



QUEST EIS 2023, Liverpool

Uniting Innovative Software and Proven Technology for Enhanced Voltage Control and Customer Benefits.

Andy Howard

**electricity
north west**

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- Whilst Project Dissemination will try and focus on session topic of:
Powering the Future: Enabling Net Zero Electricity
- Quest
 - Background to Project
 - Main Aims and Objectives
 - Our Project partners
 - How does that Enable Net Zero Electricity?
 - Where are we up to?

Questions (and hopefully Answers)



In November 2020, ENWL was awarded **£7.95 million** funding by Ofgem's Network Innovation Competition (NIC) for QUEST. The project runs from April 2021 to April 2025.

QUEST is a whole-system voltage optimisation system, comprising software held centrally within a network management system, alongside intelligent devices fitted in substations.

QUEST will co-ordinate the actions of multiple voltage control and optimisation techniques, including CLASS, Smart Street and Active Network Management (ANM), holistically across the whole system to optimise their use and facilitate the increased use of Low Carbon Technologies (LCTs).

Why is QUEST Needed?

QUEST will allow DNOs to cater for the increased uptake of LCTs and the subsequent increase in demand on the network.

Over the years, DNOs have deployed a number of discrete voltage management techniques which have been successful in helping to manage the network. QUEST will address their inherent limitations by fully coordinating their use.

The problem

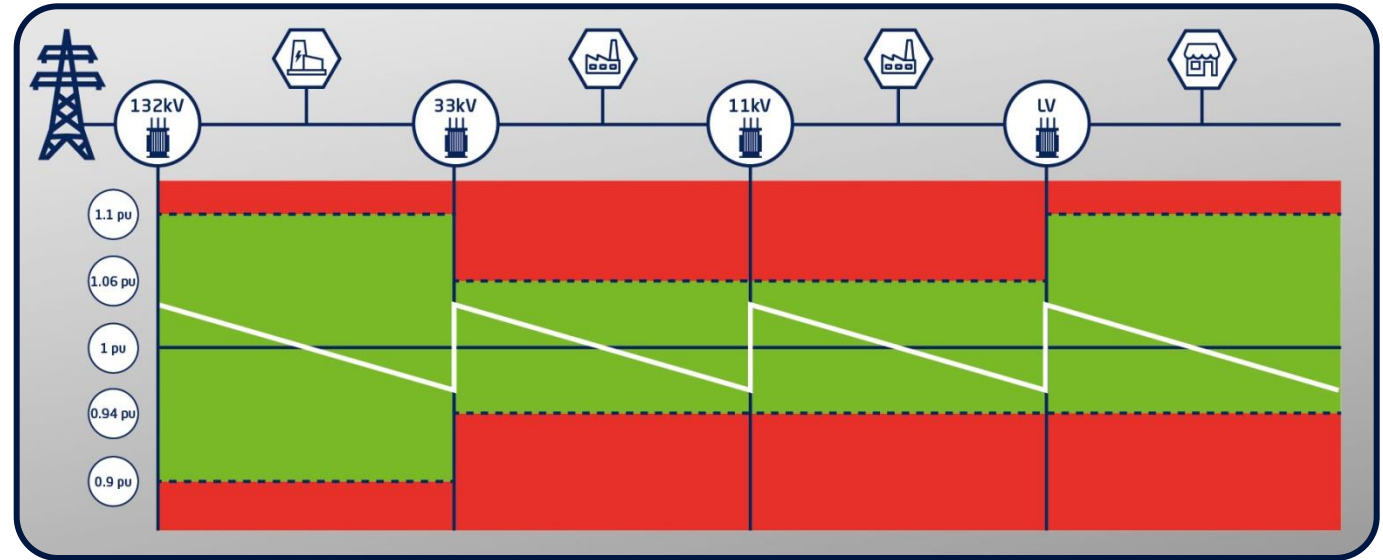


Historical

Passive traditional distribution network operation

Predictable customer demand profiles

Simple, independent voltage control techniques

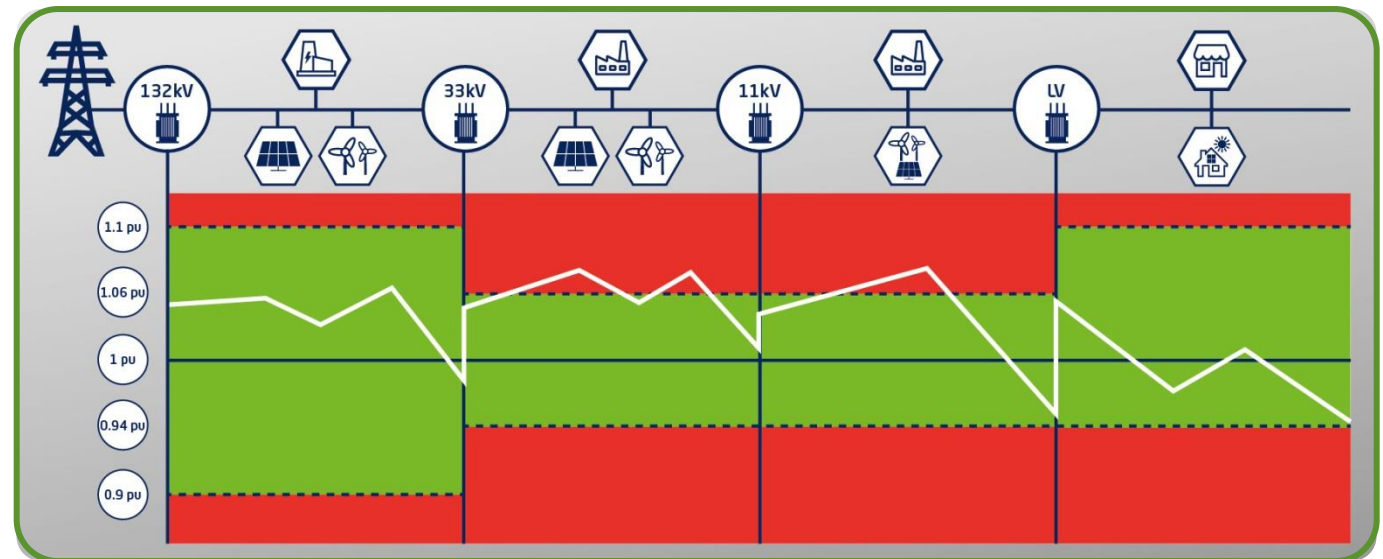


Today

Decarbonisation drives uptake of low carbon technologies

Increase in demand and generation leads to highly variable voltage profile

Voltage management techniques not co-ordinated which could reduce effectiveness





HV / LV



SMART STREET

33kV / HV



CLASS

132kV / 33kV



QUEST

QUEST
OVERARCHING CONTROL SYSTEM

- New Distribution OLTC Install (Smart St standard) & access to existing units
- Upgrade to 33/HV Voltage Control systems
- Application of enhanced 33/HV solution to 132/33 system
 - First time functionality at this Voltage level
- New QUEST Overarching Control System software
 - Full Control at all Voltage levels below Whitegate Grid Supply Point
 - Optimise / maximise voltage control at each voltage level
 - Interface with other elements of Network Management e.g. ANM, Emergency situations
 - Interface with External / 3rd Party ANM systems
 - Development of Digital twin – to inform and corroborate results

Project Partners



Our current NMS partner

NMS provides end to end real time network visibility required



Leading ANM provider to GB industry

Enable project to prove transferability



Experts in voltage control and leading AVC provider to GB industry

Facilitates transferability



Operator of the GB transmission network

Enables project to examine issues at TSO / DSO interface



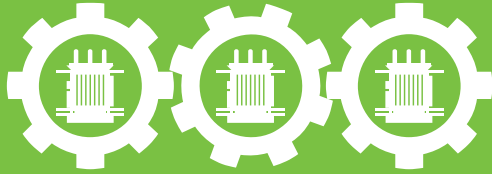
Leading consumer research consultancy with proven experience in NIC projects

Provides independent customer feedback

How does that Enable Net Zero Electricity?



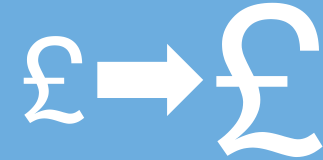
QUEST contains three highly innovative, and as yet untested, aspects



For the first time ever, network operators will have the ability to resolve voltage constraints at one voltage level through the action of voltage controllers at another



Ability to look holistically at total network, determine and deploy voltage profiles that deliver optimised outcomes for network operation and connected customers



By fully co-ordinating the operation of previously discrete systems, QUEST will boost their effectiveness to provide a fully optimised system

By integrating discrete voltage management techniques into one overarching voltage control and optimisation system, QUEST will give network operators the ability to manage system voltages more efficiently by using the full range of voltage control available in a holistic manner

QUEST Progress Update



Four Project Deliverable Reports published to ENWL website alongside Project Progress Reports

(<https://www.enwl.co.uk/go-net-zero/innovation/key-projects/quest/>)

Digital twin of Whitegate network completed and expected performance of QUEST modelled

AVC relay software updates and tested in ENWL environments, ready for installation

Installation of the additional AVC monitoring of Generation plant in progress

Delivery & successful Factory Acceptance Testing of QUEST software

Customer engagement domestic pre-trial baseline complete

Building new IT infrastructure within the ENWL Real Time Systems Operational IT Estate, whilst meeting both the flexibility required by the project and the Security required by Critical Infrastructure

Integrating project elements within and between systems

Rollout of updated software to units installed on site prior to whole system testing

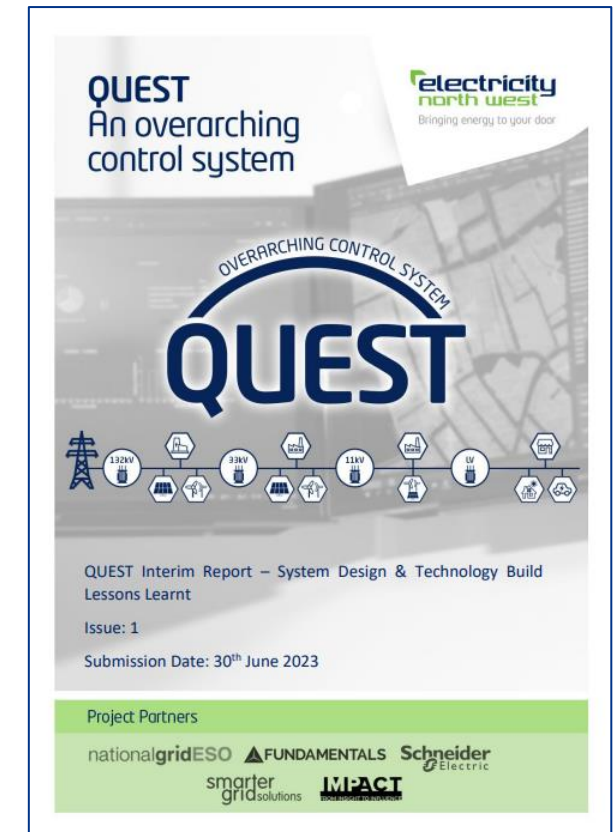
Commencement of trials

Customer Engagement – inc HV & EHV

Responding to learning

Challenges:

Integration of Innovation Systems into BaU Real Time critical systems





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OVERARCHING CONTROL SYSTEM

QUEST

