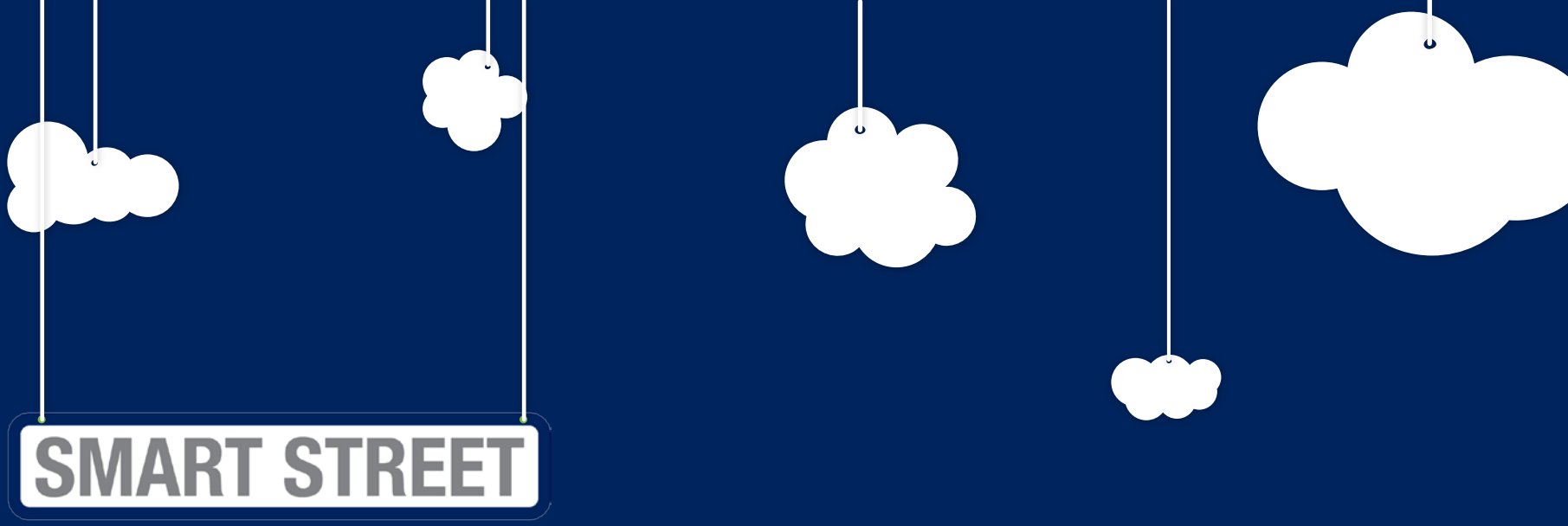


LCNI conference
Increasing Network Automation, Session 2.3
21 October 2014

Damien Coyle

LCN Fund
Low Carbon Networks

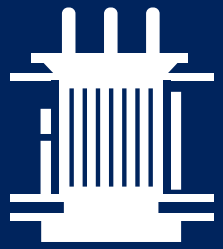
electricity north west
Bringing energy to your door

Agenda

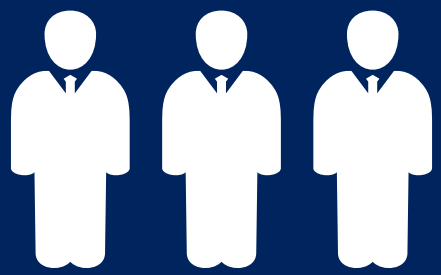
electricity north west
Bringing energy to your door

SMART STREET

Introduction



Technology



Why Smart Street?

Connecting the North West

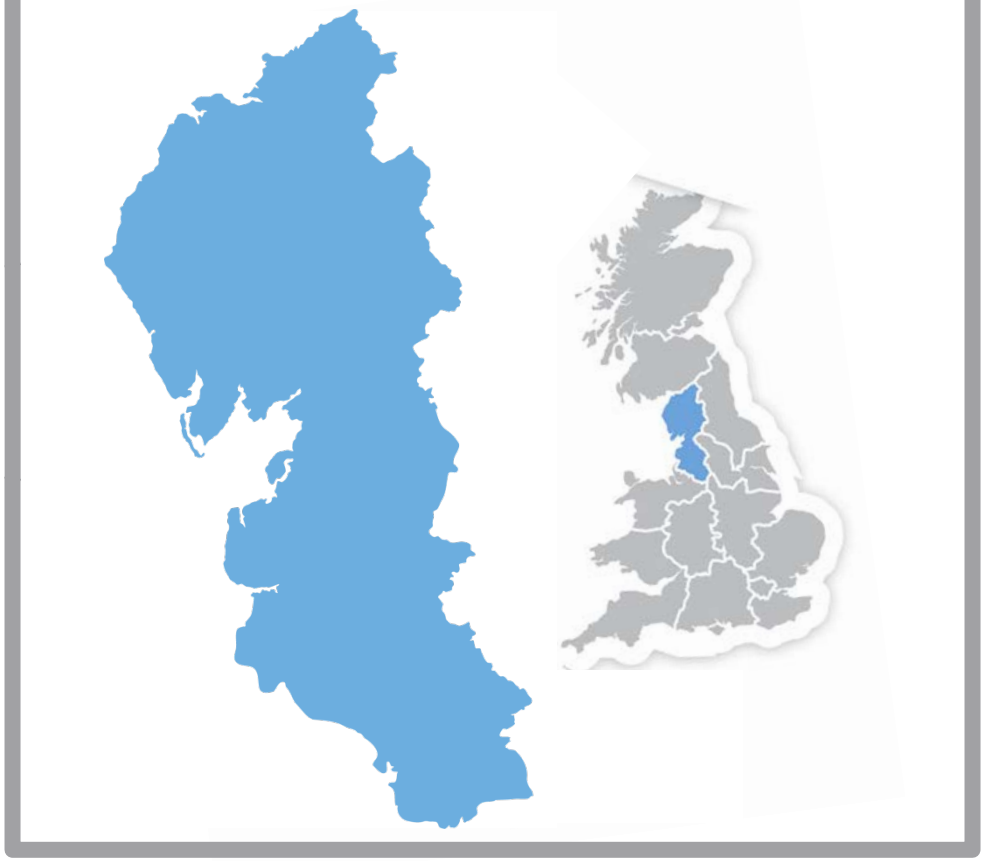
electricity north west
Bringing energy to your door

£8 billion of network assets

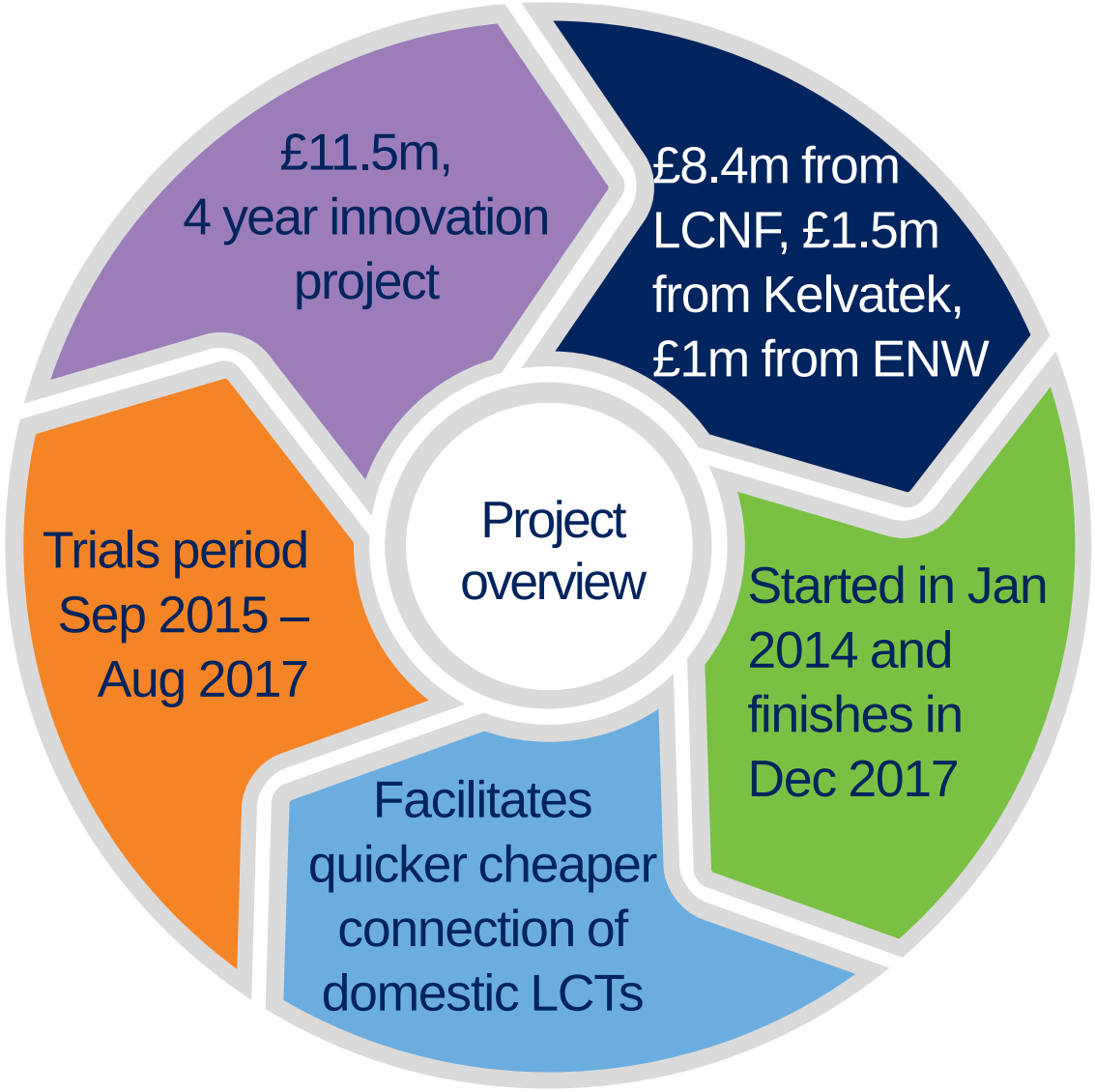
4.9 million

2.4 million

25 terawatt hours



Smart Street project overview



Project partners

electricity north west
Bringing energy to your door

KELVATEK

SIEMENS

TyndallManchester
Climate Change Research

tnei
enterprise with energy

MANCHESTER 1824
The University of Manchester

Queen's University Belfast

Impact Research

Smart Street trial areas

electricity north west
Bringing energy to your door

6 primary substations
11 HV circuits

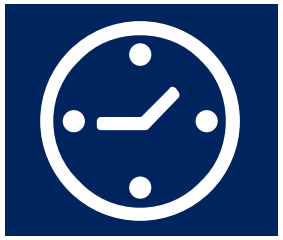
38 distribution substations

163 LV circuits

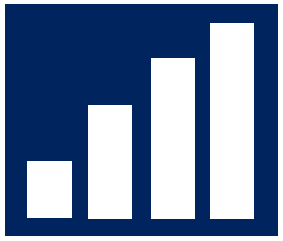
Around 62,000 customers

Smart Street trial design

electricity north west
Bringing energy to your door



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

LV capacitors in street furniture

electricity north west
Bringing energy to your door

80 LV capacitors

Tried and tested high spec

One on each closed ring

HV capacitors

4 ground mounted HV capacitors

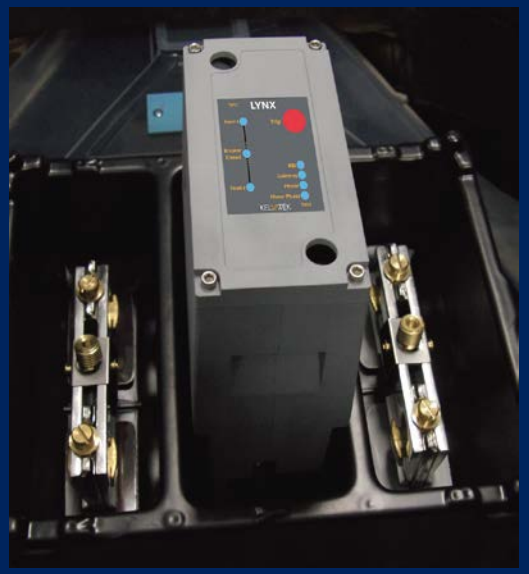
4 pole mounted HV capacitors

Housed in containers but not on street

Installed similar to pole mounted transformers

Weezap & Lynx

489 Weezaps

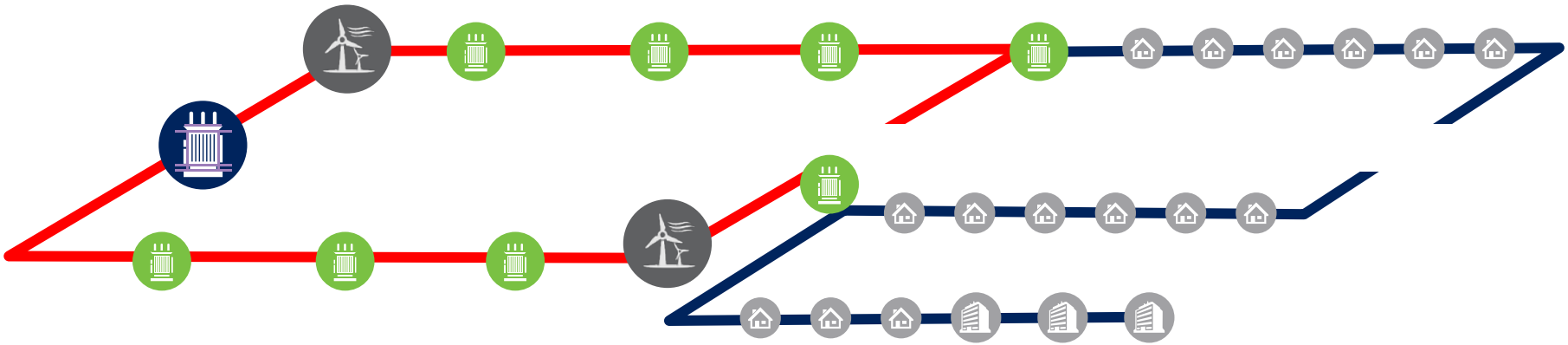


240 LYNX

Fitted across 163 LV Circuits

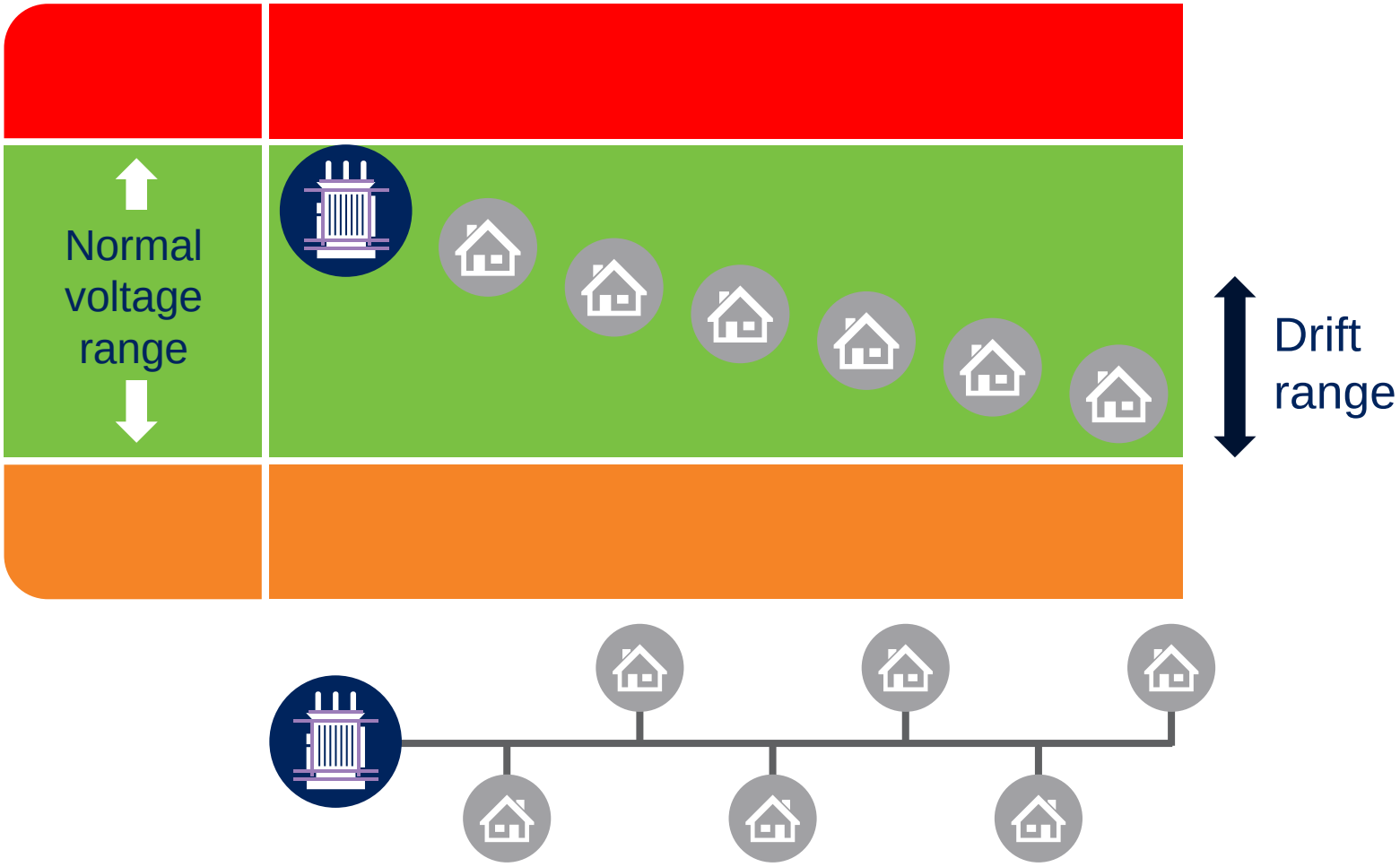
Installed in 80 LV link boxes

Existing radial network



Network limitations	Customer impact
Diversity between feeders is untapped	Customers' needs invisible to the network
Fuses unable to cope with cold load pick up	Demand and generation levels limited by passive voltage control systems
	Reliability driven by fix on fail

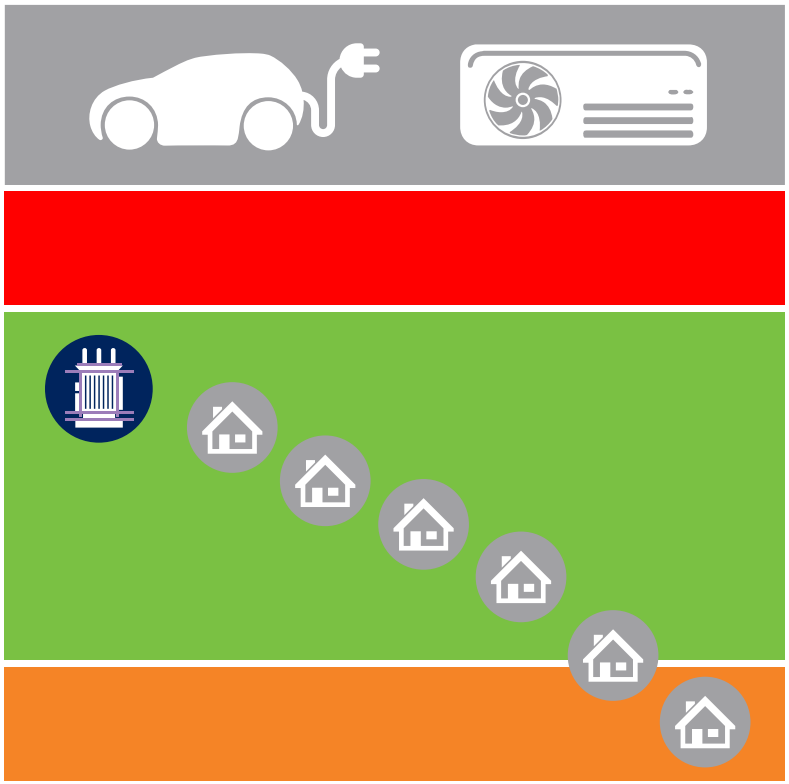
Voltage profile



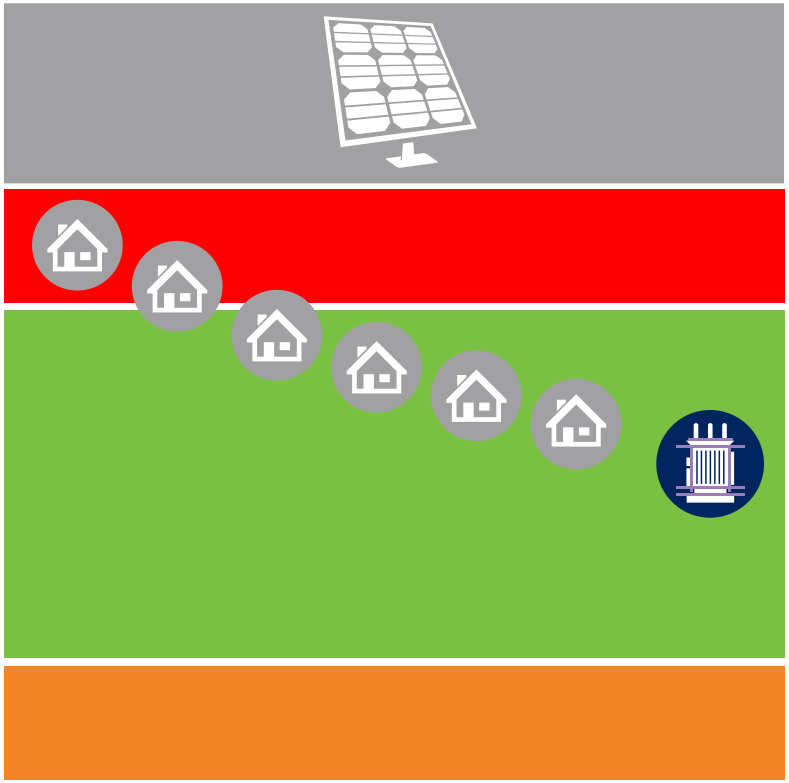
Historic networks have no active voltage regulation

Problem - LCTs create network issues

electricity north west
Bringing energy to your door



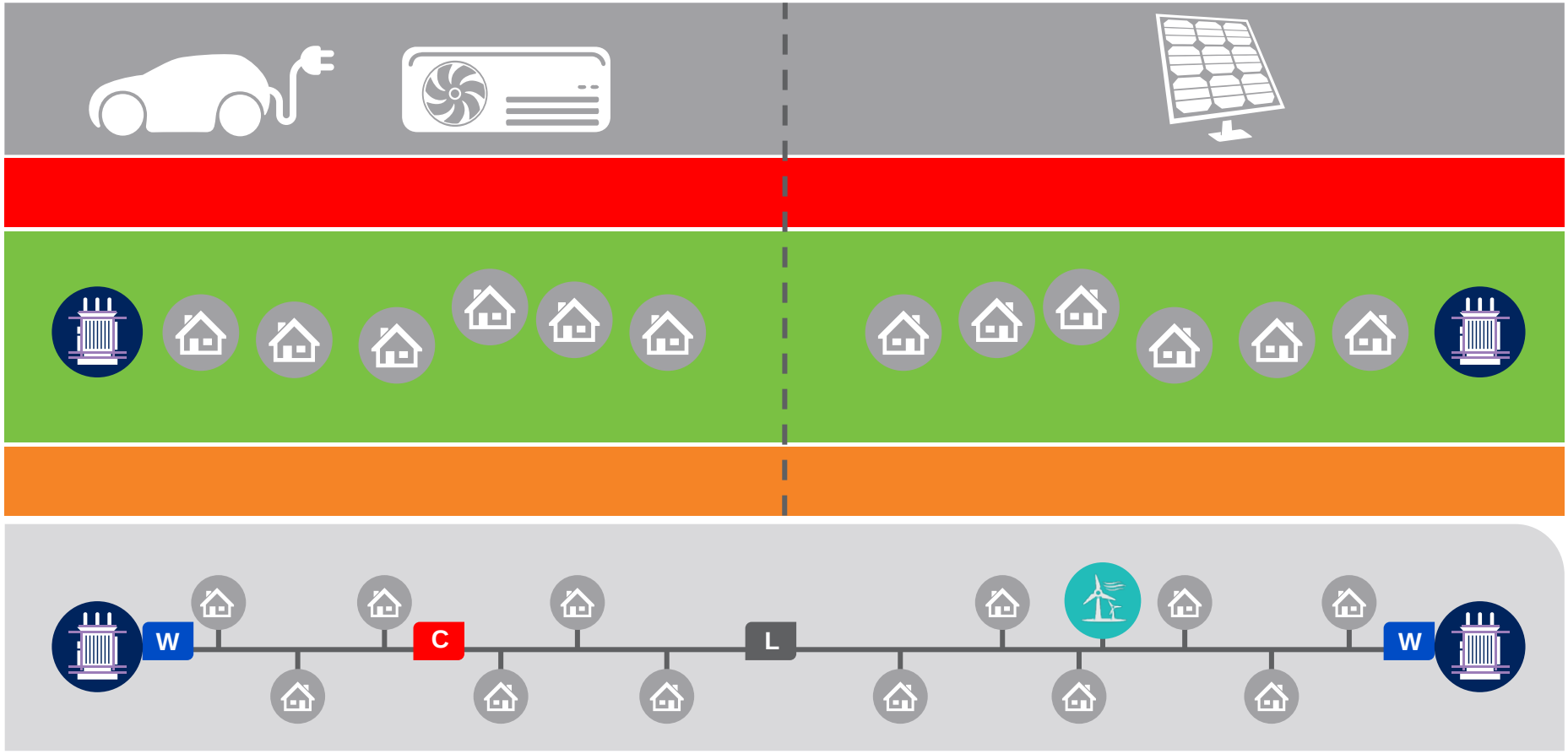
Drift range



LCTs rapidly surpass voltage and thermal network capacity

Smart Street – the first intervention

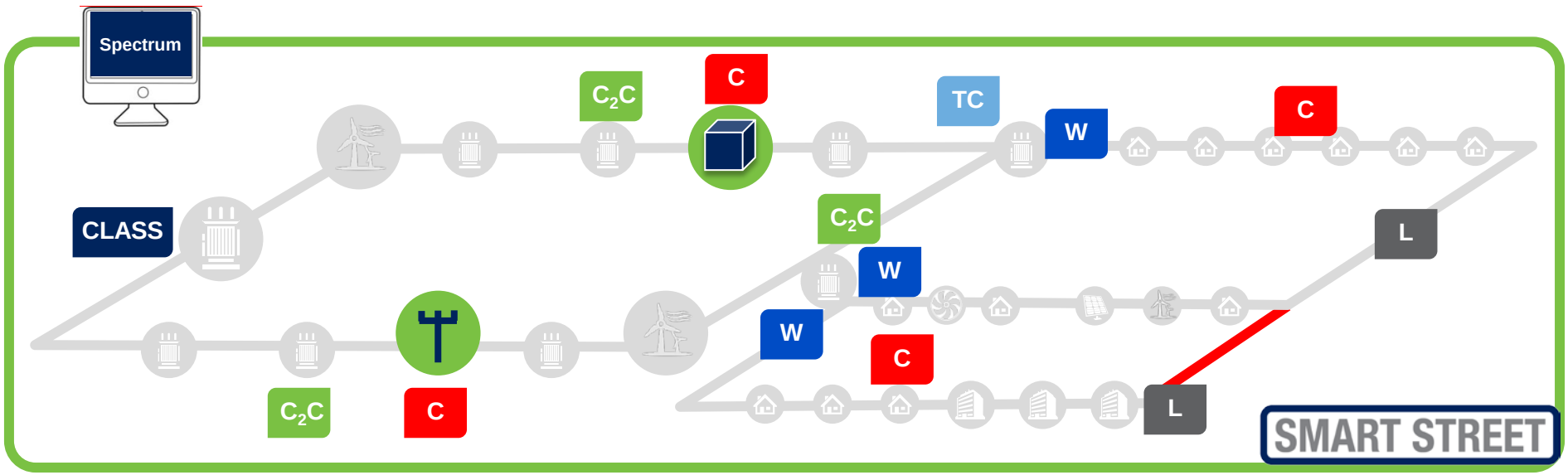
electricity north west
Bringing energy to your door



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

Voltage stabilised across the load range ● Power flows optimised

Network reliability improvement



C2C Capacity to Customers

C Capacitor

W WEEZAP

L LYNX

TC On-load tap changer

Builds on C_2C 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:

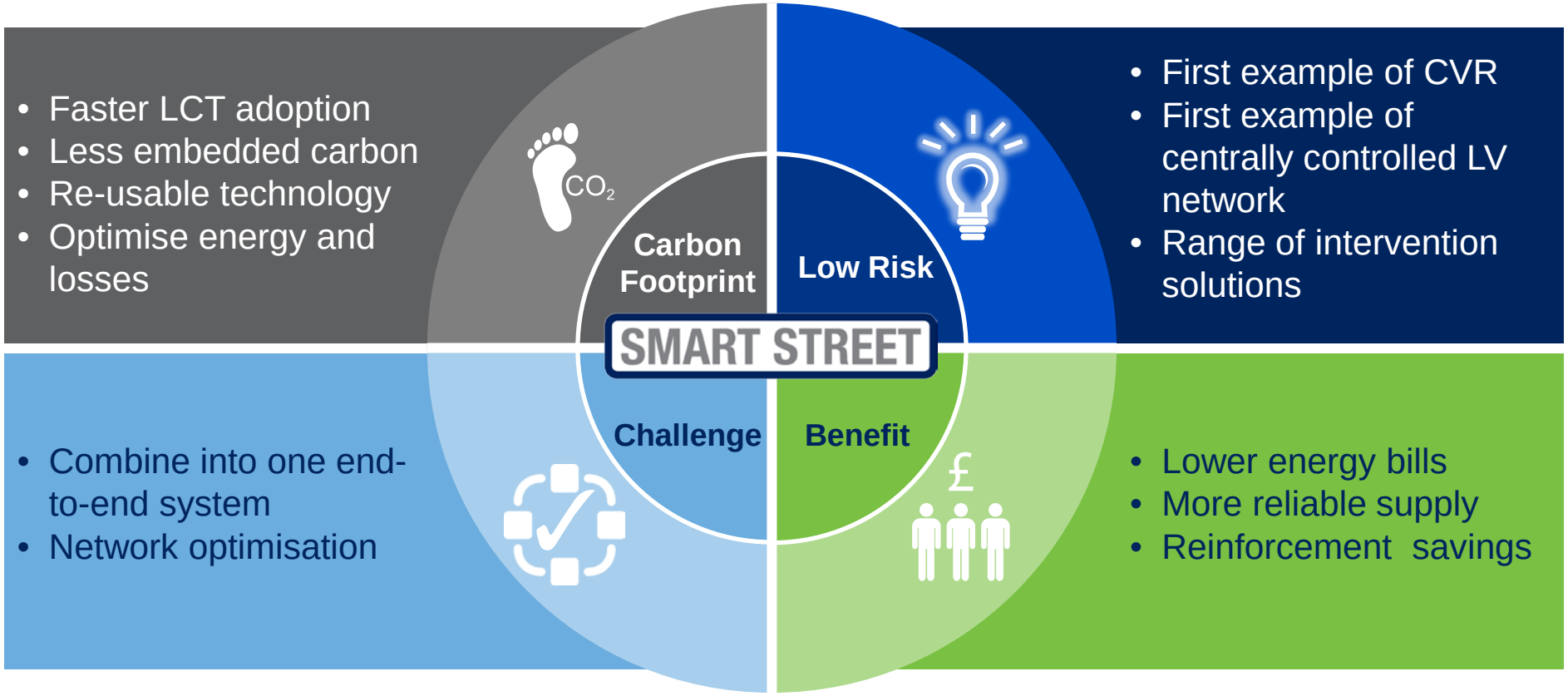
- Reduced demand
- Reduced customer energy consumption
- Maximised DG output

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

Smart Street summary

electricity north west
Bringing energy to your door



QUESTIONS & ANSWERS

electricity north west

Bringing energy to your door

Want to know more?

electricity north west
Bringing energy to your door

	**futurenetworks@enwl.co.uk**
	**www.enwl.co.uk/smartstreet**
	**0800 195 4141**
	**@ElecNW_News**
	**linkedin.com/company/electricity-north-west**
	**facebook.com/ElectricityNorthWest**
	**youtube.com/ElectricityNorthWest**

Thank you for your time and attention