CLASS webinar

26 March 2015

LCN Fund
Low Carbon Networks

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Bringing energy to your door

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26 March 2015

Simon Brooke

Electricity North West

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Agenda

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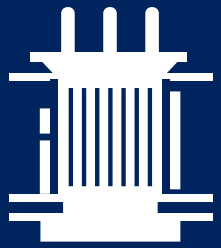
CLASS
Customer Load Active System Services

Introduction

National Grid interface



Live trials

Questions & answers

Webinar format

30 minutes presentation

10 minutes
questions & answers

Submit written questions on line during the webinar to be posted on our website

or

Press 01 on your telephone key pad
to take part in the live Q&A at the end of the presentation

Our innovation strategy

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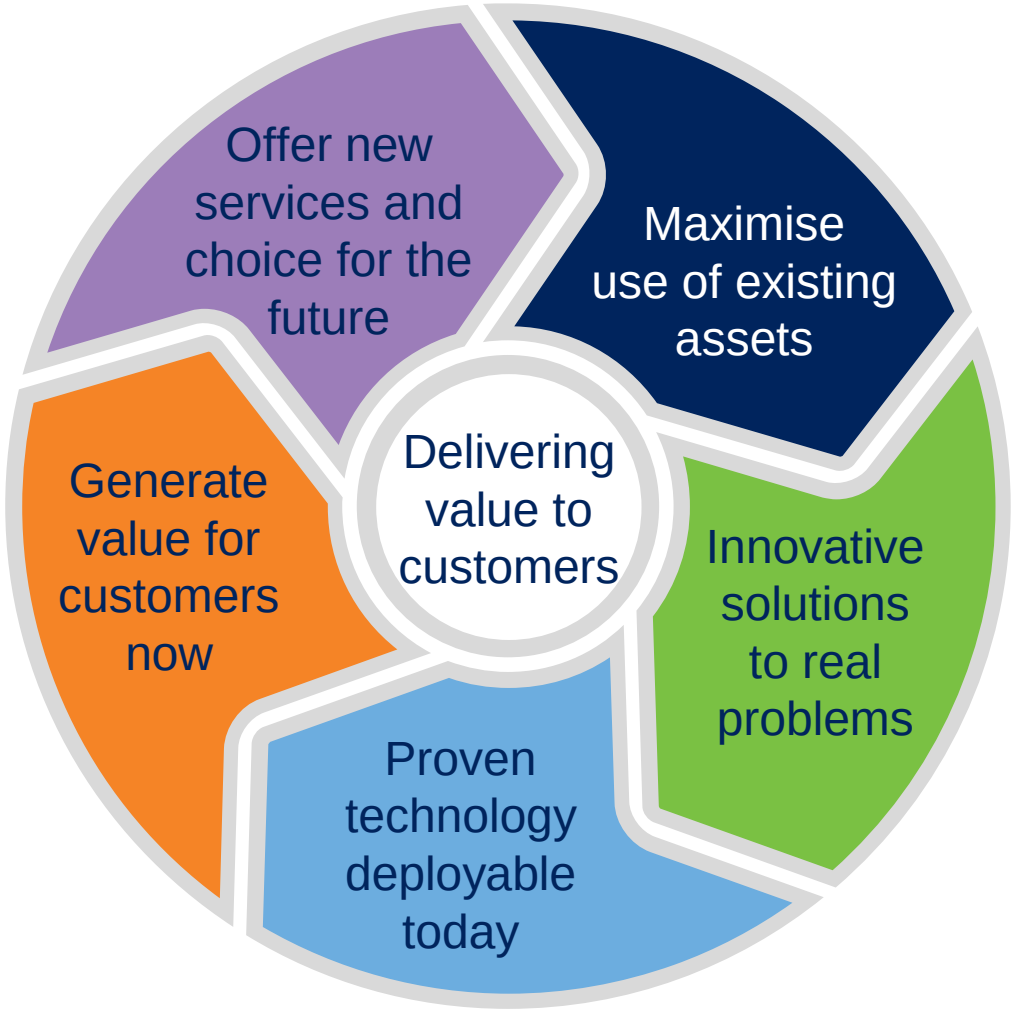

Our smart grid development

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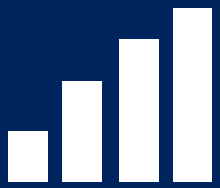
Leading work on developing smart solutions



Deliver value from existing assets

Customer choice

LCN Fund
Low Carbon Networks

Four flagship products (second tier) £36 million

C2C
Capacity to Customers

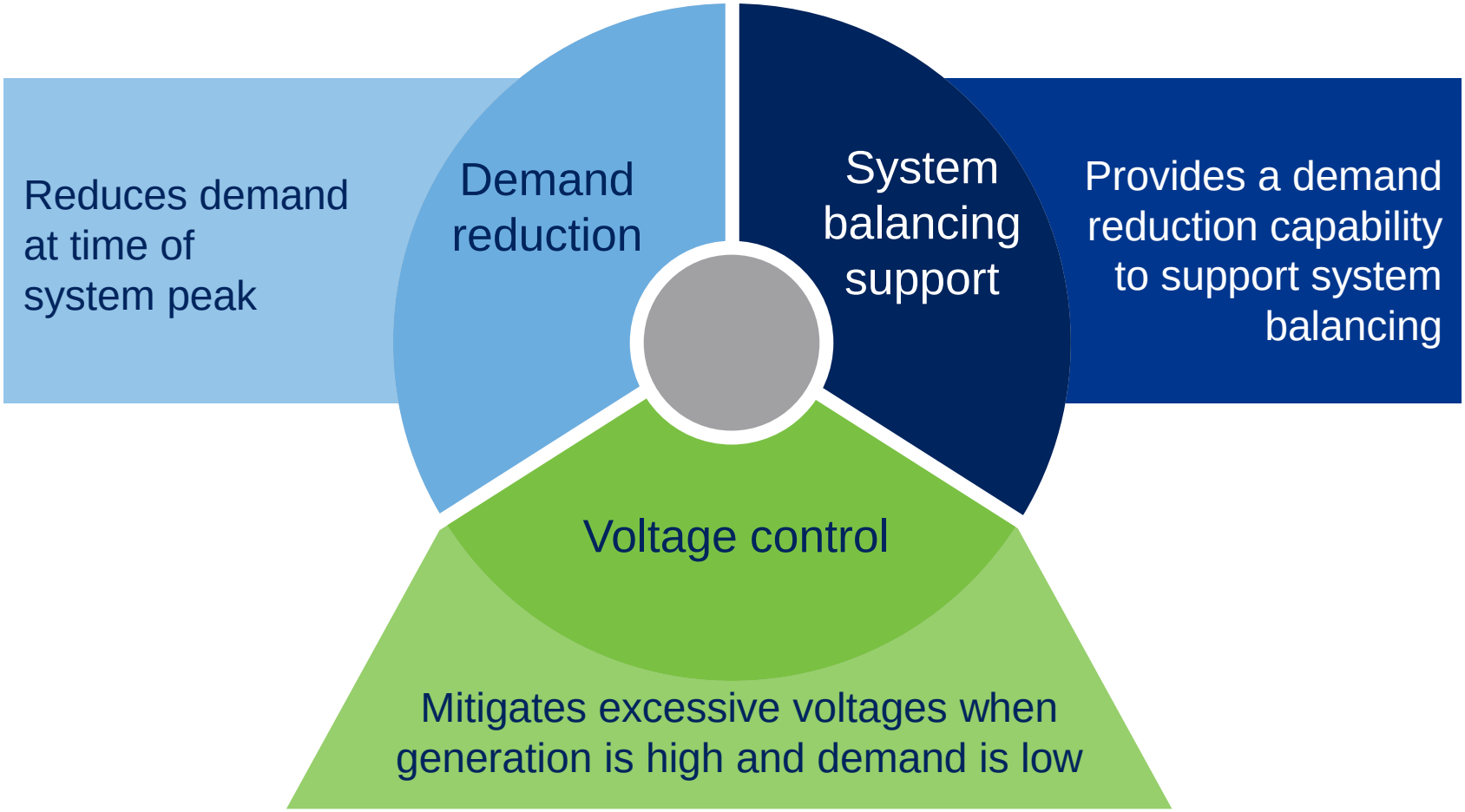
CLASS

SMART STREET

RESPOND

Customer Load Active System Services

CLASS is seeking to demonstrate that electricity demand can be managed by controlling voltage…without any discernible impacts on customers



Key activities to date

Jan 2013

March 2015

Site Selection	Design and installation of CLASS technologies	Build data link with National Grid	Design the trials and test regime	Engage customers and develop survey material	Ongoing trials and surveys
60 primaries selected which define the CLASS trial area	CLASS solution designed; hardware and software installed	Real-time data link to National Grid developed	The methodology and schedule for the CLASS trials developed	Engaged customer panels to elicit customer views	Majority of trials and surveys complete

Knowledge sharing and dissemination

The ICCP link

Dave Wagstaff

nationalgrid

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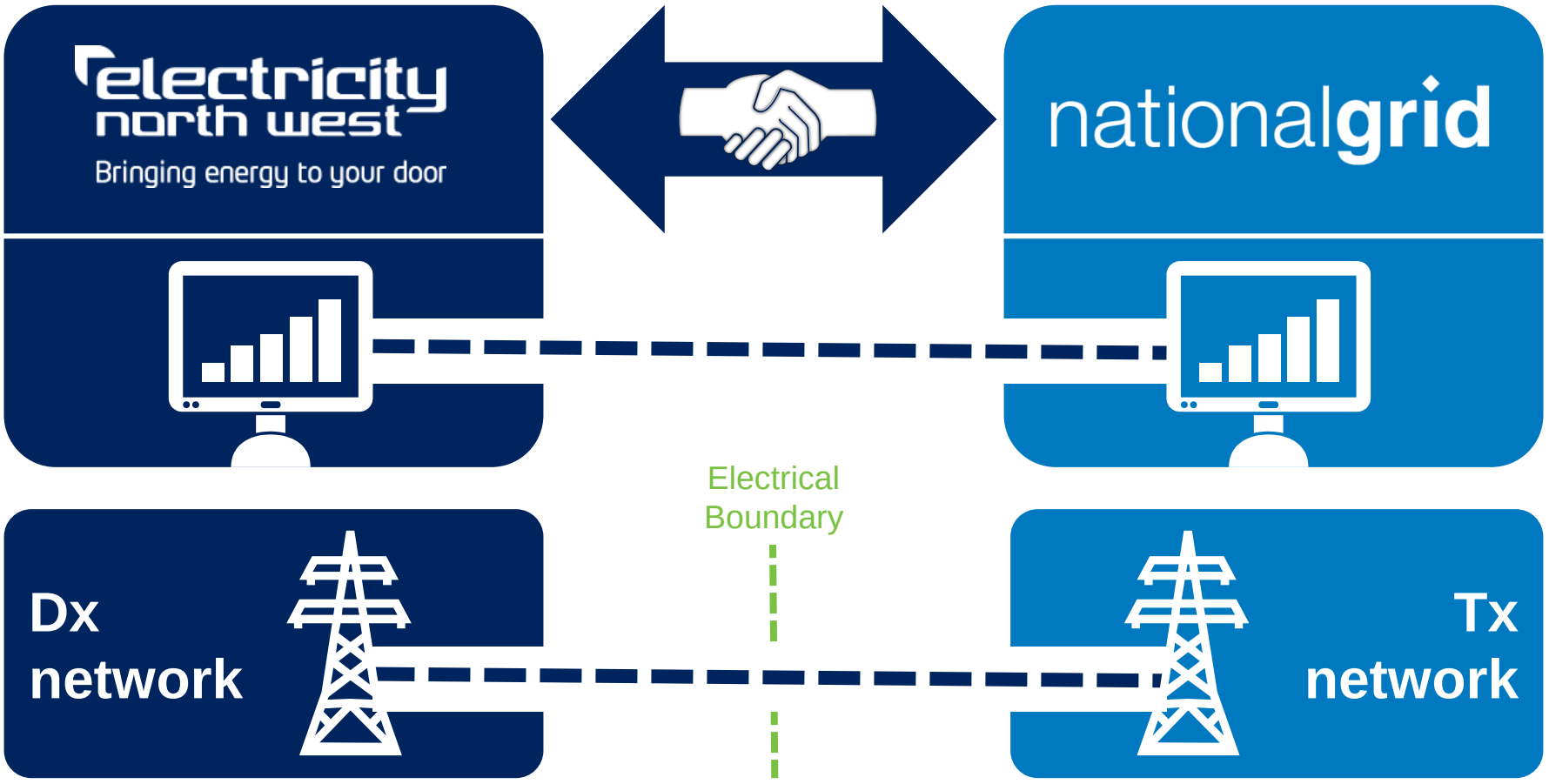
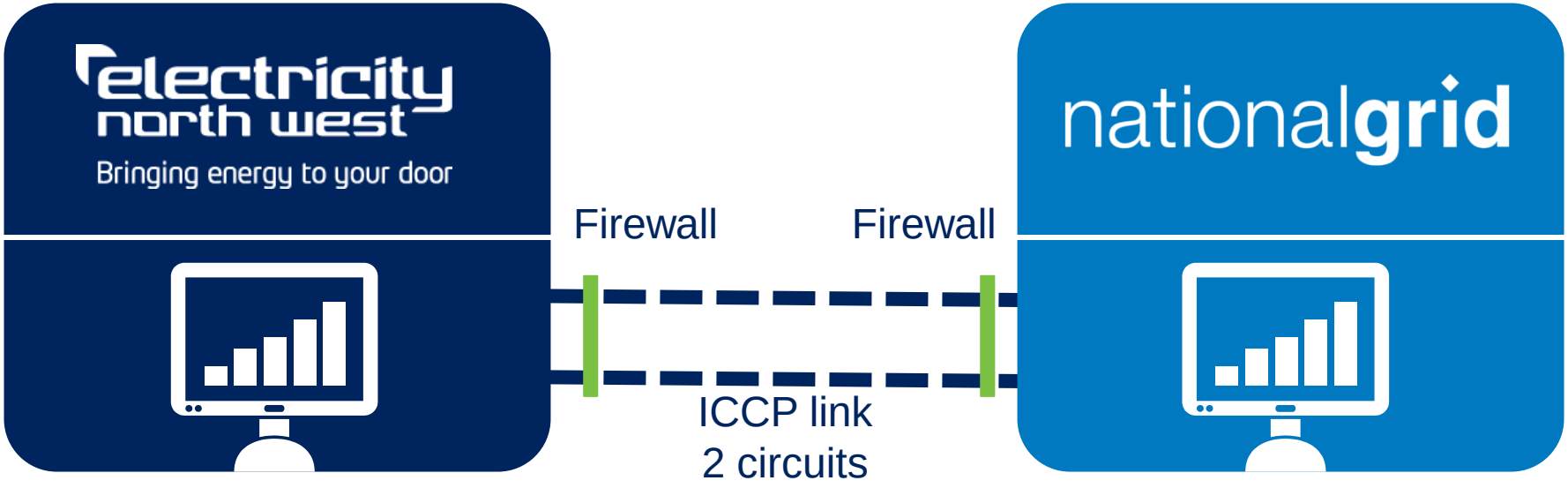
Setting the scene



What is an ICCP link?



Secure Inter Control Centre Protocol is the industry standard

Direct fibre optic connection

Enables data exchange between energy management systems

Results

No noticeable operational impacts during the CLASS trials on the NTS network	Secure and robust	Improved visibility of the information either side of the boundary	Control options for frequency and demand was successfully tested over the link

Key learning points

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Data requirements should be agreed before implementation to avoid delays

End to end testing should be completed before exchanging data

Database work should be agreed upfront and time to work on both systems synchronised

Allow extra time for contingencies

Key learning points

Potential for secure links to be used for control instructions between the SO and DNO

Design can be replicated across all DNOs

Potential changes to industry codes to ensure CLASS is implemented in a standard technical way

Next steps

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Both sides need to evaluate the long term benefits

Learning from CLASS project can be used to meet future challenges eg future DSO / embedded and generation mix challenges

Real time data sharing has placed ENW and the SO ahead of the anticipated EU Network code for operational security

CLASS live events

Paul Turner

Delivery Manager

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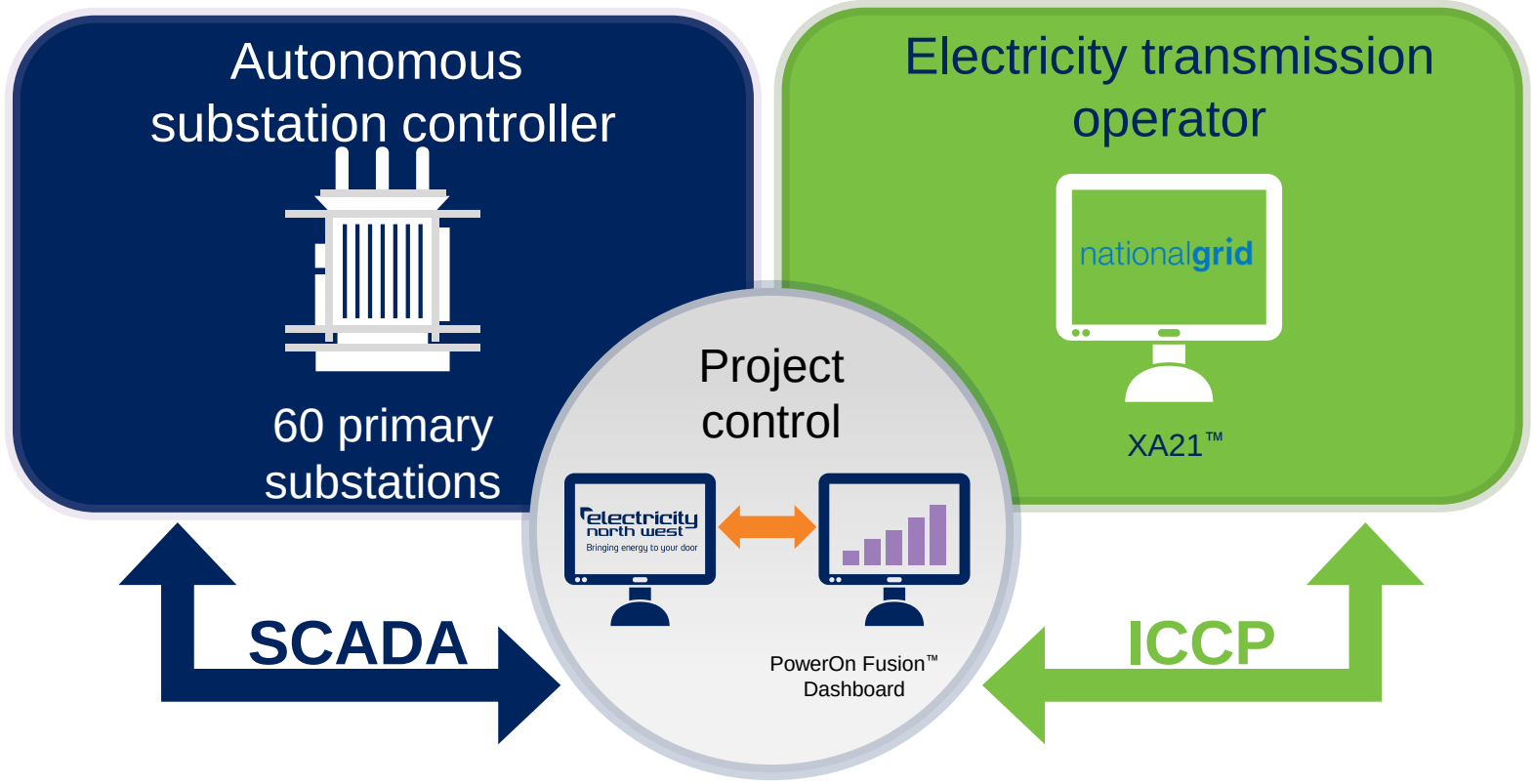
CLASS system overview



System frequency event

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CLASS

Primary frequency response enabled

One of a pair of primary transformer circuit breakers opened at the enabled CLASS sites when system frequency dropped below operational limits (but stayed within statutory limits)

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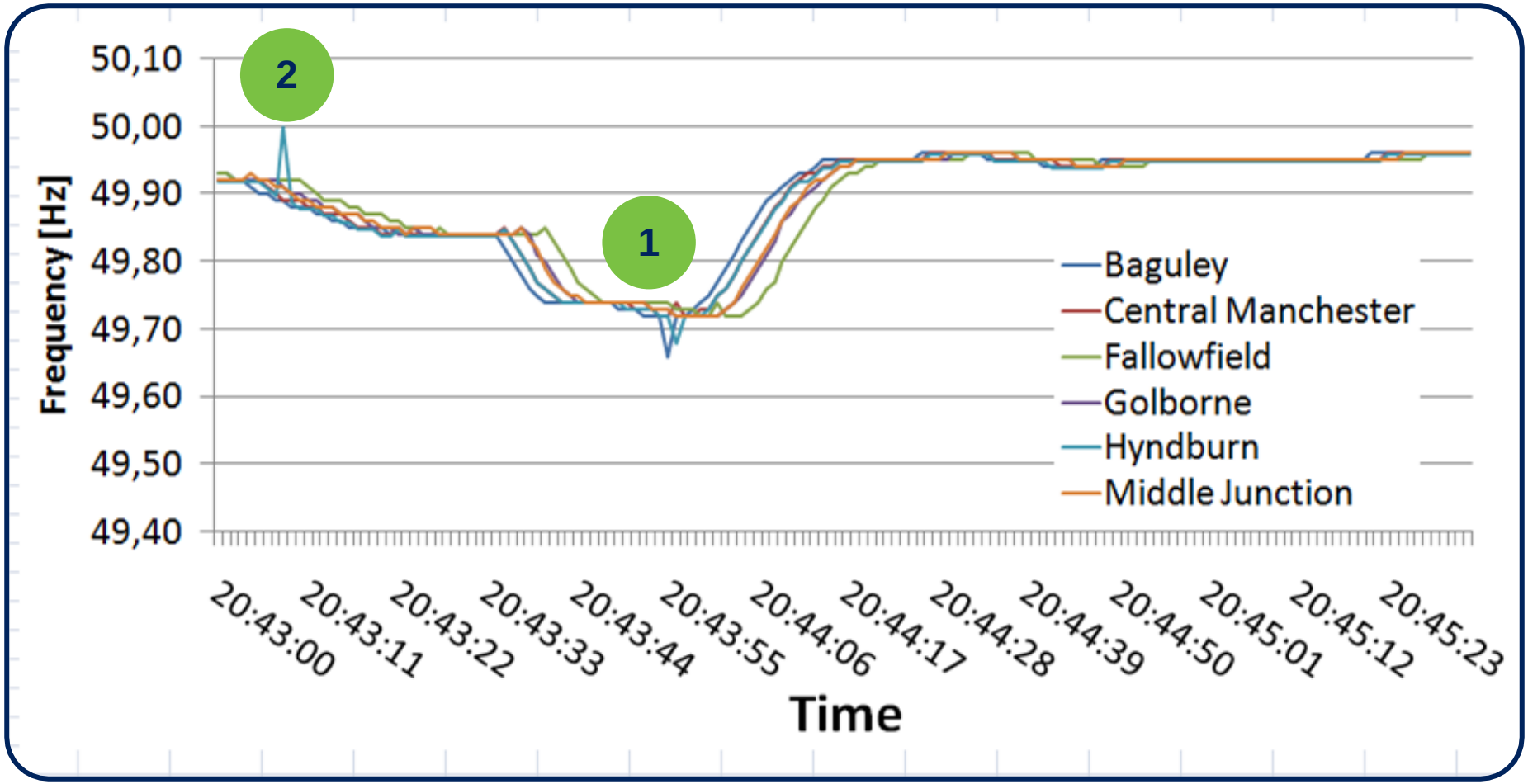
System frequency event

This resulted in a reduction in demand and voltage at these primary substations within two seconds of the National Grid frequency event

17 September – 20:44 frequency event



Fallowfield

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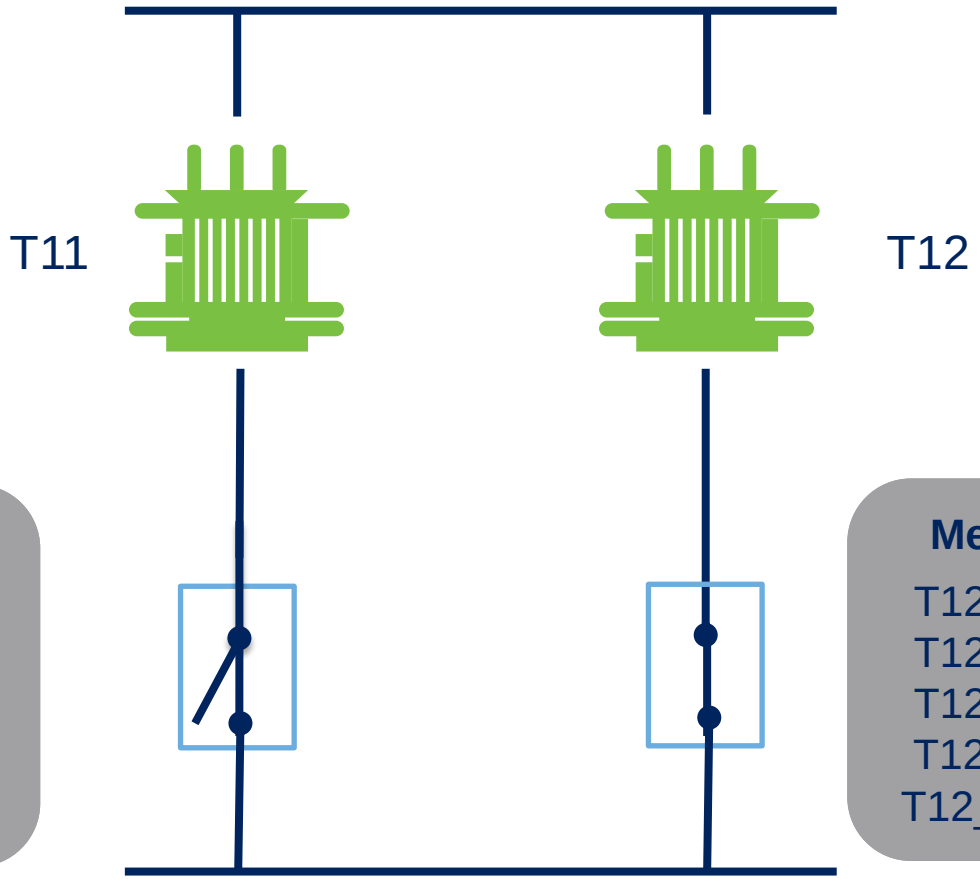
49.69Hz



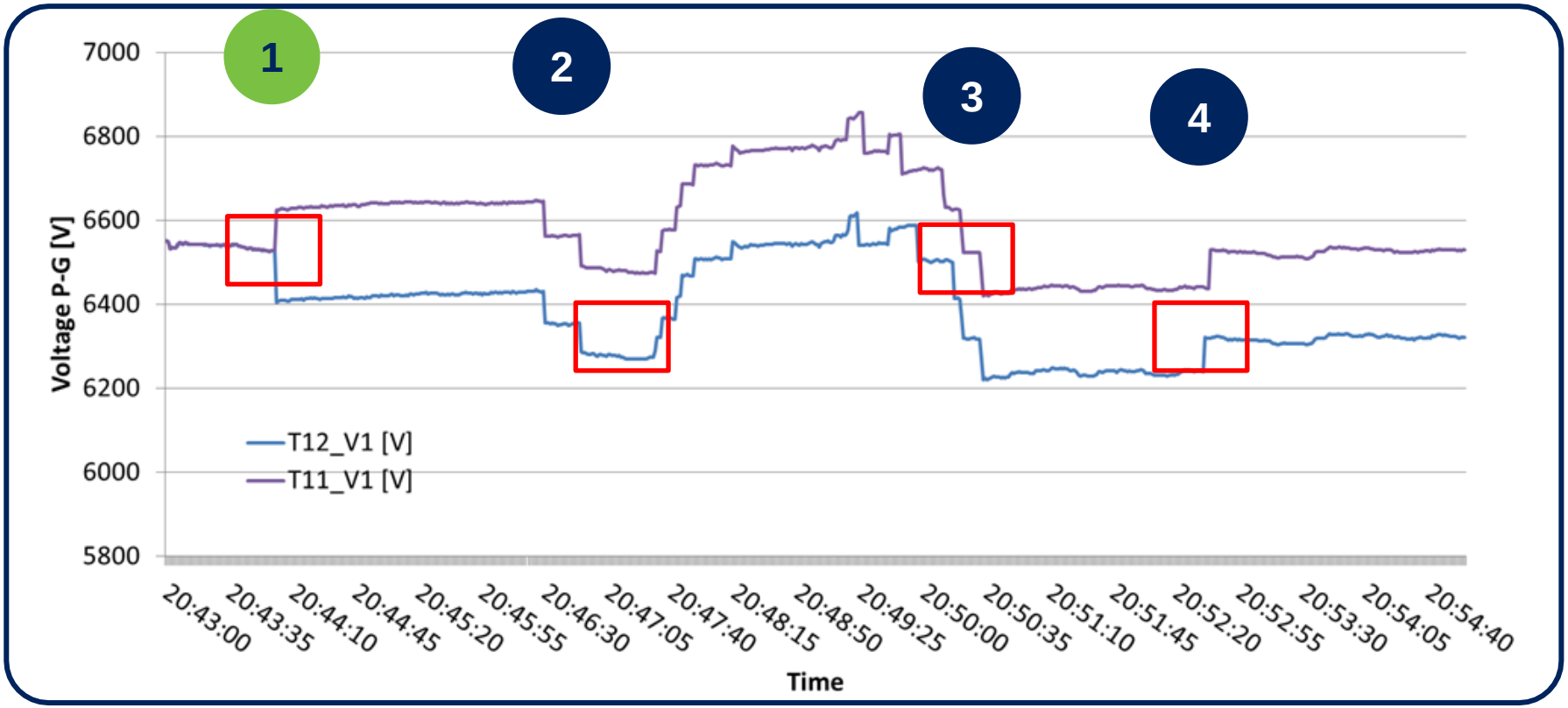
Measurements

T11_V1 = 6.62kV
T11_V2 = 6.63kV
T11_V3 = 6.64kV
T11_P = 0MW
T11_Q = 0Mvar

Measurements

T12_V1 = 6.41kV
T12_V2 = 6.43kV
T12_V3 = 6.46kV
T12_P = 8.47MW
T12_Q = 1.41Mvar

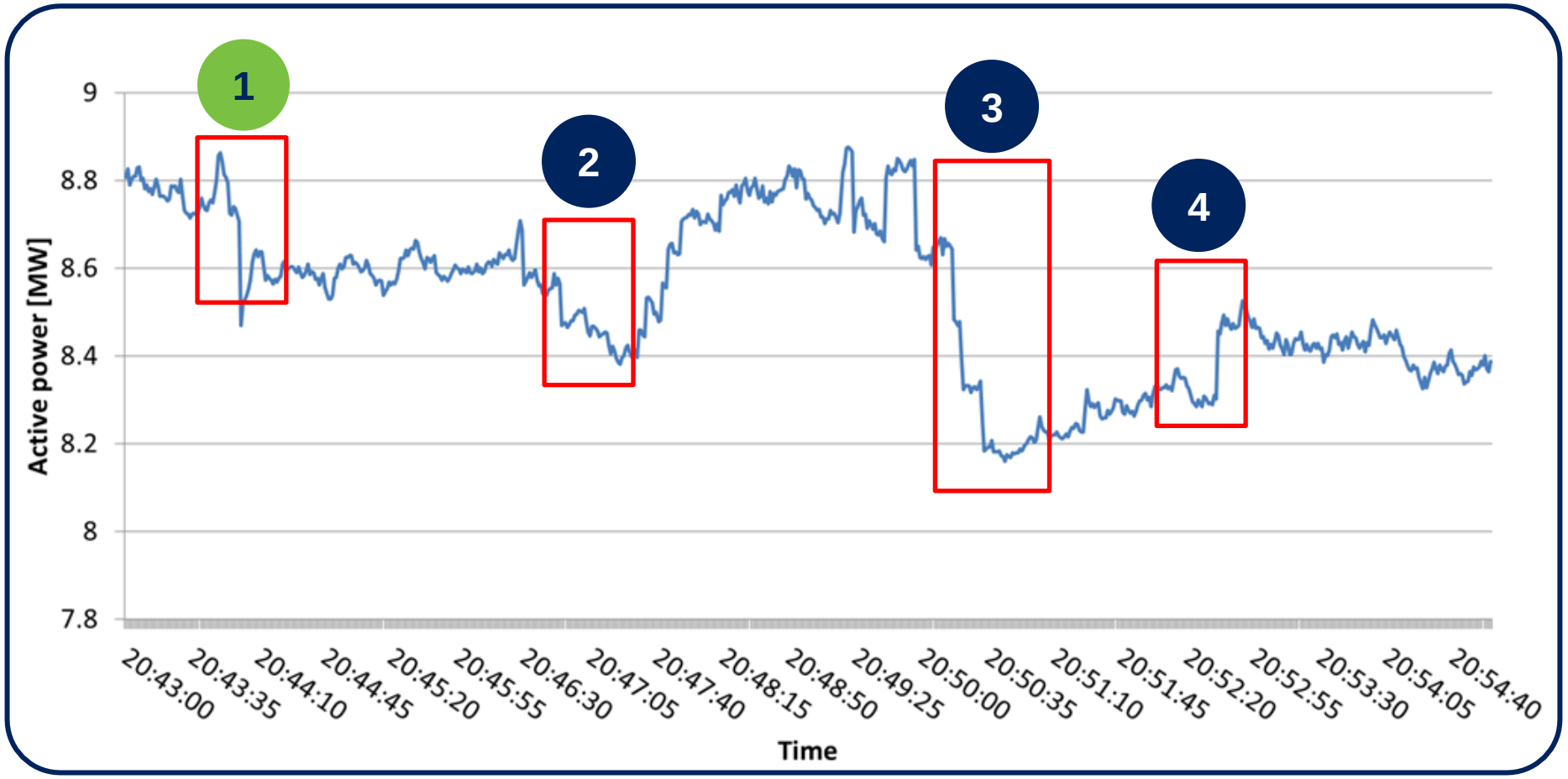
Fallowfield: Voltage



1 Transformer tripping. T11 transformer disconnected & T12 transformer still connected

2 – 4 Voltage oscillations in the upstream network and/or OLTC on the primary

Fallowfield : Active demand



Fallowfield conclusions

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	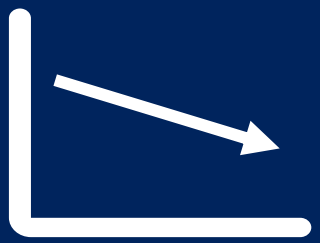			
A transformer tripping action was triggered at 20:44	A voltage reduction of 1.44% of Vnominal was achieved	An active power reduction of 0.18 MW out of 8.78 MW was experienced (2.05%)	A reactive power reduction of 0.22 MVAr out of 1.58 MVAr was experienced (13.9%)	After the tripping normal voltage variation due to OLTC and consequence power variation are evident

Voltage and power variations

Wednesday 17 September 2014 at 20:44			
Primary	**ΔV [%]**	**ΔP[%]**	**ΔQ[%]**
Fallowfield	1.44	2.05	13.9
Hyndburn	1	-	-
Golborne	3	-	-
Baguley	1.57	2.67	12.2

Monday 15 December 2014 at 22:43			
Primary	**ΔV [%]**	**ΔP[%]**	**ΔQ[%]**
Fallowfield	1	1.78	7.14
Hyndburn	0.88	0.84	7.7
Golborne	2	1.61	11.76
Baguley	1.7	1.9	10.6

Conclusions

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Voltage/demand reduction	Challenge	Voltage v demand
		
A voltage reduction between 0.88 and 3% and a demand reduction between 0.84 and 2.67% has been achieved by transformer tripping	One of the main difficulties in estimating a robust impact demand impact due to the tripping is the fact that after a few seconds/minute quite often other OLTC actions are triggered	More than a linear relationship has been noticed between voltage and demand

Next steps

March 2014

Sep 2015

Trials and customer surveys	Data collection and analysis	Report publication	Closedown event
Complete trials and customer surveys to assess perception and impact	Final analysis of technical data and customer survey outcomes	Write-up and publish trial outcomes	Final dissemination event for all stakeholders

Knowledge sharing and dissemination

QUESTIONS & ANSWERS

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Please complete our online poll

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