

Directorate	Location	Date	Status
Connections	Preston	20th Feb 2015	Complete
Operations South	Frederick Rd	26th Feb 2015	Complete
Operations South	Borron St Depot	24th Feb 2015	Complete
Major Projects	Whitegate Depot	27th Feb 2015	Complete
Operations South	Whitegate Depot	27th Feb 2015	Complete
Operations North	Whitebirk Depot	2nd March 2015	Complete
Operations North	Preston	2nd March 2015	Complete
Control Room	Linley House	2nd March 2015	Complete
Operations North	Carlisle	24th Feb 2015	Complete
Operations North	Carlisle	27th Feb 2015	Complete
Secondary Network Design South	Borron St Depot	2nd March 2015	Complete
Operations South	Hilltop Depot	2nd March 2015	Complete
Operations North	Kendal	2nd March 2015	Complete
Operations North	Workington	3rd March 2015	Complete
Estates & Wayleaves	Technology House	4th March 2015	Complete



SMART STREET

Operations Briefing

Damien Coyle/Kevin Hoban

February – March 2015



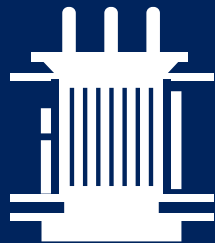


SMART STREET

Introduction



Why Smart Street?



Technology



Questions

Connecting the North West



electricity
north west

Bringing energy to your door



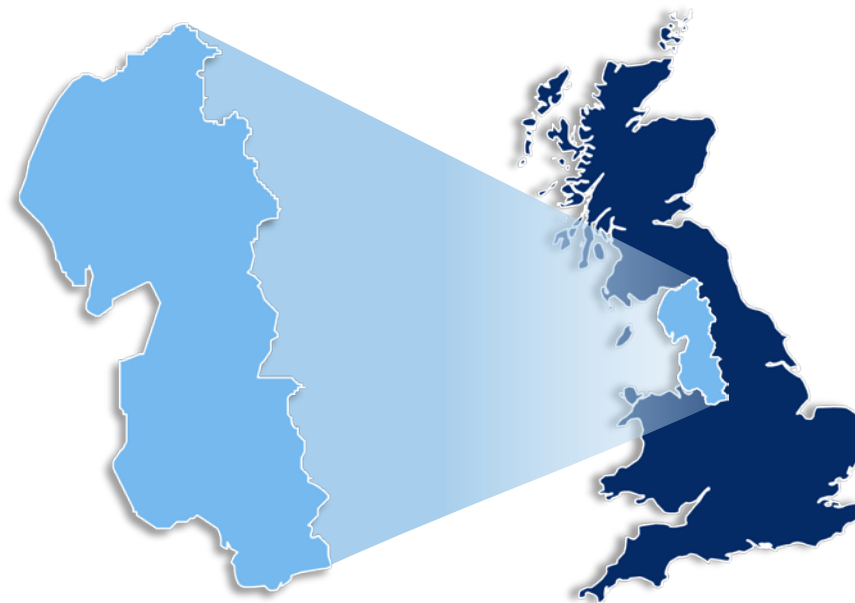
4.9 million



2.4 million



25 terawatt
hours



£12 billion of network assets

56 000 km of network ● 96 bulk supply substations
363 primary substations ● 33 000 transformers

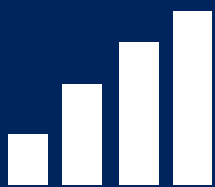
Our smart grid development



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Bringing energy to your door

Leading work on developing smart solutions



Deliver value
from existing
assets



Customer choice



Four flagship products (second tier) £36 million

C2C
Capacity to
Customers

CLASS

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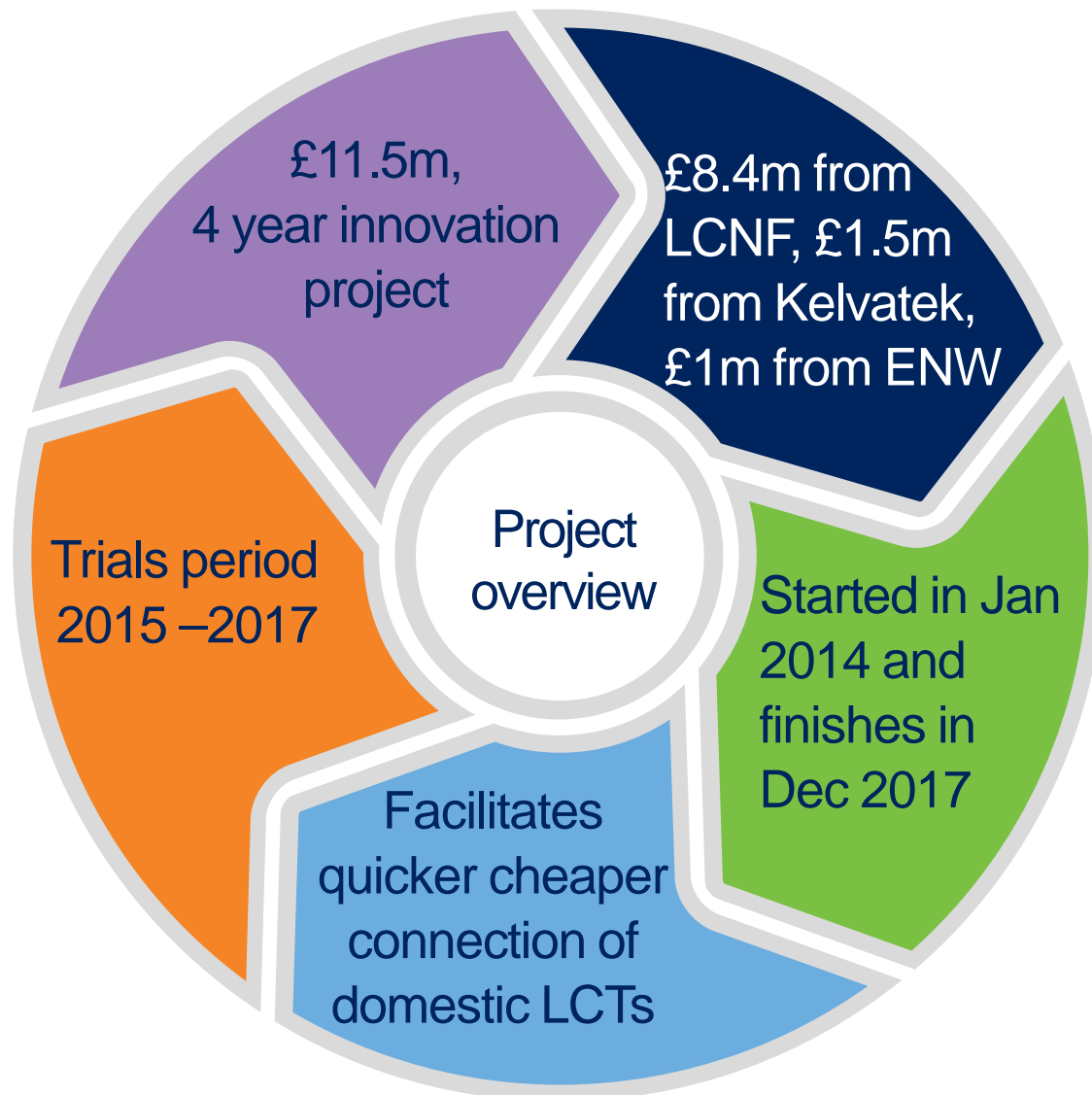
RESPOND

Smart Street project overview



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Project partners



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KELVATEK

SIEMENS


TyndallManchester
Climate Change Research

 **tnei**
enterprise with energy

MANCHESTER
1824
The University of Manchester

Impact
Research



Two years
One week on
One week off



One year's worth of
data



To be designed to
avoid placebo affect



Five trial regimes to
test full effects

Five trial techniques

LV voltage control

LV network management
and interconnection

HV voltage control

HV network management
and interconnection

Network configuration
and voltage optimisation

Smart Street trial areas



6 primary substations
11 HV circuits



38 distribution substations

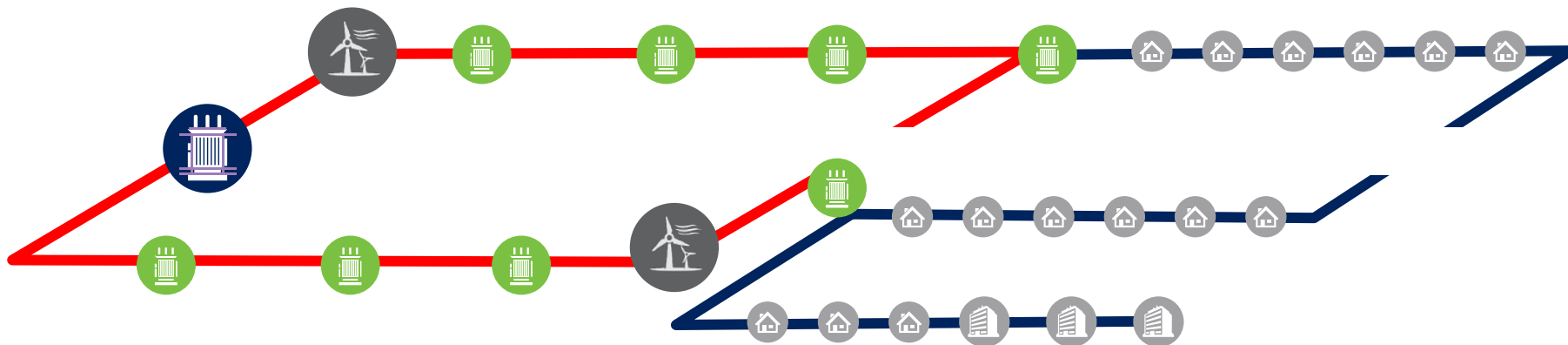


163 LV circuits



Around 62,000 customers

Existing radial network



Network limitations

Diversity between feeders is untapped

Fuses unable to cope with cold load pick up

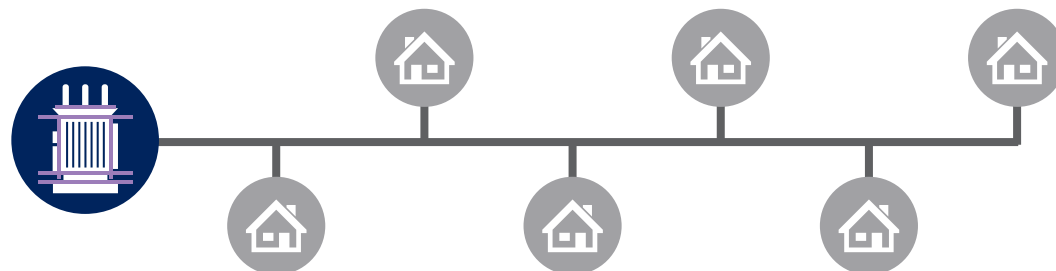
Customer impact

Customers' needs invisible to the network

Demand and generation levels limited by passive voltage control systems

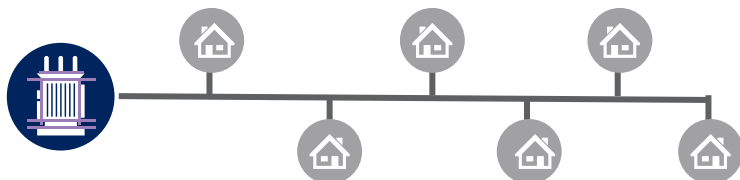
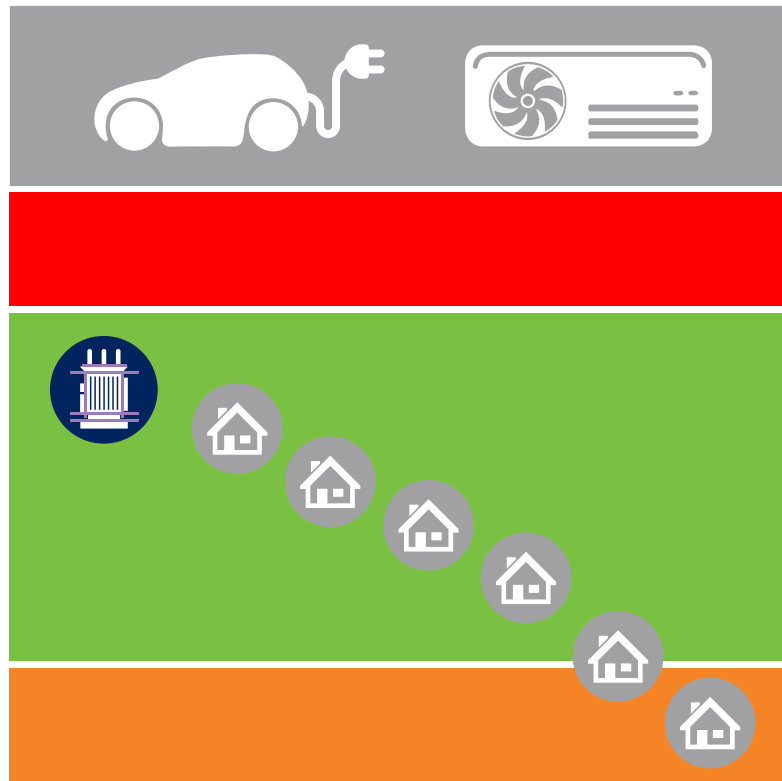
Reliability driven by fix on fail

Voltage profile

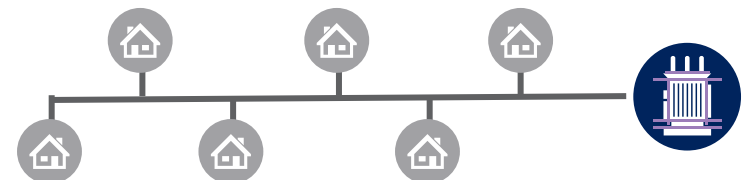
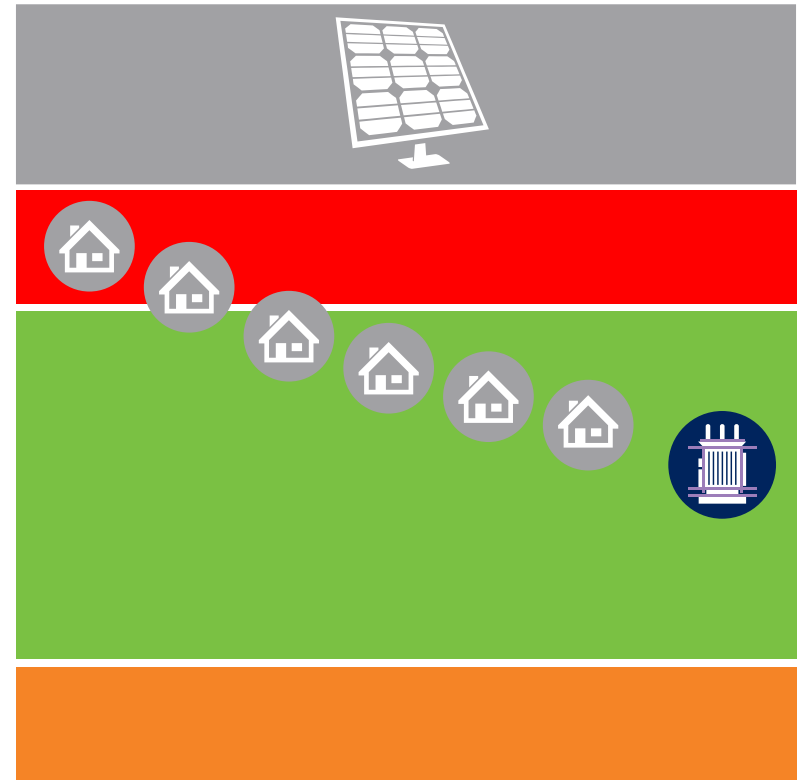


Historic networks have no active voltage regulation

Problem - LCTs create network issues

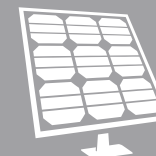


↑
Drift range
↓



LCTs rapidly surpass voltage and thermal network capacity

Smart Street – the first intervention



W



C



L



W



Low cost • Quick fit • Minimal disruption • Low carbon • Low loss • Invisible to customers

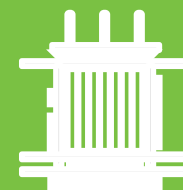
Voltage stabilised across the load range • Power flows optimised

Distribution voltage regulated transformer



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5 OLTCs



9 taps



Local or
remote

HV capacitors



3 ground mounted
HV capacitors

Secured within GRP
 housings in urban
 areas



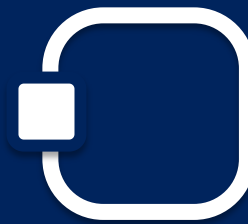
3 pole mounted
HV capacitors

Installed similar to pole
 mounted transformers

What customers will see – LV capacitors in street furniture



84 LV capacitors



One on each
closed ring



Multi staged



KELVATEK

World leading LV vacuum circuit breaker

Advanced measurement and protection capability

Safe LV interconnection, live monitoring and control

Improves supply reliability and restoration through fault management and detection



LV switch

Allows active network meshing and un-meshing

Advanced monitoring capabilities

Ability to control the circuit locally or remotely

KELVATEK



SIEMENS

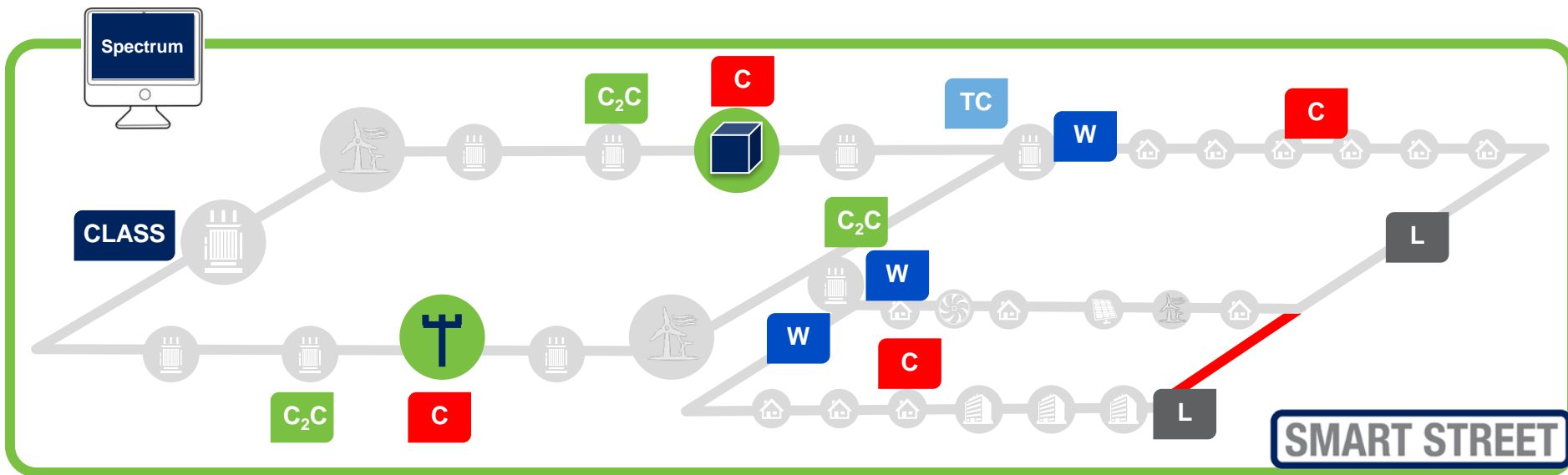
Measures, optimises and responds

CVR and losses benefits unlocked

Oversees network and customer needs

Builds on CLASS smart voltage control

Network reliability improvement



- C₂C** Capacity to Customers
- C** Capacitor
- W** WEEZAP
- L** LYNX
- TC** On-load tap changer

Builds on C₂C and CLASS • Storage compatible • Transferable solutions

Smart Street benefits



Now we can stabilise voltage
We can set the voltage level lower
This will lead to:


Reduced demand

Reduced customer energy consumption

Maximised DG output



How much could customers save?

		GB
Reinforcement savings via DUoS	£330 over 25 years	£8.6b over 25 years
Reduced energy consumption, 2013 (from CVR ≈ 3 - 7%)	£15 - £30 pa	£390 - £780m pa
Maximise DG output (from maximising Feed In Tariff income)	£70 pa	£20m pa

Efficient network solutions ● Energy savings ● Carbon benefits

Technology overview



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84 LV capacitors
installed



43 Lynx systems
498 Weezaps



50 end-point
controllers installed



Spectrum 5 installed
on network

**Next
steps**

6 HV capacitors
to be installed

Briefing and
training

Go live!

Smart Street summary



- Faster LCT adoption
- Less embedded carbon
- Re-usable technology
- Optimise energy and losses



Carbon
Footprint



Low Risk

- First example of CVR
- First example of centrally controlled LV network
- Range of intervention solutions

SMART STREET

Challenge

Benefit

- Combine into one end-to-end system
- Network optimisation



- Lower energy bills
- More reliable supply
- Reinforcement savings

A day in the life of Smart Street



- [Videos\A day in the life of Smart Street.mp4](#)



QUESTIONS ANSWERS &



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Want to know more?



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futurenetworks@enwl.co.uk



www.enwl.co.uk/smartstreet



0800 195 4141



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Thank you for your time and attention