RESPOND

LCNI conference, 26 November 2015

Session 4.3 - Evolution of a Future Energy Network

Andrew Howard

electricity north west

Bringing energy to your door

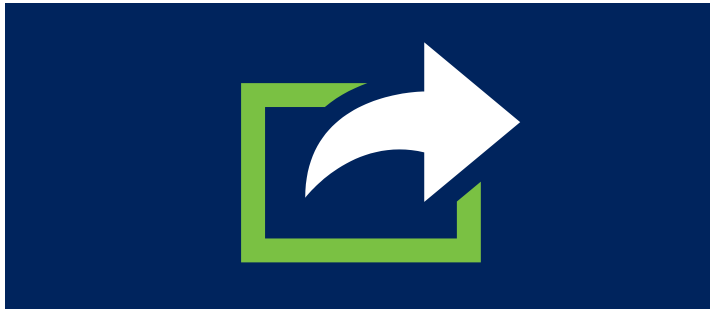
Introduction

electricity north west
Bringing energy to your door

Background

The Respond project

Progress



Next Steps

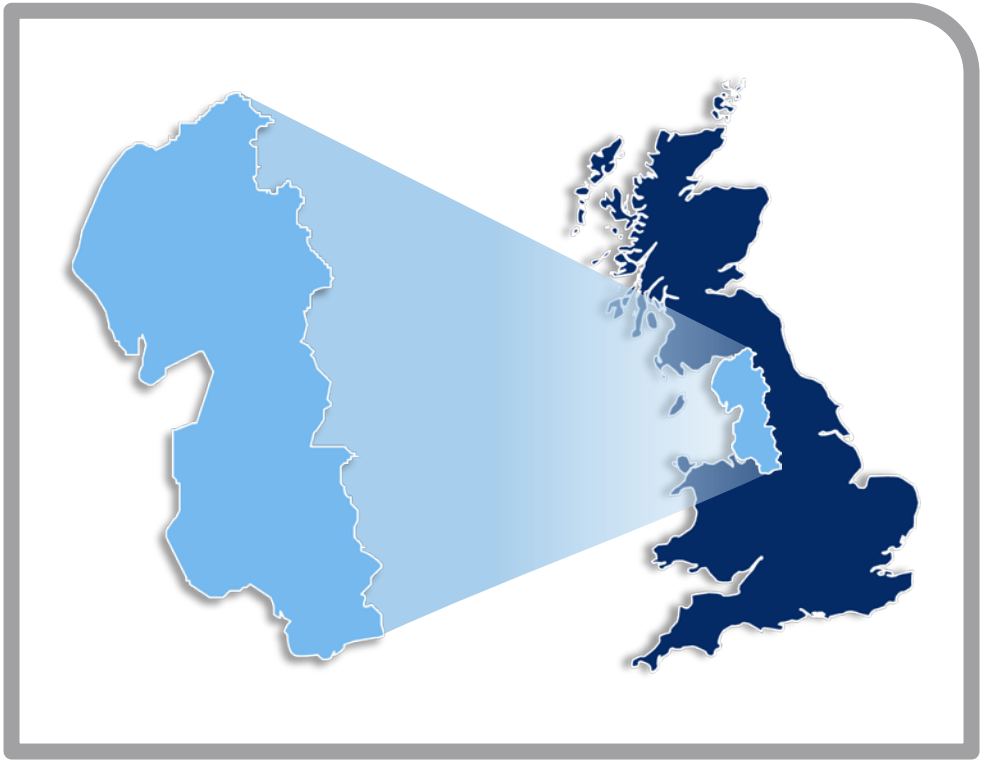
Introducing Electricity North West

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

electricity north west
Bringing energy to your door

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

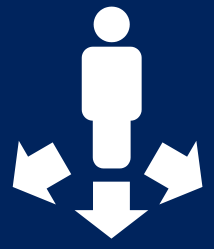
SMART STREET

RESPOND

Respond - The fault level challenge

electricity north west
Bringing energy to your door

Faults cause large currents to flow through our network
Fault current will damage our network assets if not controlled

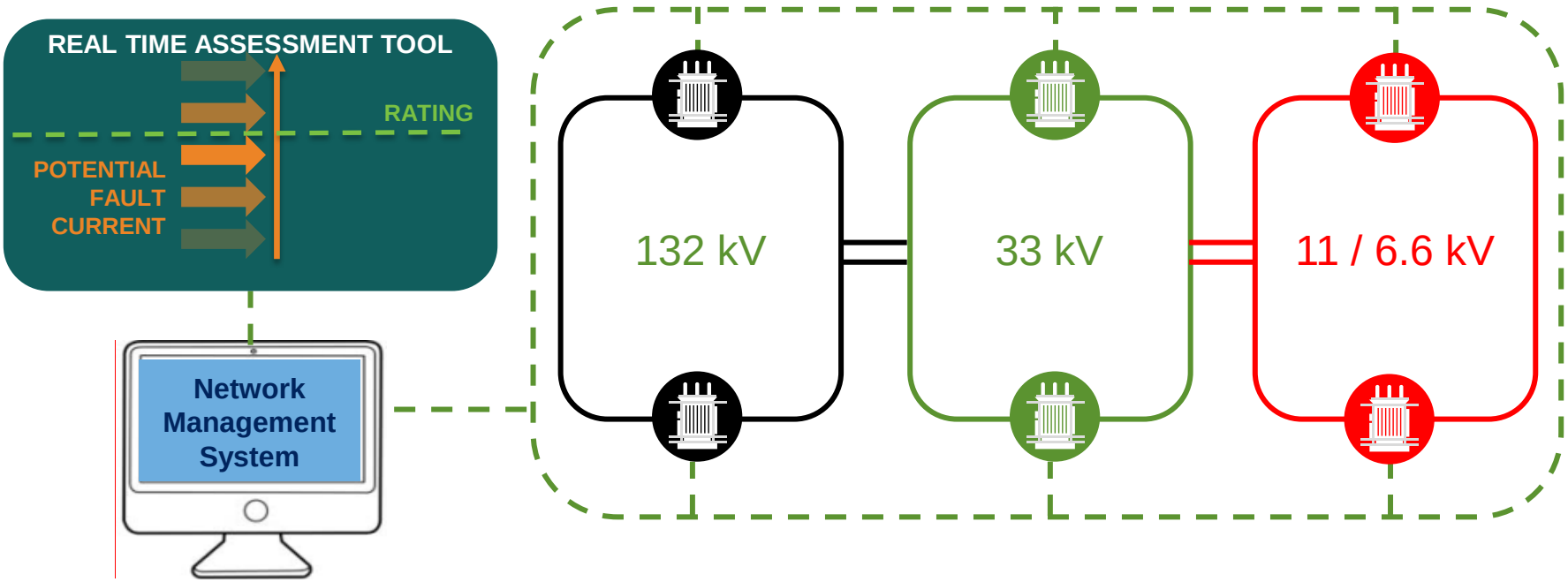
Estimation	Mitigation	New connections	Another way
			
Design tools estimate the maximum possible fault current or fault level	Sub-optimal network configuration Removal by reinforcement, cost and time	Reinforcement, cost and time May make the connection non-viable	Deliver value from existing assets Customer choice

Real time fault level assessment

Network Management model derived from geospatial information systems

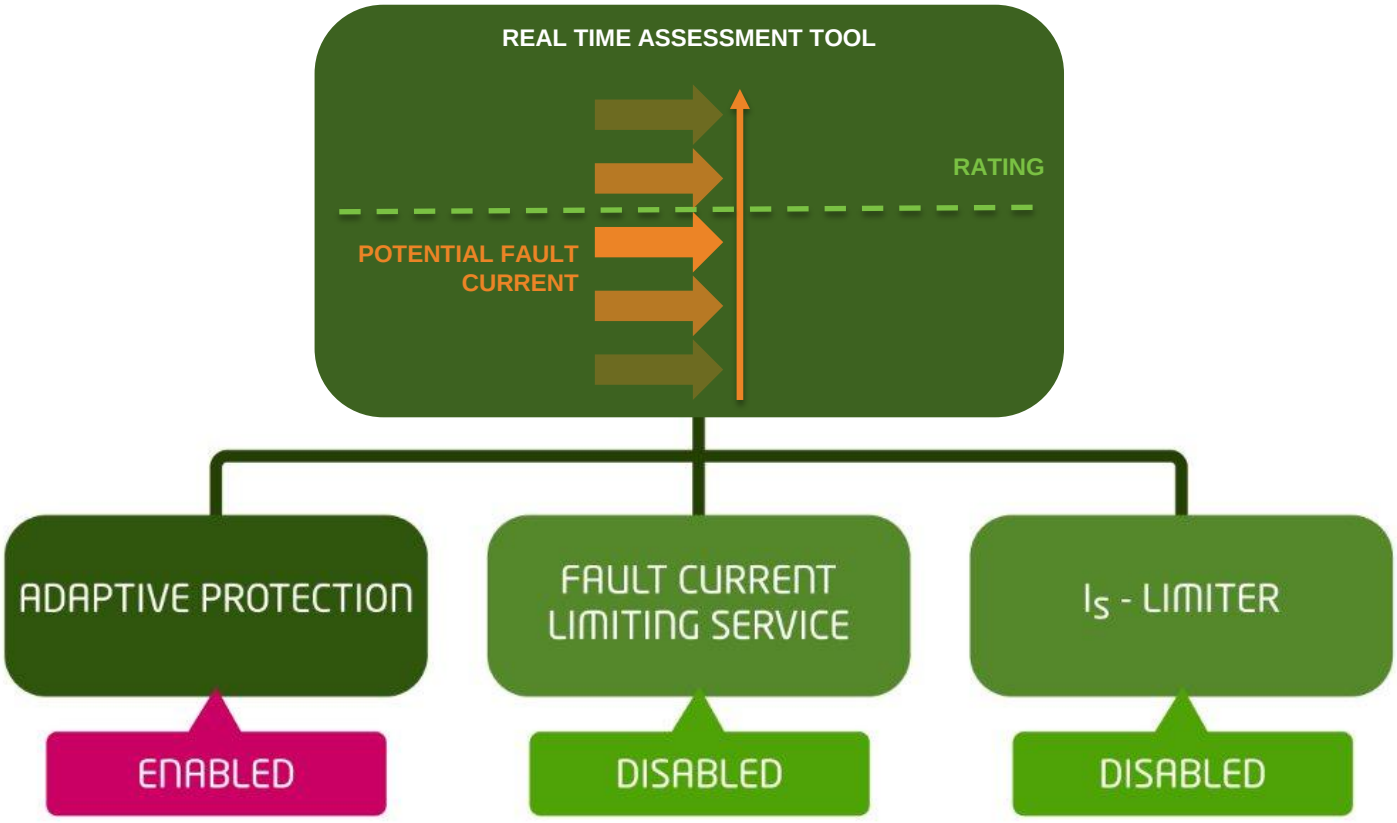
Respond will overlay fault level assessment onto this NMS

Assessment will recalculate, after changes and periodically (real time)



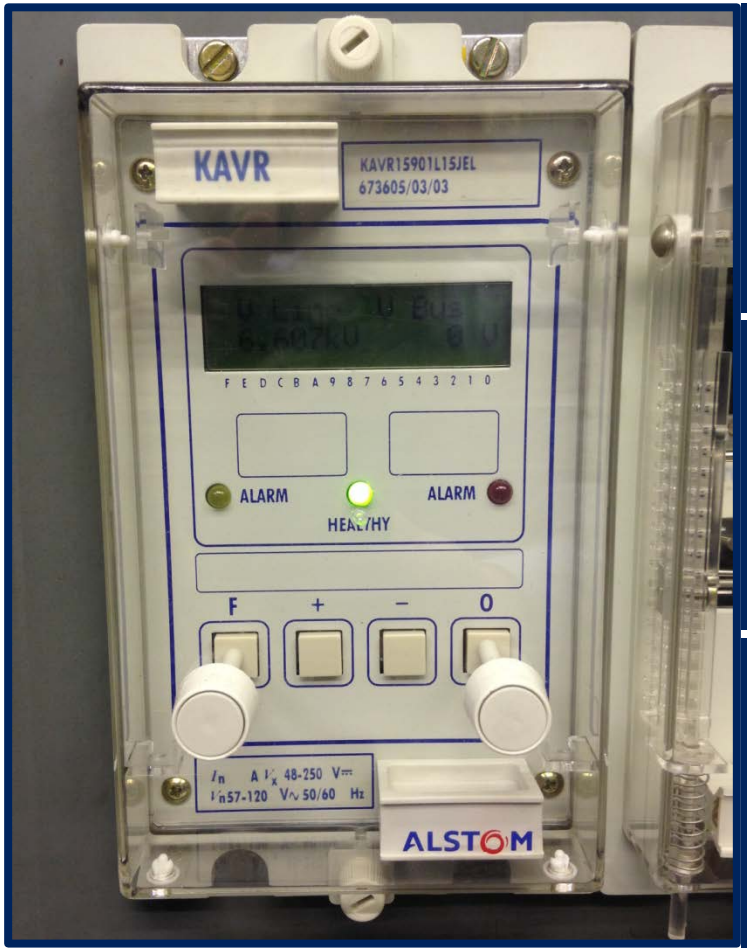
Real Time ● Assessment ● Comparison ● Action ?

Real time mitigation techniques



Enabled pre fault – No Change ● Operate post fault – When required

Adaptive Protection



Network already designed to break fault current

Adaptive protection changes the order in which circuit breakers operate to safely disconnect the fault

Using redundancy in the network ensures no other customers go off supply

I_S limiters

electricity north west
Bringing energy to your door

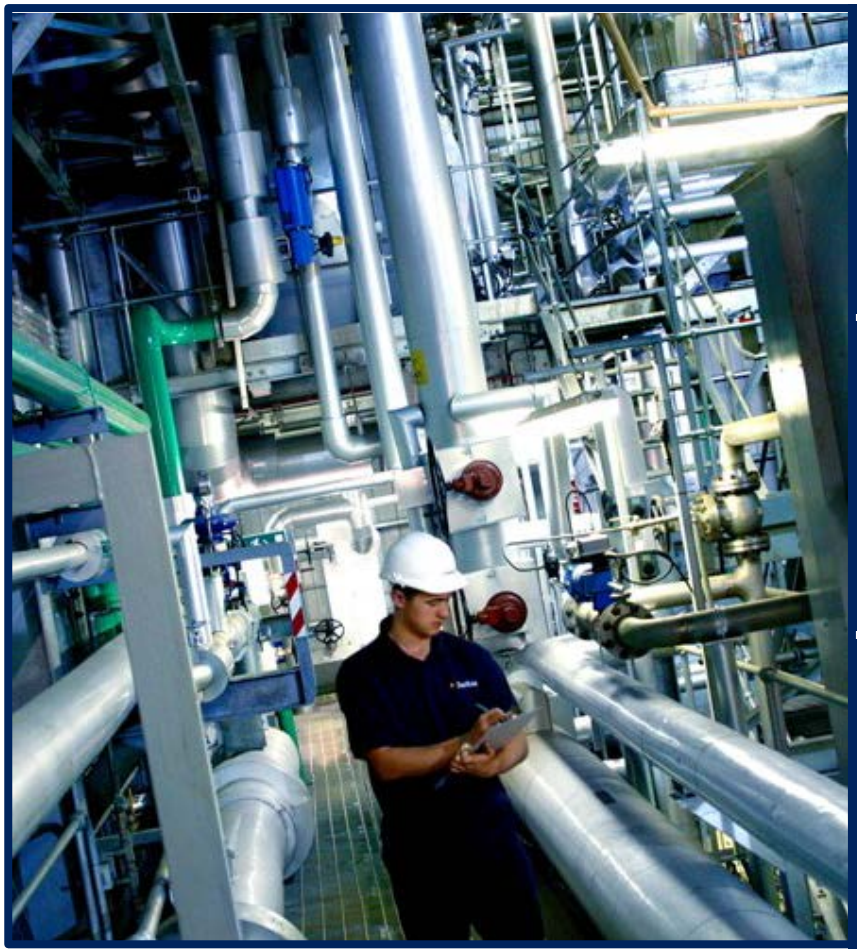
Operates within 5 milliseconds or 1/200th of a second

Detects rapid rise in current when a fault occurs and responds to break the current

Respond will prove the technology, review safety case and deploy at two sites

Fault Current Limiting (FCL) service

electricity north west
Bringing energy to your door



Fault current generated by customers can be disconnected using new technology

Financial benefits to customers taking part and long term to all customers

Challenge is to identify customers to take part in a trial of the FCL service

Respond benefits

Adaptive Protection	Fault Current Limiting service	I_s-limiter
Electricity North West scale potential benefits (2050)*		
£106m	**< £110m**	**£45m**
GB scale potential benefits (2050)*		
£1400m	**< £1456m**	**£598m**
Planning and installation time		
18 times faster		**4.5 times faster**

*DECC medium scenario achieved by 2050

Wider choice of fault level mitigation techniques for DNOs

Offers customer choice through FCL service

Updated charging methodology allows for new techniques

Project partners - technical

electricity north west
Bringing energy to your door

Schneider Electric

Fault Level Assessment Tool

ABB

Is limiter and associated containerised switchgear

PB PARSONS BRINCKERHOFF

Engineering services
(calibration, comparison, post fault analysis)

KELVATEK

Monitoring equipment
(opening times)

Outram – fault level monitors
TNEI – support of IPSA design product in ENWL
EATL – partial discharge equipment

Project partners – customer/commercial

electricity north west
Bringing energy to your door

Impact Research	ade	ENER-G	United Utilities
Customer engagement and customer surveys	Customer engagement and customer survey support	Customer survey and technical solution support	Support for a Fault Current Limiting Service

Carbon impact assessment

Respond summary

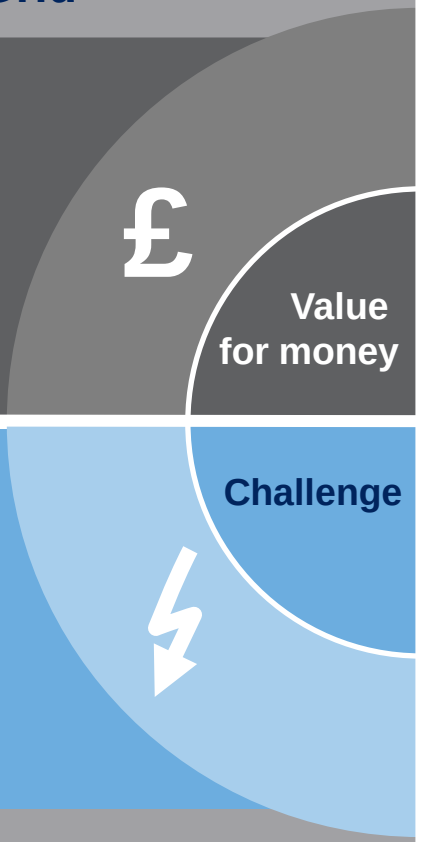
electricity north west
Bringing energy to your door

Complements FlexDGrid

- Strong consortium, competitively selected
- Full range of techniques trialled

Real time network management

- Maximise use of existing assets
- No impact on customers' equipment



- Perception of I_s-limiter
- Prove operational application
- HSE as active stakeholder

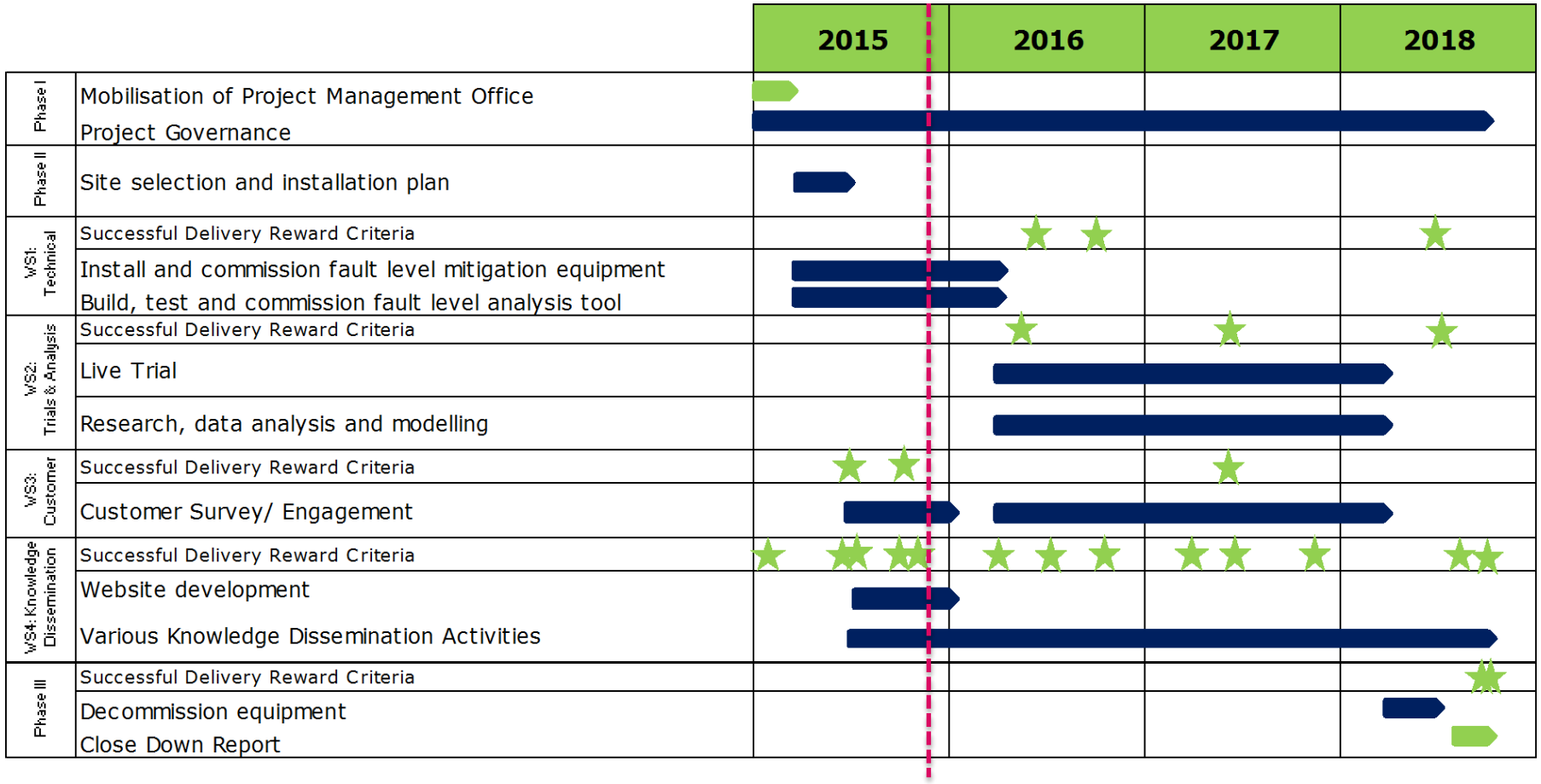
Commitment to UK adoption

- Customer payments for FCL service
- Lower connection and DUoS charges

Greater customer choice

Respond high level project plan

electricity north west
Bringing energy to your door



Key

★ Successful Delivery Criteria

Progress to date

electricity north west
Bringing energy to your door

SDRC delivered Site selection & customer engagement plan	Initial FLAT designs documented Core algorithms demonstrated	Is-limiter designs accepted Installation plans approved
Engaged customer panel Trial survey tested Full survey started	Website launched Regular L&D updates	On plan On budget

Next steps

electricity north west
Bringing energy to your door

Feb 2016	Apr 2016	May 2016	Jun 2018	Oct 2018
Customer engagement survey and results	Complete technical build and initial FCLS	Publish start of trials	Trials and post fault analysis work	Closedown and report findings

Knowledge sharing and dissemination

Early lessons

Customers understand their own business

Most customers understand load and demand

Many struggle with complexity of existing market opportunities

Understanding fault level is an additional complexity

Is limiter containerisation

Repeatable designs

Business as usual continues

Switchgear develop faults

RESPOND

QUESTIONS & ANSWERS

electricity north west

Bringing energy to your door

For more information on Respond

electricity north west
Bringing energy to your door

	**www.enwl.co.uk/respond**
	**www.enwl.co.uk/respond-survey**
	**www.enwl.co.uk/respond-videos**
	**futurenetworks@enwl.co.uk**
	**0800 195 4141**

Thank you for your time and attention