



QUEST Industry Steering Group

Number: 03

09th May 2022

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north west

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Submission of
Second
Deliverable

Progress Update
on Current
Deliverable

Challenges
within Project to
Date

QUEST GUI
Development

Learning
Outcomes to
Date

Looking at
Upcoming Works
and Deliverables

Objective of this Presentation



To ensure the potential of QUEST is maximised, ENWL have assembled an ISG, as per Appendix I QUEST Full Submission Proposal (FSP), which will external stakeholders to provide input to the project at its early stages to help shape the Use Cases. The ISG will then convene on a quarterly basis thereafter for the duration of the Project, to inform the Project direction, review trial designs and conclusions, and help to construct a plan to transfer the solution to BaU.





*In November 2020 Ofgem announced their decision to award ENWL's full funding request of **£7.95 million** for the QUEST project.*

QUEST is an overarching system that will be designed to provide a holistic voltage control methodology to coordinate discrete voltage management techniques, to optimise their use and facilitate the increased use of LCT's (Low Carbon Technologies).

What is QUEST?

To cater for the increased uptake of LCT's and subsequent increase in demand on the network, ENWL has deployed a number of discrete voltage management techniques on the network over the last number of years. These techniques have been successful in helping us manage the network in helping ENWL to manage the network, but have some limitations as they are not currently coordinated.



QUEST will identify and trial novel methods to holistically integrate multiple, concurrent system voltage control and optimisation techniques across the whole distribution system. The Method will be integrated into the NMS, thus providing the full co-ordination needed to unlock the available benefits.

- In addition, the new holistic voltage control methodology will:
- Ensure the network operates as efficiently as possible, optimising the system voltage to connected customers and minimising losses.
- Further boost the benefits available from existing voltage management techniques.
- Facilitate the increased connection and use of LCTs.
- Maximise benefits to all customers through demand reduction at High Voltage (HV) and Low Voltage (LV).

Submission of Second Deliverable

“QUEST System Design and Architecture Lessons Learned ”



The second deliverable report which was submitted on the 31st of December 2021. This deliverable comprises two main streams of work: Architecture Options and Modelling Regime. These were carried out in parallel to fulfil the programme requirements for this deliverable. This report outlines the coordination of each system and possible challenges when all or some of them are in operation at the same time.

The report then outlines solutions to overcome these challenges. Which are then further assessed and modelled to prove they exist and that solutions put forward will resolve them.

The final section of the report provides conclusion and learnings gathered at this stage within the project.





- **Communication**: In the event of loss of system communication it is expected that the QUEST overarching control system ensures that any associated discrete voltage systems default to a safe mode setting maintaining network stability and safety. This topic needs to be explored further to understand how this process would be carried out by QUEST and how this would affect the different voltage management systems.
- **Additional Studies**: Architecture options subphase 1 and 2 of the detailed design have identified that the network modelling studies are required to identify parameters that will be required when setting up the QUEST software for operational trials.
- **New CLASS Levels**: Architecture options subphase 1 and 2 of the detailed design only considered CLASS full and half levels of the demand change. Further options for $\frac{1}{4}$ and $\frac{3}{4}$ Demand Reduction modes could be introduced within the CLASS Supper Tap AVC Relay and that these modes could also be included in QUEST's trials. This will be explored in the in next phase to understand the possibility and value of introducing these modes.
- **Safe Modes**: QUEST safe mode terminology, such as CFOM, was additionally discussed and the new safe mode terms were proposed. These newly proposed terms were deemed suitable and are in accordance with the 'meso-level' architecture options suggested during subphase 2 of the detailed design. However, it should be noted that these may be further refined and changed as we continue to explore QUEST architecture options during the next phases of the project.



Third Deliverable: QUEST Trials, Design and Specification Report

This deliverable has been split into four work stream with each project partner leading on an individual work stream.

- Functional specification for chosen architecture.
- Functional specification for voltage control methodology.
- Trial design.
- Detailed site design.



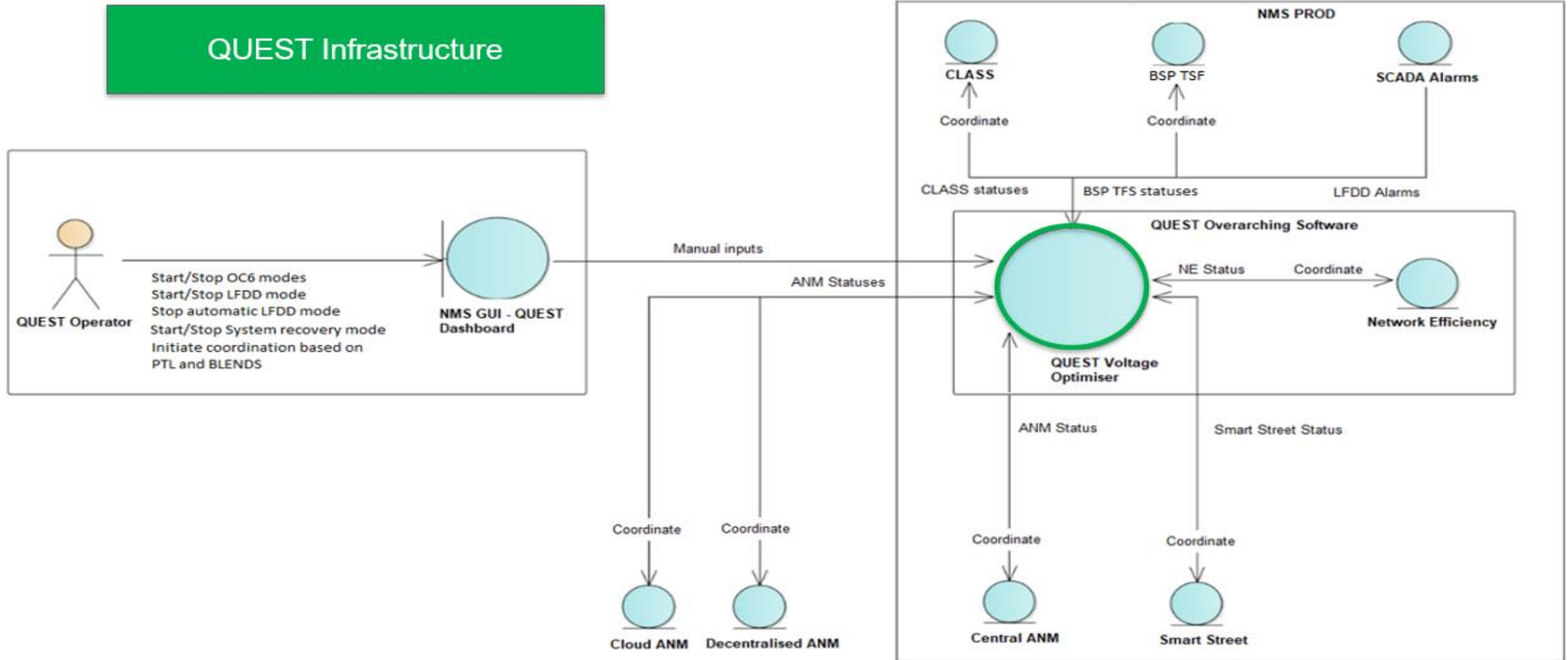
To date, the project has progressed well with a lot of engagement and commitment from all partners involved. The challenges Identified within this project phase, have been highlighted below.

- There will be no generator within QUEST trials and tests as ENWL's ANM is within its early stages of development therefore there are no DERS contracts in place. (Should this change when trials and test commence this will be looked at further.
- Collation of data to feed the modelling of this project has been quite demanding as the trial and tests are being carried out of Whitegate GSP all of the data of the BSPs and primaries below this was required in to develop the voltage control methodology.
- Integration of the decentralised Cloud ANM into QUEST architecture has provided challenges due to where ENWL are at with their own centralised ANM which is still in development.
- When AVC works are planned to be carried out on the BSP's and primaries these are clashing with other capital planned works.

Learning Outcomes to Date QUEST Architecture



QUEST Infrastructure



Learning Outcomes to Date QUEST Dashboard



QUEST Control & Monitoring

SYSCON Selector: **NORMAL(6)** OC6 VR (5) OC6 DD (4) LFDD (3&2) BLACK START (1)

Search:

WHITEGATE GSP

QUEST Contention Management Process

Configure CLASS-75% | Simulate Completed | Outcome 3/8/2022 11:22:03 AM

QUEST Control

Apply configuration CLASS-100% | QUEST Status Active

QUEST Dashboard

> Filter

Object	BSP TSF (132 kV)	NEM (33 kV)	CLASS (11 kV)	Smart Street (LV)	Centralised ANM (EHV, HV)	Deentralised ANM (EHV, HV)	Cloud ANM (EHV, HV)
WHITEGATE GSP							
CHADDERTON GRID	Off	CLASS-DRF-SM	-	-	Normal mode	Off	Off
CHADDERTON (300029)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
FAILSWORTH (100613)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
HOLLINWOOD (307008)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
LANGLEY (302855)	-	-	Off	Normal mode	Normal mode	Off	Off
MIDDLETON JUNCTION (300000)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
NEW MOSTON (100623)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
TOWNLEY ST (300004)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
GREENHILL	Off	Normal mode	-	-	Off	Normal mode	Normal mode
BELGRAVE (300832)	-	-	Off	Normal mode	Off	Normal mode	Normal mode
ST MARYS (302931)	-	-	Off	Normal mode	Off	Normal mode	Normal mode
WATERHEAD (302852)	-	-	Off	Normal mode	Off	Normal mode	Normal mode
RED BANK GRID	Off	CLASS-DRF-SM	-	-	Normal mode	Off	Off
BLACKLEY (100605)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
HARPURHEY (100614)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
ROYTON	Off	CLASS-DRF-SM	-	-	Normal mode	Off	Off
HEYSIDE (302808)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
ROYTON PRIMARY (300009)	-	-	Off	Normal mode	Normal mode	Off	Off
SHAW PRY (300006)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off
WILLOWBANK (302292)	-	-	DRF Enabled	CLASS-DRF-SM	Normal mode	Off	Off

Learning Outcomes to Date QUEST Dashboard (Continued)



QUEST Profile Editor

Profile name: QUEST

Profile description: Default QUEST Profile.

Coordination type

Responsive (Fast tap)

Proactive (Technique priority list)

Prime Technique Selector

1. BSP TSF
2. NEM
3. CLASS
4. Smart Street

Function level

NEM:	<input checked="" type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input type="radio"/> 100%
CLASS DB:	<input checked="" type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input type="radio"/> 100%
CLASS DR:	<input checked="" type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input type="radio"/> 100%
Smart Street:	<input checked="" type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input type="radio"/> 100%

Apply OK Cancel

QUEST Profile Editor

Profile name: QUEST

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Prime Technique Selector

1. CLASS
2. Smart Street
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Function level

NEM:	<input type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input checked="" type="radio"/> 100%
CLASS DB:	<input type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input checked="" type="radio"/> 100%
CLASS DR:	<input type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input checked="" type="radio"/> 100%
Smart Street:	<input type="radio"/> 0%	<input type="radio"/> 25%	<input type="radio"/> 50%	<input type="radio"/> 75%	<input checked="" type="radio"/> 100%

Apply OK Cancel

Learning Outcomes to Date QUEST Dashboard (Continued)





- The next six months of this project will look to complete the design reports for the AVC upgrades at the BSP's and primaries for where the QUEST trials and tests will be carried out.
- Once the Architecture has been finalised at the end of June 2022, SE will begin the development of the architecture based on the deliverables and learning to date.
- The installation of the OLTC's within all substations on Travis Court feeder out of Royton primary should be completed by the end of September 2022.
- The finalised architecture of the Decentralised and Cloud ANM will be completed in the next two months.





QUEST Interim Report - System Design and Technology Build Lessons Learned

The Deliverable report which is due in December 2022 will detail the following;

- Project progress to date including lessons learned.
- QUEST software development and testing.
- Power system model development.
- Site installation for the voltage control and ANM equipment.

QUEST Project Plan and Deliverables



Workstream	Tasks	2020	2021	2022	2023	2024	2025
Project Mobilisation	Project Readiness		■				
	Mobilisation		■				
	Financial & Contractual		■				
Technology	Phase 1: System Design		■				
	Phase 2: Implementation			■			
	<i>Deliverables</i>		★ ★				
Trials & Analysis	Trials				■		
	Refinement & Simulation				■		
	Trials Report					■	
	<i>Deliverables</i>			★	★ ★	★	
Transition to BaU	Closedown					■	
	BaU Transition					■	
	<i>Deliverables</i>						
Customer	Customer Engagement		■		■		
	Report of Findings					■	
	<i>Deliverables</i>					★	
Learning & Dissemination	Dissemination activities		■ ■	■ ■	■ ■	■ ■	
	<i>Deliverables</i>						★

Deliverables

- 1 Initial report: use cases
- 2 System design and architecture lessons learned
- 3 Trials, design and specification report
- 4 Interim report: system design & technology build lessons learned
- 5 System integration lessons learned report
- 6 Customer research findings report
- 7 Trials & analysis report
- 8 Final report
- 9 Knowledge transfer requirements of governance document



**YOUR FEEDBACK
MATTERS**