Customer-Led Network Revolution

# SGF WS6

# Customer Engagement Workshop

## 4 June 2013

LCN Fund Low Carbon Networks

NORTHERN POWERGRID

British Gas

Durham University

ea technology

# Session 1: Static ToU Tariffs

| | Question |
|---|---|
| 1 | What were the design criteria and how were the tariff prices selected? |
| 2 | Does the tariff reflect network costs or whole system costs? |
| 3 | What were your approaches to recruitment, and how did they differ for different tariffs and customer types? |
| 4 | What was your approach to ongoing engagement? |
| 5 | What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter? |
| 6 | What is the learning on the uptake, customer reaction, changes in behaviour and network impact? |
| 7 | How does the interaction with customers differ when using existing tariffs vs newly designed tariffs? |

# 1a. What were the design criteria

How flexible are customers? What is the cost of that flexibility?

| | |
|---|---|
| **Learning must be relevant** | **Focus on interventions that are likely to be commercially viable in the future**<br>***What will the value to industry be? What will customers accept?*** |
| **Learning must be new and robust** | **Ensure test cell delivers new learning and is no larger or more complex than required**<br>***What can we learn from previous trials? What provides value for money?*** |
| **Recognise practical constraints** | **Not all tariffs which may be useful in the future can be trialled now**<br>***What customers do we have? What are the constraints of today's technology?*** |

# 1b. How were the tariff prices selected?

## Practical considerations taken into account in tariff design

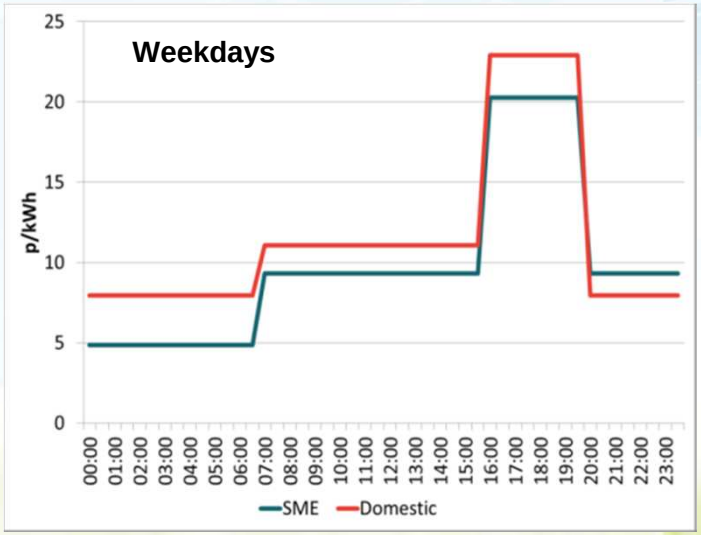
A cost-reflective tariff would vary by season

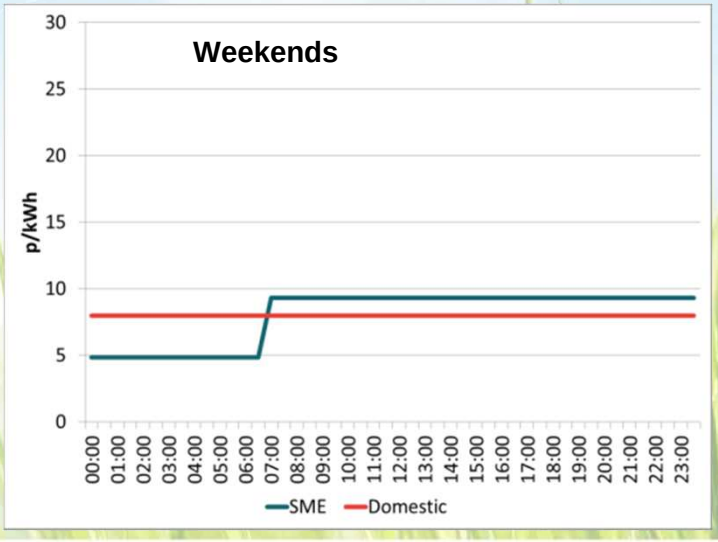
To reduce complexity for consumers, the tariff is kept constant across the year

An ‘evening shoulder’ on weekdays and two rates at weekends would be more likely to avoid risk of new peaks

Existing billing systems could not support a tariff with this structure for domestic consumers – this trial will test whether new peaks will result

| Period | Time | Rate vs. Standard |
|---|---|---|
| Day | 7am – 4pm | - 4% |
| Peak | 4pm – 8pm | +99% |
| Nights | 8pm – 7am | -31% |
| Weekend | Night Rate Applies | |
| | 16p Standing Charge p/d | |

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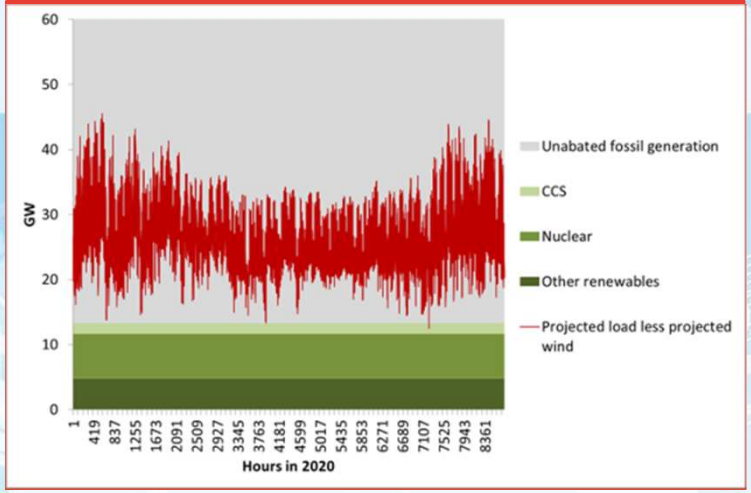
# 2. Time of use tariffs reflect whole system estimated 2020 costs (not just distribution network costs)

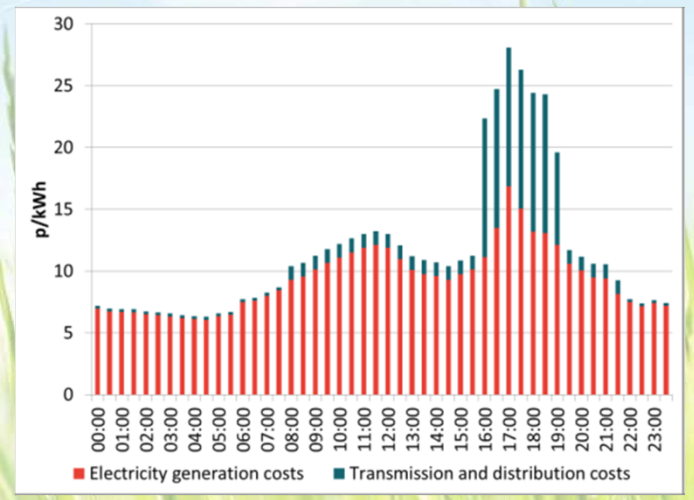
## Cost peaks expected to coincide with demand peaks




## But higher relativity between peak and off-peak tariffs

- Commodity prices (e.g. carbon and gas) expected to rise, increasing the difference between peak and off-peak generation costs
- Transmission costs per unit of peak demand expected to be higher

## The ToU tariffs are based on an estimated 2020 cost profile with a similar shape to today, but a higher differential between peak and off-peak periods (scaled back to reflect today's costs)

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# 3. What were your approaches to recruitment, and how did they differ for different tariffs and customer types?



**50,000+ Engaged**

**Recruitment Campaign** → **Phone/ f2f Consent** → **Welcome Pack** → **Smart meter/ DPI** → **Monitoring/ Intervention Equipment** → **Start of Trial Vouchers**

**Tariff Switch**

**Low Carbon Technology**

**Broadband/ GSM**

**12,000+ Monitored**

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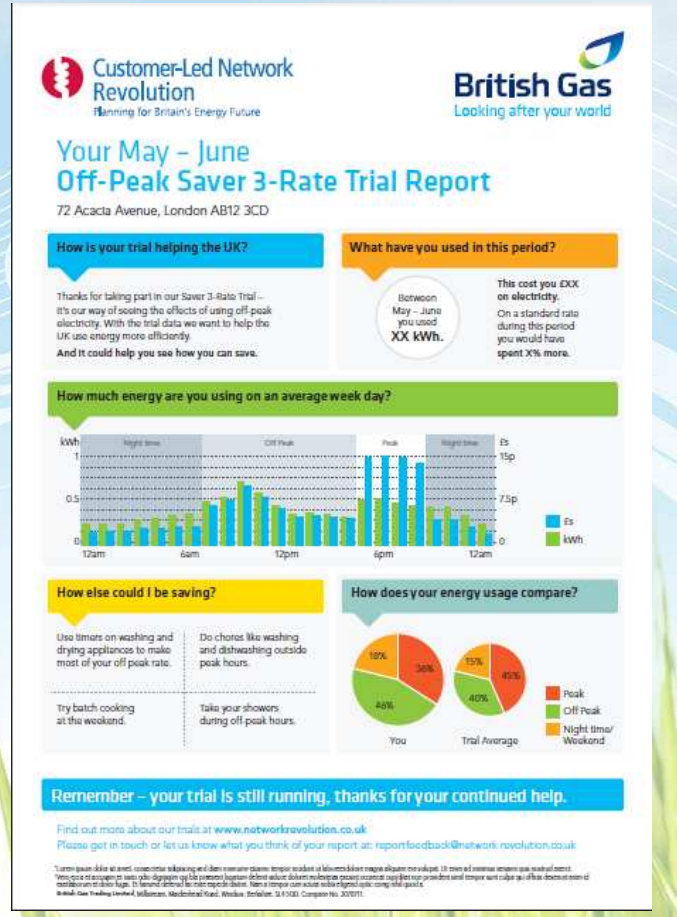
# 4. What was your approach to ongoing engagement?



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# 5. What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?

| | Time of Use | Restricted Hours/ Appliance Automation |
|---|---|---|
| **Tech** | • Smart Electricity Meter (SMETS)<br>• In home display (IHD)<br>• Headend System (HES)<br>• Smart Meter Repository/ Data store<br>• Capable Billing System | • As per Time of Use +:<br>• Neura NANO Smart Heat Pump<br>• Gledhill 300l Thermal Store<br>• Hotpoint AQUALTIS Smart Washing Machine<br>• GreenCom Smart Grid Platform<br>• Home Area Network hub |
| **Smart Capability** | • Support for multiple register tariffs<br>• Remote configuration<br>• Ability to switch between multiple registers within 24hrs<br>• Send 1/2hr and daily readings to HES<br>• Industry settlement configuration for multiple registers | • As per Time of Use<br>• Automated 'turn down cycling' capability for smart heat pump during peak periods<br>• Automated scheduling capability for smart washing machine to avoid peak periods<br>• Remote appliance configuration<br>• Customer Override |
| **Comms** | • SMS via smart meter | • SMS via smart meter<br>• Smart Washing Machine display<br>• Broadband/ GSM hub<br>• SMS via Smart Grid Platform<br>• Zigbee Home Area Network |

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

Lower than expected Opt-Outs

**<1%** on our Control Trial


Direct Marketing Success

**8%** response rate for Time of Use

Time of Use Trial Oversubscribed

**600+** still remain

Smart Meters an incentive for customers

Smart Eligible recruitment rates **11%** higher than Existing

Saving Money through behaviour change

Overwhelming reason for sign up

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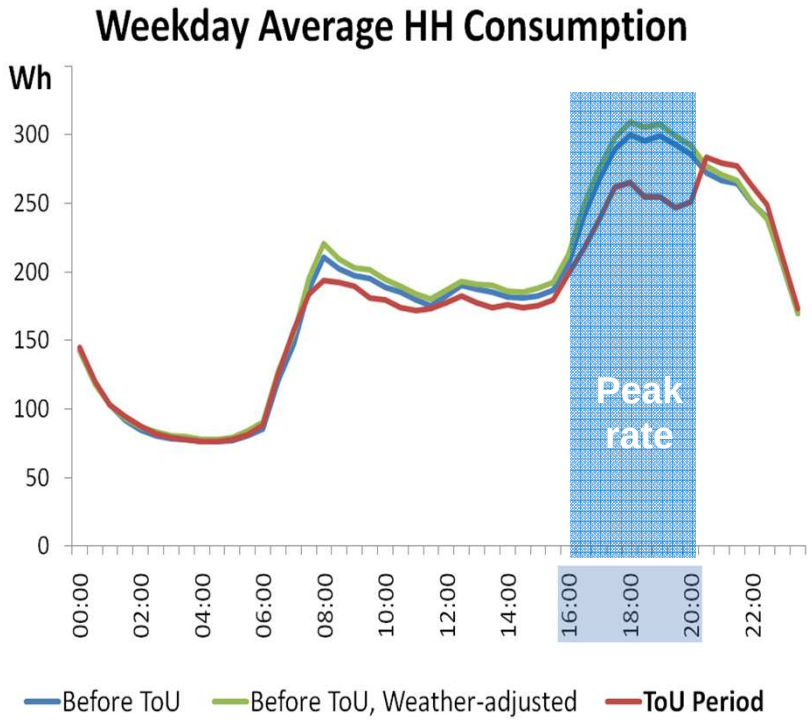
# 6. What is the learning on the uptake, customer reaction, changes in behaviour and network impact?




A preliminary analysis of 112 customers with an average of 6 months on the ToU tariff

Customers are using less during peak

Average **14%** reduction

Customers are using less not just shifting it

**71%** customers have slightly lower bills

On average **2.5%** lower

Highest users saved the most, **£20**

Behaviour is consistent over 6 months

Reduced consumption at weekends

Despite no price incentive

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# 7. How does the interaction with customers differ when using existing tariffs vs newly designed tariffs?

Customer education is required for Time of Use

- Clear and simple explanation of how the tariff works provided over the phone
- Greater detail put into welcome pack and tariff documentation
- Tariff becomes a lifestyle decision

Significant technical and on-site support required for new smart heating technologies

New skills required from engineers to manage communications set up and troubleshooting

# UK Power Networks

## ENA Smart Grid Forum: Workstream 6

## Residential Customer Engagement

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# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Trial

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# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff – Trial Description

- ***Low Carbon London set out to test whether tariff pricing signals can influence residential electric vehicle charging behaviour…***

- ***…In order to understand the potential use of ToU tariffs to:***
  - Manage the increase of demand on the network from EVs
  - Notably the evening 'arrive home and plug-in' EV demand peak

| ToU Sample | Control | Tariff structure | Design | Trial period |
|---|---|---|---|---|
| 10 residential EV owners | 45 residential EV owners (standard tariff) | Static:<br>Evening & off-peak low pricing | Existing supplier product – whole price driven | Recruitment:<br>Q4, 2012<br>Data collection:<br>Q1 – Q4, 2013 |

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff - Design Features

*What were the design criteria and how were the tariff prices selected?*

- ***Pre-existing EDFE static ToU tariff used – Eco20:20***

- ***Tariff structure:***
  - 20% reduction in tariff price in ‘off-peak’ times, defined as:
  - Between 9pm and 7am on weekdays, and weekends

- ***Strategy criteria:***
  - Meets the peak-reduction requirements of the DNO
  - Single-supplier requirement for a recruitment pool to keep a consistent tariff for test
  - Limited recruitment potential meeting all trial requirements (location, EV owner, single supplier, opt-in success)

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff - Design Features

*Does the tariff reflect network costs or whole system costs?*

- ***Tariff reflects the (supplier) whole system costs***

- ***The design:***
  - Completed by the supplier (pre-LCL) and thus is driven by wholesale energy cost

- ***Some considerations for future supplier-led ToU designs***
  - Residential DUoS is currently constant day-to-day and within day and thus static ToU is not currently incentivised
  - However, the synergy between wholesale electricity cost and network demand peaks already has indirectly incentivised this, i.e. Eco20:20 structure

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff - Design Features

*What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?*

- ***EV static ToU participants provided with EV sub-meter for research and analysis purposes***

- ***Smart fiscal meters were not installed –*** standard two-rate meters were preserved

- ***Smart meter functionality:***
  - Surpasses the minimum requirements of static ToU tariffs (billing) but required for advanced engagement with customers around a static ToU tariff
  - Does not provide for full 'device level' tariff, i.e. discriminating between EV and/or HP demand and aggregate site level consumption

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff – Engagement Strategy

*What were your approaches to recruitment, and how did they differ for different tariffs and customer types?*

- ***The trial recruitment strategy included:***
  - Contacting recruitment pool of existing Eco20:20 tariff customers
  - Opt-in recruitment materials designed jointly by UKPN and EDFE
  - Offer of free charge point installation or upgrade with participation
  - Direct recruitment completed by EDFE:
    - two phases of written letter communications

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff – Engagement Strategy

*How does the interaction with customers differ when using existing tariffs vs. newly designed tariffs?*

- ***Propositions substantively different –*** tariff contract vs. monitoring & data sharing agreement
- ***Notwithstanding, execution actually very similar,*** i.e. confirm acceptance of terms, arrange device installation, etc.

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff – Engagement Strategy

*What was your approach to on-going engagement?*

- ***Tariff billing and fiscal meter management and inquiries continue to be handled by supplier –*** business as usual function for an existing tariff product

- ***Provision of EV consumption data and trial inquiry handling handled jointly by UKPN –*** contact details provided in recruitment materials and/or by EDFE when requested

- ***Participant survey has been designed and will be issued to the participants to collect:***
  - Additional comments and feedback
  - Profile information useful for trial analysis

# UK Power Networks – Static Time of Use Tariffs

## Static EV ToU Tariff - (Early) Lessons Learnt

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

- ***Opt-in recruitment success: 10/23 - > 43% uptake***

- ***Next steps:***
  - Issue surveys gauge vehicle usage, impact of tariffs, and customer attitudes
  - Analyse profiles against non-ToU and consider qualitative feedback on charging behaviour
  - Usage characteristics compared to passive EV sample

- ***Full trial period data required for both samples before impacts can be discussed***

# Thank you

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## ENA Smart Grid Forum: Workstream 6

## Residential Customer Engagement

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# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Trial

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# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff – Trial Description

- ***Low Carbon London set out to test residential demand flexibility through tariff pricing signals…***

- ***…In order to understand the potential for a dynamic ToU tariff to support:***
  - Distribution network constraint management
  - Demand wind-twinning behaviour

| ToU Sample | Control | Tariff structure | Design | Trial period |
|---|---|---|---|---|
| 1,119 residential smart metering customers | Up to 4,696 LCL smart metering participants (standard tariff) | Dynamic tariff:<br>• Three rate (HI,MED,LO)<br>• Day-to-day and within day price changes<br>• Day-ahead notification | New tariff product – DNO & wind-twinning design focus | Recruitment: Q4, 2012<br>Data collection: Q1 – Q4, 2013 |

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

What were the design criteria and how were the tariff prices selected?

- ***Needed to select high, medium, and low price points***
- ***Primary objective was to enable customers to benefit from a £100 per annum bill reduction*** without a corresponding reduction in total energy consumption
- ***A second core requirement was setting the tariff to be cost neutral -*** Customers would see no net (annual) change if their behaviour did not change – however, month to month totals could still show penalties to the customers depending on the months interventions
- ***Supplier pricing modelling was used to assess price point sets -*** Worth noting that the key inputs were the intervention set and existing residential load profiles

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

What were the design criteria and how were the tariff prices selected?

- ***High price point – 67.20 p/kWh -*** DNO events designed to represent 'critical peak pricing so significant disincentive required from high point
- ***Low price point – 3.99 p/kWh -*** minimum value targeted to incentivise flexibility, but bound to not providing 'free' electricity
- ***Medium price point – 11.76 p/kWh -*** key design function of maintaining overall cost neutrality and enhancing tariff attractiveness by sitting lower than industry average
- ***These prices provide the incentive of saving 'about £1 per 2 kWh moved from high to low periods'***

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

*Does the tariff reflect network costs or whole system costs?*

- ***Both, intervention design was completed to test flexibility in response to wind-twinning and network constraint management***
- ***Notification Period –*** minimum 24 hours (08:00 the day prior to an event)
- ***Frequency –*** no more than 3 events per week, 150 annual total, balancing customer needs with DSR requirements

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

*Does the tariff reflect network costs or whole system costs?*

- ***Event timings and sequences (duration, time of day of occurrence):***
  - ***Wind-twinning events*** defined by analysis of historic wind output
    - 3, 6, 12, 24 hour durations, high and low prices, random times
  - ***Network-driven events*** defined by network peak profiles, residential demand profiles, and likely primary system outage durations
    - 9 variations of low-high price sequences, occurring in sets of 1 – 3 repetitions

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?

- ***For the dynamic ToU tariff, key functional requirements for the fiscal smart meter were:***
  - Maintain multiple registers for different price bands
  - Display the current price band
  - Display the current rate of consumption
    - ‘Traffic light’ system of red/amber/green indicates current rate of power consumption
  - Display notifications of upcoming tariff change events
    - Blue ‘message light’ flashes and a audible alert is issued
    - IHD can then be interrogated for a text message describing the up-coming tariff event

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff - Design Features

What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?

- ***Whilst the tariff has been fully developed and implemented at a large scale with existing smart meters, some areas of limitation due to smart meter (IHD) functionality are:***
  - Additional confidence required in the meter communications performance than standard smart metering customers
  - Message system insufficient (80 character limit, single message retention)
  - Traffic light for real-time consumption a positive
  - No traffic light system for current tariff banding is a significant negative
  - Hard-wired power supply for IHD detrimental to device exploration
  - No easy customer access to ‘raw’ data

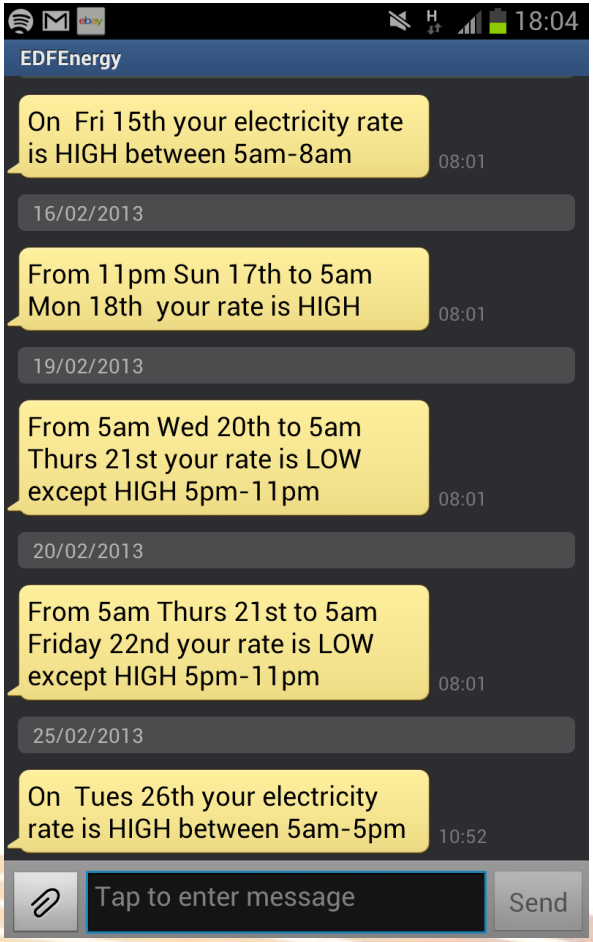
# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff – Design Features

- ***Tariff customers can opt-in to SMS alerts in addition to IHD messaging***

- ***NB:***
- The impact of the meter IHD character limit on message wording

- This historic and day-ahead view of events is not possible on the meter IHD




# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff – Engagement Strategy

What were your approaches to recruitment, and how did they differ for different tariffs and customer types?

- ***The trial recruitment strategy included:***
  - Contacting recruitment pool of existing LCL smart meter customers, with some exclusions of prospects to maintain quality of sample
  - Opt-in recruitment materials designed jointly by UKPN and EDFE
  - Direct recruitment completed by EDFE:
    - First phase of written letter communications
    - Concentrated phase of recruitment phone calls
    - UKPN, ICL, and EDFE worked closely with twice weekly reviews of strategy, exclusions, and progress
  - Participation incentives paid - £100 joining reward, £50 completion reward will be paid at the end of the trial

# UK Power Networks – Dynamic Time of Use Tariffs

## Dynamic ToU Tariff – Engagement Strategy

How does the interaction with customers differ when using existing tariffs vs. newly designed tariffs?

- ***Recruitment campaign operated to maintain continuity with offers of existing tariffs –*** EDFE Call Centre staff and procedures

- ***Key differences:***
  - Recruitment campaign focussed on balancing the trial sample
  - Concept of variable pricing straight forward, but explanation of dynamic price and signalling process required
  - Short, trial nature of product creates a barrier (short duration of offer vs. price fixing tariffs)
  - Short recruitment window impacts recruitment potential

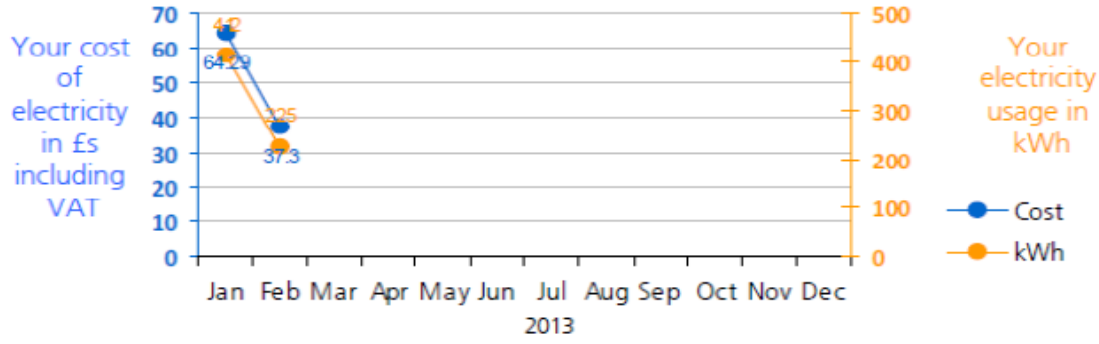
# UK Power Networks – Dynamic Time of Use Tariffs

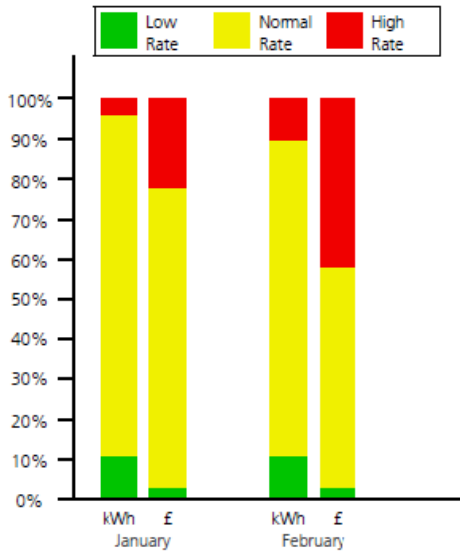
## Dynamic ToU Tariff – Engagement Strategy

What ~~was~~ your approach to on-going engagement?

- ***Detailed monthly engagement essential to maintain responsiveness***

  - Monthly energy efficiency advice via the IHD
  - Specialised call-centre available to participants
  - Monthly ToU feedback letter



# Thank you

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# Propositions for domestic and SME customers

## SoLa Bristol Dynamic tariffs

**Work Stream 6 – Learning Event Part 1**

Philip Bale
**Western Power Distribution**
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# Agenda

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

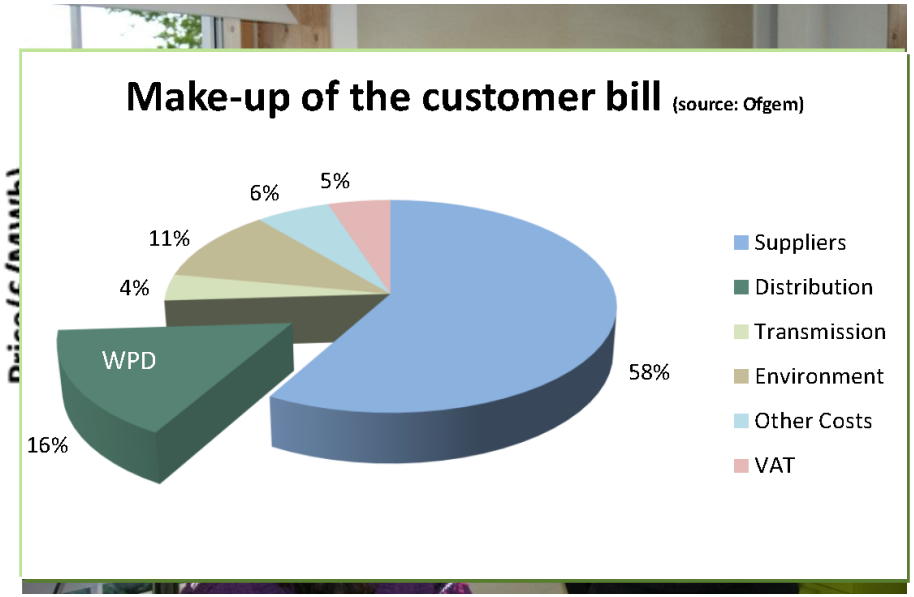
a. What were the design criteria and how were the tariff prices selected?
b. Does the tariff reflect network costs or whole system costs?
c. What were your approaches to recruitment, and how did they differ for different tariffs and customer types?
d. What was your approach to on-going engagement?
e. What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?
f. What is the learning on the uptake, customer reaction, changes in behaviour and network impact?

# What were the design criteria and how were the tariff prices selected?

Design Criteria

"To reflect the true cost of a customers energy bill including the benefits of Solar PV, Battery Storage and customer behavioural changes"

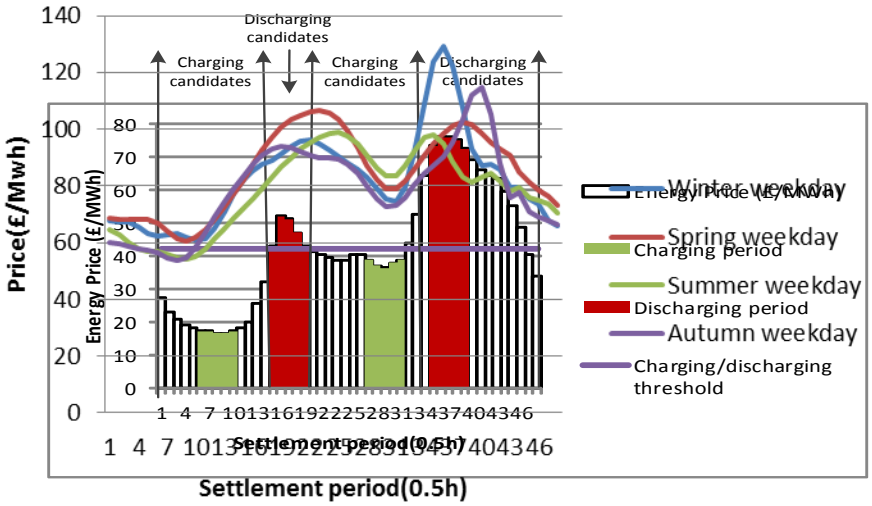
1. Focus on whole system charges
2. Simplicity
3. Transparency
4. Stability



# Does the tariff reflect network costs or whole system costs?

## Whole System Costs

- Battery Storage, Solar PV and Customer behavioural changes could lead to a reduction in all system costs.
- Discounted Tariff is based on simplified Real Time Pricing. Eight variable prices for weekdays and weekends in different seasons have been used.




| | Annual energy from grid (MWh) | Energy cost (£) | Use of system cost(£) | Others(£) | Total electricity bill(£) | Tariff(p/kWh) |
|---|---|---|---|---|---|---|
| No PV & storage | 1450 | 135609 | 56709 | 54244 | 246562 | 17 |
| With PV & storage | 933 | 74410 | 31117 | 29764 | 135292 | 14.5 |
| Cost saving | | 61199 | 25592 | 24479 | 111270 | |

Table I Cost and tariff rate comparison at Illminister Avenue substation level

# What were your approaches to recruitment, and how did they differ for different tariffs and customer types?

- **Customer Recruitment through Knowle West Media Centre**

Knowle West Media Centre is a media arts charity and limited company that aims to develop and support cultural, social and economic regeneration. For over 15 years KWMC have been supporting communities to engage with, and benefit from, digital technologies and the arts.

- **% Discount based on Real Time Pricing**

30 domestic properties all in Social housing means only one tariff will be trialled.

- **Learning from this element of SoLa Bristol**

The SoLa Bristol tariff section was designed to provide an insight into the effect and benefits a variable tariff would produce. Further trials will required to produce statistically relevant outputs.

# What was your approach to ongoing engagement?

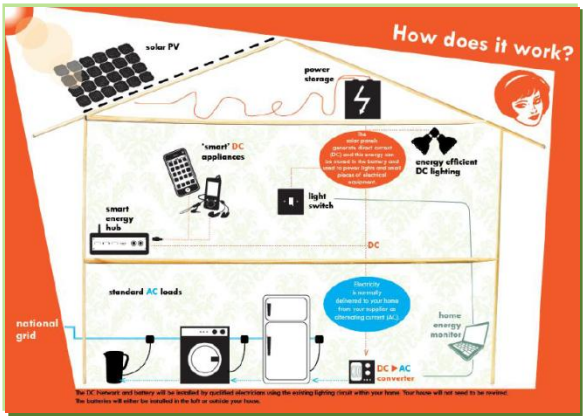
- Knowle West Media Centre are leading the customer engagement section of the project. All information and communications pass through KWMC.

- KWMC were selected as they have very clear understanding of customer recruitment, showed passion for the work they carry out and have a very local presence.

KNOWLE WEST MEDIA CENTRE

So Bristol La

Solar energy when you need it



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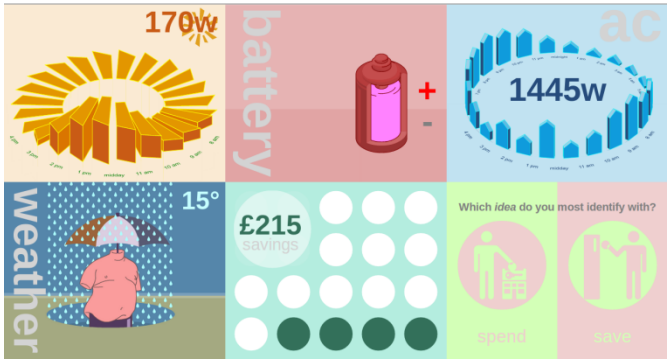
# What are the technical requirements for such tariffs? Are they in line with the capabilities of a smart meter?

**Discount Tariff based on Real Time Pricing requires:**

- Directional ½ hourly kWh measurements
- A secure register to store the Scaling Factor
- A programmable In home display




**SoLa Bristol Equipment**

The Variable Tariff being demonstrated assumes a property has PV combined with Battery storage. The battery storage will have a intelligent charging and discharging algorithms. This level of system intelligence would be outside of the smart meter.

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

- SoLa Bristol still in the initial installation phase and has not recruited customers to the variable tariff
- Residents who are interested in the SoLa Bristol expressed how they find electricity and electricity tariffs confusing, 95% of properties have credit meters “key meters”
- To be effective, Tariffs needs to be simple for customers to use and must be described in a very simple non technical language
- The impact of PV and battery storage on the distribution network will be controlled through battery charging envelopes with a discount applied through the variable tariff.
- The learning is expected to show that in domestic circumstances networks and customers requirements are generally synchronised.

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# Customer Engagement Workshop

## 4 June 2013

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# Session 2: Dynamic tariffs

| | Question |
|---|---|
| 1 | Under what circumstances will load be controlled (pre fault/post fault)? |
| 2 | What is the customer proposition and how was it designed? How does it ensure value for customers? |
| 3 | What were your approaches to recruitment, and how did they differ for different propositions and type of supplier? |
| 4 | What are the technical requirements for the proposals? Are they in line with the capabilities of a smart meter? |
| 5 | What was your approach to ongoing engagement? |
| 6 | What interactions are required with other industry parties? |
| 7 | What is the learning on the uptake, customer reaction and impact on the network? |

# 1. Under what circumstances will load be controlled (pre fault/post fault)?

Two broad generic demand response services will be required by DNOs:

- ***Static:*** to deliver habitual DSR behaviour to provide more headroom
- ***Dynamic:*** to cater for infrequent peaks / losses of capacity

Static arrangements include ToU or restricted hours tariffs

The CLNR project is trialling a direct control regime with residential customers that could be required post-fault if significant asset replacement is required to restore full circuit capacity:

75 Smart Washing Machines

18 Heat pumps with Thermal Store

- Maximum of 15 interruptions per year
- Maximum of one interruption per day
- Up to 10 consecutive days
- Peak periods only
- Customer override without penalty

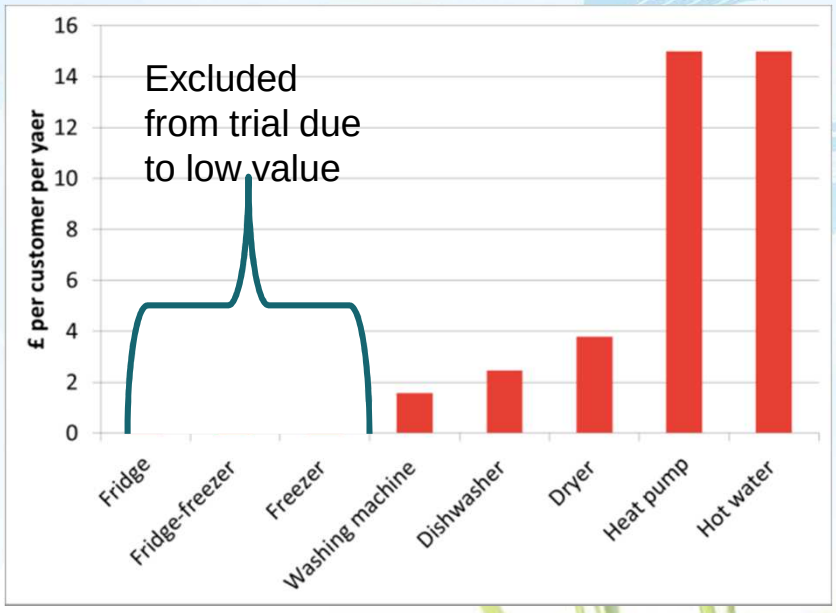
# 2. What is the customer proposition and how was it designed? How does it ensure value for customers

**The level of the incentive should reflect the potential cost savings to distribution networks**

| Learning aims | Design options | |
|---|---|---|
| | **Pay according to network value** | **Increase payment to attract more customers** |
| **Understand whether customers are likely to take up direct control proposition in 2020** | ✓ To learn whether customers will accept what is likely to be commercially viable | ✗ Less learning about customers' acceptance of commercially viable proposition |
| | **Test probable number of interruptions required** | **Test maximum number of interruptions** |
| **Understand customers' acceptance of actual interruptions in 2020** | ✓ To learn whether customers will opt out of the tariff under likely level of interruptions | ✗ This is a new tariff – testing probable number will already provide new learning |

# Direct control tariffs represent the costs savings to distribution networks only

Load associated with each technology ✖ % of load that can be interrupted ✖ Likelihood of technology being used at peak ✖ Value to distribution networks of 10-15 interruptions per year




Direct control tariffs aim to send cost-reflective signals to customers at times of distribution network outages.

There is no guarantee that times of network outages will always coincide with times of peak costs on other parts of the system.

Customer-Led Network Revolution · LCN Fund Low Carbon Networks · NORTHERN POWERGRID · British Gas · Durham University · ea technology

# 2. What is the customer proposition and how was it designed? How does it ensure value for customers?

## *Peak Energy Supply Manager (Direct Control)*

Remote appliance automation to avoid peak usage at times of network constraint

- Subsidised Neura NANO Smart Heat Pump with Gledhill 300l Thermal Store
- Free Hotpoint AQUALTIS Smart Washing Machine
- Behavioural study only – No customer incentive to respond

**Designed to deliver a response with minimal customer inconvenience**

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# 2. What is the customer proposition and how was it designed? How does it ensure value for customers?

## *Solar Panel Electricity Generation and Usage Trial (Manual Within Premises Balancing)*


- Free in-home display from Passiv Systems
- Real-time information on generation, usage and export – maximize usage, minimise export
- £50 Joining / £50 End of trial incentive – to be delivered in vouchers

## An example of real time dynamic pricing

Can real-time information encourage customers to maximize in-home use of on site generation via an IHD?

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## 3. What were your approaches to recruitment, and how did they differ for different propositions and type of supplier?

**The standard CLNR Recruitment approach was used for Direct Control and Solar Balancing Trials, however...**

- A smart Meter was not required as Direct Control functionality was delivered via the smart appliance and broadband/GSM - we could therefore accept customers from other suppliers

**More detailed pre-qualification questions/surveys had to be carried out, due to the complexity of the Smart Appliances**

- A detailed site survey was required to assess the suitability of the smart heat pump, due to the size and with of the unit and associated thermal stores
- An online expression of interest form was developed for those interested in the smart washing machine trials

# 4. What are the technical requirements for the proposals? Are they in line with the capabilities of a smart meter?

| | Within Premises Balancing | Direct Control/ Appliance Automation |
|---|---|---|
| **Tech** | • Solar PV – Existing installation<br>• Mains isolation switch<br>• Secondary meter on main supply<br>• In line monitoring of solar PV<br>• In-home Display – Passiv Systems | • Neura NANO Smart Heat Pump<br>• Gledhill 300l Thermal Store<br>• Hotpoint AQUALTIS Smart Washing Machine<br>• GreenCom Smart Grid Platform<br>• Home Area Network hub |
| **Smart Capability** | • IHD featuring energy use and PV performance with real-time notice of excess generation | • Automated 'turn down cycling' capability for smart heat pump during peak periods<br>• Automated scheduling capability for smart washing machine to respond to DC requests<br>• Remote appliance configuration<br>• Customer Override |
| **Comms** | • Zigbee Home Area Network<br>• Broadband/ GSM hub | • SMS via smart meter<br>• Smart Washing Machine display<br>• Broadband/ GSM hub<br>• SMS via Smart Grid Platform<br>• Zigbee Home Area Network |

***Smart Meters were not essential for Dynamic DSR Trials***

# 5. What was your approach to ongoing engagement?



## domestic trials take shape

If we are to operate a sustainable electricity network in the future, we need to understand how customers use and generate electricity and how flexible they are willing to be with their usage.

For this reason, British Gas is leading CLNR's trials with domestic customers to monitor current and emerging patterns of energy consumption and generation and help meet another of the project's key goals – helping customers to be 'smarter' about their electricity use.

The trials are off to a flying start: 650 customers have been signed up to the '3-rate time of use' tariff. Up to 150 consumers across the Northeast are being encouraged to take part in 'smart' washing machine trials and over 400 participants in the trials have had air-source heat pumps installed.

To date, British Gas has also installed 16 'smart' heat pumps, which are designed to interact with a 'smart' grid of the future. Awarded 'Innovation of the Year' at the Micropower Council Awards, they can be controlled remotely, meaning that they can be switched on and off during periods of peak demand, and an integrated thermal store means that hot water and comfort levels are unaffected.

The uptake of certain low carbon technologies being trialled has been slower than first expected, in part due to the slow development of markets for them.

The 'smart' washing machine trials are still in the early stages, while the number of EV users is lower than forecast at the start of the project due to a smaller number of electric vehicles being sold nationally (although recent Government plans to provide a generous 75% subsidy for charging points may encourage uptake).

One trial where there has been huge success however, is with air source heat pumps. We spoke to **Keiran Allen at British Gas** about the recruitment and engagement of residential consumers taking part in the heat pump trials.

"Feedback on heat pumps has been very positive, with some customers having already reported significant savings on their energy bills. One of the key objectives with new technologies like this is to make sure that customers aren't disadvantaged or notice a difference in service.

Heat pumps do take up more space than the average boiler, especially the larger hot water tanks we have to use, but once customers get used to them, they enjoy the benefits of improved heating and lower running costs."

Connect with us

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NORTHERN POWERGRID

British Gas

Durham University

ea technology

# 6. What interactions are required with other industry parties?

| | | |
|---|---|---|
| **Network Operator** | • Specifies Requirements<br>• Sets demand | NORTHERN POWERGRID |
| **DSR Operator** | • Calls Response from Supplier<br>• Assesses Response Provided | NORTHERN POWERGRID / British Gas |
| **DSR Supplier** | • Calls Response from Customer<br>• Rewards Customer for Response | British Gas |
| **Comms Provider** | • Communicates Demand to Appliance<br>• Communicates response to Supplier | GREENCOM NETWORKS |
| **Appliance Manufacturer** | • Provides DSR Capability<br>• Provides Communication Capability | INDESIT / NEURA smart energy systems |

# 7. What is the learning on the uptake, customer reaction and impact on the network?

Smart Heat Pump load reduction possibilities are considerable

- 0.5kW modelled during evening peak

High technology readiness but significant constraints for Smart Heat Pumps

- Size and weight unsuitable for UK homes
- Overwhelming complexity – customers & installers

Customers Appear Highly Engaged in their Energy Usage/Generation

- Customers have recently enquired about keeping IHD's
- Early results do not show change in behaviour despite customer enthusiasm

## Direct Control Trials Scheduled for Winter 13/14

Customer-Led Network Revolution | LCN Fund Low Carbon Networks | Northern Powergrid | British Gas | Durham University | ea technology

# WS6 Learning Event


## NINES & RTS Presentation

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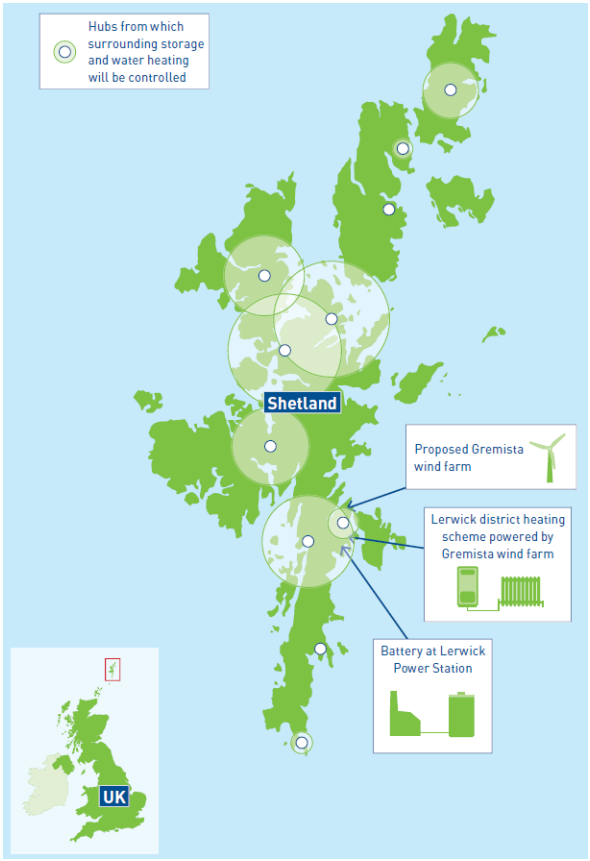
Power Distribution

# Why are we controlling load in NINES

- Renewables unable to connect
  - Does not match demand well.
  - Power flows need managing within constraints of the network and during faults
- Renewables would reduce cost of the Power Station running
- Large Electrical heating load on island
- Significant Fuel Poverty issues

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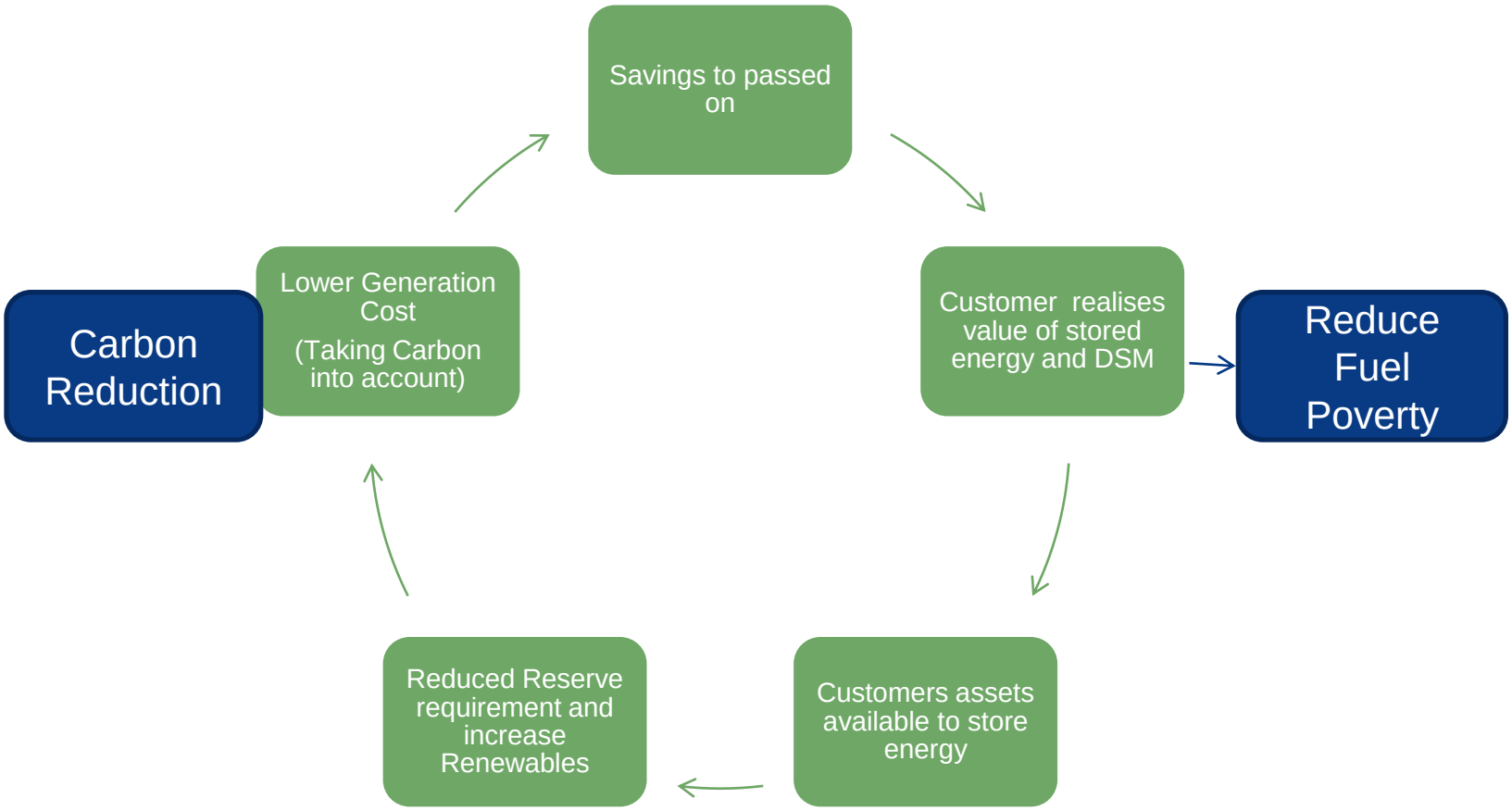
# Creating an Island Virtuous cycle

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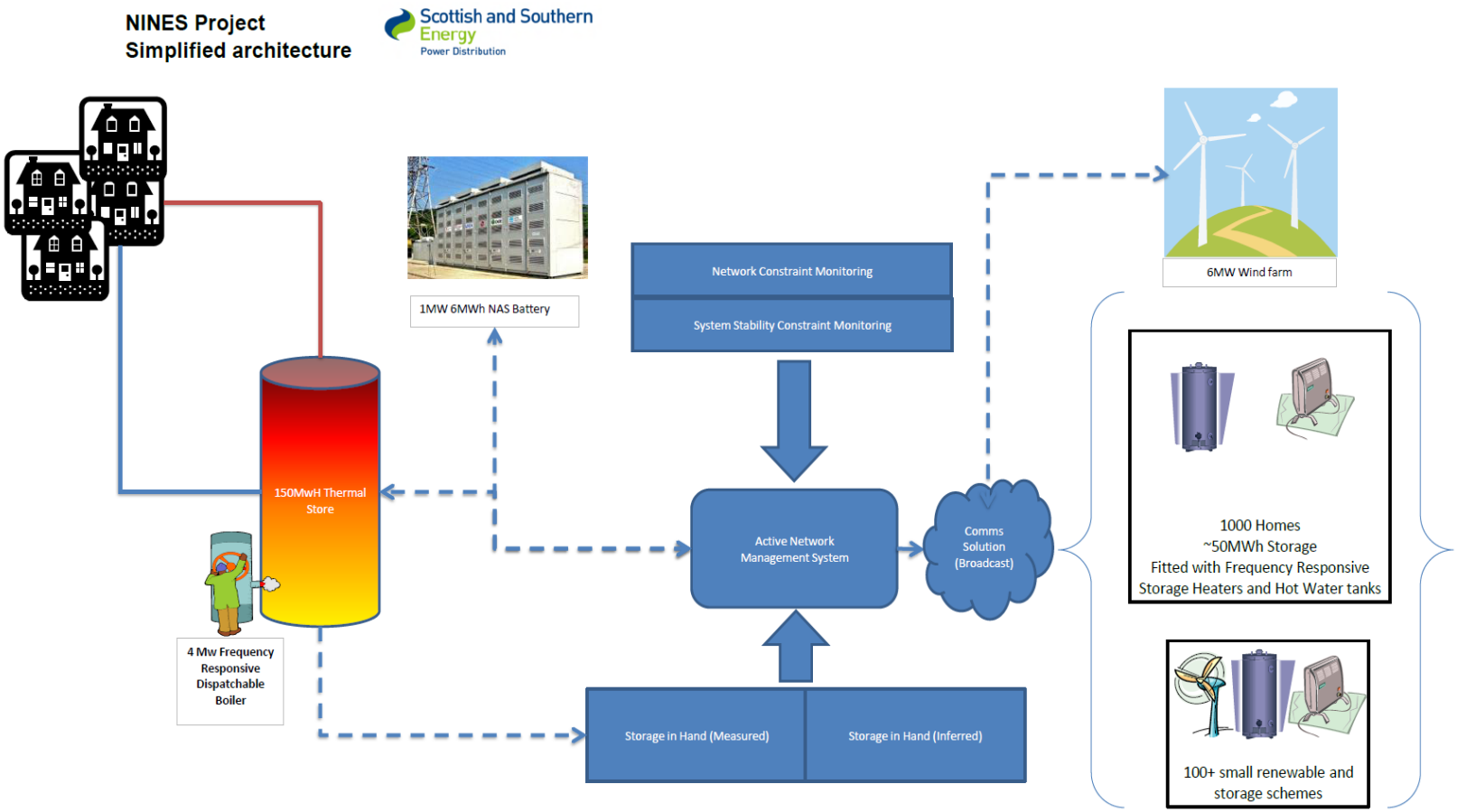
# Original Northern Isles New Energy Solutions Overview

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# The Proposition

- Installation of Quantum Storage Heaters & Hot Water Tank at no cost to the customer
- £100 one off payment
- Automatic collection of non-personal data
- Flexible Charging - Varying the devices charging times
- No change to customers current supply agreement

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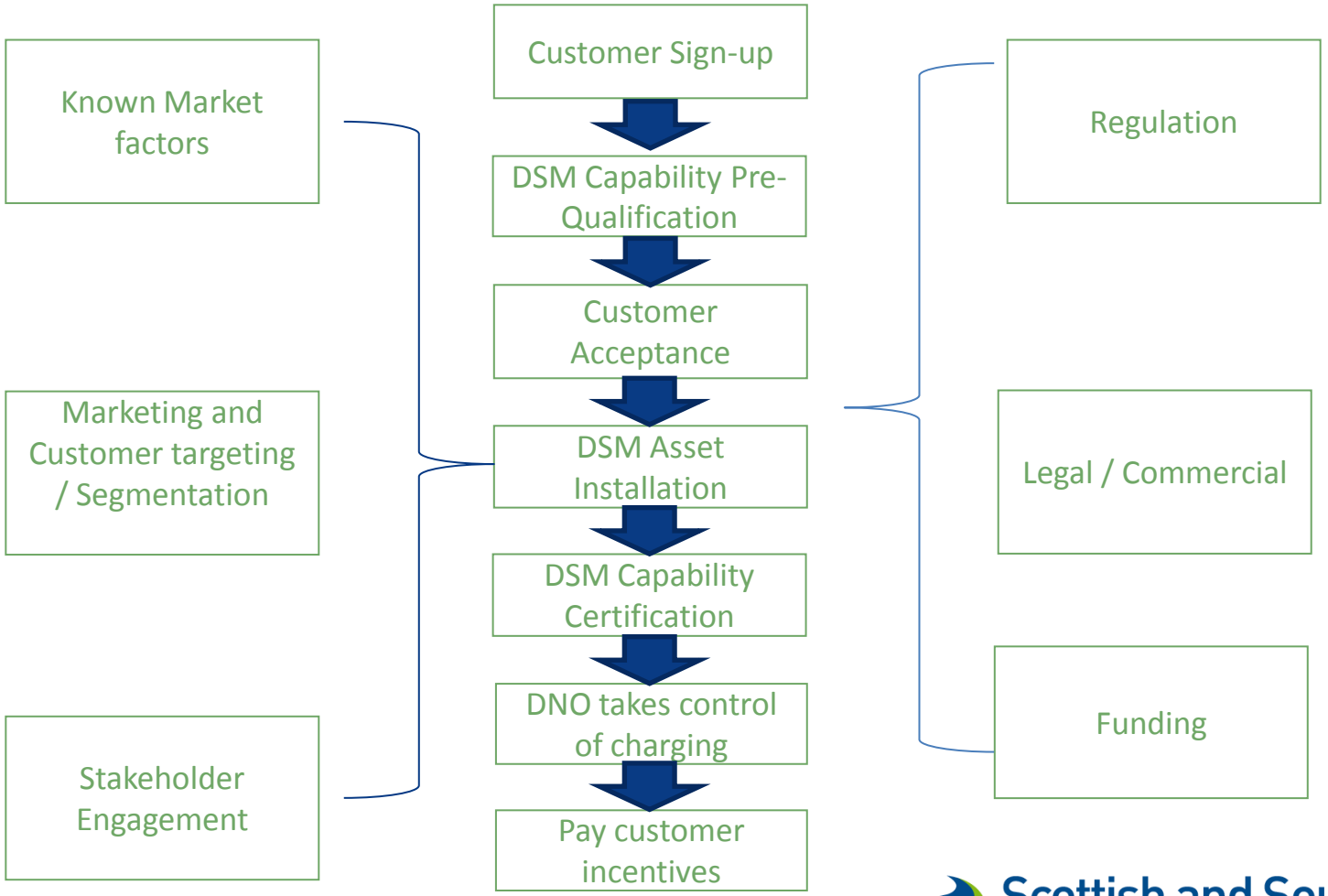
# Operational Process

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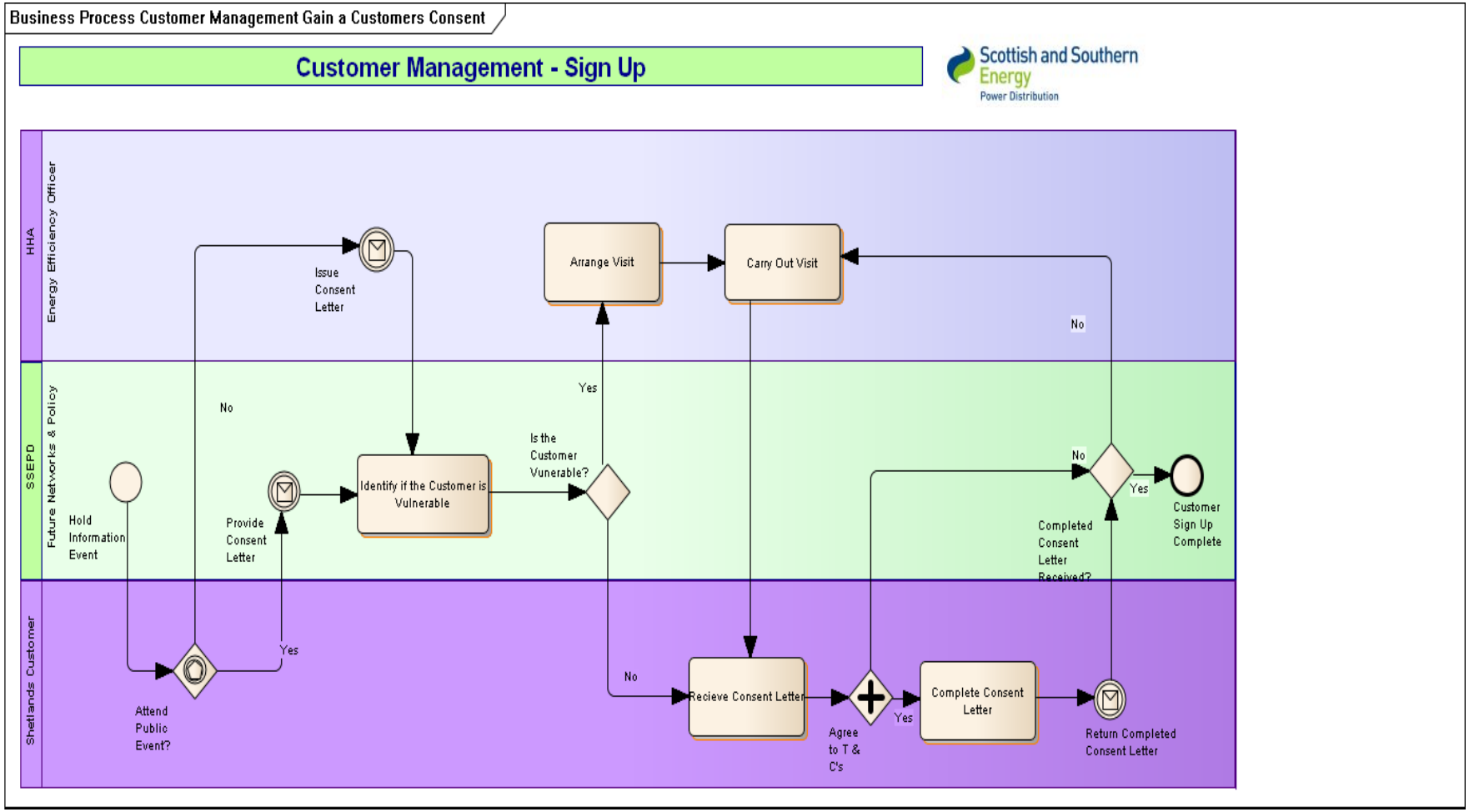
# NINES Recruitment Process

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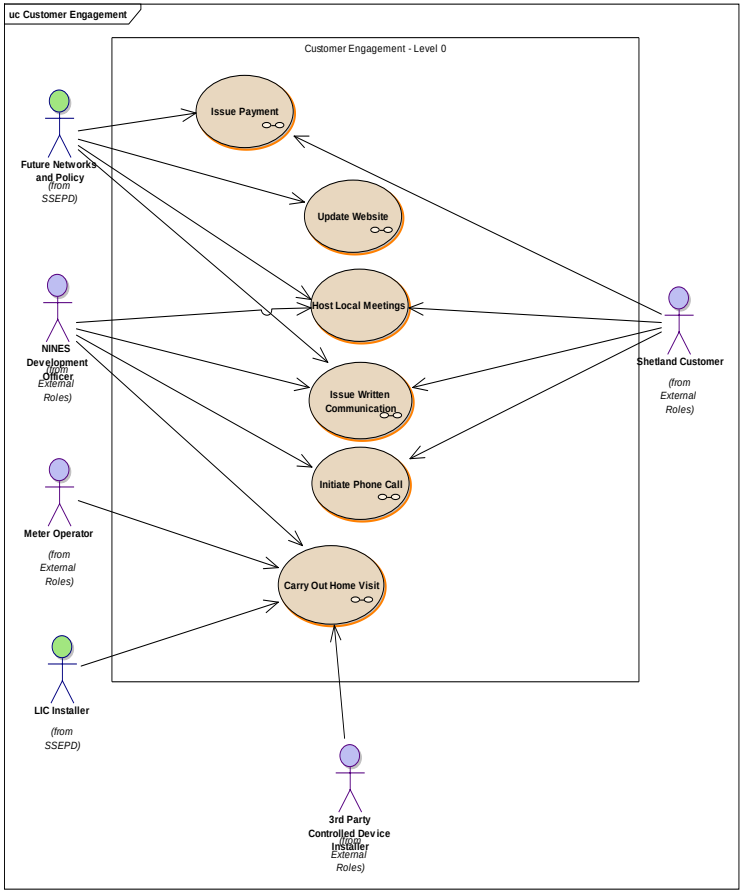
# Our Customer Engagement




## Our Commitment to You

We will:-

- Notify your supplier of your participation in the project
- Make sure it is easy for you to contact us
- Respond to requests within three working days
- Keep your personal details secure
- Provide you with quarterly project updates
- Minimise visits and disruption to your home
- Register you on our Priority Service Register (if appropriate)
- Schedule a visit to discuss your consent to participate in NINES (where appropriate)
- If you no longer wish to participate in NINES we will:-
- Confirm in writing, your request to no longer participate
- Cease all data collection from your home
- Revert your heating and hot water times back to your original agreement

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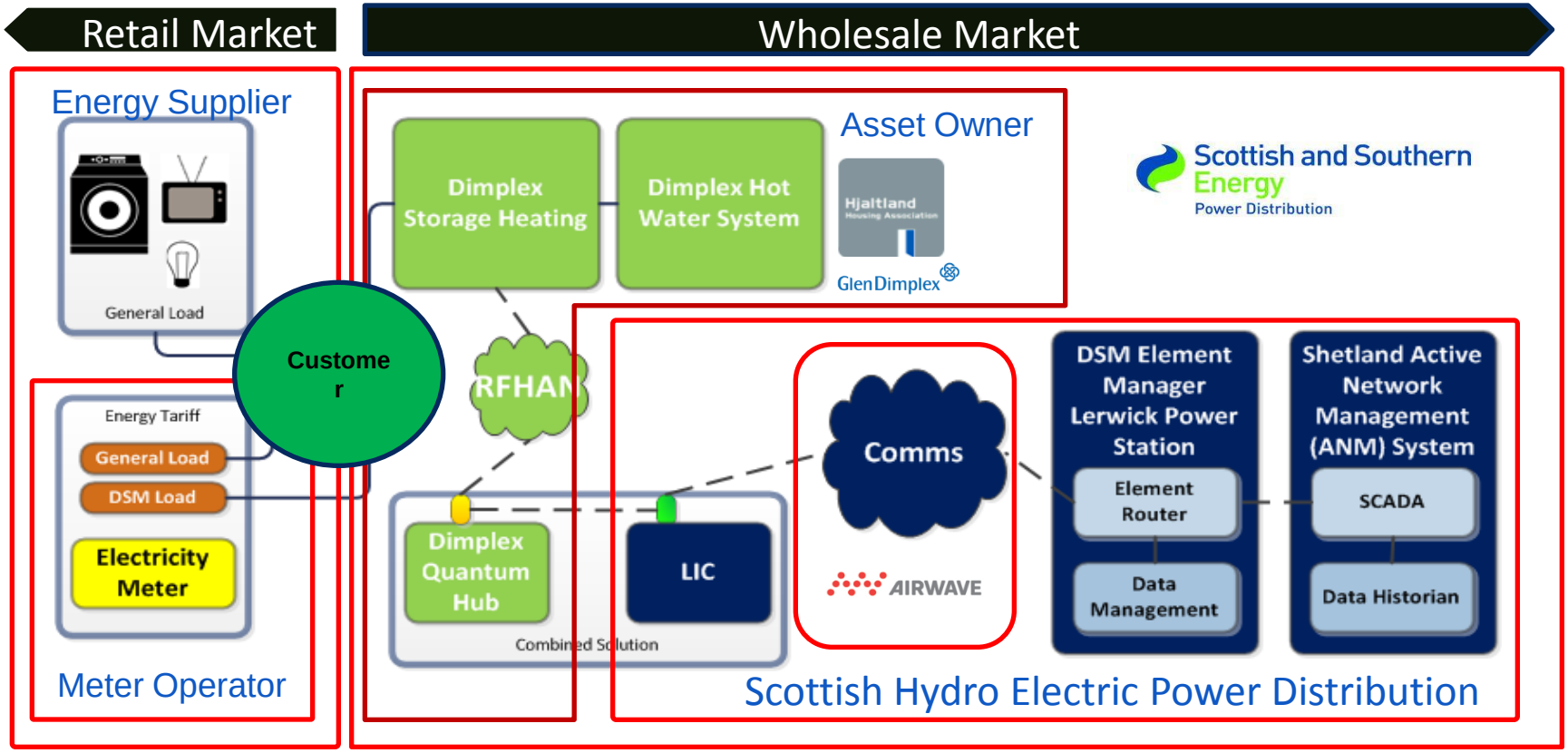
# DSM In Shetland

## NINES DSM Solution Conceptual Diagram

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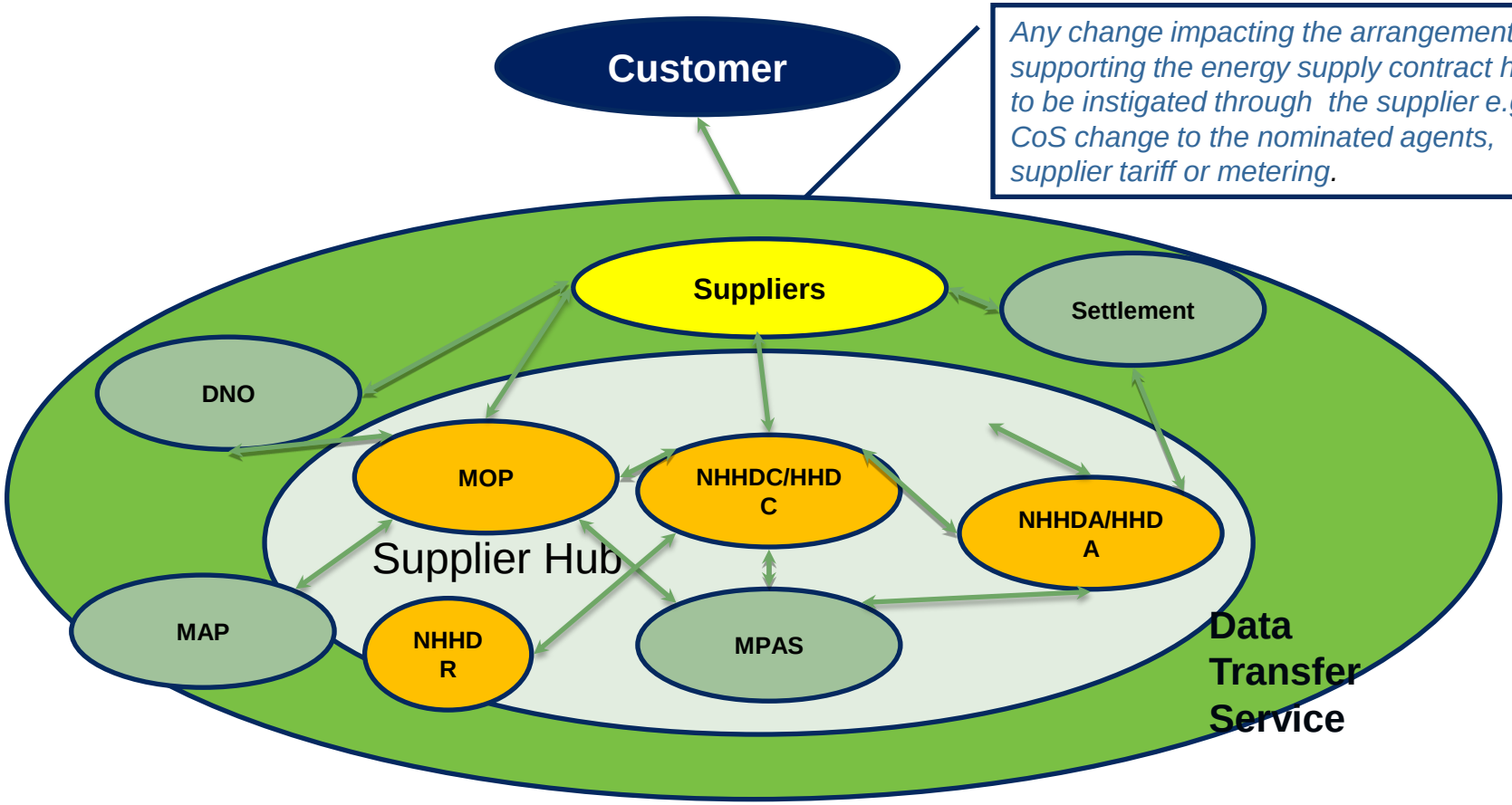
# Industry Engagement

## Supplier Hub Principle




*We have identified that this DSM Approach will have conflicts with the supplier hub principle*

# DSM Stakeholders

- Approximately 34 stakeholders identified

Including:

  - Different Customer Types i.e. private homeowners, landlords, builders
  - Industry Bodies
  - Manufactures
  - Installers
  - Community Groups
  - DNO's Internal teams
  - Financers
  - Technology suppliers
  - Sales/Marketing Groups

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# Our Experience so far …..

- Effective Communication
  - 100% sign up rate face to face
  - 30 % sign up rate from 1 direct mail shot
- Customer Education is Key
  - nothing is more valuable
- A collaborative approach is required
  - (DNO- Supplier-MOP-Councils ….)
- The proposition has to meet the needs of your target market
  - (Tenant - landlord - social housing - private home owner)
- Do not under estimate the effort required for customer management
  - (limited customer management experience …. )
- Customers are willing to participate in DSM
  - (Proved wrong as our first concern was customers would object to us changing their charging times)

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# Conclusions …..

- Customers interest is high
- Customers are willing to accept flexible charging
- More engagement with electricity suppliers is required
- The current model is not sustainable for transition into BAU
- A different proposition for the Open Market is required

Scottish and Southern Energy Power Distribution

# Workstream 6
# Knowledge Sharing Event

Tuesday 4 June 2013

**Simon Brooke**
Low Carbon Projects Manager

LCN Fund
Low Carbon Networks

electricity north west
Bringing energy to your door

# Voltage Control in CLASS

- Project Under what circumstances will load be controlled (pre fault/post fault)?
- What is your approach to communicating this method to customers?
- What are the technical requirements for the proposals?
- What was your approach to ongoing engagement?
- What interactions are required with other industry parties?

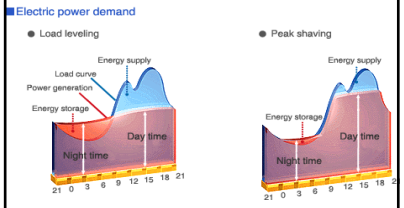
# Thousands of tiny changes at just the right time

## Today

**High Peak Demand**

2% decrease in demand

At time of peak defers reinforcement allowing more Low Carbon Technologies to be connected at lower cost. Allows rapid connection of LCTs




Lower network costs
Faster connections

## Tomorrow

**Response & Reserve**

2% decrease in demand

Compensates for loss of a large power station. Allows more low carbon generation to be connected and reduces need for reserve.

Lower balancing costs
Reduced carbon

## And into the future

**Wind Following**

2% increase in demand

Allows several large wind farms to stay on load maximising the free wind

Lower energy costs

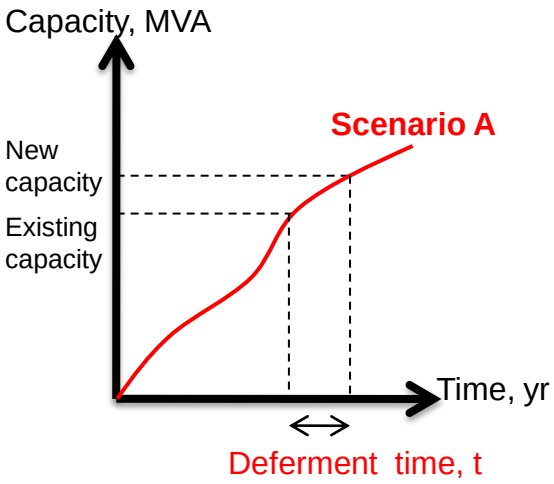
CLASS spans boundaries and adds value across the supply chain

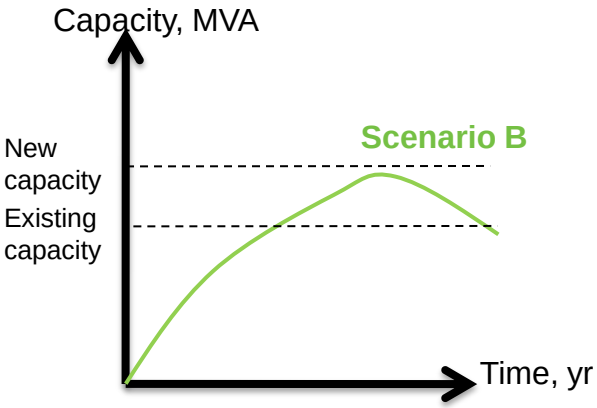
***Millions of indiscernible changes can have a huge and valuable effect***

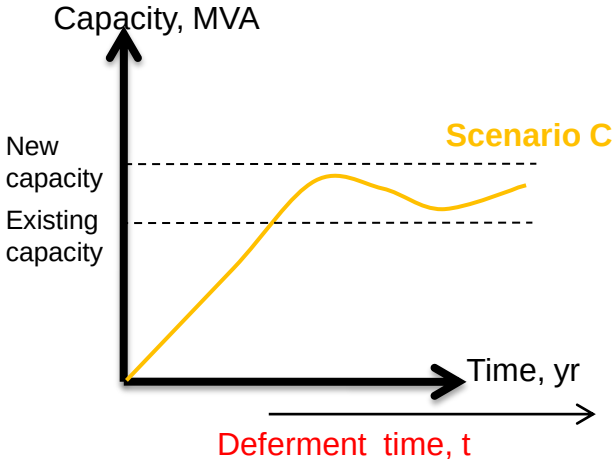
# Valuing optionality

Optionality for ongoing management of constraints

- CLASS Solution delivers optionality, managing uncertainty
- New DG and energy efficiency measures impact demand

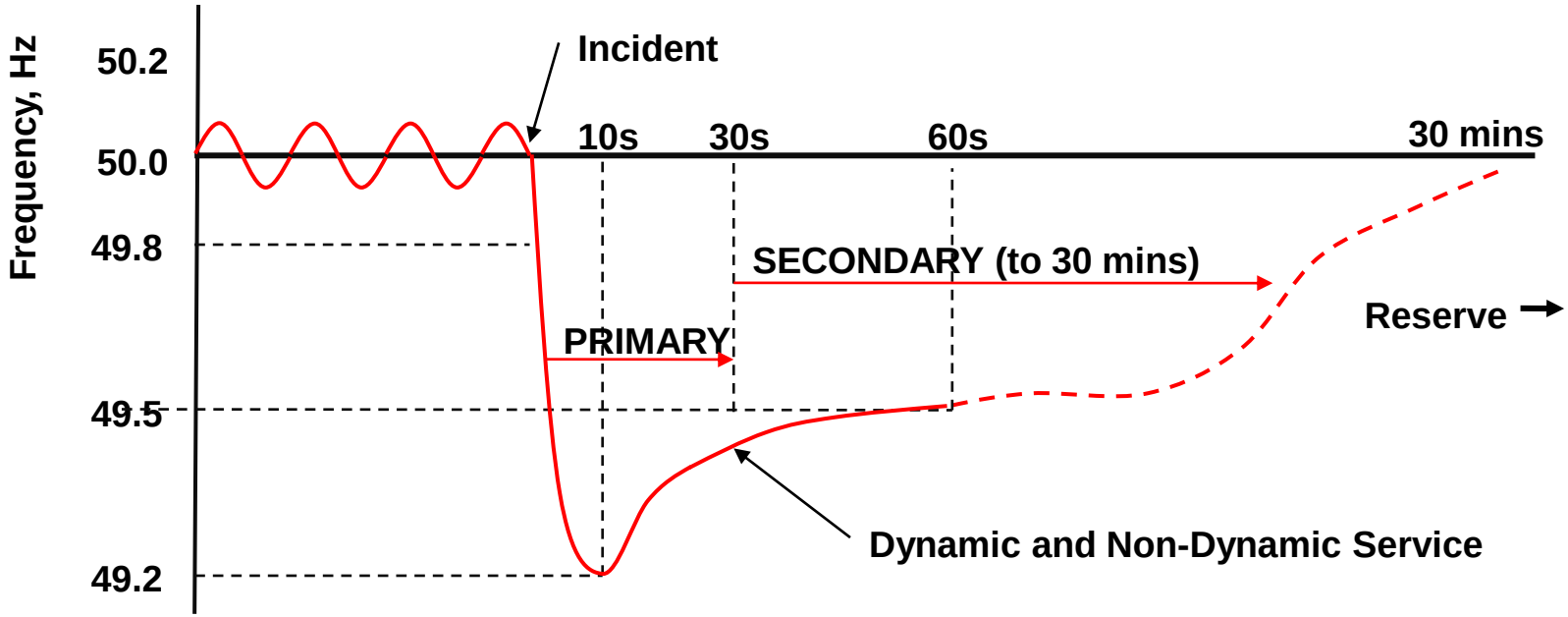


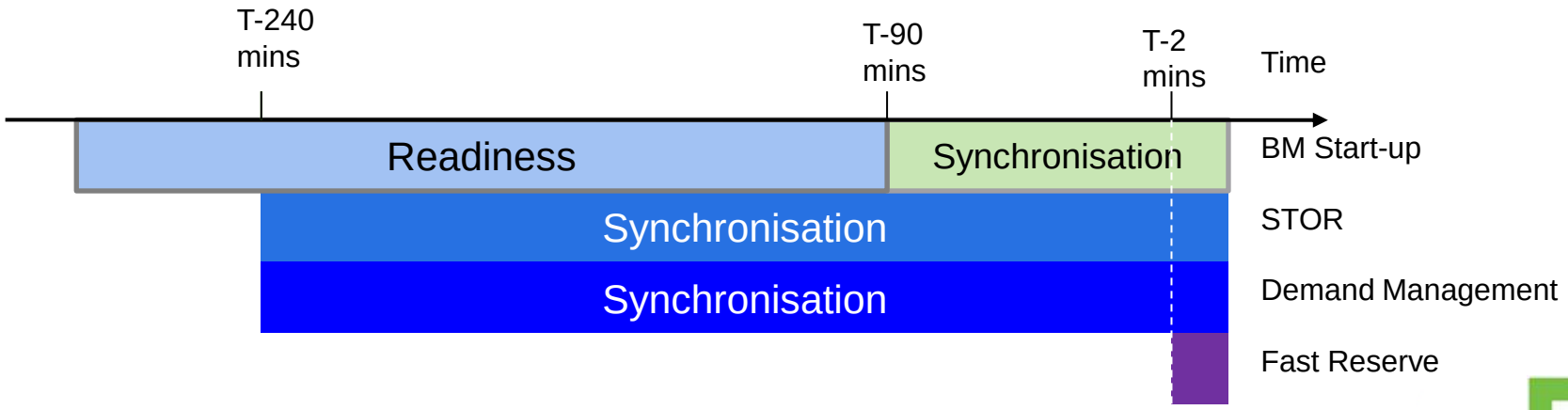




- Benefits can be permanent
- Benefits are repeatable at each Primary substation
- RIIO-ED1 will see many sites move to B or C

# Reserve and Response



# Voltage Control in CLASS

- Project Under what circumstances will load be controlled (pre fault/post fault)? Pre-fault DNO / Post fault NETSO
- What is your approach to communicating this method to customers? General awareness campaign
- What are the technical requirements for the proposals? New voltage controllers, ICCP link and dashboard
- What was your approach to ongoing engagement? Trial group and control group participations
- What interactions are required with other industry parties? NGET, PB Power, University of Manchester

SP ENERGY NETWORKS

# Community Engagement:
## Ashton Hayes Smart Village

Geoff Murphy

Ofgem

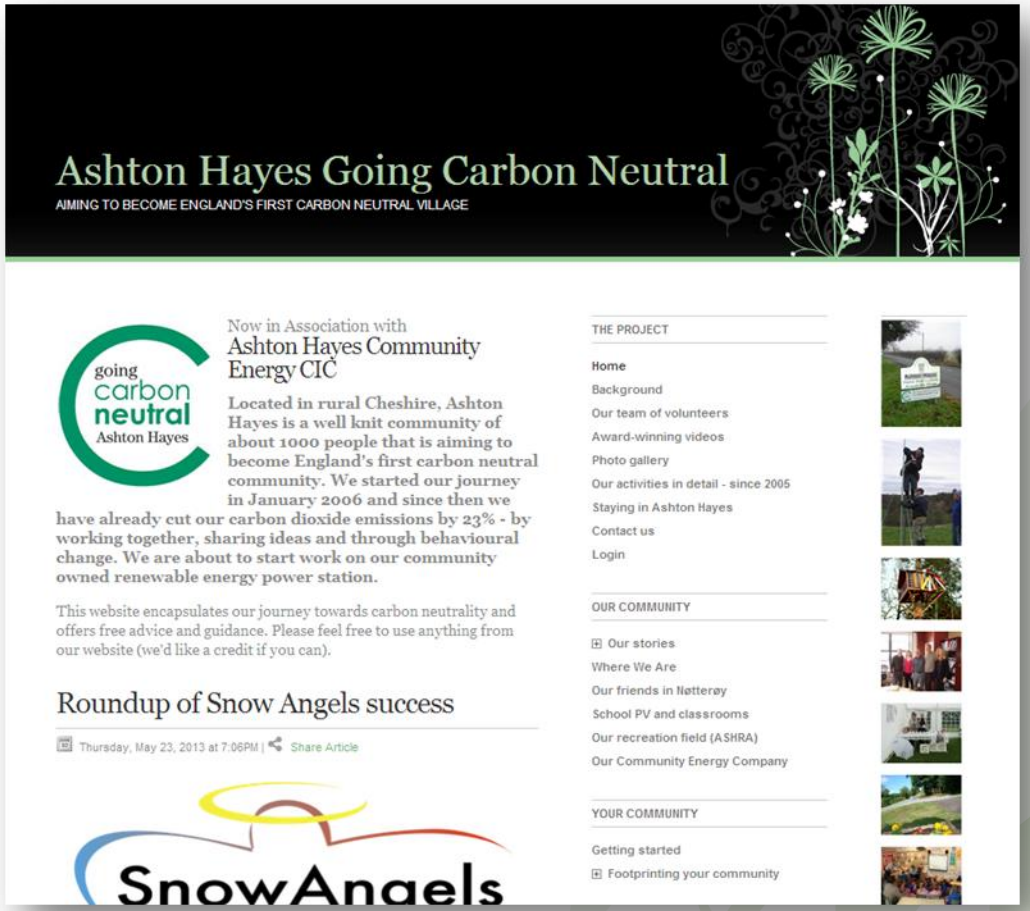
4th June 2013

# Community Engagement:
## Active Parties

- **Community Groups**
- Generator Groups
- Local Government
- Resident Social Landlords

# Community Engagement:
## Ashton Hayes Community

- Organised
- Motivated
- Educated
- Skilled
- Proven Ability
- Momentum



# Community Engagement:
## Approach

**Community Led Engagement**

- Initial engagement via community trusted partners at EA Technology and the University of Chester
- Engagement established the communities desired relationship with a DNO partner
- Mutually beneficial project outline established by EA Technology
- Project focus on community pull rather than DNO push
- DNO activities undertaken with minimal impact on the community
- Project deliverables disseminated to the community alongside partners
- Relationship / partnership established through further dissemination activities and following up on requests for support from the community
- Trust generated between all parties

# Community Engagement:
## Evidence of Success

- No immediate variance in $CO_2$ or kWh that can be directly attributed to the projects activities over the last 2 years
- Future reductions expected as the projects educational message gets across to the community
- Over the course of the project the community / DNO facilitated the connection of upwards of 30kW of PV and an EV charging pillar
- Greater awareness and trust in SPEN, culminating in joint dissemination activities including an upcoming short film
- Greater community awareness of network issues, which are now at the forefront of the development of future LCT adoption plans
- Exemplar partnership other communities desire to replicate

### ScottishPower Energy Networks helps us to monitor our energy use

Friday, January 20, 2012 at 4:40PM | Share Article

Residents of Ashton Hayes can now see how much energy the village is using thanks to an innovative monitoring system installed around the village by our technical supporter, ScottishPower Energy Networks (SPEN). The company has set up a web portal that will soon be giving us detailed data on electricity use across the community. The initial site is currently fairly brief but over the next couple of weeks we should be in a position to upload the community reports for October, November, December and January. The aim of the research will help SPEN see the impact that PV panels, electric cars and other renewables have on their network and help the community plan for the future.

### SPEN report on village PV potential

Thursday, March 21, 2013 at 10:16AM | Share Article

SP Energy Networks (SPEN) continues to give us useful technical information and power use data for the village. In its latest report *"Ashton Hayes Potential for PV Report March 2013"* it explains how much renewable energy we could generate from PV, if all the suitable spaces in Ashton Hayes were used. Click here for SPEN special page on the village project and the reports (right hand side).

### See our energy use data - courtesy of SPEN

Tuesday, October 30, 2012 at 2:28PM | Share Article

We are now being given detailed power monitoring data on the village by Scottish Power Engineeering Networks (SPEN) who are kindly helping us to understand power demand in sectors of the village. Please go to the special SPEN Ashton Hayes website for all the data. Thanks to Geoff Murphy and his team.

# Community Engagement:
## Risks & Key Learning

- Community led schemes require the DNO to be patient, flexible and understanding
- Without immediately quantifiable benefits, regulatory justification or a strong desire from stakeholders this type of engagement might not become BAU
- After the LCN Fund SPEN will have to manage the expectation of Ashton Hayes and similar minded communities who wish for this level of engagement going forward

# Community Engagement:
## Suitability for Repetition

- Community Groups - Yes
- Generator Groups - Potentially
- Local Government - No
- Resident Social Landlords - No


## For More information please go to:

**www.spenergynetworks.com/innovation &**
**www.goingcarbonneutral.com**

# The Thames Valley Vision


Mark Stannard

TVV Customer Engagement Manager


SSE

# Customer Engagement - Bracknell Community

- **Community Events**
  - Major's Annual Civic Reception
  - Pride of Bracknell Awards
  - Educational talks
  - Launch Event
  - iESE Council Team Working Award


- **Low Carbon Community Advisory Centre**
  - Opened 15th December 2012 by the Major of Bracknell

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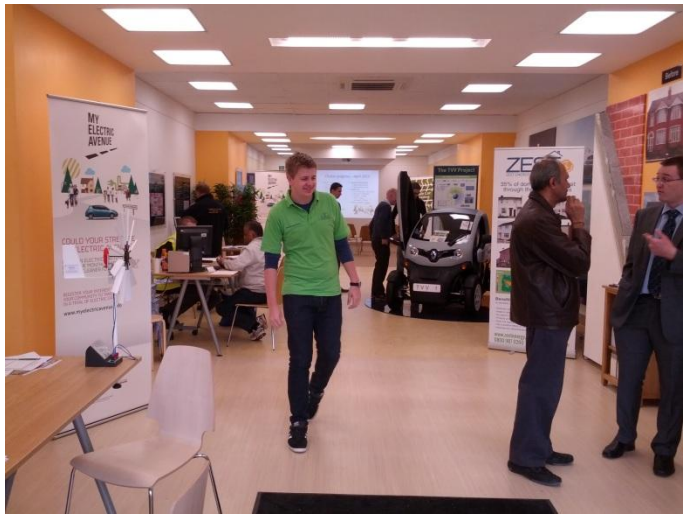
# Your Energy Matters– Event Days

- **My Electric Avenue Opening**
  - Over 100 Visitors
  - MP Philip Lee attended
  - Various Councillors endorsed the event




- **Low Carbon Open Days**
  - 5 Events held;
    - Green Deal
    - External Wall Insulation
    - Home Energy Efficiency Visits

# Domestic – How we Engaged (EPM)

- **4 Key stages**

  - Stage 1 - Initial 5,000 mailing to target customers in Bracknell. 105 project participants
  - Stage 2 - After slower than expected uptake rate, a further 10,000 customer from the UoR target list were mailed – 393 project participants
  - Stage 3 - Quickly installed 145 End Point Monitors before bookings slowed as the team were unable to contact participants
  - Stage 4 - New approach to booking and a further 5,000 mailed. Introduction of ESC and customers visits

- **Key Learning** - Take Customers from sign up to booking as soon as possible and have depot resources ready to be deployed

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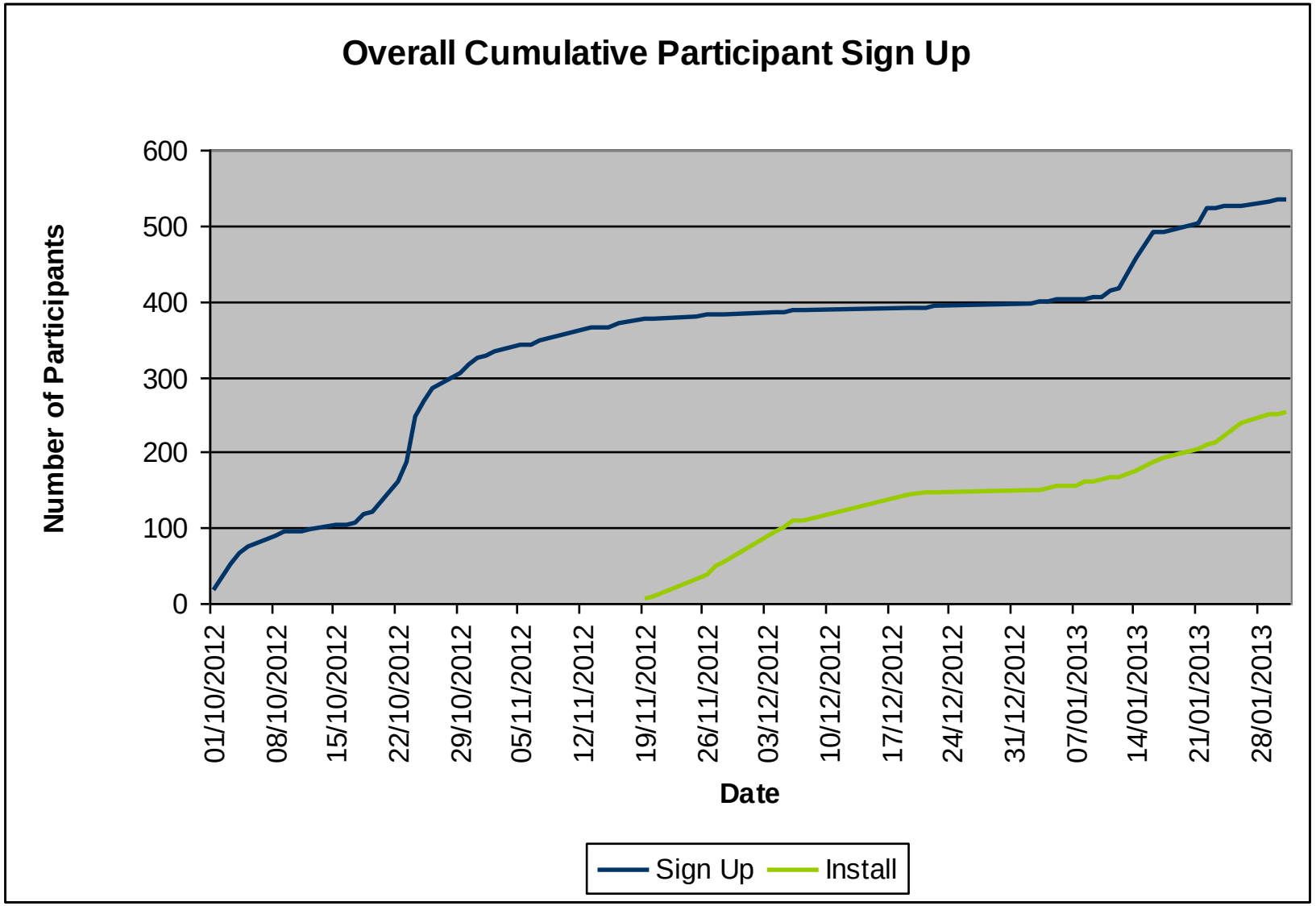


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# Domestic – Some Statistics

- **534 Project Participants**
  - £22.53 per customer sign up
- **329 Bookings Made for Installation**
  - 0.8 Man hours to proceed participant to booking
- **250 EPM Installations**
  - Complete Jan 2013
- **200 More Installations in 2013**

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# SME's Commercial – How we Engaged

- **Consumer Consortium**
  - 3 held since project start
  - 31% of Automatic Demand Response (ADR) contacts came through consortium events and local bodies
  - Chamber of Commerce events

- **Focus Groups**
  - 1 held since project start
  - Will be vital during the summer testing plan 2013

- **Face to Face**
  - International experience steered the team in this direction


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# Conclusions

- **What worked and What Didn't**
  - **Domestic**
    - Specific Events for sign up
    - Direct Mailing
    - Supplier Engagement
  - **SME/ Commercial**
    - Consortium Events
    - Face to face meeting
    - Mailings (learning taken from overseas)

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# Thank you

# Any questions?


THAMES VALLEY VISION

# UK Power Networks

## ENA Smart Grid Forum: Workstream 6

## Residential Customer Engagement

UTILITY INDUSTRY ACHIEVEMENT AWARDS 2012

UTILITY OF THE YEAR

Low carbon LONDON Energising change

UK Power Networks Delivering your energy

# UK Power Networks – Routes to Customers

UTILITY INDUSTRY ACHIEVEMENT AWARDS 2012

UTILITY OF THE YEAR

Low carbon LONDON Energising change

UK Power Networks Delivering your energy

# UK Power Networks – Routes to Customers

## Utilising Third Parties

What parties can be used (community groups, generator groups, local government, social landlords) for customer engagement?

- ***How can third parties support DNO – customer engagement?***

- ***Dependant on the objective of engagement:***
  - Information dissemination/ gathering
  - Recruitment for a monitoring/ data sharing agreement
  - Recruitment for provision of a service – DSR
  - Recruitment onto a tariff/ price signalling scheme – ToU
- ***Possible/ required activities :***
  - Run or support drop-in centres
  - Provide contact details
  - Make first contact – e.g. phone or letter campaigns
  - Manage the end-to-end relationship – e.g. recruit, enrol, manage

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Continued

What parties can be used (community groups, generator groups, local government, social landlords) for customer engagement?

- ***Residential smart metering trials:***
  - Suppliers were the primary route to customers as the relationship already existed, and would be required for tariff management

- ***Although, local community groups were used to support pilot phase recruitment***
  - LCL worked with the Mayor's Office Low Carbon Zones to run drop-in centres for the local communities of Canning Town, Lewisham, and Perry Vale
  - These included Q&A sessions and working demonstrations of smart meters were very well received
  - However, there was a low attendance overall at the events

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Continued

What parties can be used (community groups, generator groups, local government, social landlords) for customer engagement?

- ***Electric Vehicles***
  - ***Transport for London – Source London***
    - Provided contact details and approval for out-bound letter campaign
  - ***Charge point manufacturers***
    - Maintain full contact details and EV (infrastructure) owner database but limited customer relationship

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Continued

What parties can be used (community groups, generator groups, local government, social landlords) for customer engagement?

- ***Electric Vehicles – continued***
  - ***Owners groups***
    - Provide direct route for customer contact but with varied penetration and quality of relationship
  - ***OEM's & Dealerships***
    - Near complete market penetration but limited (early) customer relationship
  - ***Electricity Suppliers***
    - Limited accuracy of EV ownership records but full contact details and customer relationship where identified

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Continued

What parties can be used (community groups, generator groups, local government, social landlords) for customer engagement?

- ***Small Scale Embedded Generation***
  - ***PV installers & Microgeneration certification schemes***
    - Near complete market penetration but limited (early) customer relationship
    - Less productive engagement route for disaggregated ownership, operation, and 'user' structures
- ***Heat Pumps***
  - ***HP installers & manufacturers – As above***

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Lessons Learnt

Are there any issues in developing/maintaining relationships with third parties/communities?

- ***Utilising temporary organisations***
  - Brings the risk that when these became obsolete the route to customers is lost
  - Changeover of individuals at these organisations creates difficulties maintaining relationships

- ***Structure of the customer organisation is an important factor***
  - The user, owner, and operator are often different people or companies meaning some engagement routes will be better than others

# UK Power Networks – Routes to Customers

## Utilising Third Parties – Lessons Learnt

Are there any issues in developing/maintaining relationships with third parties/communities?

- ***The third party must have legal rights to customer contact…***
  - Even where a third party maintains a customer relationship they may not have the legal right to divulge those contact details, or…

- ***…have the appetite or incentive to utilise or manage their customer relationships on behalf of the DNO***

# UK Power Networks – Routes to Customers

## DNO-led Engagement

What are the DNO led approaches (using industry sources, G83 register, high street advisory centre)

- ***Low Carbon London Led communications:***
  - Website dissemination and expression of interest portal
  - Significant engagement campaign through active presentation and participation in industry and customer events, e.g. presentations, fliers
  - Utilisation of G83 database to support engagements
  - Outbound mailing campaigns
  - Contracted third party resource

# UK Power Networks – Routes to Customers

## DNO-led Engagement

What are the DNO led approaches (using industry sources, G83 register, high street advisory centre)

- ***Electric Vehicles Case Study***
  - ***All trial recruitment incentivised by free charge point offer***
    - Making use of external (TfL) funding to provide a clear benefit of participation to the customer
  - ***EV leasing scheme developed to generate best EV sample:***
    - Customer proposal included a significantly subsidised EV leasing agreement with Nissan (Leaf)
    - Contracted recruitment and participant management organisation working on behalf of DNO
    - Communications and materials branded LCL and Nissan

# UK Power Networks – Routes to Customers

## DNO-led Engagement

What are the DNO led approaches (using industry sources, G83 register, high street advisory centre)

- ***Generation Database Case Study***
  - G83 list should provide address and connection details for all SSEG customers
  - Positive opportunity to identify SSEG owners from within other trial samples, i.e. smart metering customers with a separate PV installation

- ***Limitations in practice:***
  - Data not collected or managed for customer contact purposes
  - Those contact details are not complete for the end user (often just the installer)
  - Postal address contact details only – low success rates should be expected for mail-only campaigns

# UK Power Networks – Routes to Customers

## Lessons Learnt

What interventions are these methods appropriate for?

- ***Two important considerations for an engagement strategy:***
  - Who maintains the customer contact details and the right to contact?
  - Who maintains the best relationship for the purpose of the engagement?

- ***Key point – DNO held contact details and relationships will usually be insufficient on their own for a widely successful (existing) customer engagement campaign***

- ***These requirements and the industry structure continue to support the supplier maintaining the primary relationship with residential customers - but not at the exclusion of the DNO***

# Thank you

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