



CLASS

Customer Load Active System Services
Victoria Turnham

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Session 1.3.2 - HV Technologies
13 November 2013



Customer Load Active System Services





This fundamental relationship is
at the heart of CLASS

But how will it change over
time as customers adopt
new devices?

How could we use this
relationship in a smart way to
benefit customers?

*voltage is proportional
to demand*

*if voltage is increased
demand increases*

And vice versa . . . !



How does it work



electricity
north west

Bringing energy to your door



00:03:00

2%



00:00:08



2%

The cost £ to make your cup of tea is always the same!

“A problem shared
is a problem halved
...”

20,000 homes in
a town

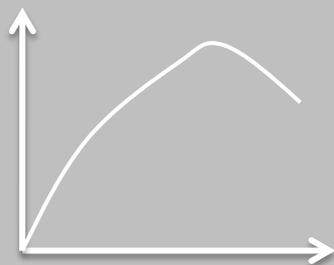
200,000 homes
in a city

26 million
across the UK



What problems could we solve ?

CLASS proposes to harness thousands of tiny changes at just the right time



**2% decrease in demand
at peak times**

Lower network costs
Faster connections



2% decrease in demand

Lower balancing costs
Reduced carbon



2% increase in demand

Lower energy costs

Today

High peak demand

Tomorrow

Response and reserve

Future

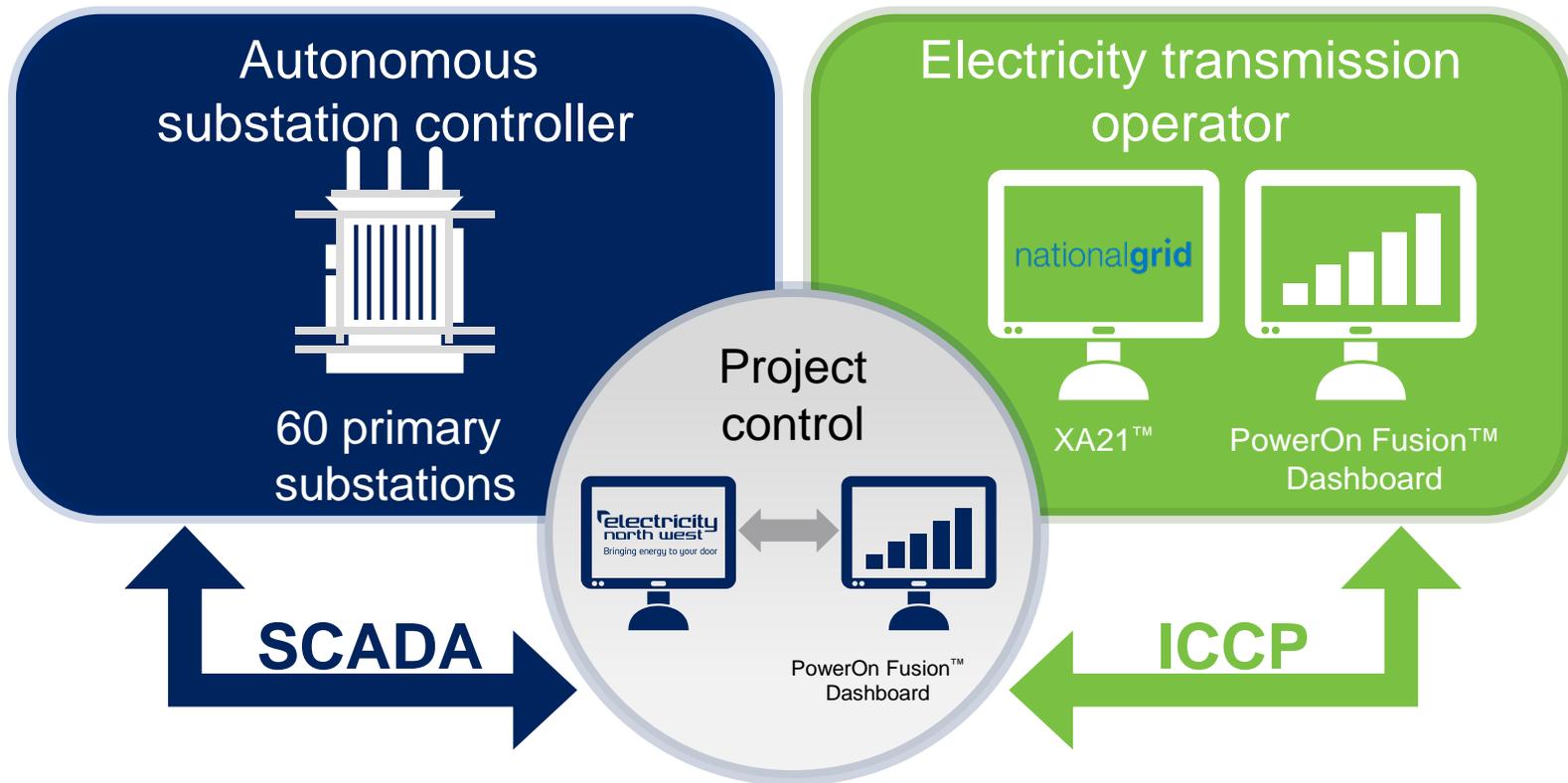
Wind following

The CLASS trials



	Objective	Technique
Load modelling	Establish voltage/demand relationship	Raise & lower tap position
Demand response	Demand response for peak reduction	Lower tap position
Frequency response	Primary response to reduce demand when frequency falls on the transmission network	Switch out transformer
	Secondary response to reduce demand after primary response above	Lower tap position
Reactive power	Absorb high voltages that occur on the transmission network	Stagger tap position

CLASS system overview





SIEMENS

Smart voltage control relay in major substations linked to control centre

Allows voltage to be adjusted to drive demand changes.
Automatically stabilises network frequency.
Keeps voltages at safe levels on transmission and distribution networks with high amount of DG



Advanced Network Management System

Links DNO control centre to National Grid control centre.
Advanced dashboard measures real time availability.
Allows demand and voltage control call off when required



GE Energy

nationalgrid

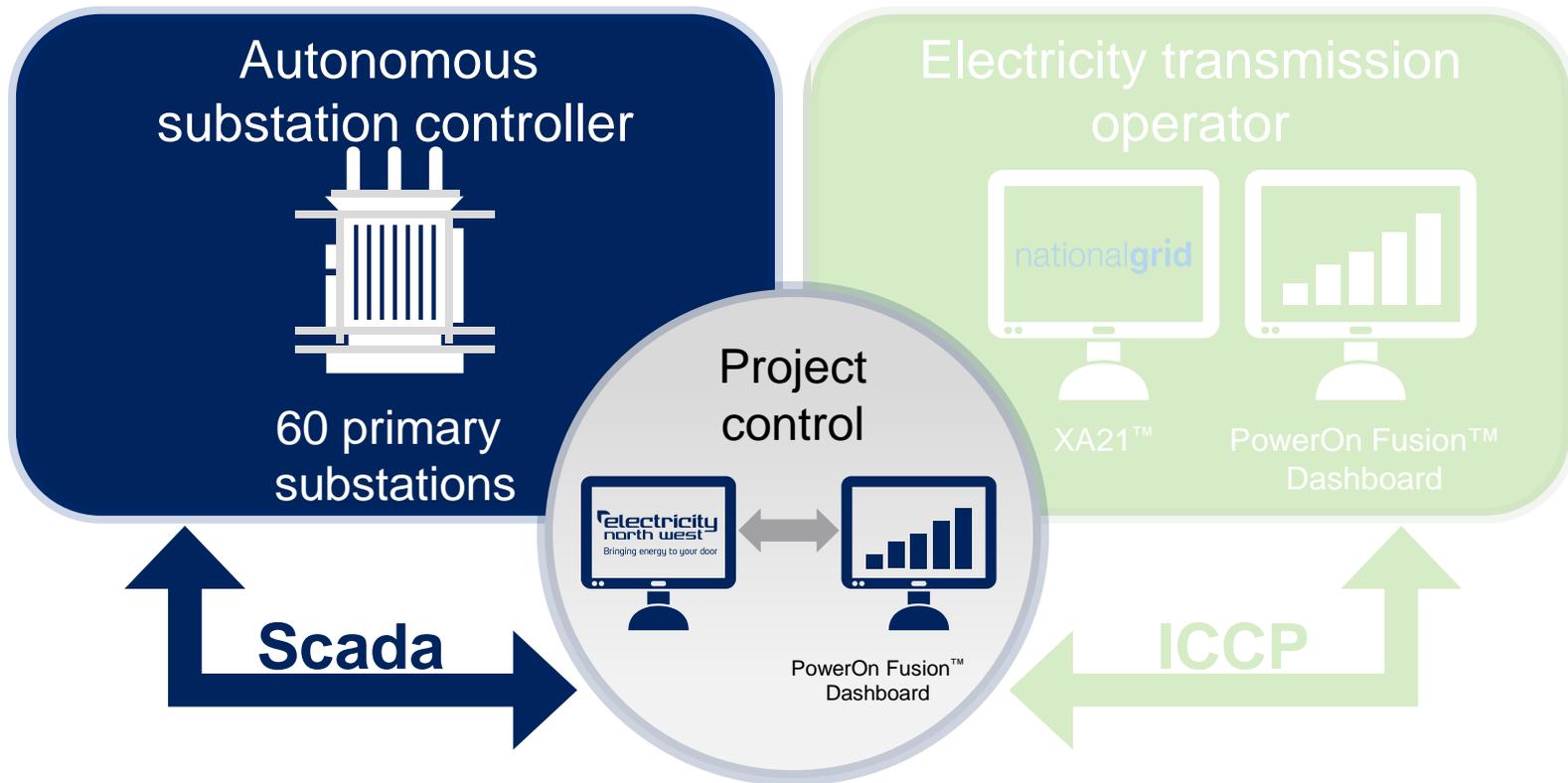
Harnessing world class technology in a innovative solution

CLASS system overview



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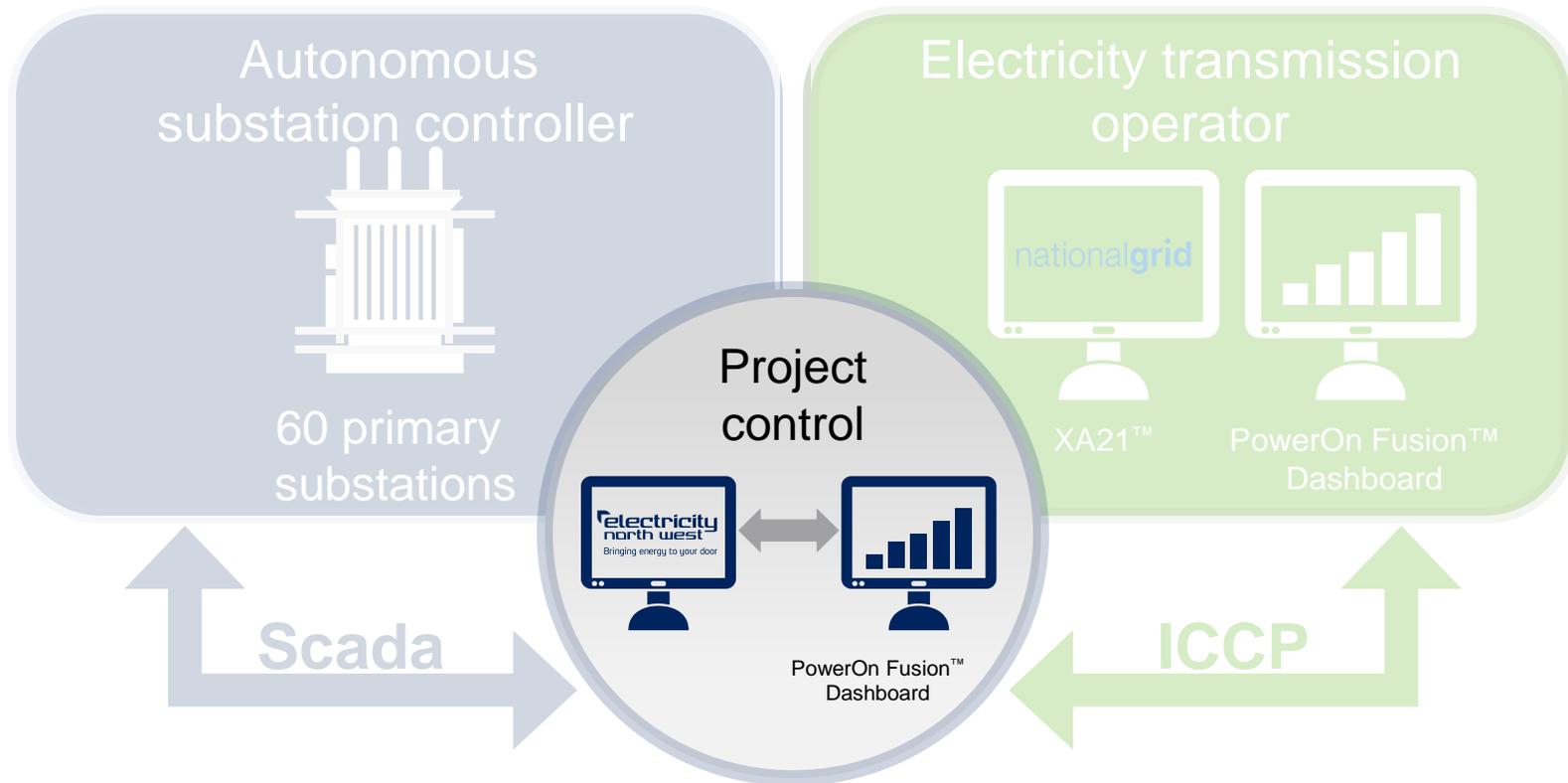


CLASS system overview



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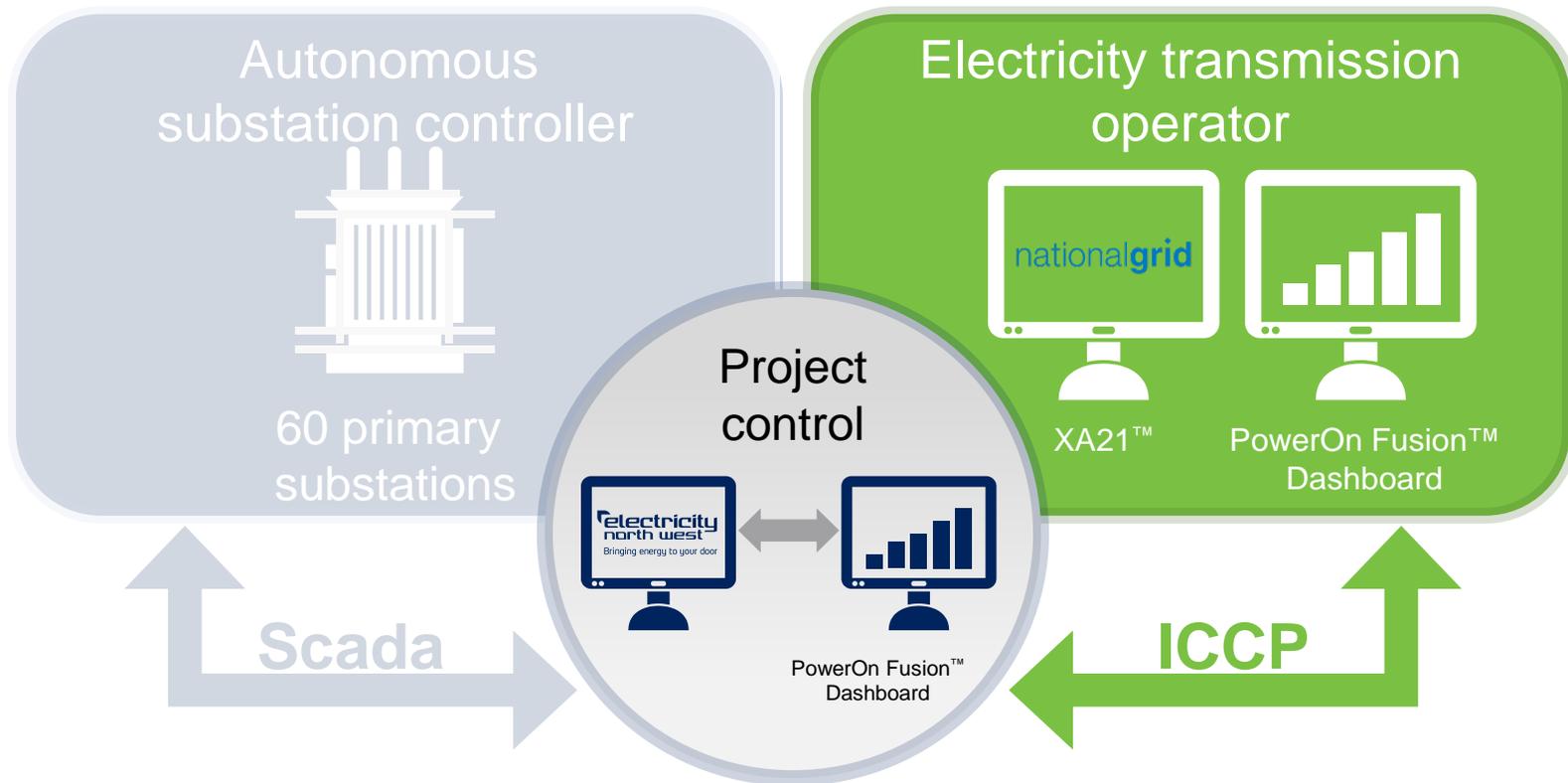


The CLASS dashboard



Group	T11 Tap/Current T12 Tap/Current	Frequency control MW		Voltage Control Mvars			Demand %			
		Stage 1	Stage 2	Stage 1	Stage 2	Stage 3	Boost		Reduction	
							Half	Full	Half	Full
South manch		6	4	0.4	0.8	1.2	2	4	2	4
		Enabled	Activated	Enabled	Enabled	Activated	Disabled		Enabled	Enabled
Trafford 11.1kV	T11 6/400A T12 6/400A	3	2	0.2	0.4	0.6	1	2	1	2
		Enabled	Activated	Enabled	Enabled	Activated	Disabled		Enabled	Enabled
Monton 11kV	T11 6/400A T12 6/400A	3	2	0.2	0.4	0.6	1	2	1	2
		Enabled	Activated	Enabled	Enabled	Activated	Disabled		Enabled	Enabled
Mount st 10.9kV	T11 6/400A T12 6/400A	0	0	0	0	0	0	0	0	0
		Inhibited	Inhibited	Inhibited	Inhibited	Inhibited	Inhibited		Inhibited	

CLASS system overview



ICCP (Inter Control Centre Protocol)



DNO control centre

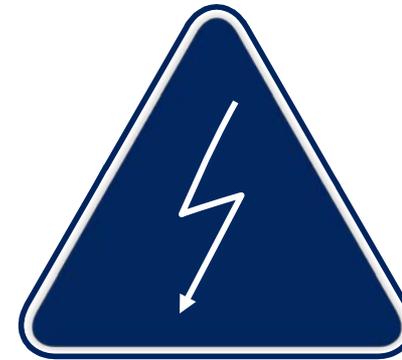


National Grid control centre



Dashboard

Measures real
time availability



Control call

Demand and voltage
control call off

CLASS: Customer Load Active System Services



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Bringing energy to your door



Exploiting assets, innovative thinking and tiny changes at just the right time

Technical innovation



Reinforcement deferral, response balancing and voltage control

World class technology



Carbon savings and lower customer bills

Financial and carbon savings for customers



V & D data underpins network management now and into the future

New understanding of a fundamental relationship

CLASS will deliver savings to DNO customers and across the supply chain