

CLNR – Propositions for industrial and commercial demand side response

20th June 2013

Andrew Spencer



Customer-Led Network
Revolution

What is demand side response (DSR)

- Demand Side Response: relates to any program which encourages shift of (demand) of energy by end consumers. The participation of the end customers is a response to factors such as incentive pricing, new tariff schemes, greater awareness and an increased sense of responsibility.
- The end consumers agree to involvement, but the participation may be active behavioural changes or passive through automated responses.

Source : ENA, Energy UK - Smart Demand Response - Discussion paper

Circumstances under which DSR will be triggered

Network Constraint / Post fault response

- Primary substation with occasional loading above firm capacity
- Fault on one of the incoming EHV circuits or a transformer fault
- Fault coincides with a time of peak loading
- No customers off supply after the fault
- Temporary load reduction required to maintain supplies until capacity is restored.
- In the course of normal operations the demand response will not be required.

Customer Role

- Rapid load reduction / generation to “shave” peak demand.
- The reduction in demand requested would be to scale back to the load to within the capability of the remaining assets.

Customer benefits

- Asset life extension by deferring network reinforcement.



Parties involved in I&C customer engagement

Winter 2012 Trials

- Working relationships with aggregators as the customer facing entity
- Focus of the trial was to test the commercial arrangements and the effectiveness of the demand response (speed, size, duration)

2012 Survey work

- We undertook two surveys to test I&C's knowledge and appetite for DSR

Winter 2013 Trials

- Continue to work with three aggregators
- Also engaging directly with some I&C customers



Approaches to I&C customer recruitment

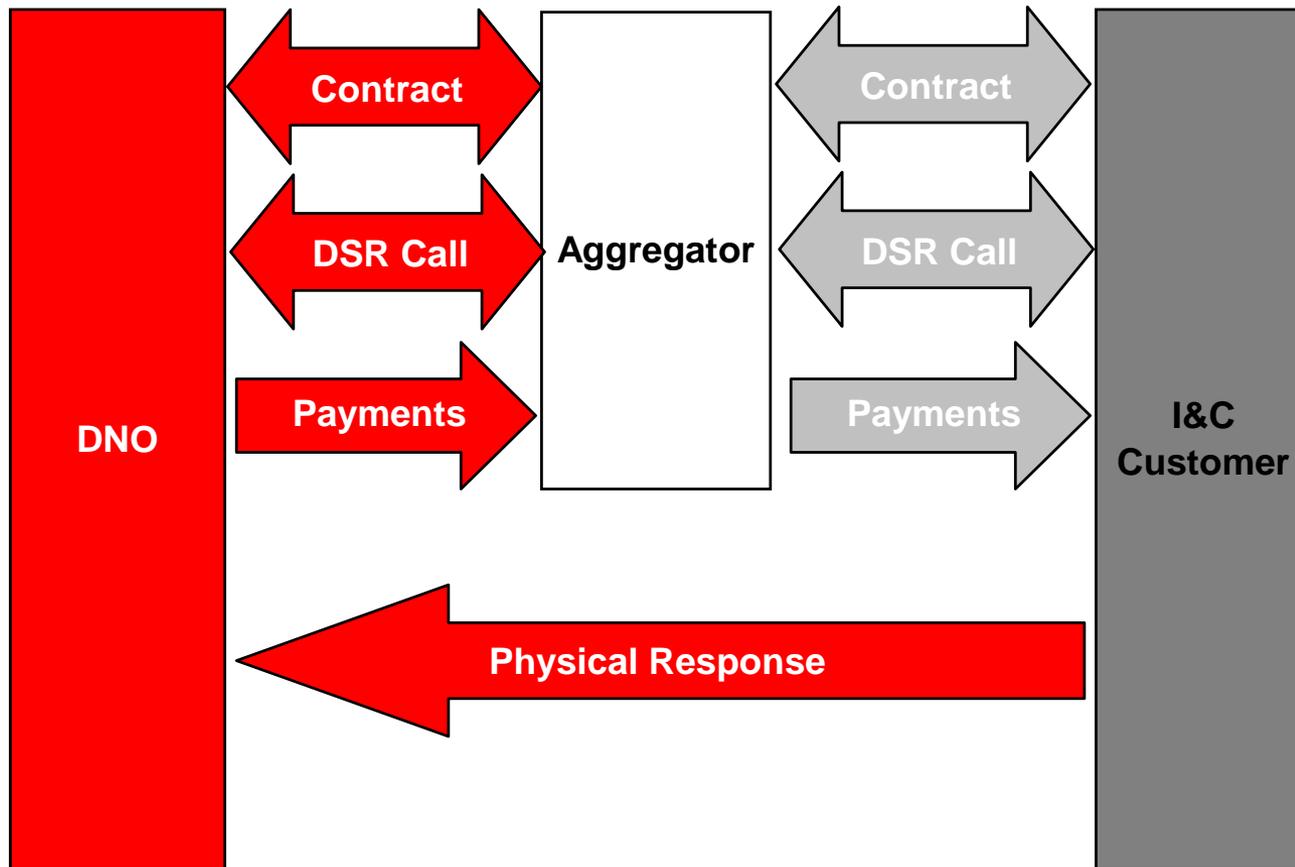
Options available to engage with the DSR market

- I&C customers directly
- Aggregators
- Suppliers
- National Grid (the Transmission System Operator)

Why partner with commercial aggregators

- Sales teams with industry experience
- Existing portfolios and customer prospects
- Proven capability to deliver front-to-end processes e.g. site evaluations, installation of smart meters, IT/comms with site and control room, maintenance programs (on-site generation), personnel training and ongoing support
- Valuable industry knowledge

DNO/Aggregator/I&C customer operating model



Key features of the commercial arrangements

- **Season:** Nov – Feb 2011/12
- **Availability Window:** Mon – Fri 1500 - 1900
- **Indicative No of Calls:** 10 consecutive weekdays
called once every three years
- **Response required:** A reduction of the contracted value relative to the consumption in the previous half hour.
- **Response Time:** 15mins
- **Response Duration:** 4 hrs/day
- **Availability Price £/MWh:** STOR used as a benchmark
- **Utilisation Price £/MWh:** STOR used as a benchmark
- **Penalties:** A failure to respond would result in suspension from the trial

I & C Winter 2011/12 DSR Trials - Customer Flexibility



Customer 1: *Mining*

- Contracted DSR: 2 MWh
- DR Type: CHP Generation
- Availability: 3pm – 6pm, Weekdays
- Response Time: 15 minutes
- Season: January – February 2012
- Instruction issued via phone call from Northern Powergrid control room to Aggregator



Customer 2: *Refrigeration*

- Contracted DSR: 0.75 MWh
- DR Type: Load Reduction
- Availability: 3pm – 7pm, Weekdays
- Response Time: 20 minutes
- Season: January – February 2012
- Instruction issued via phone call from Northern Powergrid control room to Aggregator

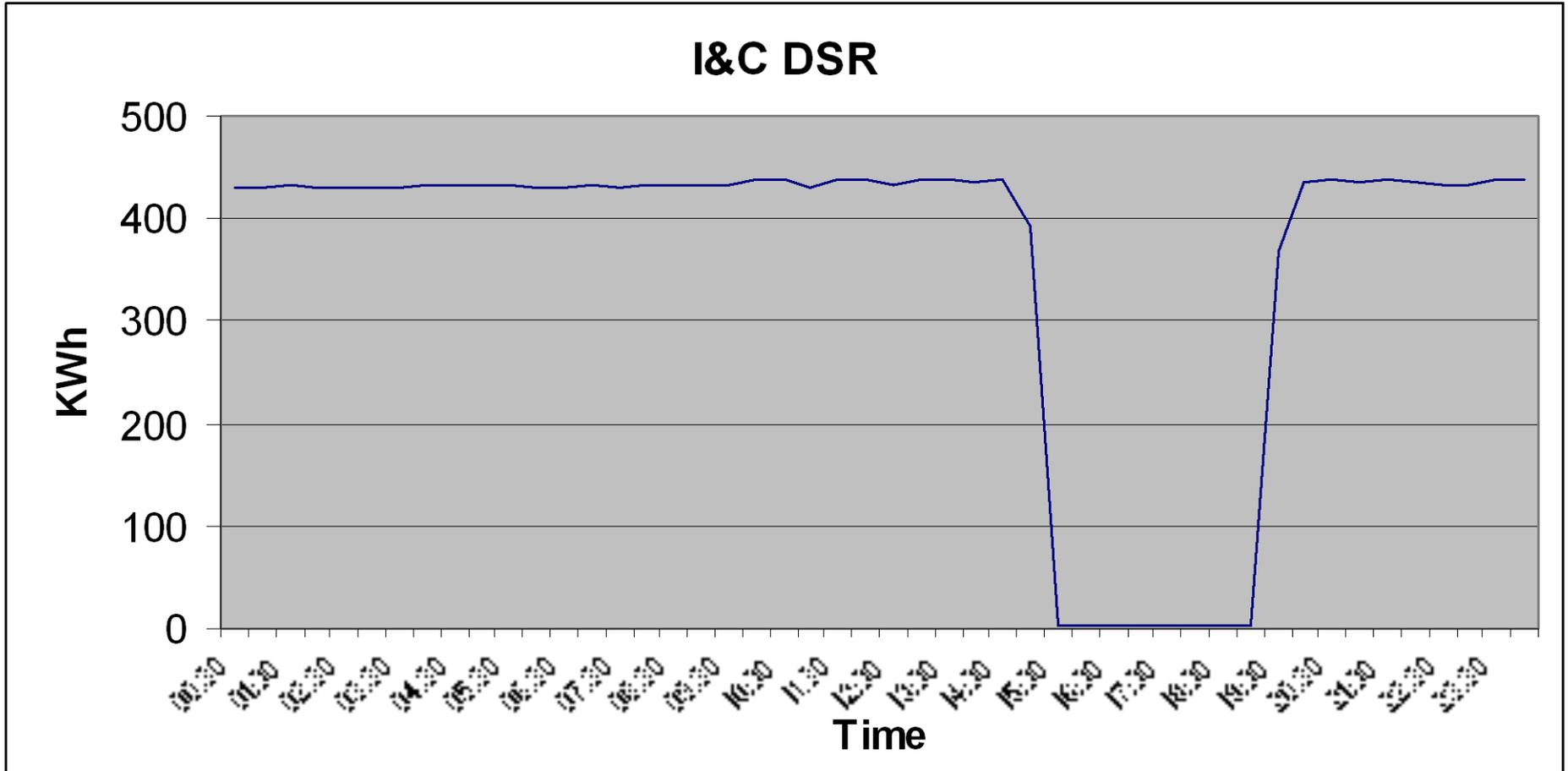


Customer 3: *Web-Hosting*

- Contracted DSR: 0.8 MWh
- DR Type: Diesel Generation
- Availability: 3pm – 7pm, Weekdays
- Response Time: 20 minutes
- Season: February 2012
- Instruction issued via phone call from Northern Powergrid control room to Aggregator



Industrial & Commercial – Pre/ Post Event Metering



I & C Winter 2011/12 DSR Trials – Contract Performance

Instruction Log

- 4 - 1 day events called across 3 sites
- 1 – 4 day event called across 2 sites

Successful events

- 9 successful DSR events from 13 instructions

Failure events

- Fire on site which removed one site for the winter 11/12 trial period
- Generator failure on 1 day, site resumed full availability the following day
- Event failure vs contractual parameters as DSR already provided for Triad (although load reduction achieved from the DNO perspective)
- Demand reduction delivered but not at the contractual level

Lessons learned – Winter 2012 I & C trials

- DNOs can build effective relationships with both the aggregators and direct with I&C customers for the purpose of providing DSR products
- DNOs are effectively in a competitive market for DSR primarily with the National Grid STOR products. However, the two requirements are potentially complementary
- The time required to finalise the legal framework for DSR products is material and the process can take up to 4 months.
- The definition and measurement of the response needs further consideration. The 2012 trials took the consumption just before the DSR request to be the baseline. The 2013 trials are trying different baselines.
- The DSR contracts delivered a 77% success rate when participants were instructed to deliver DSR. The scale of the trial at this stage is insufficient for a degree of confidence to be determined to inform industry standards for wider deployment.



Lessons learned – Winter 2012 I & C trials

- Locating customers that are willing to offer DSR for four hours in a day over a maximum 14-day period (potentially more than 14 days in some circumstances) will reduce the number of customers that can participate in these schemes. A solution to this issue is to use a portfolio of customers to deliver the DNO's requirements;
- The approach to non-performance requires further consideration;
- The pricing structure was based upon STOR but needs further consideration;
- We need to determine how best to fund / incentivise the upfront work of locating and securing DSR participants.
- Knowledge transfer from the project to operational teams will involve a significant resource commitment.

2012 I&C customer engagement research

Purpose

- Gain a more detailed understanding of potential I&C DSR when targeting specific geographical areas

Method

- Research carried out by Flexitricity and ESP
- Ten primary substations selected
- The I&C customers in the selected primary areas were approached to assess:
 - their knowledge of DSR,
 - establish their willingness and capability to participate in DSR; and
 - identify barriers to DSR programmes; using:
- Engagement via
 - Telephone conversations,
 - Questionnaires; and
 - Meetings.



I & C customer engagement - research results

- When targeting a tight geographic area the initial customer drop-out rates are high
- When contact is made with the right person in the business there is a low level of awareness of what DSR is amongst customers.
- When the concept of DSR is explained to customers a large proportion of customers want to understand more about the practical opportunities.
- The prospect of customers investing time and resources to develop their DSR capability did not represent a barrier.
- Even if customers show a positive interest in the DSR concept there may be no scope to provide DSR, e.g. not a high enough demand at the site or load profiles that did not correlate with the load profile of the primary substation.
- The implementation of DSR from generation substitution is the most successful entry point for new I&C customers wishing to participate in DSR schemes.
- The lead times from making initial contact with a customer to finalising a DSR contract can range from 12 to 24 months.

I & C Winter 2013/14 DSR Trials - Plan

Geographical Customer Recruitment

- Reviewed substations operating or forecast to operate at >100% of firm capacity;
- Aggregators tasked with engaging customers with DSR potential in these areas;

Engagement

- Using aggregators
- Direct contact by DNO

Contractual changes

- Measurement of response:
 - Floor methodology
 - Average consumption over the previous 10 days

GUS Interface

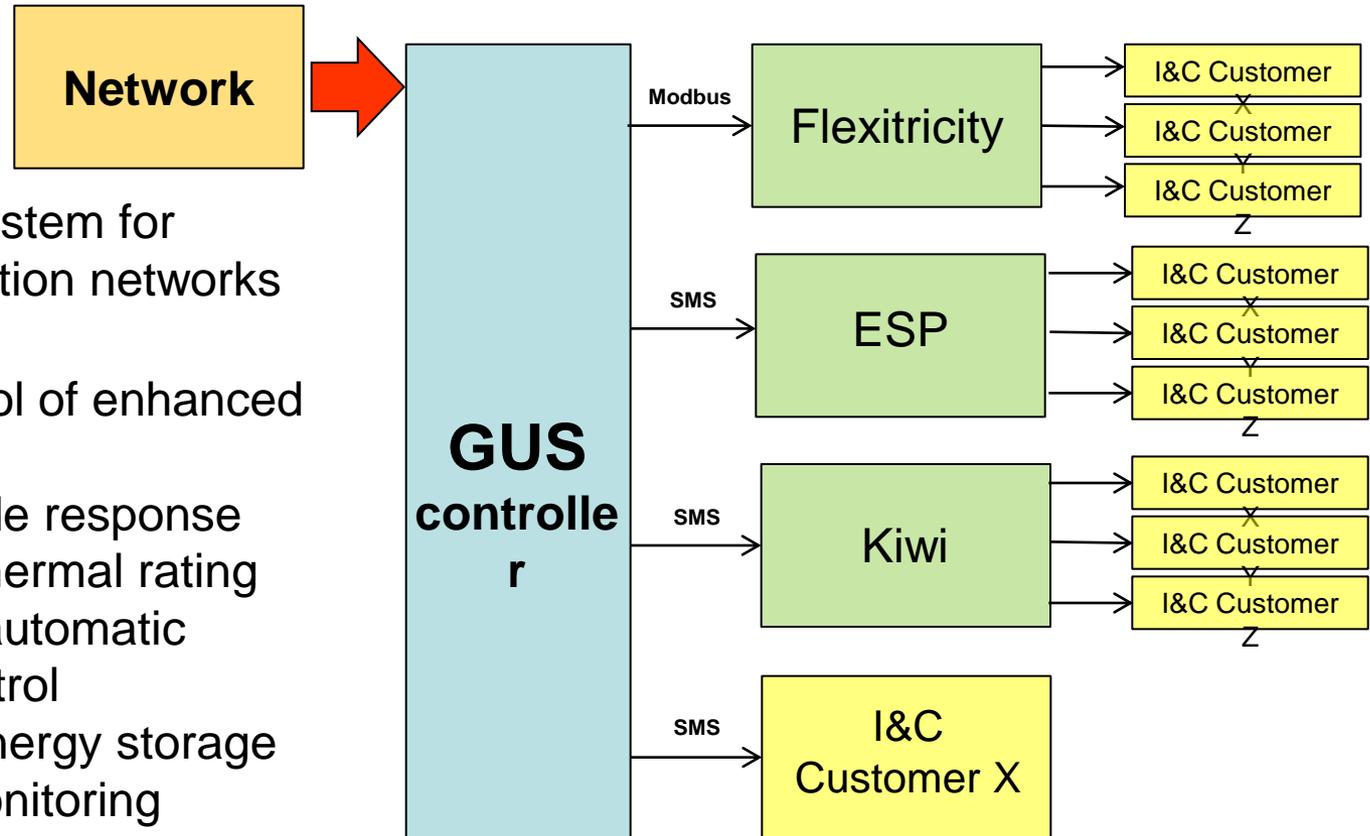
- Incorporate the I&C DSR contracts into GUS control system
- Work with the aggregators to interface with GUS



I & C Winter 2013/14 DSR Trials - GUS Interface

What is GUS ?

- Active control system for dynamic distribution networks
- Integrated control of enhanced network devices
 - Demand side response
 - Real time thermal rating
 - Enhanced automatic voltage control
 - Electrical energy storage
 - Network monitoring





UK Power Networks

ENA Smart Grid Forum: Workstream 6

Industrial & Commercial Customer Engagement



UTILITY OF THE YEAR





UK Power Networks – Demand Response Trials

Industrial & Commercial Customers



UTILITY OF THE YEAR



UK Power Networks – I&C DSR Trials

I&C DSR – Project Description

- ❖ *Low Carbon London set out to test the requirements, performance, and scale of opportunity of Industrial & Commercial demand side response...*
- ❖ *...In order to understand the potential for DSR to support:*
 - Distribution network constraint management
 - Capital programme efficiency (reinforcement deferral)

Contracted DSR (MW)	Trial Phases (~3 months each)	Interventions	Main business utilisations
2 MW 11.8 MW 2 MW 17.35 MW	Winter 2011/12 Summer 2012 Winter 2012/13 Summer 2013	circa 5 events per site per phase	LCL DSR utilised as a mitigation on a Primary system P2/6 derogation LCL DSR enrolled 'early' and held available during a network unplanned outage

UK Power Networks – I&C DSR Trials

I&C DSR – Trial & Contract Design

What were the key features of the commercial arrangements, including the size of the price signal and number of events?

❖ **Key DSR contract terms – developed from STOR framework:**

- Bilateral – DNO:Aggregator
- Key payment terms are:
 - Availability payments [£/MW/h]
 - Utilisation payments [£/MWh]
- Providers must be available throughout the ‘availability window’ and
- Able to respond to requests within 30 minutes

❖ **General DSR framework:**

- General contract terms set out in main body
- Annexes now contain most all ‘quantifications’ of service, e.g. contracted MW, response time, availability window, etc.

UK Power Networks – I&C DSR Trials

I&C DSR – Trial & Contract Design

What were the key features of the commercial arrangements, including the size of the price signal and number of events?

❖ **Pricing**

- Priced to compete with the annual value of a STOR contract
- Note the distortion this places on the availability/ utilisation rates

❖ **Key factors on overall contract value**

- Availability payment (total) grows rapidly with long windows, i.e.
 - Hours in the day
 - Days of the year
 - Contracted MW
- Number of events smaller percentage of contract value – though is a notable concern with most customers

UK Power Networks – I&C DSR Trials

I&C DSR – Trial & Contract Design

What were the key features of the commercial arrangements, including the size of the price signal and number of events?

❖ **Event selection:**

- Pre-fault selected on LCL primarily for trial purposes (guarantee events)
- Fast response (< 3 min) contracts also being tested for post-fault uses

❖ **Network Load Curve Analysis** – Examine historic load profile data for:

- Time of day and year
- Availability window (hours of the day & days of year)

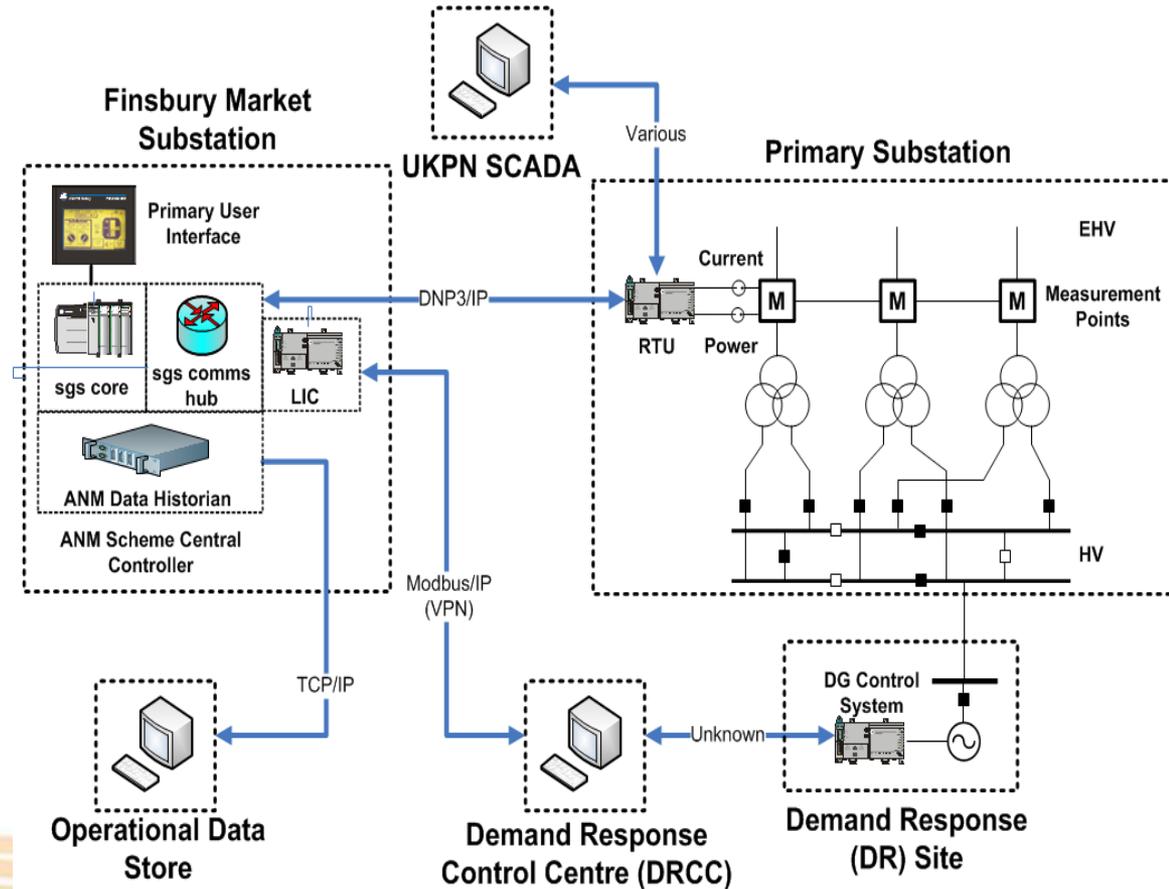
❖ **Dispatch:**

- Procedure and key responsibilities set out in contract
- Manual dispatch (phone call) from DNO to Aggregator control centre
- Follow-on trial established for auto-dispatch

UK Power Networks – I&C DSR Trials

I&C DSR – ANM Enabling DSR

- ❖ *Use of the active network management system to identify constraints and dispatch DSR in real-time*
- ❖ *Key step towards direct DG control - based on existing market structure (TSO DSR market)*



UK Power Networks – I&C DSR Trials

I&C DSR – Trial Description

What were your approaches to recruitment? What parties are involved in the recruitment, on-going engagement and operation of the arrangements?

❖ *Demand aggregators*

- Used initially with standing framework terms for DSR services
- Competitive environment within partner group

❖ *Additional aggregators later offered opportunity to participate as suppliers of DSR*

❖ *Procurement process:*

- Each trial phase carried specific terms for DSR services
- Services proposed by aggregators through submitting contract annexes
- Multiple trial phases conducted

UK Power Networks – I&C DSR Trials

I&C DSR – Trial Description

What were your approaches to recruitment? What parties are involved in the recruitment, on-going engagement and operation of the arrangements?

❖ ***Recruitment requirements and participation factors***

- Minimum of 300kW site or group demand required
- Maximum of 4MW contracted demand response per constrained substation – later introduced a 2MW limit on one site
- Weighted payment rates towards demand type, i.e. CHP & ‘building turn down’
- Sites connected at a specified network location

❖ ***Moving forward*** – are these requirements fit for on-going (ED1) use?

UK Power Networks – I&C DSR Trials

I&C DSR – Trial Description

What were your approaches to recruitment? What parties are involved in the recruitment, on-going engagement and operation of the arrangements?

❖ ***Acceptance process:***

- Base lining demand profiles (High 5 in 10)
- Successful performance assessed against baseline profile:
 - 90% of requested MWs delivered at 30 minutes
 - Operation maintained to above 95% average

❖ ***Settlement process:***

- End of period reconciliation completed
- Agreed process for declaring availability & un-availability

UK Power Networks – I&C DSR Trials

I&C DSR – Trial Description

How do you manage the uncertainty over activation of the DSR?

❖ ***Contractual terms:***

- No penalising terms placed in the contract other than reducing availability (and utilisation) payments in response to non-compliance
- Value is heavily weighted towards availability

❖ ***Set a maximum value for MW/ site accepted***

❖ ***LCL set out to test that uncertainty, specifically.***

- Are contract penalties required?
- Redundancy in number sites?
- Redundancy in number of MW?

UK Power Networks – I&C DSR Trials

I&C DSR – Trial Description

What is the learning on the uptake, customer reaction, changes in behaviour and network benefits?

- ❖ ***Enduring contracts essential for providing:***
 - Best customer proposition
 - Functional requirements and best value to the DNO
 - Though, conflict exists between ‘longer term’ contracts and duration of peak/constraint durations

- ❖ ***Pricing must be competitive*** though geographic requirements of DNO will limit supply and potentially increase costs

- ❖ ***Aggregation across an event window as well as across multiple sites will be required***, i.e. individual sites often cannot maintain response for the duration of a full constraint window.



Thank you



**UTILITY OF
THE YEAR**



DEVELOPING FUTURE POWER NETWORKS

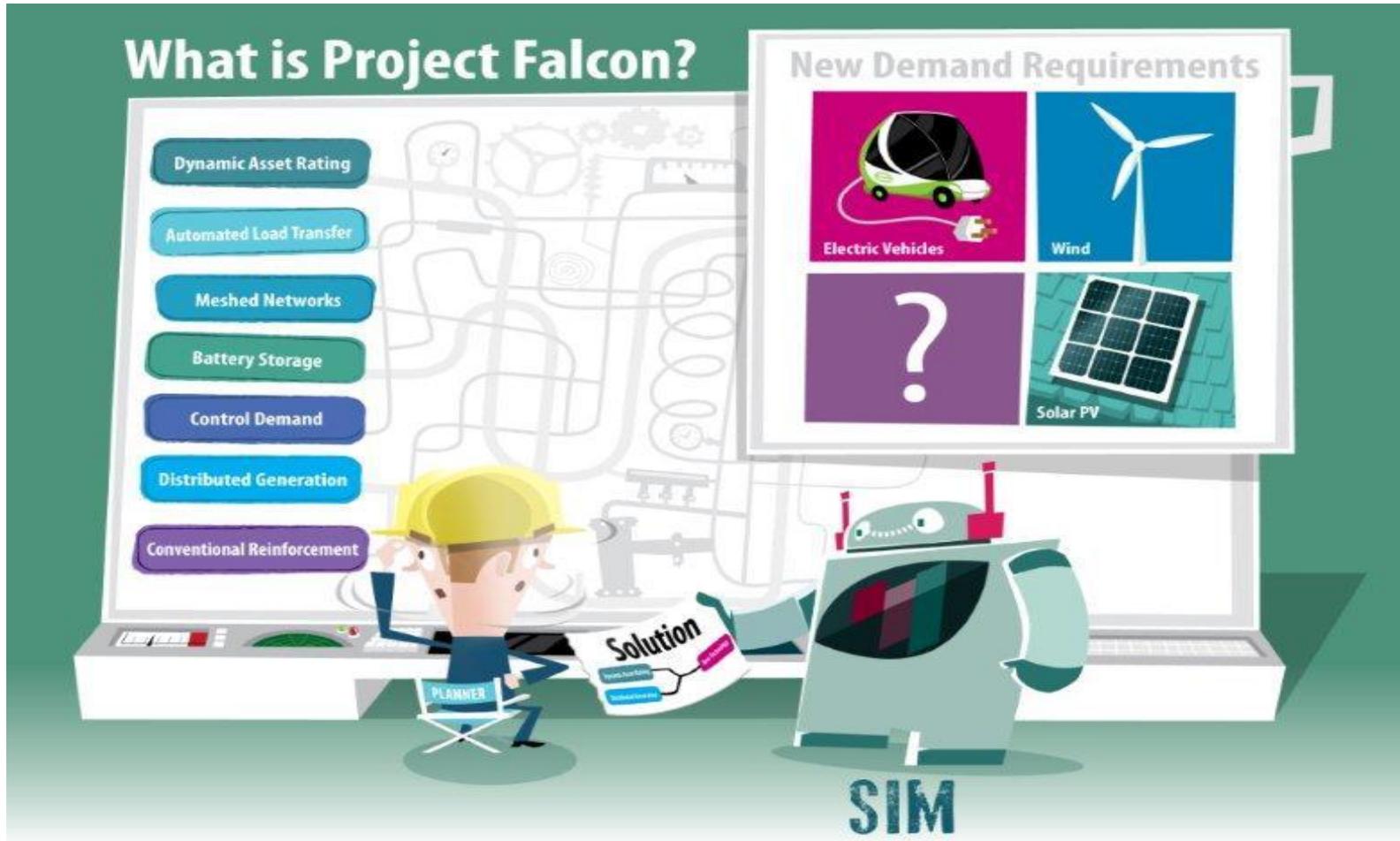
PROJECT FALCON
USING PRICE SIGNALS

OFGEM – 20th June 2013



PRESENTATION OUTLINE

- **Western Power Distribution and Project FALCON Overview**
 - **Why are we conducting commercial trials?**
 - **Approach taken: With Customers and Aggregators**
 - **The logistics: selecting sites and choosing data**
-

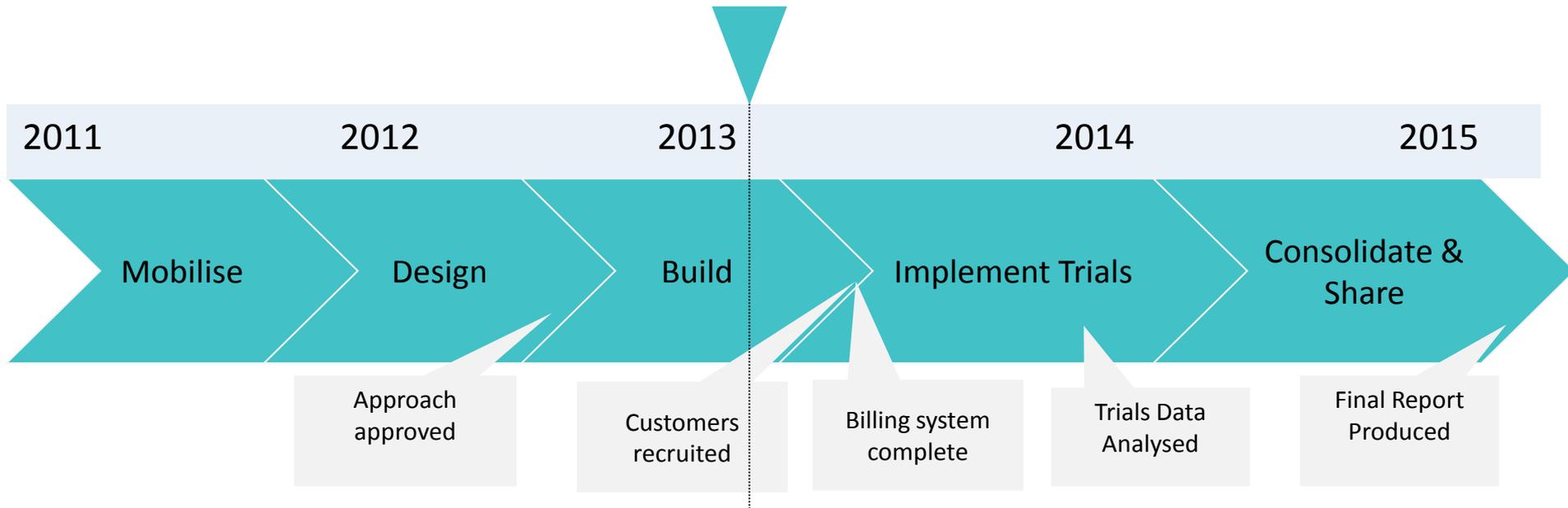


Flexible Approaches for Low Carbon Optimised Networks

Presentation Objectives

- Under what circumstances will response be triggered? Is it for network operation or supplier purposes?
 - What were the key features of the commercial arrangements, including the size of the price signal and number of events?
 - What were your approaches to recruitment?
 - What parties are involved in the recruitment, ongoing engagement and operation of the arrangements?
 - How do you manage the uncertainty over activation of the DSR?
 - What is the learning on the uptake, customer reaction, changes in behaviour and network benefits?
-

TIMESCALES - context for current learning and Project progress



COMMERCIAL TECHNIQUES

Arrangements with third parties connected on the network to change their behaviour to address network issues

Peak Lopping – pre-emptive and predictable arrangements

*this form of **DSM** is already common place within the Distribution Charging model in the form of variable time of use within DUoS*

Demand Response – reactive changes in behaviour

FALCON will be testing direct intervention methods by means of innovative commercial arrangements that award participants for positive behavioural responses in response to a signal from WPD's control centre.

COMMERCIAL TECHNIQUES

Load Reduction



Distributed Generation

Control of customer demand to increase capacity on the 11kV network through the use of innovative commercial arrangements

COMMERCIAL TECHNIQUES

Load Reduction

Distributed Generation



Control of distributed generation to increase capacity on the 11kV network using innovative commercial arrangements

ASSUMPTIONS

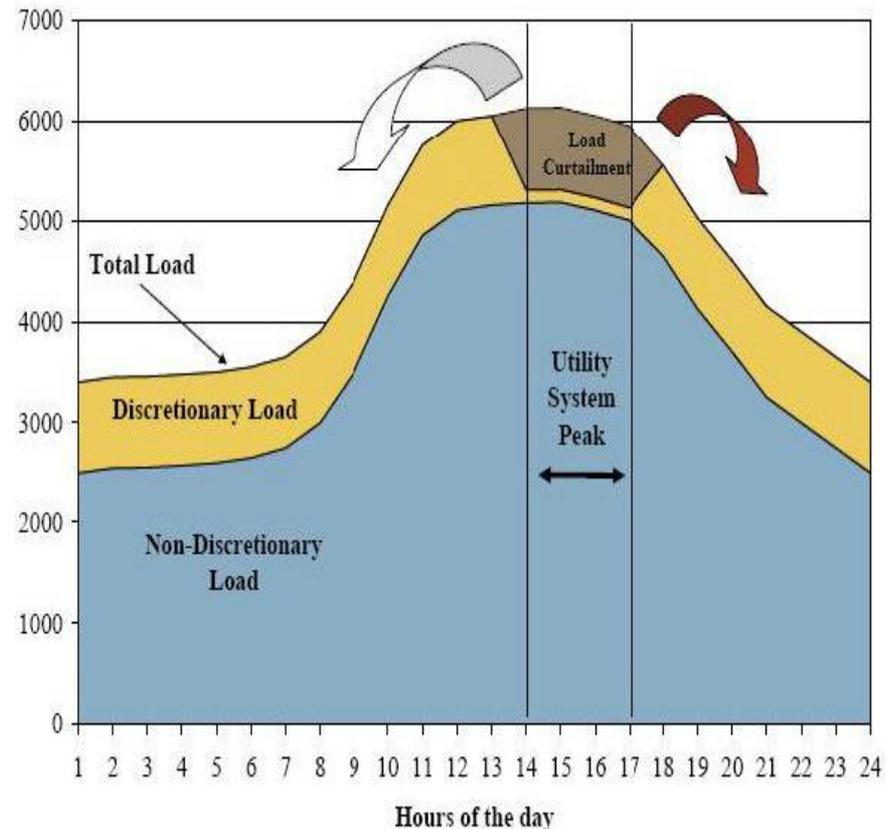
Occasional constraints

Winter season peaks

Short durations

Pre-Emergency

I&C users

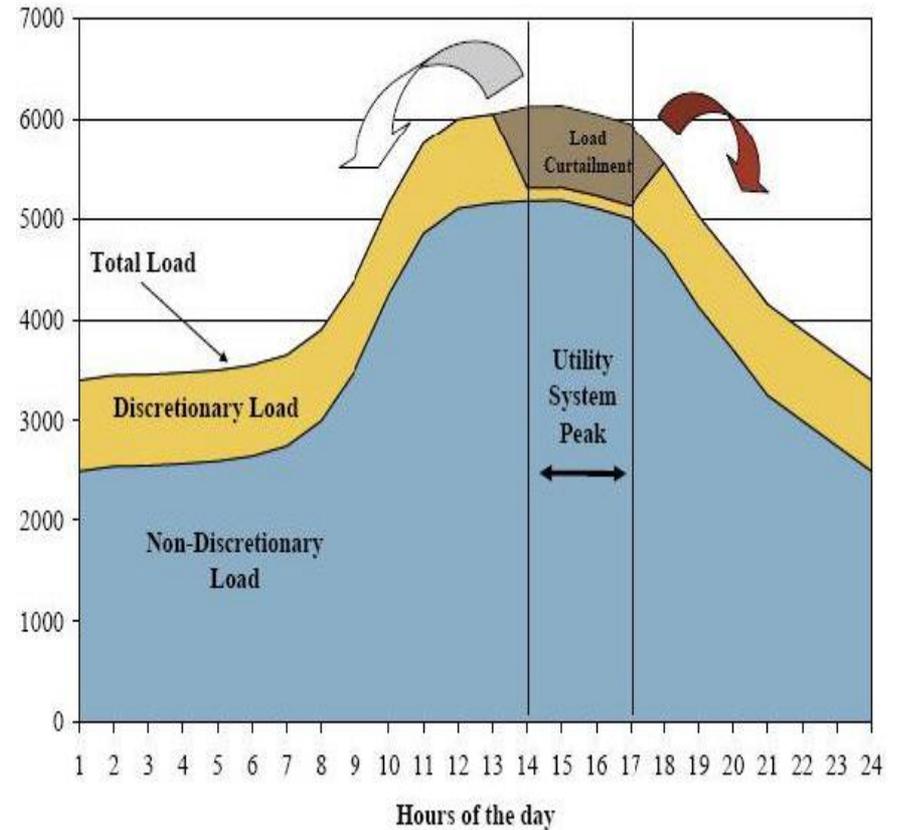


REQUIREMENTS

Suitable participants

Economic effectiveness

Reliability



REQUIREMENTS

Suitable participants

Economic effectiveness

Reliability

Systems, resources & Skills

Willing participants located specifically on the sub stations that are likely to incur constraints that can be managed by DR

REQUIREMENTS

Suitable participants

Economic effectiveness

Reliability

Systems, resources & Skills

- Adequate incentive to gain the participation of potential sites but still be more cost effective than traditional reinforcement.
- NG STOR model is unsuitable.
- Availability Payment does fit use type or economic model.
- Commercial / legal frameworks conflict with multiple access to competing programmes.

REQUIREMENTS

Suitable participants

Economic effectiveness

Reliability

Systems, resources & Skills

- Systems to dispatch and administer DR programme
- Participant behaviour
- DSM vs DSR
- Contracts & penalties

REQUIREMENTS

Suitable participants

Economic effectiveness

Reliability

Systems, resources & skills

- Open invitation to industry providers to participate in recruitment
- Benchmarking against direct EP acquisition
- Event operations directly & via third parties
- Back-office systems & contracts developed for DNOs

LEARNING

Geography



Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap

Broad geography adopted to get a wide engagement with users and identify general participation potential

Increased ability to test variety of site sizes & types

LEARNING

Geography

Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap

Building of new systems & processes for control room operation

Development of new back office administration and billing operation for the industry

LEARNING

Geography

Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap



Detailed data capture to assess real impact on network during and post demand response event

LEARNING

Geography

Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap

Post event attitudinal studies with participants to assess DR programme desirability and operational impact

Comparison between direct relationships with sites or via third party aggregators

LEARNING

Geography

Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap

Measurement of the cost of DR vs

- Traditional methods
- Alternative methods
- Participant expectations

LEARNING

Geography

Programme Operation

Network impact

Participants

Financial effectiveness

Skills Gap



Personnel and systems developments necessary to be able to implement DR as a BAU service within DNO business



Project FALCON
(Flexible Approaches for Low Carbon Optimised Networks)



Project FALCON

www.westernpowerinnovation.co.uk



FALCON is a project led by Western Power Distribution (WPD) and involves a number of partners. The project is being funded by energy regulator Ofgem under their Low Carbon Networks Fund, which tasks Distribution Network Operators (DNOs) like WPD to look at ways to provide security of supply at value for money as Great Britain moves to a low carbon future.



FALCON will test six alternatives to conventional network reinforcement methods, to see how they work in practice. It will also analyse their effectiveness in different situations, modelling their impact over many years. Ultimately, FALCON will provide guidance for network planners to select the best technique from a range of options. Four of these options are based around engineering approaches that will involve modifications to the network itself.



The remaining two options are Commercial Techniques, which focus on the energy consumption behaviour of businesses. Trials will be conducted with local businesses in the Milton Keynes area and will provide opportunities for participants to receive an incentive for changing their behaviour for a short period of time. This is commonly known as a Demand Side Response (DSR).

THE CHALLENGE

When electricity is produced at a power station it needs to travel through the National Grid TRANSMISSION system then on through the lower voltage DISTRIBUTION network to which the consumers are connected. As the Distribution Network Operator (DNO) for the Midlands, South West and Wales, it is Western Power Distribution's responsibility to ensure that the installed infrastructure meets the needs of homes and businesses.

benefiting from enhanced monitoring that is necessary to test the technical methods of intervention. This will allow Western Power Distribution to gain incredibly valuable information on the reliability of the service and detailed data on the network impact.

If successful it could not only improve the efficiency of the local network but also reduce CO2 and enable increased growth of renewable generation technologies.

If you are an industrial or commercial user located within the red boundary on the map below, you may be able to take part in this unique trial.

This means that the network is designed and maintained to cope with times of peak consumption, usually in the coldest days of Winter. This can lead to a huge expense and disruption, as more cables and transformers are laid. FALCON is testing smarter alternatives to reduce the need to do this.



THE SOLUTION

By communicating directly with users and paying them to either reduce their consumption or rely on an alternative such as emergency generators, FALCON will test the effectiveness of 'Demand Side Response'. The network area that has been selected for the trials does not currently suffer from overloading constraints. It will however be



For further information about project FALCON and the opportunity to discuss getting involved please contact
Sanna Atherton or **Gary Swandells**
satherto@westernpower.co.uk or ggswandells9@westernpower.co.uk

Workstream 6

Knowledge Sharing Event

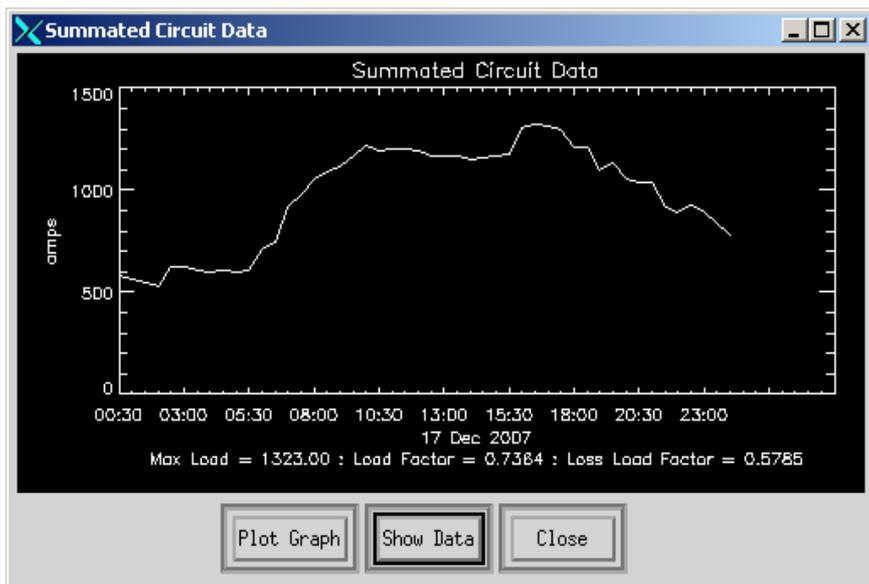
Thursday 20 June 2013

Simon Brooke

Low Carbon Projects Manager

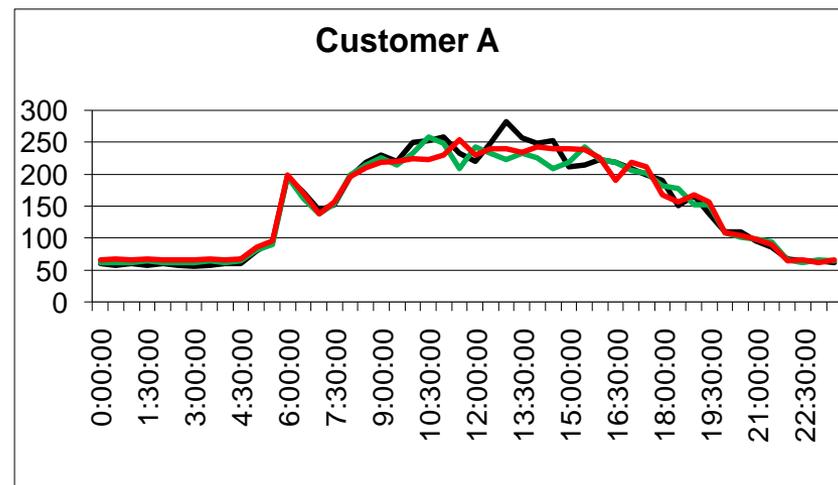


- Under what circumstances will response be triggered?
- What were the key features of the commercial arrangements?
- What were your approaches to recruitment?
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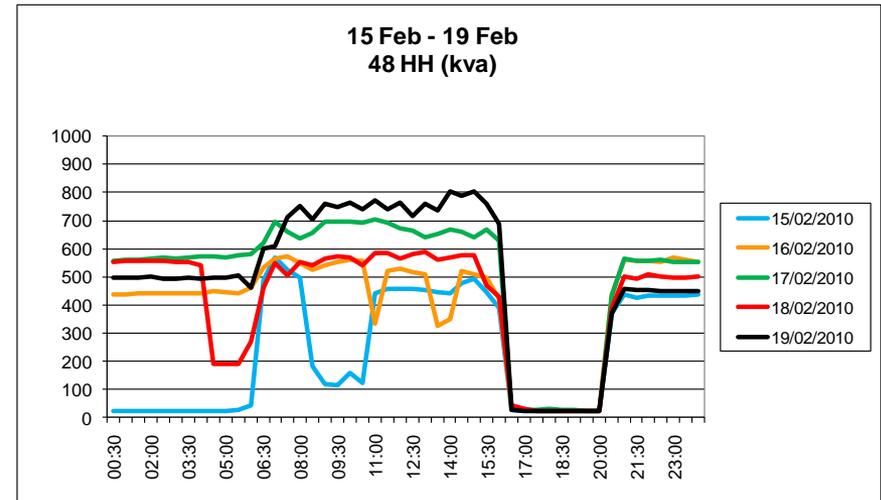
- Typical sub-station load peak between 16:30 & 18:30
- Identified areas suitable to trial demand-side response, working with customers with Maximum Capacity >400kVA

- Some large customers have significant load at these times
- Others already appeared to be actively reducing their demand or using generation between 16:00 and 19:00



2009/2010 Trial for winter reinforcement

- Single customer
- Very compliant to contractual signals
- Continues to operate in this manner due to red, amber and green signals in new distribution charges



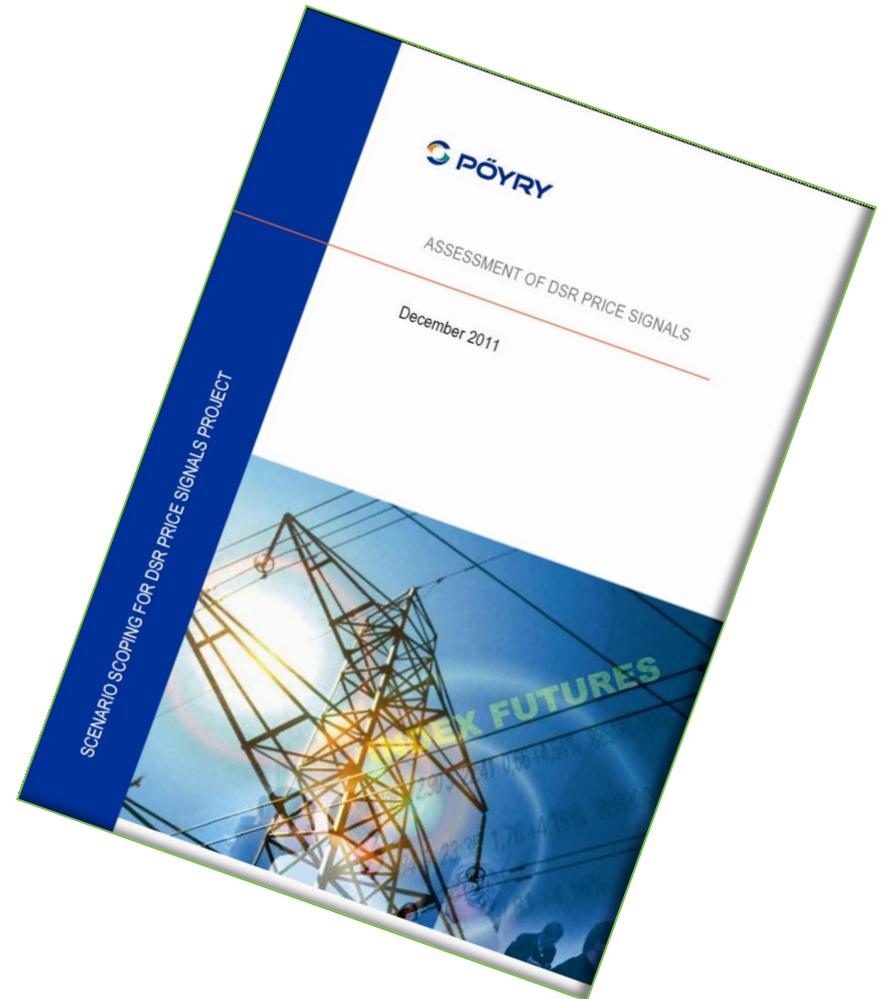
2010/11 Trial for summer reinforcement

- Customer with own generation provided response by increasing generation - very successful, demonstrating greater responsiveness than anticipated

Learnt that price point was too low for many customers

- Contracted with a leading aggregator and energy management specialist to offer customers package of demand side response and energy efficiency services
- Electricity North West request reduction in demand at certain times via aggregators state-of-the-art control room who schedule load for firms while minimising disruption to their businesses
- First location specific contracts of this kind in the country
- Early learning - price point is often too low for intrusion frequency and duration
- Contracts continue where customers have other drivers to participate

- Electricity North West and National Grid commissioned Pöyry to explore the implications for network companies of the different values ascribed to demand response by different procurers of DSR (ie National Grid, Suppliers and DNOs)
- Energy related price signals in general outweigh those of local networks related to network capacity. This, on its own, would tend to drive investment in network assets



Network capacity signals are amplified when there is network depletion. However frequency and duration of depletion varies across the voltage levels of the network

Figure 2 – Scale of value of DSR to the users across the scenarios, thus reflecting the rate payable to provider (1 = highest value, 4 = lowest value)

Scenario	DNO	TSO	Supplier
Shaving peak demand to avoid network investment			
Case A	4	-	-
Case B	3	1	2
Boost peak demand to accommodate wind and optimise prices			
Case C	3	2	1
Case D	3	2	2
Modify demand to accommodate low wind period			
Case E	-	3	1
Modify demand to compensate for a generation trip			
Case F	-	1	2
Case G	-	1	2
Modify demand to compensate for a transmission constraint			
Case H	-	1	-
Modify demand to compensate for a distribution network fault			
Case I	1	-	-
Modify demand to cope with volatile demand net wind profile			
Case J	-	1	2

Under network depletion conditions (faults or planned outages) it is possible that DNO price signals will be sufficient to drive customer or generator behaviour, although the market will need to be designed to allow this to operate

Capacity to Customers is innovative, low risk, maximises utilisation of the installed network capacity and has the potential to deliver the requirements of the low carbon economy

New Commercial Contracts



- To retain customers' security of supply we will utilise innovative demand side response contracts
- These contracts will allow ENWL to control the consumption of customers on a circuit at the time of fault

- Demand response to be provided by new connections customers and/ or existing customers
 - New connections customers avoid reinforcement costs with demand response capability
 - Existing customers receive ongoing demand response payments for demand response capability
- C₂C tests customers' willingness to enter into 'post-fault demand response' contracts across the range of high, medium and low fault rate HV circuits
- C₂C is providing useful customer behaviour data against the variables of price, frequency of call and payment mechanism
- **Initial findings demonstrate great interest and contract terms as important as price**

- Under what circumstances will response be triggered?
Constraint management (system normal) - static & dynamic
- What were the key features of the commercial arrangements?
PAYG and blend of availability and usage
- What were your approaches to recruitment? **General awareness campaign and DNO direct & aggregator approach**
- What parties are involved in the recruitment, ongoing engagement and operation of the arrangements? **Both DNO direct and aggregator approaches**
- How do you manage the uncertainty over activation of the DSR? **Penalties and over-purchase**
- What is the learning on the uptake, customer reaction, changes in behaviour and network benefits? **For system normal price point too low and intrusive for most customers**



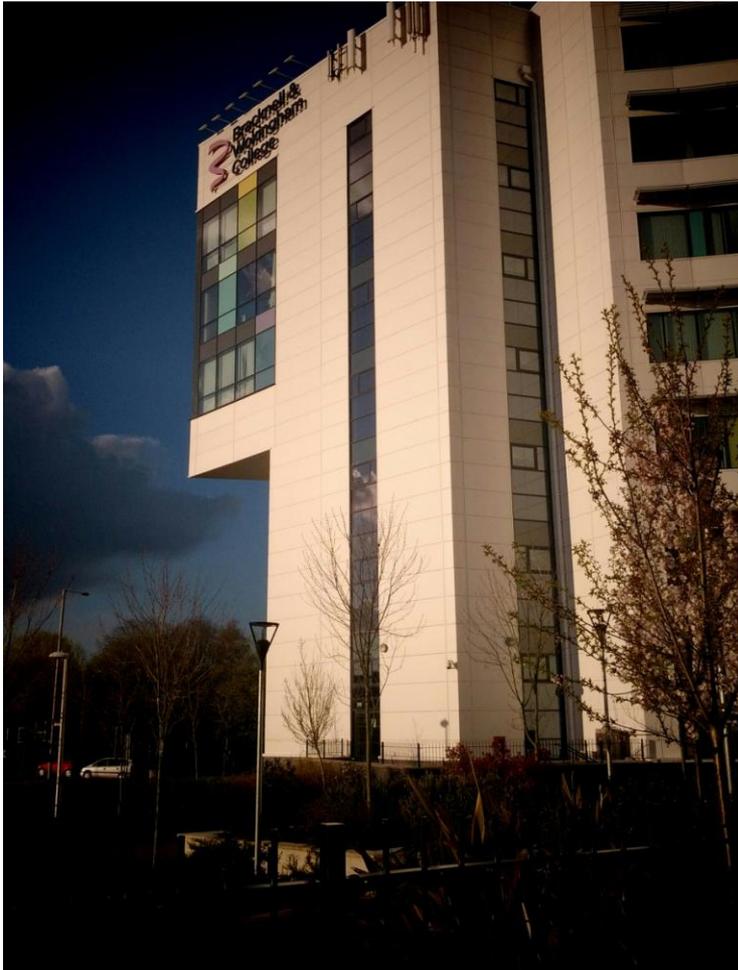
The Thames Valley Vision Project

Mark Stannard
TVV Customer Manager

Scott Petersen
European Business Development Director
Smart Grid Solutions

 **Scottish and Southern
Energy**
Power Distribution

Commercial DSR



- Target - 30 I & C Participants by Spring 2015
- 3rd Party Approach
- International Learning
- Incentives

SSEPD Engagement

- Consumer Consortium
 - 3 held since project start
 - 31% of Automated Demand Response (ADR) contacts came through consortium events and local bodies
 - TVCC events
- Focus Groups
 - 1 held since project start
 - Will be vital during the summer testing plan 2013
- Face to Face



Engaging Customers in Demand Response Programmes

Scott Petersen
European Business Development Director
Smart Grid Solutions

Honeywell

Agenda

- Honeywell Automated Demand Response Infrastructure
- Southern California Edison ADR learning points
- The role of Buildings in TVV
- Targeting Buildings for Participation
- Who's involved?
- Benefits
- The role of engagement
- Overcoming Hurdles
- Key Learning Points



Honeywell ADR Infrastructure

1. Utility Co.

- DR Programme design
- Customer liaison
- Event management

3. Software Setup & Hosting

- Programme setup
- Event Control & management
- Information reporting
- Security management
- Training



Honeywell

DR Automation Server (DRAS)

ADR Gateway
Compatible with 99+%
of BMS systems

↕ **OpenADR 2.0b**



2. Instrument & Connect Buildings

- Enrol buildings
- Site audit
- Load shed strategy design
- Load shed programming on BMS
- Install ADR Gateway device
- Commissioning & testing

Honeywell

Minute-by-minute telemetry

Apply learning from overseas to TVV project

- Face-to-face customer meetings
- Customer 'Town Hall' events
- Stands at Exhibitions & Seminars
- Conference speaking engagements
- Telemarketing
- Advertising
 - Online, e-newsletters, Trade Association emails, Trade Press
- Trade Association event speaking & networking
- Direct Mail shots



Apply varied Marketing Mix

SCE ADR programme – Outreach Activity Effectiveness

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Outreach Activity	Effectiveness
Customer 'Town Hall' events	<ul style="list-style-type: none">- Key to success is how it is advertised, and to which audience- Attendee often in the research stage- Good 6 months prior to programme start
Stands at Exhibitions & Seminars	<ul style="list-style-type: none">- Resulted in very few sales leads- Very reliant on attendee profile
Conference speaking engagements	<ul style="list-style-type: none">- Effective but requires networking after presentation- Reliant on attendee profile
Telemarketing	<ul style="list-style-type: none">- Not effective due to the complexity of qualifying a prospect for the ADR solution
Direct Mail	<ul style="list-style-type: none">- Not effective due to challenge of conveying a complex message effectively and were costly to produce
Advertising	<ul style="list-style-type: none">- Good at creating marketplace awareness for ADR, but result very few sales leads – cost effectiveness questionable
Trade Association event speaking & networking	<ul style="list-style-type: none">- Generated few leads as attendees at these events were either in research mode, wanting to learn about ADR or hearing about ADR for the first time
Face-to-face customer meetings	<ul style="list-style-type: none">- Due to the complex qualifying process, this was by far the most effective process

Apply results to TVV project ADR outreach plan

Using DR to strengthen reputation

A low-angle, upward-looking photograph of a building's exterior. The building has a blue, vertically-ribbed facade. Large, bright yellow, three-dimensional block letters are mounted on the wall, spelling out 'INKEEA'. The letters are highly stylized and cast shadows on the blue surface. The sky above is a pale blue with some light, wispy clouds. The perspective is from the bottom left, looking up and to the right.

The role of Buildings in TVV

Bracknell Primary Network Profile

- 84 I&C buildings with >200kW: 48MW potential peak capacity demand
- Top 30 buildings: 30MW (62%)
- 10.4MW unavailable
- 24 buildings in programme: 14.4MW (30%)
- Achieve at least 10% load reduction: 1.4MW

Progress to date

- 13 signed ADR agreements, 6 systems installed, 6 being installed & 30 organisations committed to participate
- 20-30 buildings connected by early summer'13

Prove the role buildings can take



ADR Event Results

- Commercial Office Building

- 265 kW normal building load on 18 Sep 2012
- 97 kW shed for 2 hours: 4pm – 6pm (36% reduction)
- Phased increase: 10%, 15%, 25%, 36%



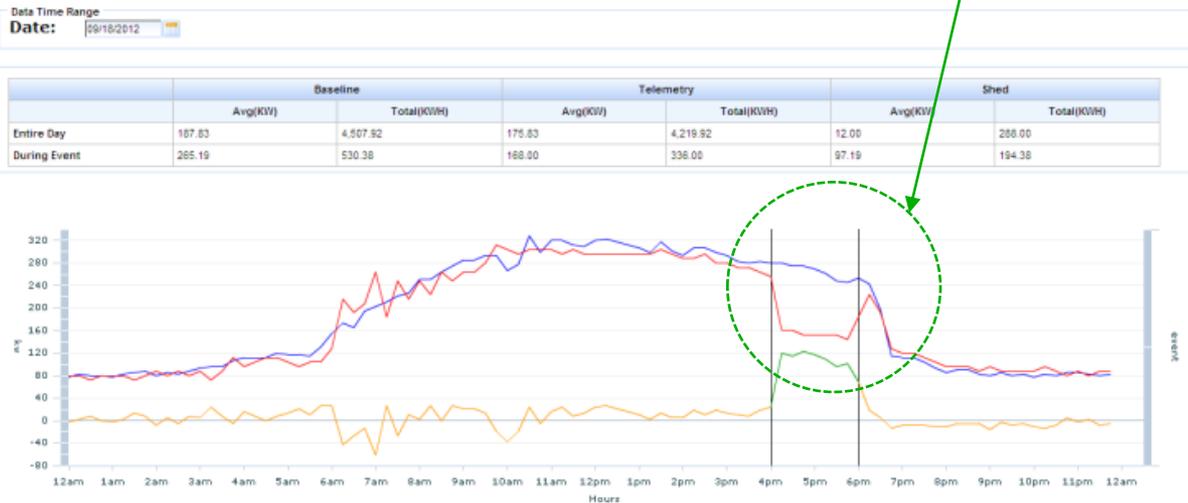
1100 kW reduction



120kw reduction



97 kW reduction



None of the occupants noticed!

Targeting Buildings for Participation

- Need to include mix of property type, age size & use
- Need to include the largest electricity users to provide largest impact
- Broad cross-section of building types
 - commercial, educational, public, leisure, hospitality, retail
- Which type of organisations will/won't join?
 - Large multi-nationals more likely than local businesses
 - Organisations with strong community involvement
 - Organisations with prior DR experience
 - Organisations with whom high CR credentials are important
- On what basis will they join and continue to participate?
 - No impact/low impact load shedding



Not every building will be suitable for participation

Major Organisations have joined the programme

Honeywell



Benefits for Participants

- Only DR programme where organisations join for *no payment* – *what's the value?*
- Be a 'good neighbour'
- Contribute to energy security in Bracknell
- Avoid local disruption
- Let project credentials wash across brand
- Participation strengthens green credentials eg BITC CR index
- Leverage project publicity
- Be part of a groundbreaking, first-in-Europe, Ofgem sponsored project



Platinum

Company Name	Industry Sector	Coverage	Year on Year
BAM Construct UK Ltd.	Construction & Materials	National	+
British Broadcasting Corporation	Media & Entertainment	Global	=
BSkyB	Media & Entertainment	National	Retained
Cappgemini UK pic	Accountants & Consultants	UK only	=
CSC	Support Services	UK only	+
Diageo Australia	Beverages	Australia	Retained
e2v technologies plc	Electronic & Electrical Equipment	Global	+
Elior UK*	Support Services	National	+
Ernst & Young LLP	Accountants & Consultants	UK only	Retained
ES&S Asset Management plc	Financial Services	Global	Retained
Fujitsu Services Ltd.	Software & Computer Services	UK only	+



Communicating 'Soft' benefits is key

TVV - The importance of engagement

- Early, ongoing engagement and communication with customers and communities is vital
- Customer engagement plan
- Town Hall meetings (with TVCoC)
- Focus Groups
- 'Your Energy Matters' – High St Advisory Centre
- Website
- Local Community events
 - The Mayor's annual civic reception
 - Local Pride of Bracknell Awards
- Demo for DECC
- Case Studies
- Press involvement
- Awards events
- Face-to-Face meetings
- Summer programme info packs



Underpinning active and ongoing participation in the DR programme

Overcoming Hurdles

Hurdle	Action to Overcome
DNO does not have data on end users	<ul style="list-style-type: none">• First action is to focus on gathering & confirming data to enable targeting
Need to obtain high recruitment success rate	<ul style="list-style-type: none">• Organisation profiling• Segmentation for targeting
Many buildings are not 'DR Ready'	<ul style="list-style-type: none">• Additional investment to access more load• Business case based decisions
Legal install & participation agreement required	<ul style="list-style-type: none">• Simplify Ts & Cs• Explain project to Legal up-front
Momentum can stall due to other priorities	<ul style="list-style-type: none">• Engage at senior level• Recruit internal champion• Keep informed and engaged

Identify & address Hurdles to Maintain Momentum

Key Learning So far

- Project resources focused early on organisation & building data gathering
- Segmentation for targeting is key
- Contact point must be senior decision maker
 - Locally or Internationally
 - Responsibility for Energy/CSR/Sustainability
- Fund equipment install – no cost to participate
- Project partners' buildings on programme to establish references & real event data
- Obtain internal sponsor to drive & sell participation internally & liaise within the organisation
- Leverage pre-established senior relationships
 - With existing customers to gain buy-in
 - To push decisions at individual building level
- Start small/no impact to minimise 'risk'
- Document all Learning Points on regular basis
- Financial payments would increase recruitment rates



WESTERN POWER **DISTRIBUTION**

Serving the Midlands, South West and Wales

I&C customers – DNO direct control **SoLa Bristol approach for offices and schools**

Work Stream 6 – Learning Event Part 2

Philip Bale

Western Power Distribution

Innovation and Low Carbon Networks Engineer

01332 827448

pbale@westernpower.co.uk

Agenda

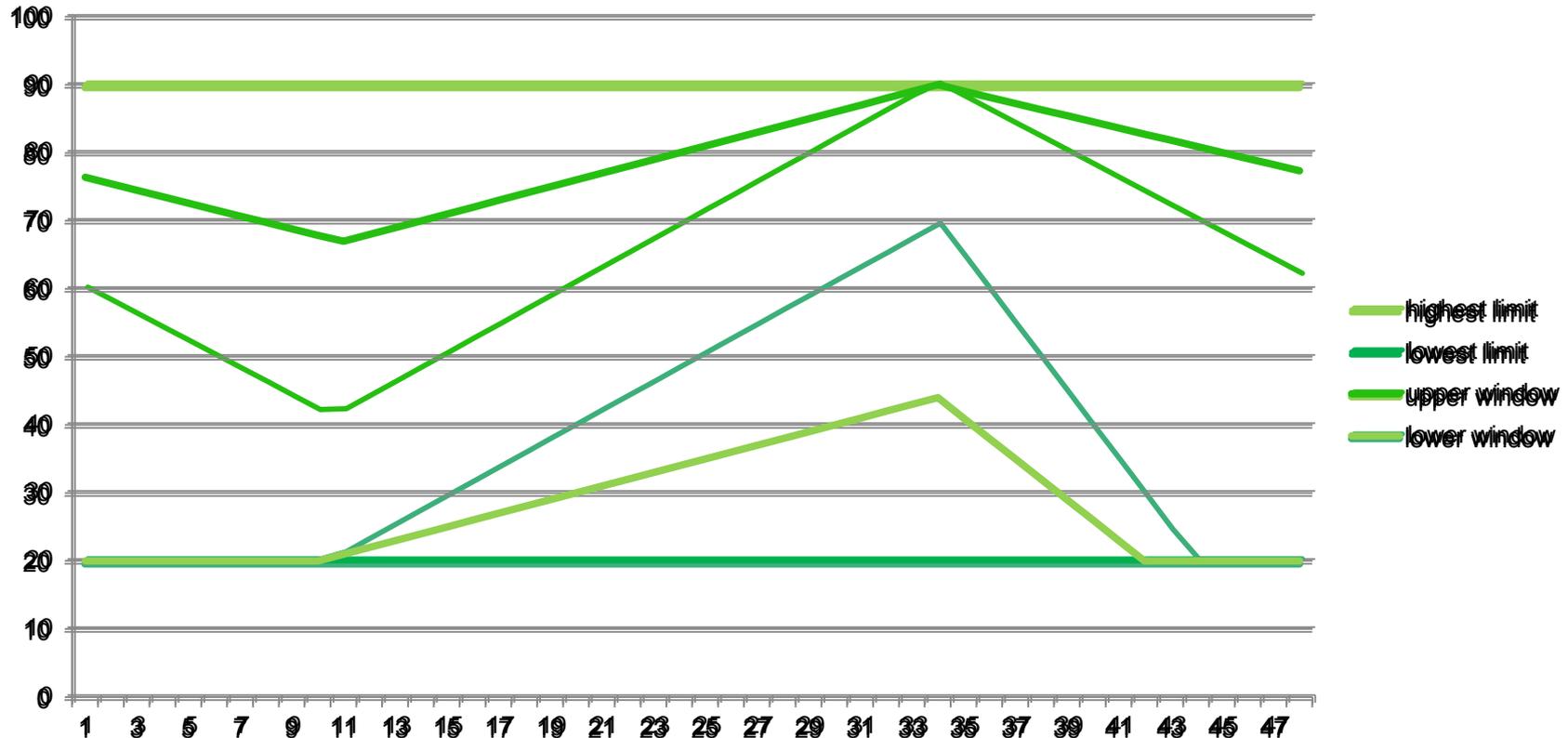
SoLa Bristol – LCNF Tier 2 project (Funded December 2011)

- a) Under what circumstances will load be controlled? Is it for network operation or supplier purposes?
- b) What were the key features of the commercial arrangements, including the size of the price signal and the number of events.
- c) What are the technical requirements for the proposition?
- d) What were your approaches to recruitment, and how did they differ for different I&C types?
- e) What parties are involved in the recruitment, on-going engagement and operation of the direct control?
- f) What is the learning on the uptake, customer reaction, changes in behaviour and network impact.

Under what circumstances will load be controlled? Is it for network operation or supplier purposes?

- Up to 19.2kWh battery storage designed for schools and offices office.
- Battery storage is optimised “automatically” to save ½ hourly metered customers money based on their demand and generation power flows.
- The batteries state of charge can be controlled for network operation purposes, both charging and discharging.
- Battery charging envelopes will only be used to support the Distribution network operation when required for both voltage & thermal restrictions.

Under what circumstances will load be controlled? Is it for network operation or supplier purposes?

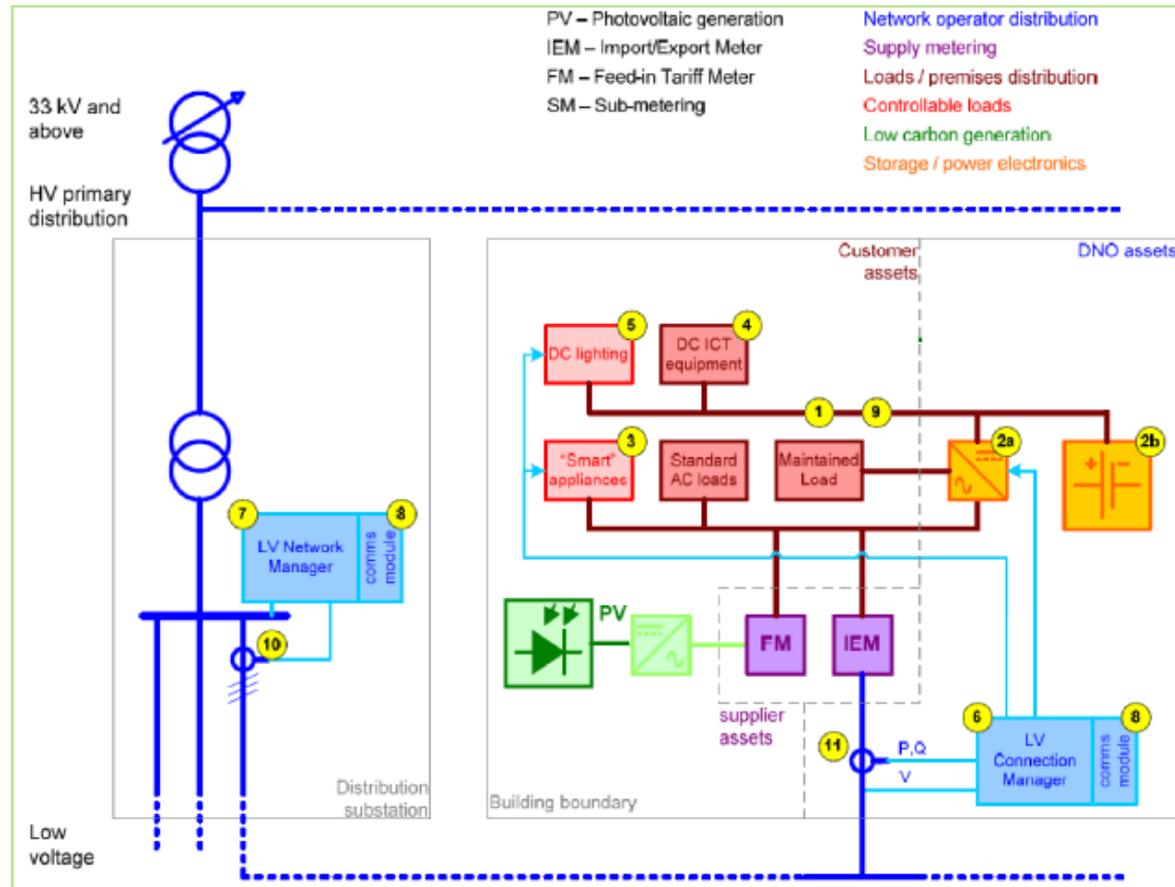


What were the key features of the commercial arrangements, including the size of the price signal and the number of events.

- Both schools and offices are seeking ways of better utilising their solar PV and reducing their energy bills
- The project is testing if battery storage can be shared with customers whilst reducing:
 - The impact of generation on the distribution network
 - The impact of demand on the distribution network
 - Customers bills
- The number of events is very dependent on each the local distribution network and the time of the year, the envelopes can be configured to each network.

What are the technical requirements for the proposition?

- Battery storage combined with solar PV
- System intelligence “LV Connection Manager”
- Substation intelligence “LV Network Manager”
- Communications between substations and I&C customers



What were your approaches to recruitment, and how did they differ for different I&C types?

- Bristol City Council approached their schools and office, registering interest in the project.
- The SoLa Bristol system was been offered to 27 schools and an office

What parties are involved in the recruitment, on-going engagement and operation of the direct control?

- Bristol City Council head up the I&C recruitment and on-going engagement. The system is operated automatically with a display detailing performance being provided to all buildings.

What is the learning on the uptake, customer reaction, changes in behaviour and network impact.

- Bristol City Council provide services to schools and their offices including electrical maintenance and IT support.
 - They have a very good understanding of their schools and offices needs and their future aims.
 - This information has helped to shape the project.
- Customers are keen to save energy, however sharing data and linking information to the curriculum is important.
- Space for installation of equipment will be limited and will make installations more difficult, we have prepared for equipment being installed outside.
- WPD is look forward to sharing the learning when customers are fully recruited and equipment is installed.

Workstream 6

Knowledge Sharing Event

Thursday 20 June 2013

Simon Brooke

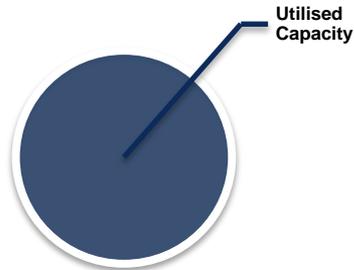
Low Carbon Projects Manager



- Under what circumstances will load be controlled?
- What were the key features of the commercial arrangements?
- What are the technical requirements for the proposition?
- What were your approaches to recruitment, and how did they differ for different I&C types?
- What parties are involved in the recruitment, ongoing engagement and operation of the direct control?
- What is the learning on the uptake, customer reaction, changes in behaviour and network impact?

Capacity to Customers

Total available network capacity



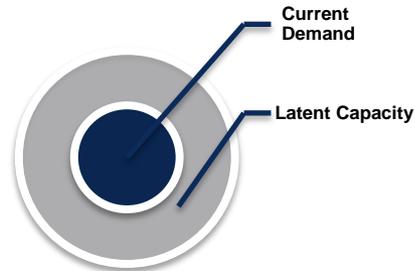
Combining proven technology and new commercial contracts

Allows us to release significant network capacity back to customers

Facilitating connection of new demand and generation without reinforcement

Technical innovation

Total available network capacity



Apply remote control equipment to the HV circuit and close the normal open point

Enhance network management software

This effectively doubles the available capacity of the circuit negating the need for traditional reinforcement

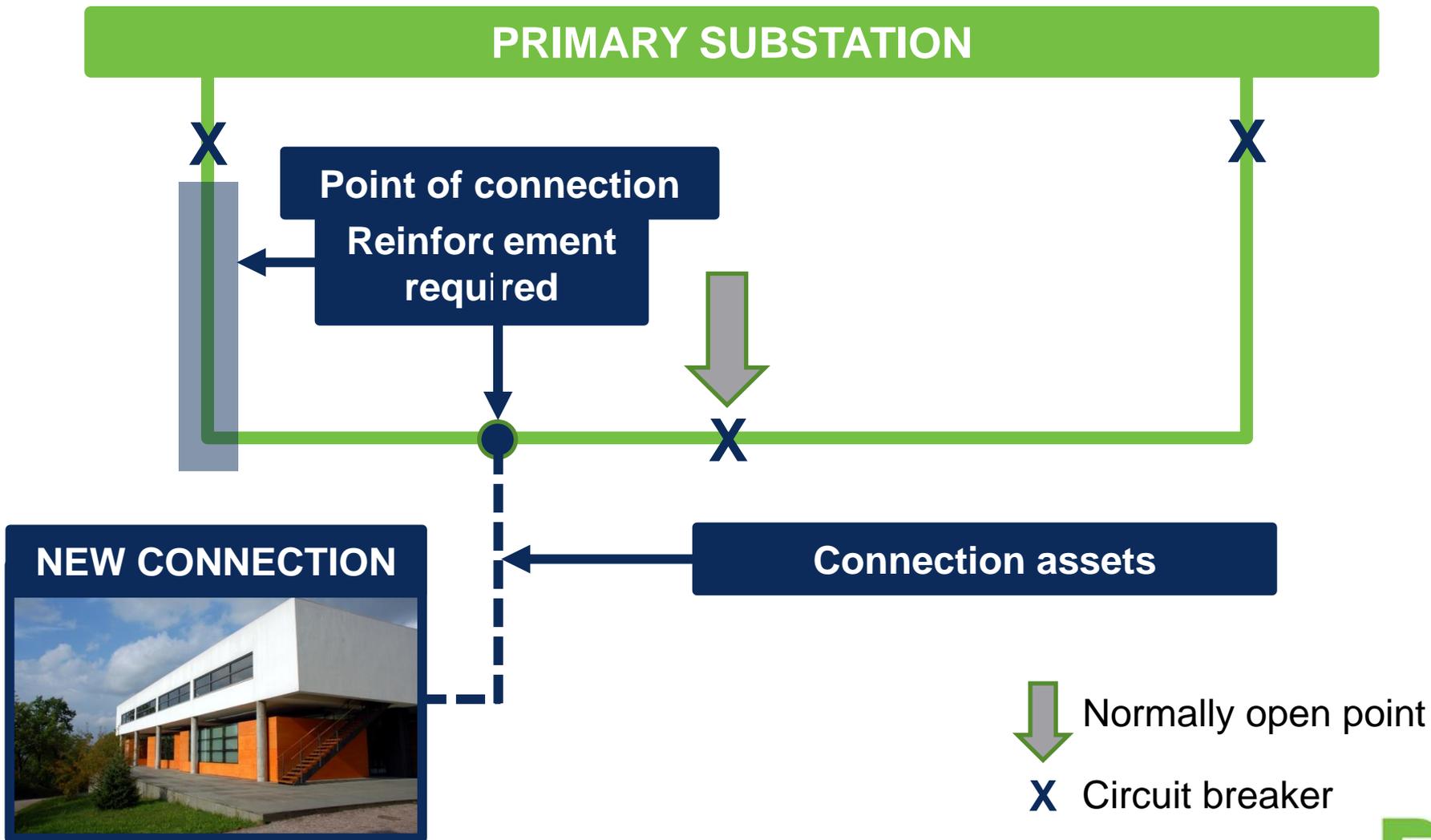
New commercial contracts



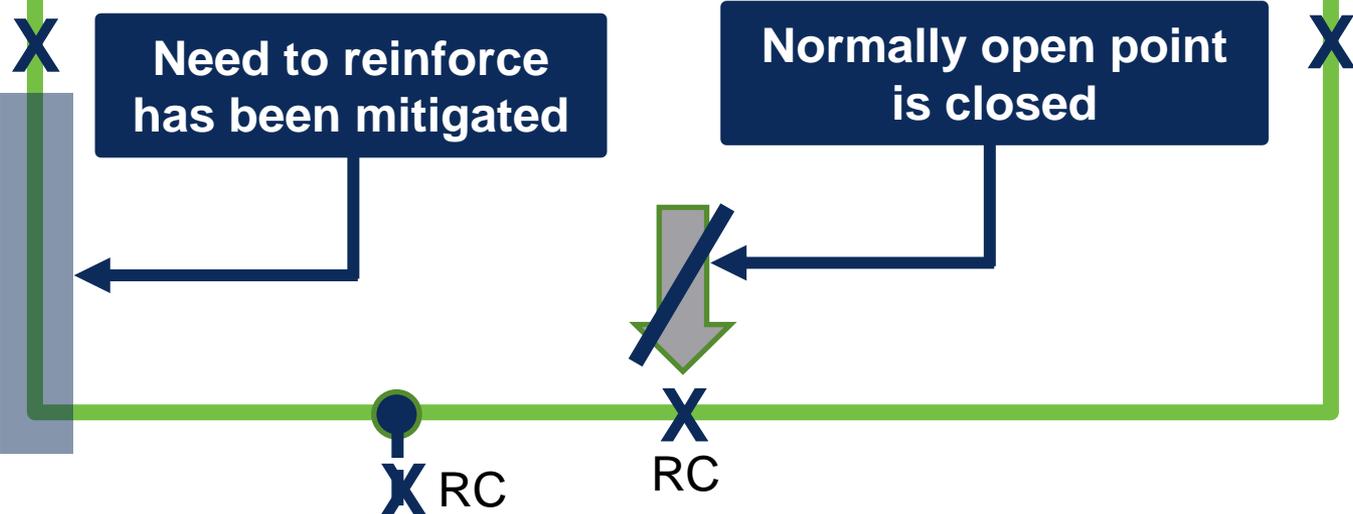
To retain customers' security of supply we will utilise innovative demand side response contracts

These contracts will allow us to control the consumption of customers on a circuit at the time of fault

Innovative, low risk and facilitates delivery of low carbon targets



PRIMARY SUBSTATION



- ↓ Normally open point
- X Circuit breaker
- RC Remote Control

PRIMARY SUBSTATION

New customers

Reduced charge for connecting to the network

Existing customers

A variable revenue stream dependent upon level of flexibility

For both new and existing customers an opportunity to participate in an innovative trial that will generate learning for the future operation of distribution networks

Three routes to customer

- DNO direct
- Trusted agent
finder's fee
- Aggregator represents
the customer

Contract arrangements

- Managed Supply
Agreement
(addendum to NTC)

<http://www.enwl.co.uk/c2c/about-c2c/key-documents>
- Aggregator bilateral
contract with the customer

- Under what circumstances will load be controlled? **When the network is depleted ie post fault**
- What were the key features of the commercial arrangements? **Addendum to NTC**
- What are the technical requirements for the proposition? **Direct remote control of incoming/ internal circuit breaker**
- What were your approaches to recruitment, and how did they differ for different I&C types? **Direct engagement**
- What parties are involved in the recruitment, ongoing engagement and operation of the direct control? **Supplier, aggregator and DNO direct approaches**
- What is the learning on the uptake, customer reaction, changes in behaviour and network impact? **Range of prices, positive engagement, three signed contracts**