

# Smart Grid Forum Workstream 6

## Domestic DSR experience from the Customer-Led Network Revolution

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# Questions

## Introduction

1. What are you aiming to find out?
2. What does the trial consist of?

## Engagement

3. What challenges have you experienced in recruiting and communicating with consumers taking part in DSR, and what solutions have you developed?
4. Which party would you say is best place to lead engagement?

## Consumer reaction

5. What is the learning on the uptake, customer reaction, changes in behaviour and attitudes?
6. What have been the most effective incentives and the main sources of complaints?

## Outcomes

7. What is the customer proposition and how effectively does the trial suggest it could be realised?
8. Have any consumer risks been identified and what protection measures have been identified to overcome these?
9. Which consumer segments would be most likely to gain or lose by the scheme and by how much?

## Technical

10. What notification of DSR actions or coordination with other parties would be required if this approach becomes business-as-usual to ensure any interactions or impacts could be managed?
11. For LCNF projects involving smart meters, do your initial findings indicate any enablers that may accelerate or increase the expected benefits from smart meters?

# Introduction

## What are you aiming to find out?

To what extent are customers flexible in their load and generation, and what is the cost of this flexibility?

- Are domestic customers willing to take part in DSR?
- Are they able to provide DSR which is useful to the DNO?

## What does the trial consist of?

- Four propositions, involving over 1000 customers, with and without heat pumps and PV

Household	Time of use	Restricted hours	Direct control	Within premises balancing
Regular Domestic	628	48*	80*	
With heat pump	17		17	
With PV				250

\* Responsive load was smart washing machine

- Focus for today on Time of Use and Direct Control. More results to follow

# CLNR trialled four types of DSR with domestic customers

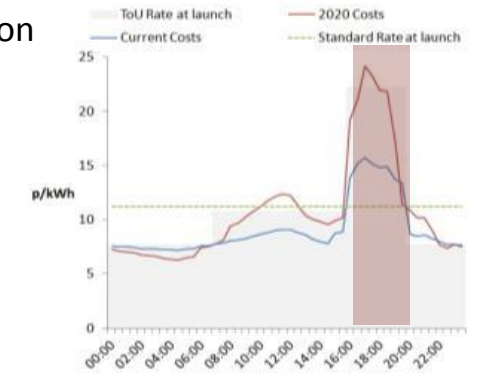
## Static: Time of Use Tariff



- Smart meter + IHD
- 2020 cost profile
- -4% day rate
- +99% peak rate
- -31% off-peak rate
- 16p standing charge

## Static: Restricted Hours Tariff

- Smart appliance automation
- Time of Use tariff
- Simulated CAD
- Customer override



## Dynamic: Direct Load Control

- Appliance automation
- Up to 15 interruptions
- Up to 4 hour events
- 1 interruption per day
- Up to 10 consecutive days
- Customer override
- DNO > supplier > appliance > customer control



## Dynamic: Within Premises Balancing

- Manual balancing, IHD provides real time info on generation, consumption and export
- Automatic balancing uses excess generation from solar panels to heat hot water
- Applies to weekends as well as weekdays



# Engagement: Recruitment & communication challenges, and solutions

Challenge	Solution
Ambitious timetable for trial recruitment	Extended project length and additional recruitment approaches, eg Charge Your Car.
Lack of penetration for LCTs and smart appliances not yet market-ready	Recruitment of non-BG heat pump, PV and EV customers. In absence of RHI incentive, BG obtained funding from DECC for innovative heat pump installations. Enrolment of Charge your Car customers.
Some demographic groups difficult to recruit due to early stage of smart meter roll out in Foundation Stage	Use of non-BG customers and customers without smart meters. Use of installation partners and BG Renewable Heat Team for community engagement.
Need for incentives to encourage participation	In the event, not critical. Vouchers offered, but not always a critical factor in recruitment.
SMEs very difficult to recruit due to limited ability to flex during peak hours	A significantly under-researched sector. So all results of value. Much scope for future work.
Many homes (mainly social housing) do not have fixed line phone or broadband	Installation of line before trial could start.

- Some challenges arose because it was a trial
- Conversely, some things were easier in a trial than in BAU

# Engagement

## Q. Which party would you say is best placed to lead engagement?

### Trials

- CLNR Time of Use trial oversubscribed – confirms supplier well placed to lead on tariff proposition and smart meter install
- For CLNR trials with PV, heat pumps, EVs, we depended heavily on intermediaries due to
  - Conditions demanded by PV rent-a-roof providers
  - Current scarcity of heat pumps and EVs

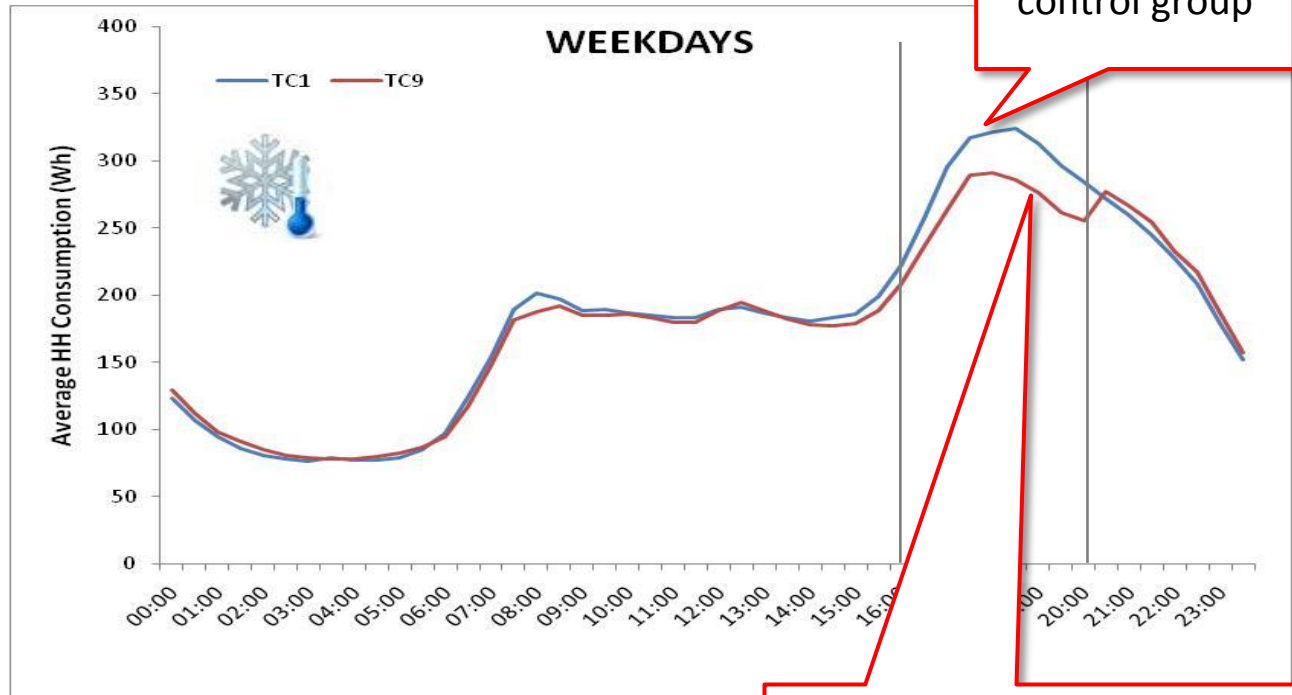
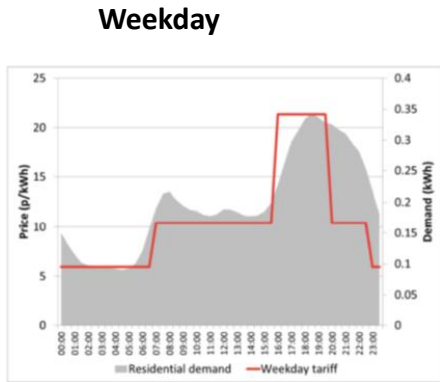
### Business as Usual

- Suppliers have primary relationship with domestic customers to manage DSR proposition in future BAU
- Suppliers could extend relationship with customers to include low carbon technology users in the DSR propositions. This must be in tandem with the DNO to provide network specific recruitment.

# Some initial insights from the domestic trials

- **High appetite for participation:** Over 1000 households taking part in DSR trials.
- **Our customers told us:** at point of recruitment, the overwhelming motivation in taking part was the opportunity to save money on energy bills. Our later surveys suggested a range of motivations including budget management, and environmental issues. Note: men often signed up for the deal, women made it work.
- **Time of Use proved particularly attractive:** the trial was oversubscribed, results show a notable peak shift of 10% and overall consumption reduction of 3%
- **Solar PV customers are highly interested and engaged.** They want to consume more of the electricity generated.
- **Restricted hours and direct control were a challenge:** Proposition had to be developed from scratch, enabling technology was new and meant we had to limited our trials to just heat pumps and washing machines.
- **Electrically-heated water is currently active as a form of DSR:** customers who are already on cheap night-rate tariffs (E7) are complying well with its intentions.

# ToU tariff findings: Behaviour persists over time, with greater load shifting and savings in the winter months



Time of use tariff customers use *ca.* 10% less electricity in peak.  
3% reduction overall.



# What have been the most effective incentives and main sources of complaints?

## Effectiveness in achieving DSR

- Detailed analysis available for ToU, analysis of other propositions and of comparative effectiveness to follow.

## Complaints

- Complaints were NOT about the DSR proposition itself. Note: CLNR trial participants were protected by overrides or safety nets.
- Some complaints related to some aspects of the administration of the trials.
- Some complaints from tenants about disruption caused by installation of heat pumps or about not liking this different type of heating. Heat pumps difficult to retrofit; easier to include in new-build.

# Direct Control: Outcomes

**Q. What is the customer proposition and how effectively does the trial suggest it could be realised?**

- Direct control of individual appliances: in CLNR, washing machines and heat pumps.
- Initial indications are that reduction in peak is small. Unlikely to be cost-effective for DNO use alone, although would be beneficial to DNOs if offered by suppliers as part of a ToU package.

**Q. Have any consumer risks been identified and what protection measures have been identified to overcome these?**

- Customer override – the manufacturer insisted on this feature. Much of the DSR functionality is around intelligent scheduling around the tariff(RH)/event(DC).

**Q. Which consumer segments would be most likely to gain or lose by the scheme and by how much?**

- We have not observed socio-demographic consumer segments, except in very broad economic terms

# Direct Control: Technical

**Q. What notification of DSR actions or coordination with other parties would be required if this approach becomes business-as-usual to ensure any interactions or impacts could be managed?**

- If offered by suppliers, notification from/to DNOs would be crucial, specifically around the signals sent to clustered customers.

**Q. For LCNF projects involving Smart Meters, do your initial findings indicate any enablers that may accelerate or increase the expected benefits from Smart Meters?**

- None from this intervention.

# Time of Use: Outcomes

## **Q. What is the customer proposition and how effectively does the trial suggest it could be realised?**

- Time of Use tariff for general households.
- 10% reduction at peak, 3% overall. Results for ToU with heat pumps to follow.

## **Q. Have any consumer risks been identified and what protection measures have been identified to overcome these?**

- Safety net provided in trial to ensure that customers did not lose out from involvement in trial. 40% of customers who took part would have paid more if the safety net had not been in place. Further analysis being undertaken to understand the implications of this. Whether or not a safety net would be used for BAU is a marketing decision for suppliers.

## **Q. Which consumer segments would be most likely to gain or lose by the scheme and by how much?**

- We are investigating which households were worse off under ToU to see if we can establish any patterns which would predict which households would be worse off

# Time of use: Technical

**Q. What notification of DSR actions or coordination with other parties would be required if this approach becomes business-as-usual to ensure any interactions or impacts could be managed?**

- Implementation needs involvement of energy supplier.

**Q. For LCNF projects involving Smart Meters, do your initial findings indicate any enablers that may accelerate or increase the expected benefits from Smart Meters?**

- Supports the business case for smart meters. Interviews suggest that the installation of a smart meter was a key factor in encouraging change in energy use. However, ToU trial participants also made greater use of IHD and reduced demand compared with BG customers with smart meters alone.
- Supports the idea that smart meters are a useful ‘intervention’ – and it is their ‘installation’ rather than the detailed information they provide that is most likely to make a change in energy use take place. Hence the process of installation and education provided to customers is crucial.

# Outcomes – Overall Learning

- Customers are willing to participate in DSR, notably ToU for households in general and within premises balancing by households with PV.
- ToU has demonstrated average reductions at peak times and overall. However, a significant minority would have been worse off, and this requires further investigation.
- Successful implementation in BAU should take account of the findings that:
  - Customers have a range of motivations: opportunity to save money on energy bills, budget management, environmental issues and oversight of household members.
  - Usually women take the actions which provide DSR, which is important in terms of different forms of motivation and response.
  - Installation of smart meter was a key factor in encouraging change in energy use, and IHD further supports and enables this.

# Any Questions?

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