May
- Industry review group – late May / early June
- Consultation – June
- Report to OFGEM – mid July
- Development of charging proposals in parallel

Questions / Discussion