Distributed ReStart

Networks Engagement Event

DNO/TO workshop
12th September 2019

In partnership with

tnei

SP ENERGY NETWORKS

nationalgridESO

Stakeholder Engagement Summary

Distributed ReStart aims to incorporate the views of wider industry at every opportunity, bringing in the diverse expertise found across the electricity market to solve this world first challenge of Black Start using Distributed Energy Resources.

On Thursday 12th September Distributed ReStart hosted an event inviting all DNOs and TOs in Great Britain to share their views on the future of restoration.

This event focused on establishing existing capability across systems, telecommunications and organisations and the potential changes which may be required to enable project outcomes. Furthermore, a review of procurement methods and code requirements was conducted drawing on the expertise of Networks Owners and Operators from across the country.

A summary of the outcomes from this event is provided in the following document to provoke thought and further discussion. If you have any queries or comments stemming from this, don't hesitate to contact us at ReStart@nationalgrideso.com, we look forward to hearing from you!
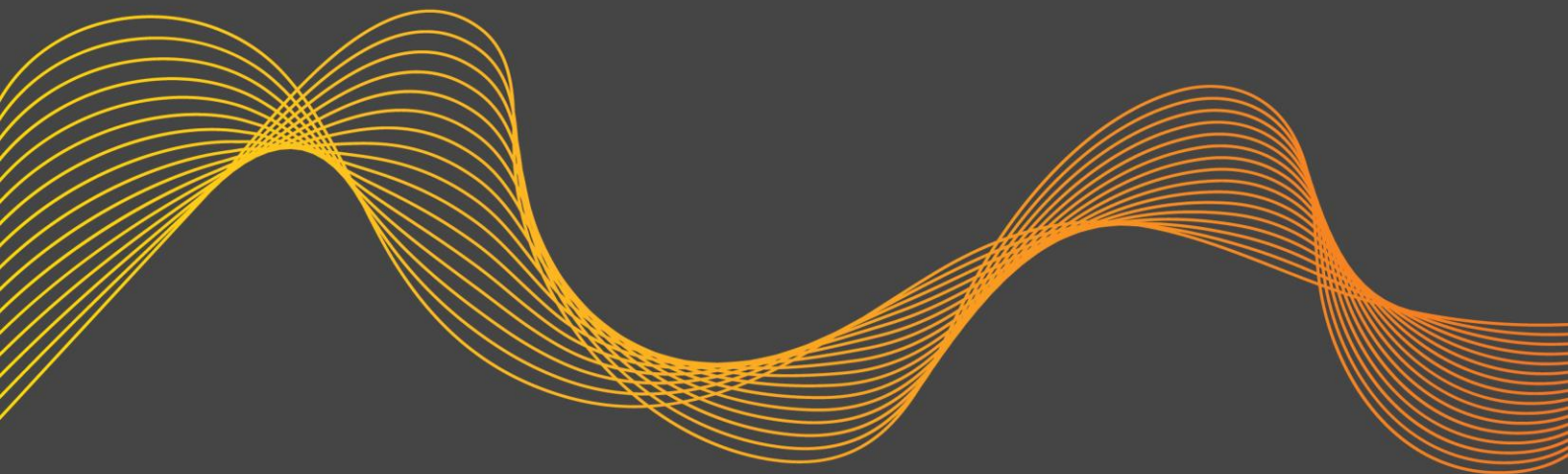
Round Table Event

A round table workshop cantered around Organisational, Systems and Telecommunications issues for Distributed ReStart. Attended by GBs DNOs and TOs

Figure 1: Delegates from most GB DNOs and all of GBs TOs with representatives from: Company Black Start process owners, strategic telecommunications groups and control engineers

Procurement and Codes

A round table on the procurement methodologies which could be applied and the codes which may be impacted was run.

Procurement outcomes

Impacted area	Consideration for further work
Procurement	How and who should be paid?
Procurement	How can/should networks be incentivised or legislated to facilitate?
Procurement	How can you contract for availability of renewables?
Procurement	Market should be simple to encourage smaller DER participation
Procurement	What timescales are appropriate for procurement from DERs?
Procurement	How do we demonstrate value from procurement method selected?
Procurement	How can storage be incentivised to participate actively and how can we assure appropriate stored energy post event?
Procurement	What methodology will be used to pay for capital investment requirements?

Codes outcomes

Impacted area	Consideration for further work
Codes	What is the impact of the Black Start standard?
Codes	Should codes be used for testing/exercising requirements?
Codes	Can any Distributed ReStart requirements be mandated in codes as minimum standards?
Codes	What blockers or enablers are available in Grid Code & Distribution Code?
Codes	Telecommunications procurement guidance will be needed from BEIS, OFGEM & OFCOM
Codes	Do Security and Quality of Supply standards need updating to achieve technical parameters present under Black Start?

Engineering Requirements

Engineering Requirements	Need to inform DER on technical requirements prior to build stage
Engineering Requirements	Can we break up service requirements between different participants?
Engineering Requirements	Can we consider different levels of service requirements?
Engineering requirements	What will the impact on telecommunications and control be of operating in islanding mode?
Engineering Requirements	What is the impact of using aggregated units for providing flexible demand or a single service?
Assurance	How will testing/assurance be incorporated into procurement and can it be conducted remotely?

Organisational Change

A round table on existing organisations and potential future requirements was hosted to establish baseline capability which Distributed ReStart must build from.

Impacted area	Findings
Resourcing	Attempts to notify staff using SMS services are made as soon as possible after the event through mass messaging
Telecoms	Assumption of 10-15mins worth of public telecommunications power resilience
Resourcing	Driven by assumed lack of telecoms self-starting processes bring key people to pre-defined sites
Assurance	Can we assure self-starting policies or the response to a mass SMS?
Telecoms	Should all DNOs and DERs involved in Black Start have priority mobile access?
Resourcing	Dependent upon external factors control resourcing varies significantly but typically 1-2 control engineers per licence area (TO & DNO)
Resourcing	Field staff authorised per voltage level varies significantly
Support Staff	Consideration of staff welfare is important
Support Staff	Up to two site engineers allocated per critical LJRP substation presently
Support Staff	How and when should focus return to customer management (in particular protection of vulnerable customers)
Training Requirements	No common training policy across DNOs
Training Requirements	Desktop exercises, knowledge shares, joint exercises and seminars are currently used
Training Requirements	Black Start leads nominated for each control room
Training Requirements	If playing an increased role in Black Start, how can this be exercised using respective systems?
Training Requirements	Should there be a requirement for GB wide training?
Training Requirements	Potential synergy with DSO models may reduce requirements
Training Requirements	Biggest skill gap in DNOs is balancing (frequency management)
Training Requirements	Biggest gap for NGESO is numbers of skilled operators
Event Controller	Controller needs network visibility
Event Controller	A single organisation in control could be a bottleneck without automation
Event Controller	Some limited capability may already exist in DNOs to manage a single Distributed ReStart plan post block loading
Event Controller	Challenge to DER in control of network switching, but potentially in control of initial stabilisation phase
Event Controller	Remains a need for a national controller
Event Controller	Overall preference for DNO management of a Distributed ReStart plan
Resourcing	3 Distribution Control engineers anticipated requirement for an existing LJRP
Resourcing	1-2 Distribution Control engineers needed per plan even if significant work is scripted or automated
Systems	Situational awareness is paramount and will affect DMS, NMS, DERMS & equivalents
Systems	Limited existing capability to forecast demand pickup
Systems/Resourcing	Changes needed in level of DER output control needed beyond current DNO capability. Manned sites or automated interfaces would be needed at DER sites to facilitate this control.

Telecommunications Review

A round table was hosted to discuss existing telecommunications capability, resilience and technologies employed.

Impacted area	Findings
Resilience	DNO core networks have 72hours of independent power None core networks vary
Resilience	Some DNOs using automatic disconnection schemes to retain a level of power resilience
Resilience	Existing communications with DERs do not meet acceptable power resilience standards and are not current required
Technology	No common technology is employed across the industry. Current technology includes:
Technology	private radio network, VSAT, microwave, Satellite communication, Fibre, public network-BT, mobile. DNOs use a combination of these and do not rely on one technology.
Technology	Factors such as bandwidth requirements, network terrain, existing equipment and cost determine the technology used.
Technology	For contacting site-based engineers most DNOs use private radios and some use satellite phones.
DER communications	Some limited extension of private networks to DER sites. However, most links use BT for SCADA to DERs.
DER communications	There is no common standard policy for DER visibility through SCADA systems. Some DNOs connect DERs above 5MW/10MW/200kW.
DER communications	Where SCADA links exist, there is also no consistent policy around power supply at DER sites. There is also no consistent policy on who is responsible for providing power.
DER communications	Most of the voice communication is via BT line or public mobile network
DER communications	Most DNOs believe they should lead the provision of telecommunication infrastructure to DERs.
DER communications	Telemetry from significantly large DERs go to the DNOs currently. An extension of this policy would allow restoration to be coordinated through a system which can be assured.
DER communications	There are cyber security concerns with ESO led provision in that providing ESO link to DERs would require tunnelling through DNO network to provide telemetry back to DNOs.
DER communications	Should all telemetry have a Black Start resilience standard applied to it regardless of use in a Black Start plan?

Automation

A round table was hosted to establish existing use of automation across the industry and the respective willingness to use it at different restoration stages.

Impacted area	Findings
Automation Requirements	Some level of automation is required to help initiate, maintain, grow and resynchronise a power island
Automation Requirements	Willingness to allow for remote operation without manual checks varies significantly between DNOs between complete comfort and desire for direct oversight at each stage.
Automation Requirements	How can an automated system assure the safety of people in proximity to the equipment without manual checks?
Existing automation	Significant variation between DNOs for current Black Start system segregation (and BAU operations). Some use a full 'manual' process to instruct remote telemetry, others use PowerOn scripts to perform a sequence of actions based on a single command.
Existing automation	PowerOn has capability to return a failure list on completion of scripted sequences
Existing automation	PowerOn has capability to utilise algorithms for optimising system restoration inclusive of returning supplies to customers.
Blockers to automation	the amount of data that would be generated should a Black Start occur (there is already a lot of data to process for standard network faults).
Blockers to automation	Any system designed for Black Start purposes should include filtering or blocking of alarms
Blockers to automation	Experience and confidence from control engineers and companies
Systems	All DNOs (except one) utilise GE PowerOn. Schneider Electric provide the only separate system

Conclusions

Though hosting this form of event, we can understand and build on the existing capabilities, systems and resources from across the industry. This will Reduce the economic impact of our decisions and ensure the concerns of industry are appropriately addressed.

The outcomes of this engagement will be directly reflected in the first reports for the Organisational Systems & Telecommunications Workstream; And the Procurement & Compliance workstream.

Further engagement will be announced through our mailing list (sign-up link available on the website) or through one of the many wider industry events we are attending (see our industry engagement calendar on the website).

The Distributed ReStart team would like to thank all delegates who have helped to deliver this event and look forward to continued engagement!