



# Contents

## 4 Foreword

## 7 Fuel poverty

## 8 About Challenge 100

- 8 The objectives
- 8 Literature review
- 9 Operational delivery
- 10 Challenge 100 measures
  - Energy efficiency
  - Income maximisation
  - Energy costs

## 12 Methodology

- 12 Inclusion criteria and participant selection
  - Scenarios
  - Definition
  - Pre-selection and marketing approach
  - Initial assessment
- 14 Measuring and evaluating impacts
  - Energy efficiency
  - Energy costs
  - Participant experience

## 16 Data and results

- 16 Take-up rates
- 18 Participant profile
  - Urban and rural areas
- 19 Subjective perception of fuel poverty
- 20 Impacts of energy efficiency measures
  - Urban and rural areas
- 21 Thermal imaging
- 22 Energy efficiency installations
  - Case studies
- 24 The impact of ground source heat pumps on fuel poverty
  - Case study
- 26 Impact on thermal comfort
  - Increasing thermal comfort
  - Relative humidity levels
  - Energy efficiency and thermal comfort levels
- 30 Income maximisation
  - Take-up rate
  - Impacts of the income maximisation package
  - Case study
  - Further investigation into reasons for refusing the income maximisation package
- 36 Energy costs
- 38 Education, advice and behavioural changes
  - Energy monitors
  - Energy efficiency advice
  - Community Energy Volunteers (CEVs)
  - Case study
- 43 Operational delivery learning
  - Selection and participant engagement
- 44 The Challenge 100 experience
  - Recommending Challenge 100
- 46 The Challenge 100 journey
  - Delivery of energy efficiency installations

## 48 Key findings

- 50 The role of E.ON in eradicating fuel poverty
  - Energy efficiency installations
  - Education and advice
  - Energy costs
  - A holistic approach
- 51 The role of partners and benefits of collaborative working
- 51 The role of government and the policy changes required

## 52 Recommendations

- 52 What needs to be done?
- 52 How can fuel poverty programmes be effective and efficient?
- 52 Where is special focus needed?

## 53 Next steps

## 54 Appendices

- 54 Executive summary of literature review
  - Key measures
- 57 Challenge 100 NPS questionnaire
- 57 Challenge 100 CEV questionnaire
- 58 Measures installed by household

# Foreword

from Dr Paul Golby



When we launched Challenge 100 in November 2009, I was delighted that by focusing the support that we and our partners were able to provide in our 'One Stop Shop', we would be making a real difference for 100 families, in 100 homes, in 100 days. Too often fuel poverty projects are about theory not action, and we wanted to change this.

Challenge 100 has given us practical insights into what types of support really work and we'll be making changes to our business as a result. There are still too many people struggling to affordably heat their homes and we need to ensure the products and programmes designed to help are effective, given the expectation that energy prices will continue to rise.

We found that changing the condition of the home and the behaviour of the family, through energy efficiency measures and advice, is the most sustainable way of reducing fuel poverty. Energy efficiency measures alone led to fuel poverty being eradicated in 45% of our Challenge 100 families. By improving the properties' energy efficiency ratings, we could ensure a long-term reduction in the householders' energy costs. It sounds simple, but in practice implementing this is much harder. Families often don't want intrusive measures, or simply don't believe they can save money. Energy efficiency programmes also have to truly engage the community.

We found that it was critical to educate householders about the way they use energy, if the projected savings from energy efficiency installations were to become real savings on their bills.

I know we have the in-house expertise to deliver this support and we've been doing so for a number of years. But sometimes the Government's frameworks weren't flexible enough to allow us to install the energy efficiency measures a family needed. This has to change if we are to make a real difference. We also found that, in some cases, we couldn't take a family out of fuel poverty because their household income was too low. As an energy supplier, we don't have the expertise to provide the support these families need. I'd like to see suppliers being supported further so that families get the full package of support.

We're now looking at how we integrate our findings into support for vulnerable customers, but we also need to see some leadership from the Government. The introduction of the Green Deal is the perfect opportunity to make a difference to families living in fuel poverty.

The Government must draw on projects like Challenge 100 to make sure that fuel poor families don't miss out on the Green Deal and to make sure that it's a fair deal for the fuel poor.

Dr Paul Golby,  
Chief Executive, E.ON UK



## Fuel poverty

Fuel poverty is a complex issue that arises from a simple problem: the inability to heat one's home affordably. The Government's definition of fuel poverty is a household that needs to spend more than 10% of its full income on fuel to keep the home warm. The most recent government statistics suggest that over 4 million UK households currently live in fuel poverty – around 16% of all homes in the UK<sup>1</sup>.

It's widely recognised that there are three main causes of fuel poverty:

- inefficient use of fuel, caused by poor heating and inadequate insulation
- low household income
- energy costs.

Along with other energy suppliers, we're committed to investing substantial resources to help improve energy efficiency in the home and ease fuel poverty. By 2012, the UK energy industry will have spent over £5 billion on energy efficiency measures through national programmes such as the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP). A significant part of this sum is targeted at people aged 70 and over and households that receive means-tested or disability-related benefits.

At E.ON, we're committed to further helping our most vulnerable customers by investing £59 million in our social programme by 2011. The programme gives vulnerable customers access to a range of specialist products and services designed to reduce energy bills, improve energy efficiency and increase household income. These measures help our customers to heat their homes more affordably.

As well as the work the energy suppliers are doing, many other organisations provide support to people living in fuel poverty, including charities, healthcare services and local and national Government. There are a range of initiatives in place which all tackle fuel poverty in different ways. This situation is made more complicated by the fact that there isn't just one type of fuel poor customer and therefore, there can't be a 'one size fits all' solution. This has led to a variety of approaches and to fuel poverty programmes becoming increasingly complex.

Challenge 100 aimed to unravel some of this complexity by showing us the best and most efficient ways to get help to those people who need it the most.

<sup>1</sup>The latest data is for 2007 and is available at: [www.decc.gov.uk/assets/decc/Statistics/fuelpoverty/1\\_20091020153241\\_e\\_@\\_@\\_annualreportfuelpovertystats2009.pdf](http://www.decc.gov.uk/assets/decc/Statistics/fuelpoverty/1_20091020153241_e_@_@_annualreportfuelpovertystats2009.pdf)

# About Challenge 100

## The objectives

The aim of Challenge 100 was simple: to eradicate fuel poverty for 100 families, in 100 homes, in 100 days.

Challenge 100 focused our efforts on finding out what positive changes we could achieve in 100 days, during the coldest months of the year. This would help us understand where:

- we can tackle fuel poverty alone
- we need to work with partners and assess the benefits of partnership working
- the Government needs to make policy changes to make it possible to lift every household out of fuel poverty as effectively and quickly as possible.

As an energy supplier, we know we don't have all the answers to eradicating fuel poverty. So it was essential to establish strong and effective partnerships to ensure we could make the biggest possible difference to our 100 families.

We put together a coalition of 12 expert partners from the public, private and charity sectors, and drew on their expertise to support Challenge 100's strategic direction and peer review. A collaborative literature review was conducted by Loughborough University and E.ON, and Loughborough University has continued to help ensure the project's rigour by critically reviewing our methodology, approach and data analysis.

## Literature review

The literature review carried out by Loughborough University and E.ON assessed the work done to date on the major issues and barriers associated with tackling fuel poverty in the UK.

The literature review is summarised in the appendices. The key findings shown below, alongside input from our expert partners, steered our approach to how we should design the Challenge 100 project.

### Designing the Challenge 100 project

- Subjective measures of fuel poverty should be used as well as the standard objective measures.
- Actual levels of income, fuel consumption, thermal comfort and dwelling efficiency (SAP rating) should be recorded for each household.
- When introducing technology into a household, we must also educate the householder about energy use in a way that will create long-term behavioural change. Therefore, it's vital to include ongoing monitoring and feedback in any fuel poverty programme and especially in Challenge 100.
- Fuel poverty measures must include a benefit entitlement check and follow-up support to make sure the benefits are actually claimed. The claims process merits further investigation regarding trigger points and intervention.
- Where possible, we should avoid implementing energy efficiency measures that need planning permission, as this causes delays. This recommendation meant we were unable to use some microgeneration technologies for Challenge 100.
- It's critical to accurately monitor the temperatures of all habitable rooms and the actual amount of energy used at the property, so that we can properly assess the difference our interventions have made.
- The relationship between stakeholders is highly complex. Further analysis is needed in this area to fully understand the barriers to delivering fuel poverty solutions.

## Operational delivery

Challenge 100 took place in three urban areas: Birmingham, Luton and Manchester, and two rural areas: County Durham and South Staffordshire. We worked in partnership with the local authority in each area.

We took a 'community' or 'whole street' approach to delivering Challenge 100 so we didn't only target E.ON customers. Anyone affected by fuel poverty living in our selected streets, regardless of their energy supplier, was eligible to take part.

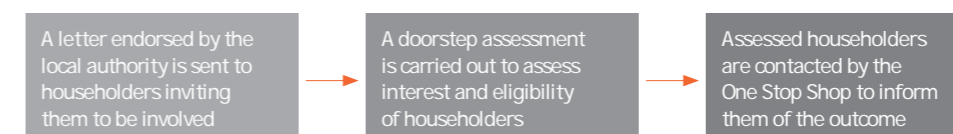
The literature review suggested that major fuel poverty stakeholders, such as energy suppliers, could provide more guidance for people in difficulty. Therefore, to support the project, we set up our One Stop Shop - a single point of contact with a freephone number - to proactively manage the delivery of the project's interventions in a coordinated and holistic way. This enabled us to provide effective and efficient support for our 100 households. The One Stop Shop was based on our own expertise, as well as our partners', to ensure each household could access specific support and advice tailored to their individual circumstances.

Face-to-face energy efficiency advice was also provided by Community Energy Volunteers (CEVs) during the project.

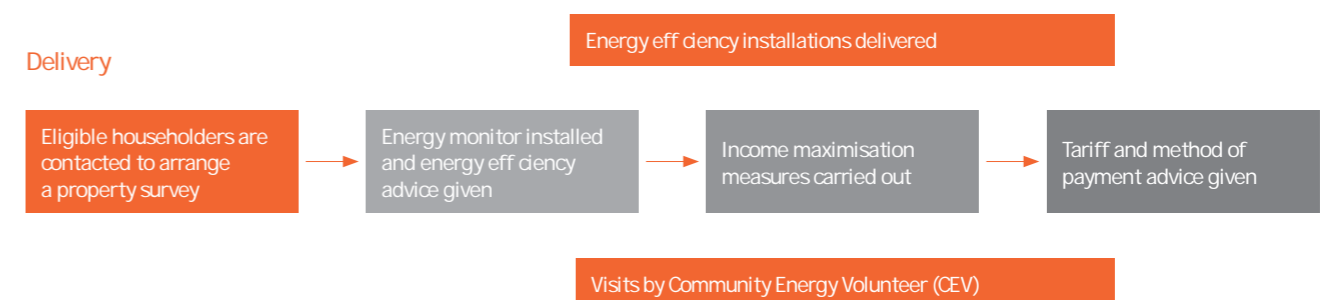
Figure 1 illustrates the Challenge 100 journey and each point of intervention for our participating families.

Figure 1 – The Challenge 100 journey

### Recruitment and selection



### Delivery

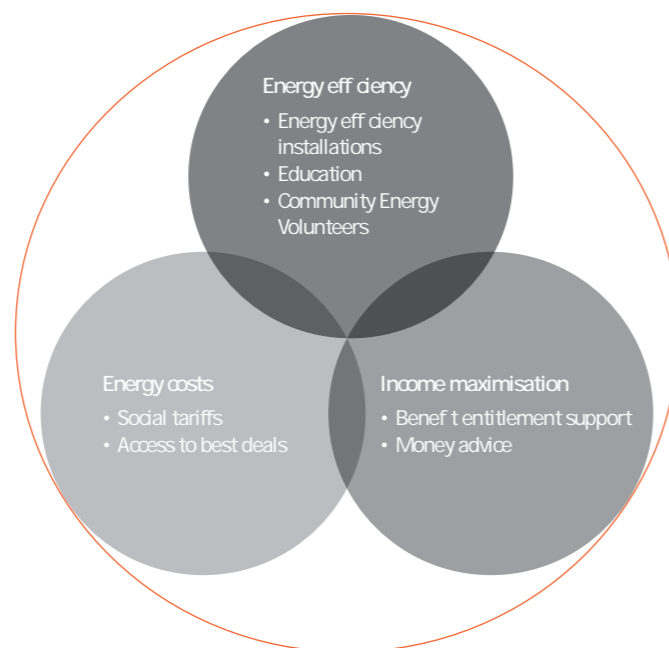




## Challenge 100 measures

Because there's no 'one size fits all' when it comes to fuel poverty, Challenge 100 was designed to deliver a combination of practical measures to address the individual needs of our 100 different families. The measures aimed to tackle all three recognised causes of fuel poverty – inefficient fuel use, low household income and energy costs – through different social and technical interventions. Through this holistic approach, we could manage the end to end support for our families in a coordinated way. Figure 2 illustrates the holistic approach and the different measures offered during the project.

Figure 2- Measures offered during Challenge 100



### Energy efficiency

Poor energy efficiency in the home is a major contributor to fuel poverty, so energy efficiency installations formed a crucial part of Challenge 100. To enable us to fully understand the best ways that energy suppliers can provide support, it was important that the measures used in Challenge 100 were consistent with those that are already available within the Government's existing frameworks for energy efficiency. These are the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP). Using these frameworks would also allow us to identify sustainable solutions which could be rolled out on a larger scale.

The CESP and CERT frameworks offer incentives for installing different types of energy efficiency measures. For example, solid wall insulation can be installed under the CESP scheme, but isn't cost-effective under CERT. Because CESP isn't available in rural areas, the measures we installed within Challenge 100 varied significantly between urban and rural areas. This helped us identify what support we can offer to the fuel poor under the existing frameworks.

We combined the energy efficiency installations with behavioural measures to advise families on how to best use energy. An energy monitor as well as energy efficiency advice was also given to each family to help them understand their energy use, and how they could reduce their consumption.

### Income maximisation

Combined with poor energy efficiency in the home, low income is a fundamental factor in fuel poverty. Therefore, maximising a family's income is key to reducing fuel poverty. We carried out benefit entitlement checks and budget reviews for each household that agreed to the package. Each individual family was offered end to end support, from reviewing their benefit entitlement to helping them fill in the forms and send them to the relevant departments. Debt advice was also provided where needed and if a householder's debts were found to be unmanageable, they were referred to the National Debtline for further support.

### Energy costs

Our One Stop Shop advisers gave tariff advice and information to all households in Challenge 100. Advice given to non-E.ON customers was generic and covered the advantages and disadvantages of certain payment types and tariff structures. They also suggested that householders ask their suppliers about social tariffs and to be added to the Priority Service Register where appropriate.



# Methodology

## Inclusion criteria and participant selection

### Scenarios

It was important that the 100 families across our five selected areas represented a reasonable cross-section of the actual household types found to be in fuel poverty.

The 100 households were selected using a case study approach across five scenarios identified in the literature review where households were considered to be at high risk of being fuel poor.

These five scenarios are:

- older people living in a rural area
- families living in a rural area
- older people living in an urban area
- two parent families living in an urban area
- lone parent families living in an urban area.

Each household was treated as a case study in its own right, providing practical and real insight into the issues that people face.

### Definition

Fuel poor households were targeted using the Government's definition of fuel poverty: a household that needs to spend more than 10% of its full income on fuel to maintain an adequate level of warmth<sup>2</sup>. The 'full income' used in this definition includes all benefits that the household receives, including those that are housing-related such as Housing Benefit.

The literature review had highlighted that various groups have criticised this definition of fuel poverty. However, fuel poverty reporting tends to be given solely in terms of the Government's fuel poverty measures, making it hard to assess what a representative sample would look like if other definitions were used. Moreover, government reports tend to focus on the 'full income' measures, which is why we decided to use the Government's definition as our inclusion criteria for Challenge 100.

### Pre-selection and marketing approach

Working in partnership with local authorities, we identified key areas for recruitment of families for Challenge 100.

The urban areas selected were all ranked in the lowest 10% of areas in the Index of Multiple Deprivation (IMD)<sup>3</sup>, where CESP is the funding mechanism used to deliver energy efficiency installations<sup>4</sup>. We worked closely with local authorities in Birmingham, Luton and Manchester to identify 'Lower Super Output Areas' suitable for Challenge 100.

For the rural areas, we worked with our partners at Durham County Council and South Staffordshire Council to identify the communities that would benefit most from the project.

Once we'd identified suitable streets, we sent a letter, endorsed by the local authority, to households within our target areas. The letter outlined the benefits of the project and told the householder that a Challenge 100 assessor would soon visit.

### Initial assessment

Within days of target households receiving the letter, we carried out doorstep assessments to identify the exact homes to be included in Challenge 100. The assessment took the form of a five minute questionnaire that was designed to ascertain the property's energy efficiency performance and each household's income level.

The energy efficiency assessment included questions around:

- the property's age
- its type of glazing
- wall and loft insulation
- space and water heating systems and their controls.

The answers to these questions allowed us to generate a Standard Assessment Procedure (SAP)<sup>5</sup> rating, which we used to estimate the amount each household would need to spend on fuel to maintain an adequate level of warmth. This approach was originally designed by Warm Zones and has been adopted as good practice in other schemes.

We knew householders might not want to disclose their exact income on the doorstep, so they were asked to choose from a list of 25 different income levels and a list of benefits which best represented their situation. Whilst this method was practical, we had to take into account that the information we collected was limited to what the householder was willing to disclose.

The Fuel Poverty Index was calculated by comparing the ratio of estimated fuel spend to the household's income level. The Fuel Poverty Index is the percentage of income that must be spent to keep the home adequately warm. All households assessed as having a Fuel Poverty Index of 9.5% and above were included in Challenge 100.

<sup>2</sup> Adequate level of warmth is usually defined as 21°C for the main living area, and 18°C for other occupied rooms.

<sup>3</sup> [www.communities.gov.uk/publications/corporate/statistics/ehcs2007headlinereport](http://www.communities.gov.uk/publications/corporate/statistics/ehcs2007headlinereport)

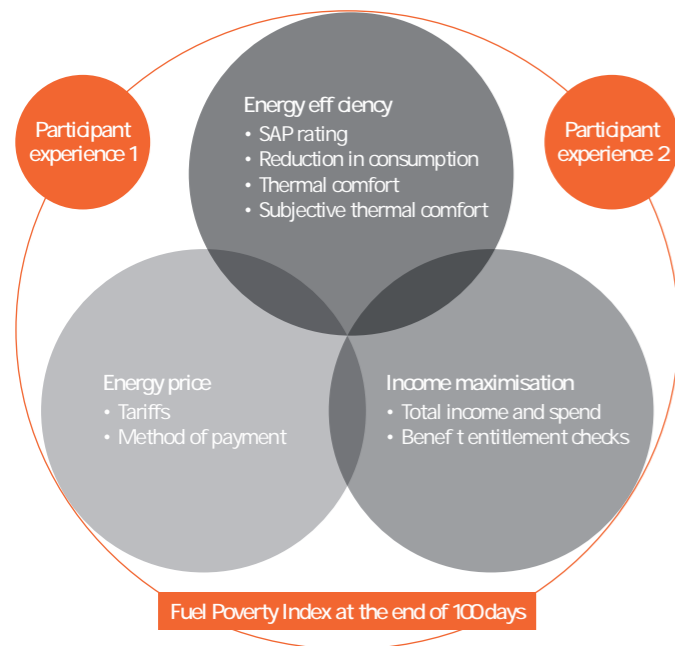
<sup>4</sup> CESP is a government programme targeted to the lowest 10% Super Output Areas across the UK.

<sup>5</sup> SAP is the Government's standard methodology for home energy rating.

# Measuring and evaluating impacts

A key part of Challenge 100 was to assess the difference that our interventions made for the 100 families, in 100 days. A series of Key Performance Indicators (KPIs) was measured at the beginning and end of the project, helping us to understand the impact of the different interventions that we delivered. The KPIs are summarised in Figure 3.

Figure 3- Key Performance Indicators to measure impacts



## Energy efficiency

### Standard Assessment Procedure (SAP) rating

SAP rating is a key indicator used to assess a property's energy efficiency performance. For Challenge 100, we used the information collected during the doorstep assessments to generate a SAP rating. We then calculated individual SAP ratings and estimated fuel spends for each property using software developed by National Home Energy Rating (NHER). The software makes assumptions about a property's energy consumption based on its physical characteristics and the number of people living in the house. At the end of the project, we used the same methodology to generate a final SAP rating and calculate the estimated fuel savings after energy efficiency measures had been installed.

### Energy consumption

To understand whether the estimated fuel savings turned into real savings for each household, we tracked their gas and electricity consumption throughout the project and after we'd finished installing the energy efficiency measures. The consumption was tracked by taking weekly meter readings. We used historical billing data, from up to 12 months before the Challenge started, as a baseline to compare each household's fuel consumption before and after the energy efficiency installations. At the time of publishing this report, it was too soon after the interventions to quantify the impacts on energy consumption. We'll keep monitoring consumption to ensure we fully understand how our interventions translate into real energy savings.

### Thermal comfort

Thermal comfort is a key measure in any fuel poverty project as the ultimate aim is to ensure people can afford to heat their homes at a comfortable level.

To identify a change in thermal comfort, we tracked the internal temperature and humidity of each house by installing data loggers in the main living area and the master bedroom. Where possible, we took readings during the project and up to six weeks after we'd finished installing energy efficiency measures.

## Energy costs

Our One Stop Shop advisers provided tariff advice and information to all households in Challenge 100, to both E.ON and non-E.ON customers. For E.ON customers, we could use our system to review any tariff changes and the impact these had on the families' energy costs. But for non-E.ON customers, although we had access to some tariff information through their billing histories, we could only measure the impact of any tariff changes if the householders in question told us they had changed tariffs as a result of advice given by our One Stop Shop. Within these limitations, the data gathered still provides a useful insight into the impact of tariff advice on reducing fuel poverty.

## Participant experience

The most important aspect of Challenge 100 was 'the human factor' - measuring the difference we could make to the lives of our families. Therefore, the quality of their experience was one of the project's key success measures. To assess the householder experience, we used a 'Net Promoter Score' (NPS), which is a measure of customer satisfaction commonly used within our business. The NPS is built around a single question: "How likely are you to recommend Challenge 100 to friends or family?" The question is then followed by an interview which gathers background information about the score given.

Our CEVs also completed questionnaires with the families during their visits to gather further information. They asked questions around thermal comfort, for example, to find out if householders could keep warm in the main living area and if they had to wear an outdoor coat and/or use a blanket to do so. Householders were also asked about behavioural changes they might have made after the energy efficiency measures and energy monitors were installed so we could understand if there were additional benefits. The CEV and NPS questionnaires can be found in the appendices.





# Data and results

## Take-up rates

Table 1 shows the take-up rates at each step of the recruiting process by operating area.

Table 1

Take-up rates by area						
Operating area	Marketed (Household received the initial marketing letters)	Assessed (Household answered the door step assessment questionnaires)	Included (Household fitted inclusion criteria and agreed to Ts & Cs)	Excluded (Household not fuel poor)	Excluded (Household refused to take part)	Take-up rate (Household included/household marketed)
Birmingham	115	79	41	28	10	35.7%
Luton	93	56	24	28	4	25.8%
Manchester	115	46	19	17	10	16.5%
County Durham	73	48	10	17	21	13.7%
South Staffordshire	38	12	8	3	1	21.1%
<b>Total</b>	<b>434</b>	<b>241</b>	<b>102</b>	<b>93</b>	<b>46</b>	<b>23.5%</b>

Take-up rates varied depending on the location, with the highest take-up being in Birmingham (see Table 1). Other urban areas were slightly less successful with take-up rates of 25.8% for Luton and 16.5% for Manchester.

We found that partnerships with local authorities were essential for successful community engagement. The proximity of the houses, as well as the local sense of community, played a key role in ensuring a higher level of take-up, particularly in urban areas.

We observed that take-up was increased by the impact of neighbours, relatives and community spirit in creating word of mouth around the project. Even after the assessors had left the community, we received a number of self-assessments and requests from people who wanted to be part of Challenge 100. The presence of our assessors in the streets and in the local community centre during the recruitment process also played a crucial role by bringing the project to life for householders and answering their questions. However, we recognise that trust takes time to build up, and focusing the project over a short time period may have had an impact on the level of take-up.

We found that more than a third of the householders we approached in the urban Lower Super Output Areas were not fuel poor according to the Government's definition and our methodology, so we couldn't include them in Challenge 100. However, this is a higher percentage than might be found in other areas<sup>6</sup>.

In practice, the recruitment process in rural areas was more difficult, although the take-up rates were similar to those in urban areas. Less dense housing meant that we couldn't use the 'whole street' approach to encourage take-up. This also made the doorstep assessments difficult and we had to do most of the initial assessments by phone. We also had to exclude more households from the project as initial assessments showed them not to be fuel poor. One of the rural areas was mostly comprised of privately rented properties, which created an extra hurdle. Some tenants wouldn't take part in the project because they were worried their landlords would increase their rent after improvements were made to the house.

<sup>6</sup> Average for West Midlands is 20.3%, North West is 27.3% and Eastern is 16.2% ([www.nea.org.uk/assets/North-East.pdf](http://www.nea.org.uk/assets/North-East.pdf))

# Participant profile

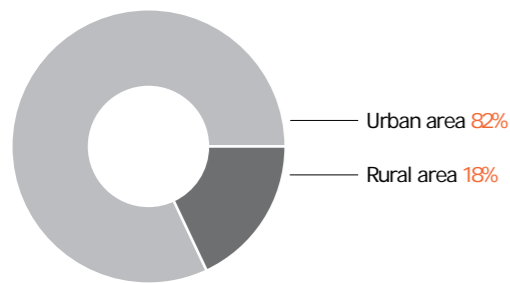
The project was designed using a case study approach across five scenarios where households were considered to be at high risk of being fuel poor.

The breakdown of our 102 households by area, by scenario and type of tenure is illustrated in Figure 4.

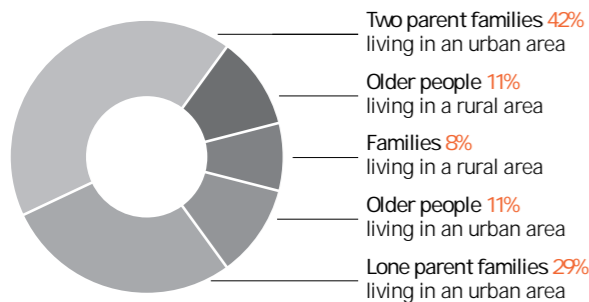
The different characteristics of the households chosen for Challenge 100 are shown by operating area in the tables opposite.

Figure 4 - Participant profile

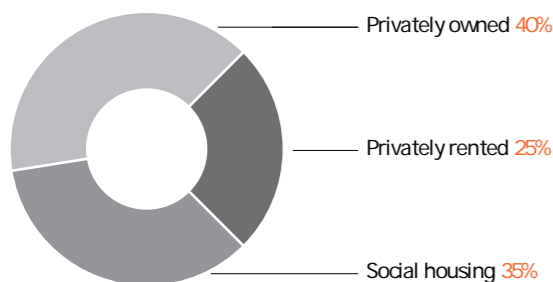
### Coverage by area



### Coverage by scenario



### Coverage by tenure



Using information collected in the doorstep assessment, we selected households for Challenge 100 that were found to spend more than 9.5% of their income on energy. Once included in the project, we then reviewed their income against the benefit entitlement being claimed and found that nine households weren't actually fuel poor.

We recognise that this is a limitation of our methodology. However, given the widely-recognised difficulties in identifying the fuel poor and the practicality required for a project like Challenge 100, we consider the recruitment process to have been successful.

### Urban areas

Table 2

Average figures					
Operating area	Number of homes	SAP initial	Annual energy costs (£)	Annual income (£)	Fuel Poverty Index
Birmingham	41	51.3	1162	9160	14.9
Luton	24	49.6	1172	8828	15.0
Manchester	19	48.8	1057	8053	14.7

The properties chosen in the urban areas were terraced houses built before 1900 and with solid walls. As local authorities in these areas already had initiatives in place to support energy efficiency measures, some of the properties already had double glazing, loft insulation and energy efficient boilers. The average SAP rating for all urban areas was around 50, which is in line with the national average according to the English House Condition Survey (EHCS) 2007<sup>7</sup>.

The level of unemployment in these areas is high, especially in Luton where 42% of households recruited had no one in the family who was working. As a result, most of these households were on low incomes with an average annual income of £8,000 to £9,200 across all areas. This shows how important it is to support these households, not just through energy efficiency measures, but also through the income maximisation package.

### Rural areas

Table 3

Average figures					
Operating area	Number of homes	SAP initial	Annual energy costs (£)	Annual income (£)	Fuel Poverty Index
County Durham	10	38.6	1230	9703	13.3
South Staffordshire	8	15.6	1847	10105	20.8

The SAP ratings for the selected rural properties were significantly lower than urban ratings, with an average of 38.6 for County Durham and 15.6 for South Staffordshire. Although these are based on a small number of properties, this reflects the presence of 'Hard to Treat' homes in rural communities. Neither of our sample areas are on the gas network; instead the households use oil, coal or electricity for heating.

<sup>7</sup> www.communities.gov.uk/publications/corporate/statistics/ehcs2007headline-report

# Subjective perception of fuel poverty

Findings from the literature review suggested that we should use a subjective measure of fuel poverty as well as the standard objective measures. In the doorstep assessment, all householders were asked: "During the cold weather, can you normally keep warm in your living room?" Based on a similar question in the EHCS, this question was included so we could gain an insight into householders' own perceptions of their thermal comfort in winter<sup>8</sup>.

If respondents answered "No", we asked a further question to find out if this was because it cost too much to keep the heating on, and/or if it simply wasn't possible to heat the room to a comfortable standard. Householders who said they couldn't keep warm in their main living room because it cost too much to heat were classified as being 'self-reported' fuel poor.

The number of self-reported fuel poor is outlined in Table 4. It also shows which members of this group were identified as fuel poor according to the Government's definition and therefore selected as part of Challenge 100.

Table 4

Subjective fuel poor			
	Self-reported fuel poor	Not self-reported fuel poor	Total
Fuel poor (spend > 10%)	49	93	142
Not fuel poor (spend < 10%)	28	57	85
<b>Total</b>	<b>77</b>	<b>150</b>	<b>227</b>

The response rate for this question was 94%.

Overall, studies highlighted in the literature review indicate that more people are in self-reported fuel poverty than are 'officially' in fuel poverty according to government figures. The Challenge 100 results imply that there is no clear link between subjective thermal comfort and the Government's definition of fuel poverty. Results also suggest that the number of those who 'feel' fuel poor is well below the number of those who are actually fuel poor, contrary to what has been shown in other studies.

These results mean that even if some households weren't selected as part of Challenge 100, some might still feel unable to afford their bills. Whilst this is a small number, it illustrates the difficulties in addressing fuel poverty and in identifying fuel poor households.

<sup>8</sup> Defra/BERR (2008), The UK Fuel Poverty Strategy 6th Annual Progress Report, joint publication by the Department for the Environment, Food and Rural Affairs and the Department for Business, Enterprise and Regulatory Reform.



<sup>7</sup> www.communities.gov.uk/publications/corporate/statistics/ehcs2007headline-report

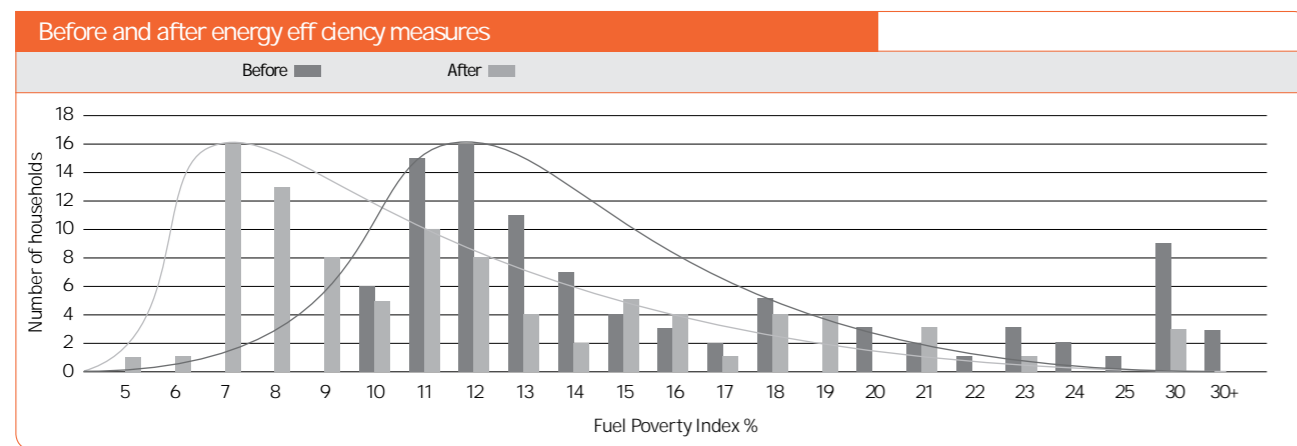
# Impacts of energy efficiency measures

Figure 5 shows the number of households against the Fuel Poverty Index before and after energy efficiency installations. We couldn't eradicate fuel poverty in every household with energy efficiency measures alone. However, a marked improvement can be seen to the left of the chart, by the increasing numbers of households having lower fuel poverty indexes after insulation was installed.

Most families that were taken below the 10% fuel poverty threshold had an initial Fuel Poverty Index of 13.5% or less. This demonstrates that energy efficiency measures can only be effective to a certain point and that a holistic approach to tackle all causes of fuel poverty is essential.

Tables 5 and 6 show the average SAP and Fuel Poverty Index ratings before and after energy efficiency measures were installed, as well as the average estimated annual fuel cost savings. Full details about the measures installed and impacts on each individual household can be found in the appendices. These reflect the different types of energy efficiency measures covered by the CERT and CESP frameworks.

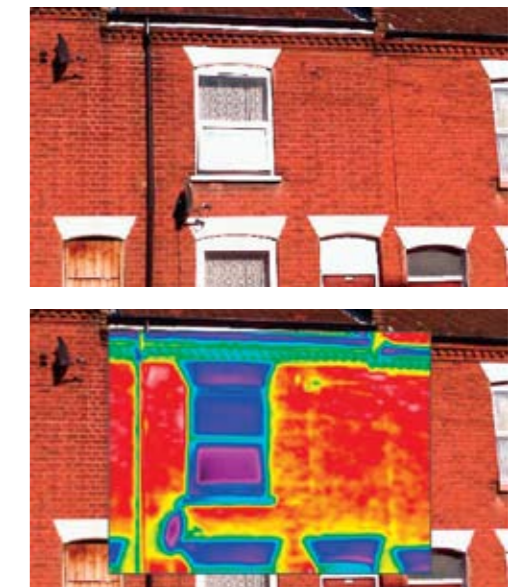
Figure 5- Number of households by Fuel Poverty Index



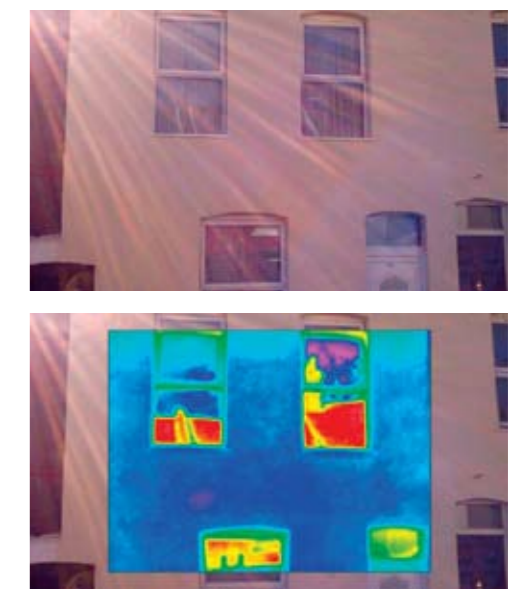
# Thermal imaging

These thermal images show the energy efficiency improvement that results from installing external wall insulation. The pictures were taken on the same day in similar external conditions. Blue images indicate cooler surface temperatures while the redder images indicate warmer surface temperatures caused by heat loss.

House without external wall insulation



House with external wall insulation



## Urban areas

Table 5

Average figures						
Operating area	Numbers of homes	SAP initial	SAP final saving	Annual costs (£)	FPI initial	FPI final
Birmingham	41	51.3	64.1	310	14.9	10.9
Luton	24	49.6	66.6	383	15.0	10.4
Manchester	19	48.8	67.6	372	14.7	9.5
Average	84 (total)	49.9	66.1	355	14.9	10.3

The urban areas' SAP ratings improved from an average of around 50 to 66 after energy efficiency measures were installed under CESP, resulting in an expected average cost saving of £311 to £383 a year.

External wall insulation was the single most effective measure and increased SAP ratings by 6 to 24 points, depending on the property's wall surface area. This measure alone could lead to savings of more than £700 a year on energy bills (see Table 21 in appendices).

A small number of houses in Birmingham fell outside the Lower Super Output Area that was targeted for CESP, so we were only able to use CERT measures for these houses. However, most of the properties were solid wall and Birmingham City Council had already run several initiatives to promote loft insulation, so no further measures could be funded under the CERT framework. Therefore, we couldn't install any more energy efficiency measures at these properties.

Based on these initial results, the energy efficiency measures that we delivered under CESP had the biggest impact on reducing fuel poverty levels and led to fuel poverty being eradicated in 48% of our urban households<sup>9</sup>.

## Rural areas

Table 6

Average figures						
Operating area	Numbers of homes	SAP initial	SAP final saving	Annual costs (£)	FPI initial	FPI final
County Durham	10	38.6	46.5	199	13.3	11.3
South Staffordshire	8	15.6	30.0	471	20.8	15.6
Average	18 (total)	27.1	38.3	335	17.1	13.5

In County Durham average SAP ratings increased from 38.6 to 46.5 and in South Staffordshire from 15.6 to 30. Based on these results, five households were taken below the 10% fuel poverty threshold and we eradicated fuel poverty in 33% of our rural households<sup>9</sup>.

<sup>9</sup> This excludes the householders who have been included in Challenge 100 but were ultimately found not to be fuel poor.

## Energy efficiency installations

### Case study: Lone parent family living in an urban area

A single mother and her child live in a two bedroom council house in an urban area. It's a solid walled mid-terraced house, built before 1900, and has double glazing, an insulated loft and a combination boiler that includes a programmer, room thermostats and thermostatic valves. The initial SAP rating of the property was 50, resulting in an estimated energy cost of £1,100 a year.

When we asked the participant if she can keep warm in the living room during cold weather, she answered "No", as it costs too much to do so. She is currently unemployed and has an annual income of around £4,200. She receives Housing Benefit, Council Tax Benefit and Income Based Job Seekers Allowance. Her initial Fuel Poverty Index was 26.1%.

During the project, we installed external wall insulation at the property. This measure alone led to a significant improvement in the SAP rating from 50 to 69. This represents an estimated annual saving of £417 on energy bills. The participant declined the income maximisation package, so we weren't able to improve her income. Her final Fuel Poverty Index was 16.2%.

Our One Stop Shop also contacted her to give energy efficiency advice over the phone. The participant had her heating set at 30°C, so the adviser explained she could turn the temperature down to reduce her energy consumption whilst staying comfortably warm. As she was also using electric heaters, the adviser told her about the benefits of using these less as well as the benefits of switching off appliances instead of leaving them on standby. The participant also received an energy monitor although, as she has a prepayment meter, she said she already knows how much energy she uses.

The single measure of fitting external wall insulation had a great impact on reducing this participant's fuel poverty level. However, it wasn't enough to completely eradicate fuel poverty in this case.

### Case study: Two parent family living in an urban area

A couple privately rent a two bedroom mid-terraced house in an urban area where they live with their two children. It's a solid wall property built before 1900 which has double glazing, an insulated loft and a combination boiler. The initial SAP rating of the property was 50 and the annual energy cost was estimated at around £1,140 a year.

When we asked the participants if they can keep warm in the living room during cold weather, they initially answered "No", as it costs too much to do so. One of the couple works full-time and the other is in full-time education. They receive Housing Benefit, Child Tax Credit, Working Tax Credit and Council Tax Benefit. Their initial Fuel Poverty Index was 13.5%.

As part of the project, we installed external wall insulation to the property, which improved the SAP rating from 50 to 69. This represents an annual saving of around £419 on energy bills. The participants declined the income maximisation package, so we weren't able to improve their income. Their final Fuel Poverty Index was 8.5%.

After the installation, they told our CEV they can now keep warm in the main living area and that they use less heating as a result.

In this case, external wall insulation alone eradicated fuel poverty for this family as well as increasing their thermal comfort.

These two case studies clearly show the major impact that energy efficiency installations can have on fuel poverty. The results also show that people in severe fuel poverty benefit the most from these installations, as the first case study saw a 10% reduction in the Fuel Poverty Index compared to a 5% reduction for the second case study.

However, the first case study demonstrates that energy efficiency installations aren't always enough to eradicate fuel poverty. It also highlights how important it is to maximise the income of those living in the most severe fuel poverty. In some situations, fuel poverty is simply a result of income poverty which, as an energy supplier, we can't directly influence.



## The impact of ground source heat pumps on fuel poverty

Ground source heat pumps are an appealing technology to address fuel poverty in rural areas, especially for houses that are off the gas network. The CERT framework will fund the installation of ground source heat pumps if:

- the property is off the gas network
- the property is privately owned or rented
- the householder is receiving certain benefits.

The subsidy level that we can offer for ground source heat pumps under CERT depends on the type of fuel that the ground source heat pump is replacing. As the CERT framework is based on the reduction of carbon emissions, the subsidy levels are based on how much carbon will be saved by installing the heat pumps through the funding framework.

Under this criteria, properties heated using coal or electricity are eligible for full subsidies, whereas those heated by oil and LPG receive subsidies of 40% and 25% respectively.

However, because it costs £12,000 to £14,000 to install a ground source heat pump, it isn't realistic to expect a fuel poor householder currently using oil or LPG to contribute £7,000 to £9,000 to this cost. So a ground source heat pump might not be an option for tackling fuel poverty in these households because of financial limitations.

Even if the householder does meet the criteria for a full subsidy, the property must still be surveyed to check if it's suitable for a heat pump to be installed. Because of the pump's technical limitations, heat loss is a key evaluation factor and it's often uneconomical to include households that have features such as solid walls. Also, the property needs to have suitable access for the drilling work that's required to install the heat pump.

For Challenge 100, nine properties were surveyed for suitability of ground source heat pump installation. Only two of these were potentially suitable. However, one property had to be further discounted as the heat loss would have been too great. It would have needed two heat pump units, which would have greatly increased the participant's installation and running costs.

We were left with just one participant that was potentially eligible. However, the participant wasn't claiming any of the benefits that the CERT framework requires in order to grant the full subsidy for installing the ground source heat pump.

As part of our Challenge 100 partnership, Durham County Council agreed to fund the installation to assess the suitability of renewable energy technologies for tackling fuel poverty.

### Case study: A lone person living in a rural area

A woman owns a three-bedroom house in a rural area where she lives on her own. It's an end-terraced house, built between 1950 and 1965. The property has double glazing and cavity walls which have already been insulated. The property is off the gas network and the main source of heat is coal. During the winter, the householder also uses three halogen heaters to keep warm. She uses an immersion heater for hot water. The property's initial SAP rating is 40, with an estimated annual fuel cost of £1,165.

The participant works full-time and is not in receipt of any benefits. She has an annual income of around £10,800 which results in an initial Fuel Poverty Index of 10.8%. Her level of income suggests she could be entitled to Working Tax Credit but she refused a benefit entitlement check.

At the outset, the participant wasn't convinced about the advantages offered by the ground source heat pump. She was worried it would increase her energy bills and had concerns about its reliability, as some air source heat pumps installed in her local area had experienced technical issues. Our team had several conversations with the participant to explain the process and the heat pump's potential fuel saving, and to ensure she fully understood the work involved in installing it.

She agreed to go ahead, and the installation started with the external works, which consisted of drilling vertical boreholes to accommodate the ground loops that would form the heat collectors.

The internal work included installing top-up insulation in the loft, pipe work, a new hot water cylinder, and new radiators. We also had to remove the coal fire due to the heat which would be lost through the flue. The coal fire was replaced with a wood burner.



In addition to the heat pump, the participant received an energy monitor and energy efficiency advice from a CEV. After the monitor was installed she radically changed the way she used energy, reducing her consumption by £14 a week. We also discussed tariff options with the participant as she is on a prepayment meter. However, she prefers this payment method as she has previously been in fuel debt, and feels the prepayment meter gives her better control over her spending on electricity.

After all the Challenge 100 measures, the property's SAP rating increased from 40 to 66. This was the highest SAP rating across all the households in our rural areas. This has resulted in an estimated annual saving of around £650 on the participant's energy bills and a final Fuel Poverty Index of 4.3%. This shows that, by using the right technology and encouraging behavioural changes, fuel poverty can be eradicated in rural areas.

However, the disruption associated with installing this technology and the level of customer support that's required must not be underestimated. We also found that the current CERT funding framework is too inflexible to enable fully-subsidised ground source heat pumps to be offered to a significant number of fuel poor households.



# Impact on thermal comfort

To measure the thermal comfort levels within our Challenge 100 houses, we placed data loggers in the properties' living rooms and bedrooms. These recorded the indoor air temperature and relative humidity levels at 15 minute intervals. We compared data from six houses in Birmingham that received energy efficiency installations, with six houses that didn't.

We chose data collected between 25th March 2010 and 26th March 2010 to be analysed for this report during which loggers were placed in all houses. We also obtained hourly external temperature data from the Met Office which was recorded by weather stations situated 1.4km from the test area<sup>10</sup>.

### Increasing thermal comfort

The houses that didn't receive any energy efficiency installation upgrades recorded living room and bedroom temperatures below 18°C, except for one that was kept constantly at 23°C. However, the houses that did receive energy efficiency installations were relatively warmer and mostly above 18°C<sup>11</sup>.

We analysed the temperature profiles (highs and lows) for each house. As seen in Figure 6 (A to D), whilst outdoor temperature had highs of 12.4°C and lows of 6.2°C, the houses that hadn't received any energy efficiency installations recorded a lower band of internal temperature, ranging

from 11.5°C to 21°C. When outdoor temperatures were at a low of 6°C, the temperatures in these houses fell to 13.5°C, giving an indoor to outdoor temperature difference of 7.5°C. The houses that received energy efficiency installations recorded a higher band of internal temperatures, mostly around 20°C, and a phase of 11.5°C when the outdoor temperature was at its lowest. The greater variation between indoor and outdoor temperature suggests that heat loss from these houses was reduced as a consequence of energy efficiency installations such as external wall insulation and loft insulation top-ups which had been installed at these properties.

Figure 6A – Living room temperature profile ranges

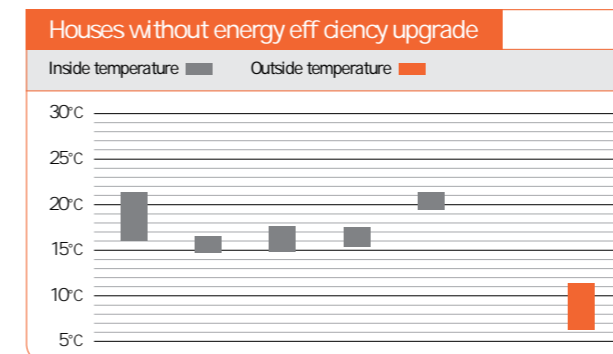


Figure 6B – Living room temperature profile ranges

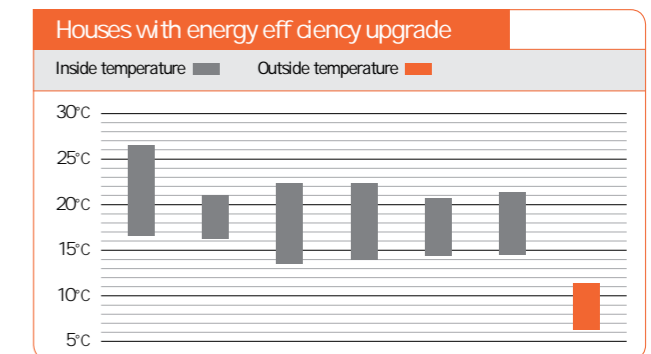


Figure 6C – Bedroom temperature profile ranges

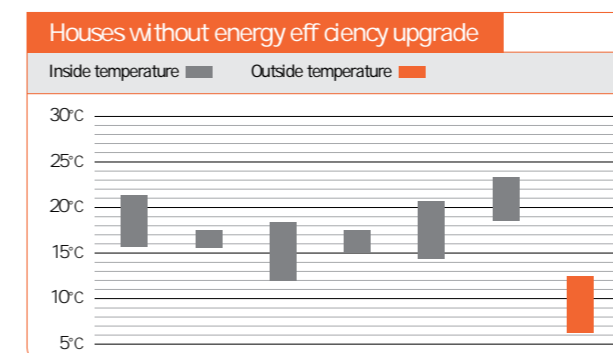
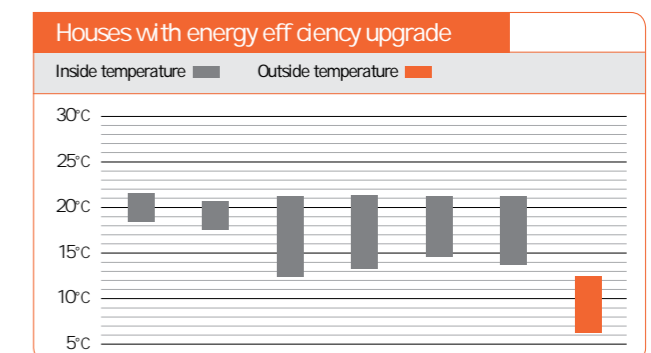


Figure 6D – Bedroom temperature profile ranges



<sup>10</sup> One of the houses that didn't receive any energy efficiency installations recorded unusually high temperatures of 26°C. We were unable to confirm whether the occupants preferred such high indoor temperatures, and it appears that there may have been a recording error. This could have been caused by the data logger being placed near a heat source, and therefore, data from this property has been excluded from the analysis.

<sup>11</sup> This is the recommended temperature for bedrooms in UK houses, according to WHO and CIBSE standards.





**Relative humidity levels**

Figure 7 (A to D) further demonstrates the benefits of energy efficiency installations and their impact on thermal comfort. The levels of relative humidity in houses without energy efficiency installations were in the higher range of 60-80% with some houses reaching up to 90%. This suggests a cold and damp indoor environment. On the other hand, the houses that had received energy efficiency installations recorded relative humidity levels in the range of 40-60%.

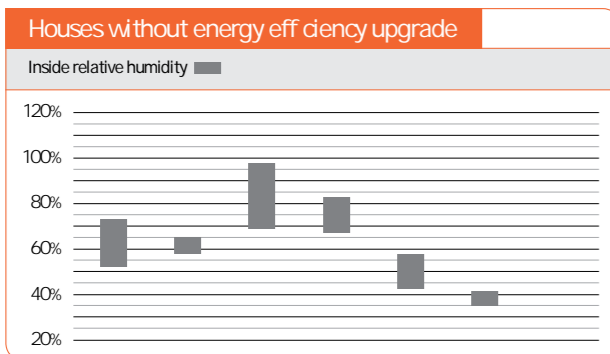
**Energy efficiency and thermal comfort levels**

The average night-time temperatures in the bedrooms of the houses without energy efficiency installations were mostly lower than 18°C. These houses are shown in red in Figure 8 (A and B). The bedrooms of the houses with energy efficiency installations had average night-time temperatures of 17.5°C to 23°C.

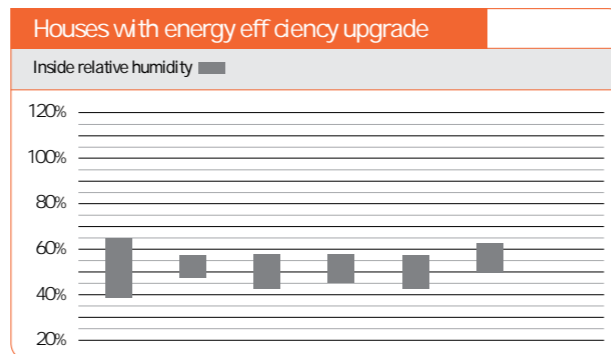
levels of all participating houses for the pre and post intervention periods. However, our preliminary analysis of the temperature and humidity profiles for the selected houses, over a 24-hour period, gives an indication of typical thermal environments in fuel poor houses. It also shows the improvement that energy efficiency installations, such as external wall insulation and loft top-up, can make to indoor thermal environments.

Within the constraints of the Challenge 100 project we weren't able to comprehensively assess the thermal comfort

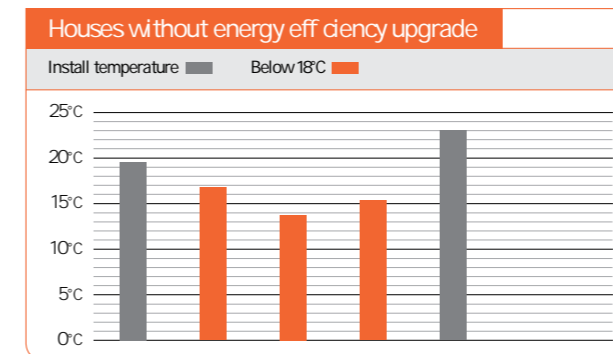
**Figure 7A – Living room relative humidity range**



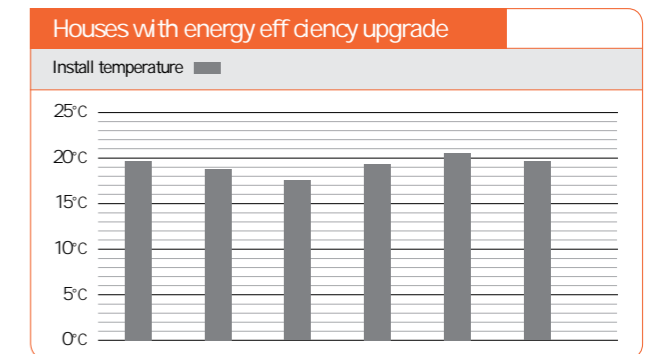
**Figure 7B – Living room relative humidity range**



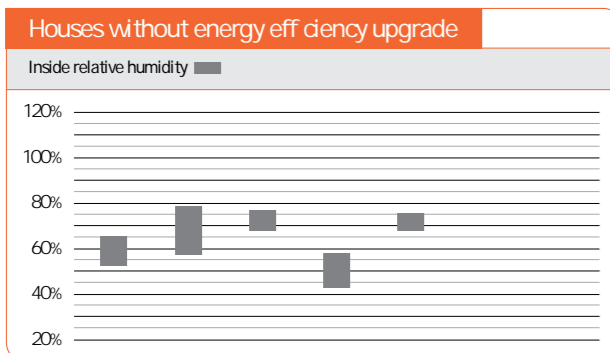
**Figure 8A – Bedroom temperature profile ranges at night**



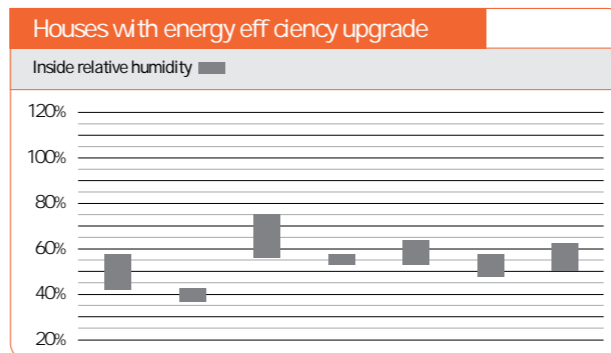
**Figure 8B – Bedroom temperature profile ranges at night**



**Figure 7C – Bedroom relative humidity range**



**Figure 7D – Bedroom relative humidity range**



# Income maximisation

We supported our 100 families by offering them an income maximisation package. We offered benefit entitlement checks and budget reviews to each Challenge 100 household.



## Take-up rate

We offered the income maximisation package to householders after the energy efficiency installations had been completed. This was to ensure that we had established a certain level of trust before discussing more sensitive information.

The results of the benefit entitlement checks are outlined in Tables 7 and 8 by area and by scenario. The overall take-up rate for the income maximisation package was 19.6%.

Table 7

Benefit entitlement checks					
Operating area	Unable to contact	Decline	Language barrier preventing BEC	No further entitlement identified	Entitlement identified
Birmingham	23	10	3	4	1
Luton	9	8	2	3	2
Manchester	6	9	0	4	0
County Durham	3	3	0	3	1
South Staffordshire	6	0	0	1	1

Table 8

Benefit entitlement checks					
Scenario	Unable to contact	Decline	Language barrier preventing BEC	No further entitlement identified	Entitlement identified
Two parent families in an urban area living	18	16	3	3	3
Lone parent families in an urban area living	15	7	1	7	0
Older people living in an urban area	5	4	1	1	0
Families living in a rural area	3	3	0	0	1
Older people living in a rural area	6	0	0	4	1

The initial assessments were carried out by phone. If we didn't manage to contact the participant after three phone calls, a letter was sent to them.

It proved difficult to successfully contact participants, especially in Birmingham. This can be explained by the fact that many householders were working families who weren't at home during the day, when the calls were made.

To address this issue, we invited householders in Birmingham to attend a community event where they could meet a benefits adviser face to face. However, none of the householders took up the offer. They were also sent details for the local benefits advice team at Birmingham City Council but again, there was no take-up.

Language barriers also prevented some of the benefit entitlement checks taking place, mainly in the diverse communities of Birmingham and Luton.

A significant number (29%) declined receiving the benefit entitlement checks. We were given different reasons for refusal, such as:

- the participant is already using another service
- he/she already knows what they're entitled to
- he/she is satisfied with the level of benefits received.

However, in some cases householders simply weren't interested.

We observed a lower level of engagement from householders in the Challenge 100 project in general after we'd finished installing energy efficiency measures. This could be explained by the fact that householders had already received their free measures and were noticing the difference to their energy bills and thermal comfort. Therefore, they weren't interested in receiving further support.

The low take-up rate for the income maximisation package could also be partly attributed to the project's short duration, which didn't allow the time to build up enough trust to enable sensitive conversations around income and debt.

## Impacts of the income maximisation package

When checking householders' benefit entitlement, we found that most people were already receiving all the benefits they were entitled to. We only identified further entitlement in 5 of the 20 checks. Table 9 outlines these 5 householders' entitlement details as well as the impact that the extra benefits had on their income and Fuel Poverty Index.

This sample is too small to draw robust conclusions. However, this insight shows the importance of tackling all causes of fuel poverty. Used on its own, the income maximisation measure can potentially eradicate fuel poverty and this was achieved for one of our families. However, when combined with energy efficiency installations, it contributed to eradicating fuel poverty for four of our families. This was two more than for energy efficiency installations alone.

Table 9

Householders' entitlement details/impact of extra benefits					
	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Benefit identified	Disability Living Allowance	Disability Living Allowance	Child Tax Credit	Pension Credit and Council Tax benefit	Second Adult Rebate
Additional income	From £18.95 to £71.40 a week	From £18.95 to £71.40 a week	£20.30 a week	£49.84 a week	£6.73 a week
Income before	£14,460	£6,780	£6,780	£7,556	£19,166
Income after	From £15,445 to £18,172	From £7,765 to £10,492	£7,835	£10,148	£19,516
FPI before	11.6%	24.4%	13.4%	19.3%	10.4%
FPI after income maximisation only	From 11.0% to 9.4%	From 21.3% to 15.8%	11.6%	14.4%	10.2%
FPI after installation only	8.6%	10.6%	10.6%	18.4%	6.6%
FPI after all measures	From 8.1% to 6.9%	From 9.3% to 6.9%	9.2%	13.7%	6.5%



#### Case study: Older person living in a rural area

A man in his 80s lives on his own in a rural area. He owns a two bedroom end-terraced house built between 1950 and 1965. The property already has cavity wall insulation, 10centimetres of loft insulation and a mixture of double and single glazed windows. The house is off the gas network and the main source of heating is an oil-fired boiler. The property's SAP rating is 32 which results in an estimated annual energy cost of £1,458.

He has an annual income around of around £7,550 and receives Attendance Allowance. His initial Fuel Poverty Index was 19.3%. The man is terminally ill with limited mobility and pays for personal care at home.

Our initial property survey showed that the participant was eligible for draught exclusion and loft top-up insulation to be funded under the CERT framework. Because of the participant's state of health, the disruption associated with installing loft top-up was judged to be inappropriate so the participant only received the draught exclusion installation. This measure led to the property's SAP rating improving slightly from 32 to 34, representing an annual saving of around £65 on energy bills and a slightly reduced Fuel Poverty Index of 18.4%.

Again considering the participant's health, we kept our other interventions to a minimum. We didn't install an energy monitor or hold conversations around energy efficiency and fuel tariffs. However the participant agreed to the income maximisation package as we thought this would have the most benefit for him.

A benefits adviser visited the man at his house to carry out the income maximisation measures. With the adviser's help, he successfully increased his Pension Credit entitlement by £35 a week. Due to his ill health, he also had a reduction in his Council Tax resulting in an annual saving of £129. He was also eligible for £14.84 a week of Council Tax Benefit, including around £1,400 of back-dated money. Furthermore, the council now pays £60.53 per week for his personal care. He was also placed on a social tariff with his energy supplier.

The income maximisation package led to an annual increase in income of £2,590, thereby reducing his Fuel Poverty Index from 19.3% to 13.7%. Although our interventions weren't enough to eradicate fuel poverty in this case, it illustrates the important impact that income maximisation can have on the level of fuel poverty. It also demonstrates the need for a flexible approach to tackling fuel poverty, where measures can be adapted to meet the different needs and realities of individual fuel poor households.

#### Further investigation into reasons for refusing the income maximisation package

##### Background to undaimed benefits

According to Citizens Advice in 2009, £16 billion worth of benefits go undaimed every year. Figures highlighted by Citizens Advice include:

- 80% of low income workers without children – or 1.2 million households – miss out on £38 per week of Tax Credits totalling £1.9million a year.
- Half of all eligible working households don't claim housing benefit, with nearly one million households missing out on an extra £37.60 per week.
- Council Tax Benefit and Pension Credit are both significantly under-claimed.
- Take-up rates for the Council Tax and Housing Benefits are generally 10% lower in ethnic minority families.

Most of the available literature around the take-up of benefits is focused around pensioners. Some studies identify a relationship between a person's age<sup>12</sup> and their take-up of benefit entitlements. As a pensioner's age increases, the percentage of benefit entitlement take-up decreases.

The literature review identified that 'In helping to eradicate fuel poverty, it will be necessary to ensure all fuel poor households, but especially those with a 'vulnerable' status, are in receipt of their full benefit entitlement'<sup>13</sup> Other research also recognised that tackling the non take-up of benefits should be given more focus if fuel poverty levels are to be significantly reduced<sup>14</sup>.

During Challenge 100, we experienced low take-up rates when offering income maximisation packages to householders. However, we also noted the importance of supporting the fuel poor by maximising their income. We therefore decided to carry out a specific investigation into the reasons behind the low take-up of benefit entitlement checks by further questioning some of the participants who refused the package.

We also spoke to other organisations working in this field about the approaches they use for their income maximisation programmes, so we could compare the different approaches.

<sup>12</sup> Hancock, R., & Barker, G. (2003). The quality of social security data in the British benefit data in the British family resources survey: Implications for investigating income support take-up by pensioners. Leicester: Nuffield Community Care Studies Unit.

<sup>13</sup> Loveday D, Vadodaria K, Haines V, Mallaband B, Mitchell V, Perren K, Guest P (2009). A literature review of the factors associated with tackling fuel poverty in the United Kingdom, E.ON Engineering/Loughborough University (internal report).

<sup>14</sup> van Oorschot, W. J. (1998). Failing selectivity: On the extent and causes of non take-up of social security benefits. In H. J. Andreß, Empirical Poverty Research in a Comparative Perspective (pp. 101-132). Aldershot.

**Engagement approaches**

Our investigations identified a number of different approaches, which are discussed below.

**Home visits**

Within Challenge 100, a third party organisation was commissioned to work with local authorities to target and engage householders who agreed to benefit entitlement checks.

Where the adviser considered that a participant wasn't claiming their full benefit entitlement, a home visit would be arranged to carry out a full benefit entitlement check. When unclaimed benefits were identified, the adviser helped fill in the necessary forms and supported the householder through the process until a successful claim was made. This may have involved more than one visit to the household to make sure all the necessary paperwork had been filled in and sent out.

The organisation that we commissioned and other initiatives such as the Birmingham Advice Centre and Warm Front strongly believe that home visits are essential to the engagement process. Through face to face contact, home visits enable trust to be built up between the benefits adviser and the individual. This is crucial if the individual is to share the sensitive and highly personal financial and medical information that the adviser needs to assess their benefit entitlement.

Home visits are also useful in another way. The benefit system can be hard to understand, and completing the often long and complex forms can be a daunting task for the householder. Home visits allow advisers to help individuals 'on the spot' by filling out forms on their behalf and explaining about their entitlements. The Birmingham Advice Centre describes home visits as a 'proactive' service because an adviser can immediately act on an individual's needs.

Despite being an expensive way to check benefit entitlement, they believe that the benefits of home visits outweigh the costs involved.

**A telephone-based approach**

This organisation is a community based company and doesn't agree that home visits are necessary to engage individuals in benefit entitlement checks. The organisation says it enjoys a very high success rate for engaging individuals in checks carried out through a telephone service – significantly reducing the service's costs and increasing its speed.

It claims that up to 20 benefit entitlement checks a day can be carried out on the phone, compared to three to four home visits. This can be achieved by training advisers to identify where a check would be appropriate, in the course of providing high quality customer service. This method could allow other organisations to recommend benefit entitlement checks as an extension to their own customer service.

By using this method within a targeted assessment programme, it's claimed that 80% of unclaimed benefit entitlement cases are not only successfully identified, but also go on to claim their full entitlement.

**Birmingham Advice Centre**

The Birmingham Advice Centre could be described as an advice network, as they claim to work with around 120 referral agencies, including large organisations such as the NHS. For example, the Birmingham Advice Centre currently works with a team of nurses who deal with fractures within the home, as people who have been immobilised through compound fractures are often found to be entitled to extra benefits. Therefore the Birmingham Advice Centre trains nurses to look out for individuals who may be eligible for additional benefit entitlement. Once identified, these individuals are referred back to the Birmingham Advice Centre, which carries out the benefit entitlement checks.

**Comparing the different approaches**

Table 10 shows the 'reach' of the different types of benefit entitlement services.

**Table 10**

Benefit entitlement services	
Initiative	Unclaimed benefits £s
Third party organisation involved in Challenge 100 (home visits)	£1.3million (since 2008)
National community based company (telephone-based approach)	£3.5million – £4million per year
Birmingham Advice Centre	£6.8million a year

**Key barriers to take-up**

**Lack of collaboration between organisations**

A lot of support is available to help people identify unclaimed benefit entitlement. This is provided by a range of organisations, from local authorities to area-based and nationally-based initiatives. Our experiences during Challenge 100 showed that a key barrier to offering a benefit entitlement check was a lack of collaboration and communication between these different initiatives, which made it hard to identify whether an individual was already being supported by a different service.

**Individuals don't link energy efficiency with increasing household income**

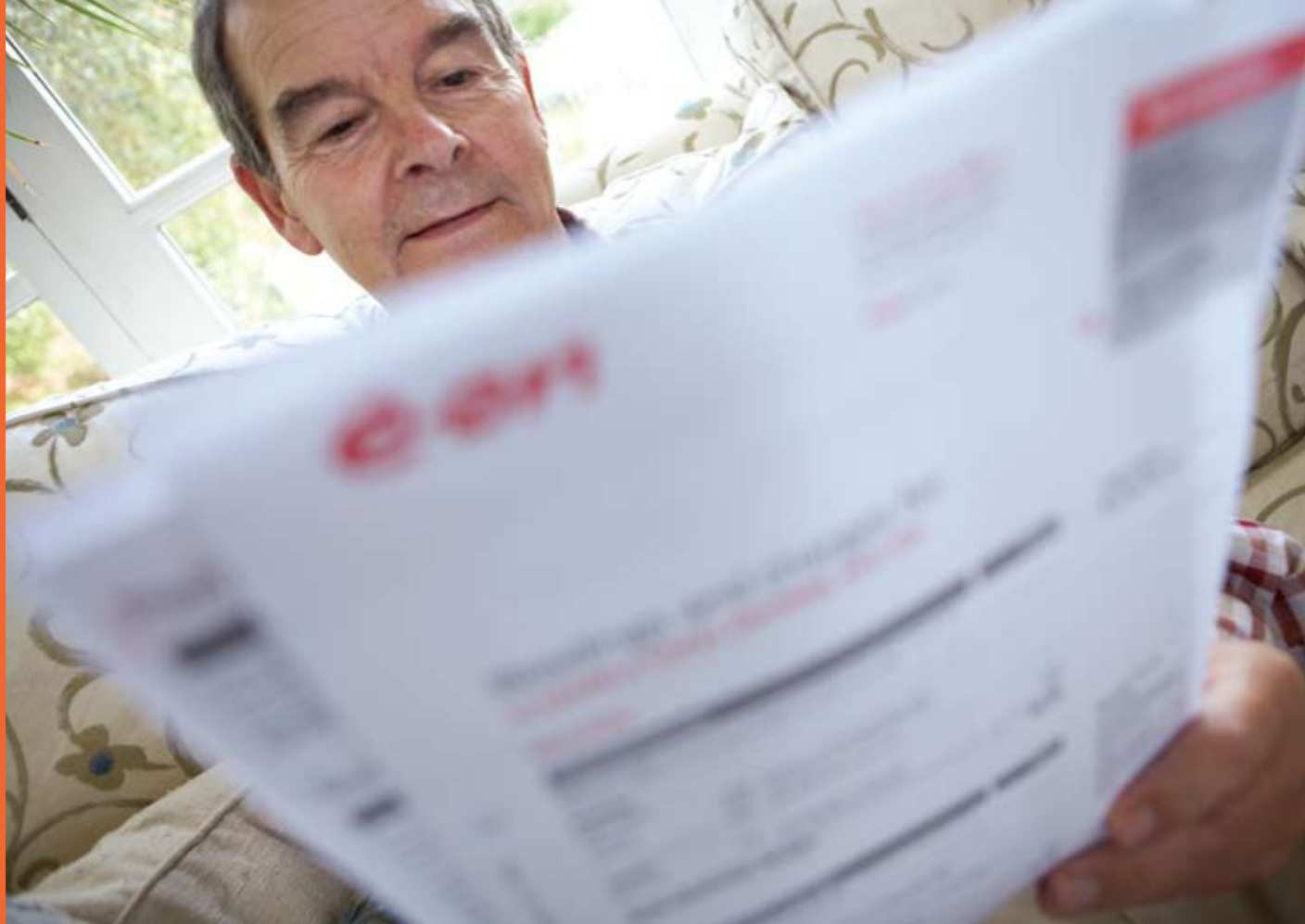
Another key barrier identified within Challenge 100 was that householders generally didn't understand the link between providing energy efficiency measures in the household and potentially increasing their household income through a benefit entitlement check. There was confusion around why this service was part of a scheme which householders viewed as being aimed at improving the condition of their homes.

However, the third party organisation suggests that it's quite common for people that have received positive advice and successfully claimed extra benefits to contact the organisation again about energy efficiency issues, or any issues with the benefits system. One service can lead to people accessing another.

**Cultural barriers**

Cultural barriers also meant it was sometimes hard to carry out comprehensive benefit entitlement checks during Challenge 100. In some cases, several generations of one family were living in one property and it was difficult to ascertain the make-up of the household.





## Energy costs

A successful approach to tackling all potential causes of fuel poverty has to recognise all three of its drivers - inefficient use of fuel, low household income and energy costs. We addressed the issue of energy costs during Challenge 100 by offering tariff advice to householders. This advice was given over the phone by our One Stop Shop advisers. Energy efficiency advice was given at the same time.

The number of households that were given tariff advice is shown by area in Table 11.

Table 11

Households by area	
Operating area	No. of households
Birmingham	21
Luton	14
Manchester	16
County Durham	3
South Staffordshire	4
<b>Total</b>	<b>58</b>

The literature review highlighted that the different social tariffs offered by energy suppliers has resulted in a complex landscape for these tariffs. The review also indicated that, in some cases, one supplier's standard Direct Debit tariff could be cheaper than a social tariff offered by another supplier. The criteria for social tariffs also varies by supplier.

Our One Stop Shop advisers have extensive knowledge of all the different tariffs that we offer. However, they have limited information about other suppliers' tariffs.

For non-EON customers, it was therefore more difficult for our advisers to fully help householders reduce their energy costs by advising on tariff options and payment methods.

Less than 7% of Challenge 100 householders were E.ON customers. Therefore, tariff advice had a limited impact on the householders' overall fuel poverty levels. This illustrates that energy suppliers can only offer a full package of support to their own customers.

Furthermore, more than 25% of our participants had prepayment meters, which limited their access to other types of tariff. We also found that some customers preferred a particular payment method, even if it wasn't offering the cheapest tariff. This was particularly the case with prepayment meter customers. A few of these householders highlighted that they didn't want to change their tariff as they liked having control over their spending on electricity that the prepayment meter offers.

## Education, advice and behavioural changes

A range of educational measures were delivered to help our families become more energy aware and to influence their energy-using behaviours. It's hard to quantify the impact of some of these measures in terms of reduced energy consumption, but they remain a key part of our holistic approach. Our findings gave us some interesting insights into the important role played by education in maximising the benefits of the energy efficiency installations.



### Energy monitors

We offered each Challenge 100 family an energy monitor to display their electricity use. This aimed mainly to reduce consumption by influencing behaviours, for example turning off appliances instead of leaving them on standby.

The energy monitors were installed by the CEVs in each area. During the installation, the CEVs also gave general instructions about what the energy monitor was for and how to use it, as well as providing energy efficiency advice.

We installed a total of 64 energy monitors. The number installed by area is detailed in Table 12.

Table 12

Energy monitors installed	
Operating area	Total number of monitors
Birmingham	24
Luton	21
Manchester	17
County Durham	2
South Staffordshire	0
<b>Total</b>	<b>64</b>

Take-up varied considerably by area. In Birmingham, most of the energy monitors were installed after the energy efficiency installations were completed, which was when we tended to see a general decrease in householders' engagement levels. This may partly explain why the take-up in Birmingham was lower than in other urban areas. It was harder to encourage take-up in rural areas where we didn't have dedicated CEVs.

As we delivered many different measures at the same time, it was difficult to quantify the impact that the energy monitors had on householders' energy consumption and, ultimately, on their Fuel Poverty Index. Therefore, most of the information we collected during the project was qualitative. It consisted mainly of the CEVs asking householders questions about how their energy-using behaviours changed after we installed the monitors.

Almost half of the 64 participants who received the energy monitor had a follow-up visit from a CEV who asked questions about behavioural changes. Out of the 29, 12 said they had changed their behaviours after the monitor was installed. However, due to the project's short duration, it's hard to say if these behavioural changes will be sustained over time.

### Energy efficiency advice

All of our One Stop Shop advisers were already trained, experienced energy efficiency advisers. In addition to the CEVs' visits, the One Stop Shop called every participant to give energy efficiency advice over the phone. This advice was followed up by supporting brochures sent through the post.

Table 13 outlines the number of householders contacted who were willing to accept energy efficiency advice from our advisers. Leaflets and brochures were sent to those householders we couldn't contact by phone.

Table 13

Householders accepting advice	
Operating area	Total number of householders
Birmingham	21
Luton	14
Manchester	16
County Durham	3
South Staffordshire	4
<b>Total</b>	<b>58</b>

The case study in the CEVs section shows the importance of supporting the energy efficiency installations by offering ongoing support, education and advice.

**Community Energy Volunteers (CEVs)**

The literature review highlighted the importance of community support groups, friends, family and neighbours in supporting fuel poor households. Therefore, we included CEVs in the project to provide local support, including home visits, to householders in each area. These volunteers were to be recruited within the communities where Challenge 100 was taking place.

**CEV recruitment in Birmingham**

As one of our expert partners, the Energy Saving Trust (EST) helped recruit and train our CEVs in Birmingham. They contacted all the households taking part in Challenge 100 as well as active volunteers known in the community. As a result, one Challenge 100 participant was recruited for the CEV role in Birmingham.

The volunteer was then trained as an energy efficiency adviser using the NEA/City and Guilds 6176 Energy Awareness qualification. They also received communication and personal security training as well as mentoring from our own Home Energy Consultants team.

Each volunteer had to be CRB checked before carrying out any home visits. This process typically takes between 6 and 12 weeks. As Challenge 100 was aiming to deliver all its measures within 100 days, this was an important limitation of the CEV appointment process. The volunteer in Birmingham received his CRB check after 6 weeks and could then begin carrying out home visits.

**Recruitment in other areas – operational challenges**

We encountered a number of challenges when trying to recruit CEVs in all other areas. The main reasons given for refusal were lack of time and lack of interest.

These issues meant we had to review our approach to ensuring local support for our householders. In Luton, we were supported by EST volunteers who carried out the home visits. In Manchester our One Stop Shop colleagues fulfilled this role. And in County Durham we received support from Go Warm, locally recognised for their work in energy efficiency. Unfortunately, we weren't able to provide any CEV support for our householders in South Staffordshire.

**Impacts of CEV home visits**

In total, 39 of our Challenge 100 participants agreed to home visits as outlined in Table 14.

**Table 14**

CEV visits	
Operating area	CEV visits
Birmingham	7
Luton	20
Manchester	7
County Durham	5
South Staffordshire	0
<b>Total</b>	<b>39</b>

Each visit covered a range of support areas, mainly around energy efficiency advice and improving thermal comfort. In general, householders were receptive to the advice given by CEVs although we saw a reduction in engagement levels after the energy efficiency installations were complete.

The following case study highlights the importance of providing support through home visits and the need for follow-up visits to reinforce the information provided, rather than just giving advice over the phone.

**Case study: Older person living in an urban area**

A woman in her 70s owns a two-bedroom terraced house in an urban area. She lives on her own in the house, which was built at the beginning of the 1900s. The property has solid walls, double glazed windows and full loft insulation. The SAP rating of the property is 47, resulting in an estimated energy cost of £1,074 a year.

We asked the participant if she can keep warm in the living room during cold weather and she answered "Yes". She has an annual income of around £8,400 and receives Pension Credit. Her initial Fuel Poverty Index was 12.7%.

As part of the project, we installed external wall insulation as well as a new energy efficient boiler and thermostat. This resulted in a significant improvement in the SAP rating from 47 to 72. This represents an estimated annual saving of more than £490 on energy bills and a reduction of the Fuel Poverty Index to 6.9%.

Our One Stop Shop contacted her to provide energy efficiency advice over the phone. The adviser explained how to use the temperature and timer controls on the boiler to reduce her energy consumption. She was also told about the benefits of switching off appliances instead of leaving them on standby, and how she could save money by fitting energy efficient light bulbs. The participant was also given an energy monitor so she could see the impact of these behavioural changes on her energy consumption.

A month after the phone call, a CEV visited her to follow up on the energy efficiency advice given by the One Stop Shop. As they went around the house, the CEV noticed the participant had a chair in front of the gas fire in the lounge. When asked if this is how she heats her room, she said she prefers the fire to the central heating. She also prefers to only heat that room as this is where she spends most of her time. The CEV also asked the participant about the energy monitor and the impact it had for her. She answered that she doesn't take much notice of it as she feels she has to use what energy she needs.

The CEV reiterated the energy efficiency advice that was given over the phone, and also stressed that using the central heating would be more efficient than just using the gas fire in the lounge.

This case illustrates the importance of supporting energy efficiency installations through appropriate education and advice to maximise their benefits. In this case, phone advice wasn't enough, and this example shows that home visits are key to gaining a much better insight into people's behaviour than can be achieved over the phone. It also shows that it takes time and continuous support to influence a person's energy-using behaviours.





## Operational delivery learnings

### Selection and participant engagement

Community engagement was critical to ensuring the take-up and involvement of householders in the Challenge 100 project. We found that face to face interactions were often more successful than communicating by phone. Having a community member on hand was extremely useful when answering householders' questions and encouraging them to take advantage of the support available.

Working closely with local authorities and/or local community groups was also essential to ensuring engagement. But it's important not to underestimate the time required to work effectively with local communities.

Creating trust is crucial to successfully engaging a local community. Some of the energy efficiency measures we installed were intrusive and inevitably caused some disruption for the household. More importantly, conversations about income, debt or other budget issues could be sensitive. As an energy supplier, we recognise that householders might not trust us initially, and that this can be exacerbated by us proposing measures to help reduce their energy bills. The householder is often left looking for the 'catch', so the support of community partners in reassuring householders about such projects is essential. By working with local authorities, Challenge 100 was able to gain credibility which encouraged householders to be open to our initiative.

The presence of E.ON within the community when installing energy efficiency measures also built up trust with householders over time. Once householders started seeing the work being done to other houses, some people who'd initially refused to participate approached us in the street to ask if they could still take part in the project.

# The Challenge 100 experience

Participant experience was a crucial part of Challenge 100. We used the 'Net Promoter Score' (NPS) tool, commonly used throughout our business, to measure participant satisfaction levels. NPS allows the Challenge 100 householders to give us feedback by telling us how likely

they'd be, on a scale of zero to ten, to recommend Challenge 100 or E.ON to a friend. We contacted householders twice during the project: once just after the energy efficiency installations were completed, and again four to six weeks after the end of the project.



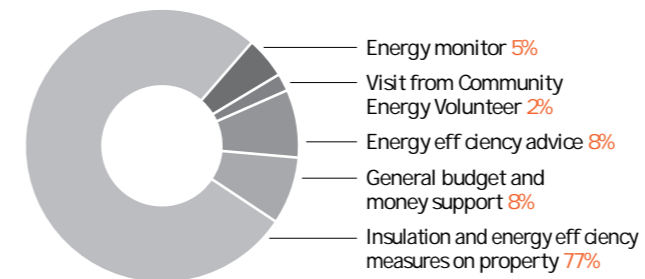
## Recommending Challenge 100

All 102 participants included in Challenge 100 were given an NPS survey. 27 participants responded to the first survey and 14 responded to the second survey. This number of respondents only allows indicative information but provides interesting insights into our householders' experiences.

The NPS scores show that the householders responded very well to Challenge 100. The maximum score of 10 was given by 60% of respondents when asked if they would recommend either E.ON or the Challenge 100 project. These results show that the householders felt engaged with Challenge 100 and that the project was widely viewed as very positive. We received some of our highest ever NPS scores. Unsurprisingly, this indicates that offering participants free goods and services through the project has led to higher levels of support for E.ON from the Challenge 100 participants.

Figure 9 highlights the measures that householders felt were the most useful. As expected, most of the householders found the energy efficiency installation measures to be the most useful. General budget and money support as well as energy efficiency advice were seen as the next most useful measure.

Figure 9- Most useful measures



When asked about their expectations, 75% of the participants referred to saving money and enjoying increased warmth in the home. On conclusion of the project, 70% of the respondents felt that Challenge 100 had met their expectations. A high proportion of householders also referred specifically to the service received from our engineers and advisers as reasons for giving us a high score.

Below are some examples of specific comments we received, with NPS scores shown in brackets.

- "The house is a lot warmer. I don't have to have everything on longer like the central heating." (8)
- "Should lower my bills and noticed my house is warmer than before." (10)
- "Hopefully the energy bills should be dropping and using less. The monitor has a lot of improvement on it, it looks good." (10)
- "Because I feel that it's really good if we can get less energy waste and recommend it to anyone." (10)
- "Hopefully keep me warmer in the winter and cheaper. That's what it's for to save on your heating and if it does what it's supposed to do then that's all good." (8)
- "Well just to keep my house warmer and to save money hopefully." (8)
- "The difference it's made, the excellent customer care and service, and the people that did the work was fantastic." (10)
- "They were good. Very polite, very good." (10)
- "I've had no complaints, if they couldn't come they rang to tell me." (9)
- "They have done a proper job and a very good job and worked hard." (10)

We also received a few negative comments, mainly around processes and communications with householders. However, these comments didn't appear significant enough to pull down the NPS scores. It's interesting to see that, despite the intrusive nature of the work, people generally accepted the disruption caused by installing energy efficiency measures.

A few examples of the negative comments received are below.

- "You can't go to work and go places when they are doing stuff, (it's) a bit stressing when people are in and out." (8)
- "Well it's been a bit of a mess with the cladding and scaffolding outside with the rain." (8)

## The Challenge 100 journey

The results of the NPS indicated that the overall customer experience during Challenge 100 was positive. This can be partly attributed to the One Stop Shop approach where our advisers closely supported each participant and proactively managed delivery of the project's interventions in a coordinated way.

The role of our colleagues who installed the energy efficiency installations was also key to supporting our householders. As the 'faces' of Challenge 100, they were our front line agents in solving any issues that arose on the ground. The presence of a community liaison officer in the street also enabled a hands-on approach and ensured that any problems were addressed as quickly as possible.

We found that the householders tended to view the energy efficiency installers as 'home renovators'. As a result, they were often asked to carry out tasks outside their remit such as fixing a blocked gutter or tiling a roof. This led to a negative perception from householders when the installers didn't carry out this work. We could have minimised these issues by clearly setting householders' expectations from the beginning about the work that would be done, and by providing a list of other service providers to signpost the participant if needed.

In one urban area in particular, a lack of communication around the participant selection process created some confusion. People who were excluded from Challenge 100 (because they weren't fuel poor according to the definition we used for the project) felt the selection process was unfair. According to the comments we received, they felt that we were favouring 'people living off benefits' as opposed to 'hard working people', some of whom were juggling several part-time jobs to make ends meet. This created some hostility towards the project in this area, resulting in a higher level of complaints. Offering excluded households an alternative energy efficiency proposition may have helped alleviate some of these difficulties.

### Delivery of energy efficiency installations

The energy efficiency measures we installed had a great impact on reducing the Fuel Poverty Index of the householders. However, some of these installations did prove challenging.

Last winter's prolonged cold weather and snowfall had a major impact on the installations. In Birmingham, work had to be suspended for over three weeks due to the weather. The sub-zero temperatures also meant we had to stop fitting external wall insulation as the render can't be mixed below 5°C.

CESP and its 'whole-house' approach has allowed us to carry out a wide range of installations on properties. However, the fact that CESP is driven by carbon savings has meant that we haven't always been able to provide the best solution for some fuel poor families. For instance, our Challenge 100 team came across a boiler which had to be condemned as it posed significant safety risks to the household. On other occasions, the boiler was obsolete and it was impossible to find the part that was needed to adapt the fuel to fit the external wall insulation. However, as these boilers weren't G-rated and therefore not classed as inefficient in carbon terms, their replacement couldn't be funded under CESP. As part of the Challenge 100 project, we changed these boilers at our own expense using our CaringEnergy Fund. But we wouldn't be able to cover these costs if the project was rolled out on a larger scale. Also, the CESP framework doesn't account for some incidental costs such as replacing the canopy and gutters after fitting external wall insulation. Again, we covered these costs ourselves during Challenge 100.

Elements like these must be considered when delivering energy efficiency measures to fuel poor households who don't have the capital to fund these 'make-good' costs. If these minor elements aren't included in installations, this could affect the level of participant engagement in future projects.

Some of the households assessed under CERT could not be offered any measures due to the property's age or type. Properties with solid walls which already had full loft insulation weren't eligible for any other measures. In some cases, cavity wall properties weren't suitable for us to retrofit insulation because of the type of stone wall or the high risk of damp penetration.

Despite these various challenges, we delivered nearly all the Challenge 100 measures in less than 100 days as shown in Table 15. Birmingham was the only exception, with three weeks' stoppage time caused by the coldest winter on record for 30 years.

Table 15

Completion days	
	No. of days to complete
Birmingham	103
Luton	68
Manchester	67
County Durham	59
South Staffordshire	80



# Key findings

Challenge 100 focused our efforts on finding out what positive changes we could achieve for our 100 families in 100 days, and to understand:

- how many households we could lift out of fuel poverty
- which measures would have the most impact and in which situations
- how many households we couldn't help and why.

Tables 16 and 17 highlight the characteristics of the families and their properties where we were able to eradicate fuel poverty, broken down by area and by scenario<sup>15</sup>.

Table 16

Where we eradicated fuel poverty								
Operating area	Number of properties	SAP initial	SAP final	Annual income initial (£)	Annual income final (£)	FPI initial	FPI final	% of total
Birmingham	13	50.4	67.1	11252	11252	10.7	7.2	37.1
Luton	11	49.3	69.0	10026	10026	11.7	7.5	50.0
Manchester	13	48.7	69.4	8917	8917	12.0	7.4	68.4
County Durham	4	46.5	60.0	10192	10192	10.6	7.3	44.4
South Staffordshire	1	14.0	34.0	19166	19166	10.4	6.6	12.5

Table 17

Where we eradicated fuel poverty								
Scenario	Number of properties	SAP initial	SAP final	Annual income initial (£)	Annual income final (£)	FPI initial	FPI final	% of total
Two parent families living in an urban area	18	50.8	68.1	10377	10377	11.0	7.5	46.2
Lone parent families living in an urban area	13	48.9	69.5	9374	9374	12.0	7.4	50.0
Older people living in an urban area	6	46.5	67.2	10640	10640	11.4	6.8	54.5
Families living in a rural area	3	33.7	52.7	13577	13577	10.5	6.3	50.0
Older people living in a rural area	2	49.5	58.0	9601	9601	10.6	8.5	18.2

<sup>15</sup> Final annual income only includes changes from successful benefit entitlement claims. Entitlements which have been identified but not claimed or still being processed at the time of publishing this report have not been included. The nine participants which were found not to be fuel poor after being included in the challenge have been excluded.

Table 18

Where we couldn't eradicate fuel poverty								
Operating area	Number of properties	SAP initial	SAP final	Annual income initial (£)	Annual income final (£)	FPI initial	FPI final	% of total
Birmingham	22	50.8	61.1	6940	6940	19.2	14.5	62.9
Luton	11	50.8	64.3	6120	6120	19.6	14.2	50.0
Manchester	6	49.0	63.7	6180	6180	20.5	14.0	31.6
County Durham	5	32.8	36.0	8017	8573	16.5	14.3	55.6
South Staffordshire	7	15.9	29.4	8810	8810	22.3	16.9	87.5

Table 19

Where we couldn't eradicate fuel poverty								
Scenario	Number of properties	SAP initial	SAP final	Annual income initial (£)	Annual income final (£)	FPI initial	FPI final	% of total
Two parent families living in an urban area	21	50.8	61.5	7122	7122	17.5	13.5	53.8
Lone parent families living in an urban area	13	50.8	65.1	5275	5275	23.9	16.4	50.0
Older people living in an urban area	5	48.6	59.0	7824	7824	16.4	12.4	45.5
Families living in a rural area	3	15.3	36.0	7576	7576	26.1	17.1	50.0
Older people living in a rural area	9	25.4	30.9	8781	9069	17.8	15.4	81.8

The measures that had the most impact during the project were energy efficiency installations. The average final SAP ratings where we eradicated fuel poverty were significantly higher than those where we didn't. However, Tables 18 and 19 highlight that energy efficiency installations can only go so far towards eradicating fuel poverty for those who are marginally fuel poor (those with an average initial Fuel Poverty Index of less than 13.5%).

The householders with a higher Fuel Poverty Index need additional support, mainly around income maximisation, if they're to be lifted out of fuel poverty. The tables show that the average income of those we couldn't take out of fuel poverty is significantly lower than the average income of those where we succeeded.

During Challenge 100 we could only identify five householders who were entitled to extra benefits, so the overall variations in income resulting from the project were minimal. So, as well as showing the importance of income maximisation measures to effectively eradicating fuel poverty, our results show that it requires time and effort to successfully implement these.

The results in South Staffordshire and County Durham reflect the additional difficulties of addressing fuel poverty in rural areas. The presence of 'Hard to Treat' homes as well as limited measures under the current CERT framework meant that we achieved lower final SAP ratings than in

urban areas. The ground source heat pump case study also indicates that, although some technical solutions are available under CERT, these present their own challenges and require a considerable investment of time and effort in supporting the customer.

We knew from the very beginning of Challenge 100 that, as an energy supplier, we don't have all the answers to eradicating fuel poverty. And the project's results have confirmed this by demonstrating that we couldn't eradicate fuel poverty for all householders.

However, the key objectives of Challenge 100 were to help us understand:

- where we can tackle fuel poverty alone
- where we need to work with partners and assess the benefits of partnership working
- where the Government needs to make policy changes so that it's possible to lift every household out of fuel poverty as effectively and quickly as possible.

Our findings have provided greater clarity in determining our own responsibilities as an energy supplier. They have also shown us where we need to work alongside other organisations or enlist government support to make a difference. As highlighted in the literature review, addressing fuel poverty is multifaceted and the intricate web of stakeholders involved contributes to its complexity.



## The role of E.ON in eradicating fuel poverty

In light of our learnings from Challenge 100, where are we best placed to eradicate fuel poverty?

### Energy efficiency installations

Energy efficiency installations made the most impact on alleviating fuel poverty during Challenge 100. By improving the properties' SAP ratings, we could ensure a long-term reduction in the householders' energy costs.

As an integrated energy company, we had the in-house expertise and experience to deliver these measures. We also succeeded in delivering them quickly whilst maintaining a high level of customer satisfaction. The existence of the funding frameworks (CERT and CESP) used during Challenge 100 meant that the measures we offered could be replicated and rolled out on a larger scale. However, these schemes need to allow more flexibility than at present if they're to provide maximum benefit to those living in fuel poverty.

### Education and advice

Our findings confirmed that it's critical to provide energy efficiency advice and education around behavioural changes if projected savings from the installations are to turn into real savings for fuel poor families. We used our in-house expertise, via the One Stop Shop advisers, to deliver these supporting measures. Providing energy efficiency advice is a crucial part of our customer offering and our customer service colleagues are therefore highly trained and experienced in this area.

### Energy costs

It was hard to assess Challenge 100's impact on energy tariffs as very few of the householders were E.ON customers. The literature review identified that the social tariff landscape offered by the different energy suppliers is a complex one. Our advisers have extensive knowledge of the different tariffs that we offer and can also access existing customers' consumption data so they can tailor their advice to each individual. Therefore, one of our key roles is to make sure our customers are on the best tariff for their own circumstances.

### A holistic approach

Our One Stop Shop model allowed us to offer a holistic and targeted approach to those householders who were most in need, by guiding them through the different steps of the Challenge 100 process. We used our existing expertise to coordinate this approach. As an energy supplier, we often work to identify which customers are struggling to pay their bills. However, we could do more to intervene early and to ensure that our process can identify and separate customers who can benefit most from assistance, and those who are genuinely unable to pay their energy bills. It's also part of our role to raise awareness of the different measures that exist to support those living in fuel poverty.

## The role of partners and benefits of collaborative working

Without the support of our partners, it wouldn't have been possible to deliver Challenge 100 in such a short time. Community engagement was critical to ensuring take-up and involvement from householders, and local authorities' knowledge of their communities was essential to targeting the right areas.

Our partners also gave us great support in identifying, recruiting and training the CEVs. This illustrates the value of collaborative working to build on their existing knowledge of each community.

By working with local authorities, Challenge 100 was also able to gain credibility within communities and encourage householders to be open to our initiative.

The project's results highlighted our limited impact on householders' income, and we didn't get the take-up we had hoped for when offering our income maximisation package. One of the reasons for this was that householders didn't fully understand the links between energy efficiency, reducing their energy costs and income maximisation measures such as benefit entitlement checks. The low take-up also highlighted that people don't usually expect energy suppliers to provide income maximisation services. Partners such as the Citizens Advice or the Money Advice Trust are more likely to have the existing credentials, trust and expertise needed to carry out these measures.

The literature review identified a wide variety of organisations working with householders in fuel poverty and an extensive range of measures to tackle the issue. Challenge 100's One Stop Shop approach showed that it's possible to offer a variety of measures in a coordinated way, ensuring a holistic approach to eradicating fuel poverty. However, there is scope to build on each partner's expertise to maximise the benefits for fuel poor families. This coordinated approach would leverage the strengths of the various stakeholders involved in tackling fuel poverty, leading to better results.

## The role of government and the policy changes required

The Government has an important role to play in eradicating fuel poverty. As well as ensuring the right level of support through the benefits system, it also needs to provide appropriate frameworks through which a wide variety of organisations can effectively deliver fuel poverty initiatives. As an energy supplier operating in a highly regulated industry, the frameworks set by the Government will directly influence our approach to tackling fuel poverty.

Challenge 100 highlighted the limitations of delivering energy efficiency installations within frameworks that are driven by carbon savings. We recognise that CERT and CESP were designed largely with carbon reduction in mind, and that carbon savings are likely to lead to financial savings for many households. However, Challenge 100 has shown that, in practical terms, we need more flexibility within these frameworks to provide the best possible solution for individual families.

Our results also demonstrate that, in many cases, fuel poverty is a result of income poverty which we can't directly influence.

Finally, Challenge 100 has shown the true value of a coordinated and holistic approach to addressing all causes of fuel poverty. We've recognised that we can't solve fuel poverty on our own. Our partners played a key role throughout the project by enabling us to build on their expertise to maximise benefits for fuel poor households. In setting the future frameworks for eradicating fuel poverty, the Government needs to create an environment that enables and incentivises all key stakeholders to adopt this type of collaborative working to form effective partnerships.

# Recommendations

We believe Challenge 100 has given us important insights into three key areas.

1. What needs to be done?
2. How can fuel poverty programmes be effective and efficient?
3. Where is special focus needed?

We've based the recommendations outlined below on our findings in each of these areas.

## 1. What needs to be done?

Changing the condition of the home and the behaviour of the family, through energy efficiency measures and advice, is the most sustainable way of reducing fuel poverty.

Recommendations

- The Government must design a fuel poverty strategy which meets the specific needs of the fuel poor and is based around improving the energy efficiency of their homes.
- Targeting energy suppliers' social spend commitments on energy efficiency measures will enable the fuel poor to benefit from programmes such as the Green Deal and from future supplier obligations.

Existing energy efficiency programmes such as CERT and CESP aren't flexible enough to support those living in fuel poverty.

Recommendations

- Any scheme(s) replacing or succeeding CERT and CESP should allow suppliers to provide a wider range of energy efficiency measures so they can meet the needs of their most vulnerable customers.
- Energy efficiency programmes must also include 'make-good' costs for solid wall insulation and similar measures if they're to be suitable for fuel poor customers. The Government should ensure these costs are included in the programme structure.

For some householders, energy efficiency measures alone aren't enough to take them out of fuel poverty.

Recommendation

Whilst energy suppliers can play a role in this area, we don't have the expertise to provide the comprehensive financial support that these customers need, such as debt management services or an in-depth benefit entitlement check. We believe suppliers should be able to refer their most vulnerable customers to a Government-supported money advice service. The cost of this referral scheme should be recoverable under the supplier's social spend commitments.

## 2. How can fuel poverty programmes be effective and efficient?

Any fuel poverty programme must be simple for householders to access. It must provide a full package of support at a single point of contact and include after-care services.

Recommendation

Green Deal energy efficiency assessors should be able to make referrals from the Green Deal to a fuel poverty programme to make sure vulnerable customers don't miss out on accessing vital means of support. The full benefits of this support must be explained in a way that the customer can both understand and appreciate.

Community engagement, tailored to local needs, is critical to ensure take-up and involvement of vulnerable householders in energy efficiency schemes.

Recommendation

The Government's approach to fuel poverty should encourage local authorities and energy suppliers to work together to deliver tailored and effective schemes. Companies delivering fuel poverty programmes should provide a clear, local point of contact for communities.

## 3. Where is special focus needed?

Fuel poor customers living in rural areas require a special focus and additional attention. This is because their properties often need more expensive measures than those in urban areas.

Recommendation

The Government must recognise the specific needs of the rural fuel poor by incorporating measures aimed at solid wall and off-gas properties into its fuel poverty programme, and into any future supplier obligations. This package must include microgeneration and low carbon heating systems.

# Next steps

Challenge 100 was always just the starting point. We'll use the findings from Challenge 100 to overhaul the way we provide support to our customers who might be in fuel poverty. In the future, we hope to provide a holistic approach to ensure the best possible support for our fuel poor customers.

We'll also build on what we've learnt in Challenge 100 through an E.ON-funded CASE award PhD studentship. This project will be conducted collaboratively between E.ON and Loughborough University. It will give us an opportunity to further investigate the challenges of addressing fuel poverty and the role that energy suppliers might take in its alleviation. This will also include continuing to monitor our 100 families to fully understand the long-term impacts of our interventions.

We'll further support our Challenge 100 families by trialling a project in partnership with Phillips and ERF Electrical Wholesalers Ltd to offer LED whole-house lighting schemes to some of our households. The energy savings will be monitored to understand the impact that LED lighting can make on fuel poverty.

And finally, we'll share our findings with the Government and consult with our partners and other stakeholders to make sure Challenge 100 contributes to the delivery of an effective and efficient strategy for eradicating fuel poverty.

We believe the Government needs to consider these recommendations and the practical findings from Challenge 100 when it designs energy efficiency programmes and supplier obligations for the future. By doing this, it will make sure these make a real difference to the fuel poor.

If you'd like more information about Challenge 100, please contact us at [cr@eon-uk.com](mailto:cr@eon-uk.com).



# Appendices

## Executive summary of literature review<sup>16</sup>

Fuel poverty is a complex issue arising from a simple problem – the inability to affordably heat one's home. The Government has pledged that all vulnerable households should be removed from fuel poverty by 2010. Longer-term, it aims for no households in England to live in fuel poverty by 2016 and

by 2018, to have completely eradicated fuel poverty throughout the UK. This report comprises a review of the available literature on the major issues associated with fuel poverty in the UK, with particular reference to the efficacy of staple methods used to treat fuel poor households.



### Key measures

#### Definition

The standard definition used by the Government states that a household is suffering from fuel poverty if it would need to spend over 10% of its income to achieve satisfactory levels of heating within the home. The full income used in this definition includes all benefits, including income directly related to housing such as Housing Benefit. The amount of energy required to provide satisfactory heat to a dwelling is a value based on modelling rather than measurement. Government figures use energy consumptions modelled using the Buildings Research Establishment Domestic Energy Model (BREDEM).

The Government's definition is open to criticism from a number of angles. In reality, a household's ability to pay heating costs depends upon its disposable income, but this measure is not generally used in Government headline figures. Antipoverty groups tend to favour a disposable income measure because such metrics are comparatively insensitive to extraneous factors such as local house prices or rents. Regarding the Government metric, there's a lack of clarity regarding exactly which benefits should be included in an appropriate definition, meaning that the existing definition is open to misinterpretation.

Crucially, the definition is not normalised to enable accurate comparison between different occupancies – this is out of line with most credible poverty indicators. This means the Government indicator will tend to overestimate the levels of fuel poverty in small households and underestimate the levels in larger households.

#### Thermal comfort

There's little correlation between an individual's subjective view of household thermal comfort and the objective measure of thermal comfort. Generally, households with dependant children are more likely to consider themselves unable to keep comfortably warm. Elderly households tend to consider themselves relatively thermally comfortable – this may highlight a variation in different generations' attitudes to thermal comfort and fuel conservation. Overall, studies indicate that the number of people in subjective fuel poverty is greater than the number living in official fuel poverty, according to the Government definition.

#### Regulations

There are numerous regulatory aspects designed to help households at risk of fuel poverty. Firstly, the benefits system provides extra income for the vulnerable. However, the benefits system is highly complex and there is evidence that many people don't claim all of their entitlement.

Benefit claims are usually instigated by the claimant, so householders who are socially isolated may not be aware of their eligibility. The major benefit aimed at helping those at risk of fuel poverty, the Winter Fuel Payment, is not means-tested, and is therefore paid to a significant number of fuel rich householders.

#### Efficiency

Housing efficiency measures may be installed under the umbrella of many different types of initiative, including fuel poverty measures, climate change reduction or home quality standards. The type of initiative can influence the types of efficiency measures that can be installed. All of these measures must comply with building and planning regulations and this can restrict or delay the installation of certain technologies.

The actual energy savings observed after the installation of energy efficiency measures are often less significant than the predicted savings. This is due to imperfect installations and to behavioural changes within households. In dwellings which were previously kept at relatively low temperatures, householders tend to renormalize their level of thermal comfort, an effect commonly known as 'take-back'.

<sup>16</sup> Loveday D, Vadodaria K, Haines V, Mallaband B, Mitchell V, Perren K, Guest P (2009). A literature review of the factors associated with tackling fuel poverty in the United Kingdom, E.ON Engineering/Loughborough University (internal report).

### Tariffs

Some households may be eligible for an energy supplier's social tariff. Social tariffs are special products designed to help the most vulnerable customers within a supplier's portfolio. They must at least match a supplier's cheapest standard tariff. These products are monitored by Ofgem, but suppliers are free to focus on any vulnerable subset of their customer base and are free to choose the pricing structure.

There's little coordination of these tariffs across the energy supply industry with respect to both pricing and target audience. As a result, it's possible for an individual social tariff to be undercut by a standard price from a rival supplier. Social tariffs have a relatively low profile and tend not to be aggressively marketed by suppliers, but there is some variation between the different energy companies.

### Effectiveness of work-to-date

Much of the available literature is based upon the effectiveness of Warm Front installations. It's been observed that, although Warm Front measures do typically increase dwelling efficiency, fuel consumption reductions are significantly less than predicted. There are two main reasons for this: 1. technical issues, which limit the extent to which energy efficiency measures can be employed; and 2. behavioural changes, which result in a take-back of energy savings. Also, socio-cultural and regional factors have influenced the take-up and success of fuel poverty measures and schemes.

Measures that raise consumer awareness of the help available to reduce energy bills have had a degree of success. Research has suggested that technologies like smart meters and clip-on visual displays may reduce the take-back process. However, technological and regulatory barriers currently prohibit cost-effective take-up for these initiatives.

The literature review has highlighted several key challenges that must be addressed. There are a large number of households, notably Hard To Treat properties, where it's difficult or ineffective to use staple energy efficiency measures. Whilst new, efficient housing stock is needed to replace the least energy efficient dwellings, development of cost-effective low or zero carbon technologies is required for Hard To Treat properties.

### Roles of stakeholders

A wide variety of stakeholders has been identified in the review, and the influence and visibility of these stakeholders varies significantly. Clearly, the responsibilities of Government and energy suppliers are critical in providing the means for individuals to receive fuel poverty mitigation measures. However, raising awareness of the issues is a role that could be taken by several stakeholders, ranging from official advice from major players to informal advice from friends and family.

Fuel poverty is a difficult issue to address, and the fact that the number of sufferers has increased over the past few years suggests to date that remedial measures have had limited success. Possible reasons for this are that those at risk of fuel poverty are unaware of the measures available or are reluctant to spend money/time to obtain benefits that are realised over a longer term. It's clear that some of the major stakeholders could play a more significant role in providing guidance for people in difficulty, for example, by acting as a One Stop Shop for such guidance.

In view of the number of factors involved and the various geographic and socio-economic factors involved, there are several different paths that can be taken by an individual suffering from fuel poverty. Although there are many measures available, the interplay of the stakeholders to deliver any improvements is complex and warrants further attention.

### Financial exclusion

Financial exclusion refers to processes that prevent or deter people from accessing standard financial services such as current accounts, affordable credit, insurance products, savings and financial advice. There's a clear overlap between households and communities that are financially excluded and those that are at risk of fuel poverty.



## Challenge 100 NPS questionnaire

- Based on your experiences, how likely are you to recommend Challenge 100 to a friend or colleague?  
(Please use a zero to ten scale where zero represents "Not at all likely" and ten represents "Extremely likely". 0-10 Likelihood scale)
- Why did you say this? Interviewer probes: How does it feel to be a part of challenge 100? What could we have done differently to improve the score?
- Based on your experiences, how likely are you to recommend E.ON to a friend or colleague?  
(Please use a zero to ten scale where zero represents "Not at all likely" and ten represents "Extremely likely". 0-10 Likelihood scale)
- Why did you say this?
- What are your expectations regarding your participation in the Challenge 100 scheme?
- Did the Challenge 100 scheme meet your expectations?  
(Yes/No/Not sure)
- Why did you say this?
- Did this project change your view of E.ON?  
(Yes: I feel more positive about E.ON - No: I feel the same towards E.ON as I did before I heard about this scheme - Yes: I feel more negative about E.ON - Don't Know)
- Which changes or support offered to you as part of the Challenge 100 scheme did you find most useful?  
Benefit entitlement support - Insulation and energy efficiency measures on property - Energy efficiency advice - Energy monitor - Visit from Community Energy Volunteer - General budget/money support
- Do you have any other thoughts about either E.ON or Challenge 100 you would like to share with us?

## Challenge 100 CEV questionnaire

- Can you keep warm in your main living area?
- How do you heat this space?
- To keep warm in your main living area do you ever need to wear an outdoor coat, eg fleece, or use a blanket?
- How have you found the experience?
- Has it made a difference and made the house warmer?
- Have you changed your behaviours as a result of the measures and/or the energy monitor?

## Measures installed by household

Table 20

Birmingham					
Measures installed	SAP initial	SAP final	Annual costs saving (£)	FPI initial	FPI final
External wall insulations (EWI), new boiler	41	66	684	8.9	5.0
EWI, Loft top-up	60	69	168	8.6	7.0
EWI, Loft top-up	49	69	460	10.2	6.4
EWI	50	57	185	12.0	10.0
EWI	41	61	511	15.0	10.2
EWI, Loft top-up	48	64	435	11.8	7.8
EWI	49	58	283	12.5	10.2
EWI	39	51	444	11.6	8.6
EWI	47	64	426	9.2	6.3
EWI	49	69	473	11.2	6.8
EWI, Loft top-up	50	69	404	29.2	18.7
EWI	47	64	402	22.2	14.4
EWI, Loft top-up	62	71	185	20.1	15.7
EWI, Loft top-up	60	69	188	8.9	7.0
EWI, Loft top-up	38	60	670	10.6	6.0
EWI	50	69	404	10.3	6.6
EWI	50	69	417	26.1	16.2
EWI	50	69	404	11.6	7.4
EWI, Loft top-up	60	69	179	7.4	5.9
EWI	49	57	204	13.1	11.0
EWI	40	53	354	15.7	12.0
EWI	67	74	140	15.2	12.5
EWI	40	62	596	8.9	5.3
EWI, Loft top-up	50	69	386	10.6	7.0
EWI	52	71	399	10.2	6.5
EWI	57	70	331	20.6	14.2
EWI	51	71	435	43.3	28.2
EWI	42	55	381	27.8	20.4
EWI, Loft top-up	67	74	135	10.4	8.6
EWI, Loft top-up	41	66	684	23.7	13.6
EWI	50	69	404	26.6	17.0
EWI	67	74	128	9.7	8.2
EWI	49	69	484	10.7	6.31
EWI, full central heating, loft insulation	69	76	127	6.1	5.06
EWI	60	69	217	12.9	10.0
No measures available under CERT*	50	50	0	11.1	11.1
No measures available under CERT*	50	50	0	11.6	11.6
No measures available under CERT*	59	59	0	14.4	14.4
No measures available under CERT*	52	52	0	14.3	14.3
No measures available under CERT*	50	50	0	11.0	11.0
No measures available under CERT*	50	50	0	22.5	22.5
Average	51.3	64.1	310	14.9	10.9

\*Outside Lower Super Output Area targeted for Challenge 100

Table 21

Luton					
Measures installed	SAP initial	SAP final	Annual costs saving (£)	FPI initial	FPI final
EWI, Loft top-up	52	71	380	10.4	6.9
EWI	50	69	385	9.5	6.3
EWI, new boiler	48	65	349	11.2	7.9
EWI, new boiler	47	61	269	10.8	8.0
EWI, Loft top-up	49	59	212	12.6	9.8
EWI, new boiler	50	76	477	13.6	7.9
EWI	51	71	466	14.2	8.6
EWI	50	69	403	12.6	7.8
EWI	49	69	440	11.7	7.6
EWI, new boiler	48	74	527	9.4	5.0
EWI	50	69	419	13.5	8.5
EWI	47	65	415	11.1	7.3
EWI	50	69	385	7.8	5.2
EWI	58	68	196	19.7	15.5
EWI	51	59	212	25.0	20.5
EWI	50	57	185	22.2	18.6
EWI, Loft top-up	50	69	418	23.2	14.3
EWI, new boiler	57	74	330	19.2	12.8
EWI	40	64	742	8.9	5.1
EWI	49	57	204	13.1	11.0
EWI, full central heating	49	57	213	25.5	20.9
EWI, new boiler, loft top-up	40	72	931	24.3	10.6
EWI, Loft top-up	49	69	440	16.7	10.8
EWI	57	66	191	13.4	10.5
Average	49.6	66.6	383	15.0	10.4

## Measures installed by household

Table 22

Manchester					
Measures installed	SAP initial	SAP final	Annual costs saving (£)	FPI initial	FPI final
EWI, new boiler, loft top-up	50	76	487	14.7	7.5
EWI	46	61	341	17.7	12.6
EWI	48	55	182	12.8	10.6
EWI, full central heating	43	62	228	12.0	9.3
EWI, full central heating	50	67	335	11.1	7.6
EWI, new boiler	47	72	493	12.7	6.9
EWI, loft top-up	48	66	392	12.4	7.8
EWI, new boiler, loft top-up	47	73	488	16.0	8.8
EWI, loft top-up	48	67	388	10.5	6.5
EWI, loft top-up	50	69	382	17.2	10.9
EWI, new boiler, loft top-up	59	69	179	11.3	9.0
EWI	50	58	183	13.5	11.1
EWI	57	66	179	9.4	7.6
EWI, loft top-up	50	69	367	9.7	6.3
EWI, new boiler	47	71	496	11.2	6.1
EWI, new boiler	38	69	679	12.7	6.4
EWI, new boiler, loft top-up	49	75	453	11.2	6.5
EWI	50	69	397	17.2	10.6
EWI, loft insulation	50	70	423	44.2	27.7
Average	48.8	67.6	372	14.7	9.5

Table 23

County Durham					
Measures installed	SAP initial	SAP final	Annual costs saving (£)	FPI initial	FPI final
Loft top-up, Ground Source Heat Pump	40	66	651	10.8	4.3
Draught exclusion, loft top-up	19	27	303	21.5	17.8
Draught exclusion	32	34	65	19.3	18.4
No energy efficiency installation received	22	22	0	17.4	17.4
Loft top-up	36	45	210	8.4	7.1
Draught exclusion, loft top-up	39	43	94	12.6	11.5
Loft top-up	52	54	6	11.5	11.1
Draught exclusion, loft top-up	52	64	275	10.7	7.8
Loft top-up	47	52	127	10.5	9.2
Loft top up	47	58	261	10.4	8.0
Average	38.6	46.5	199	13.3	11.3

Table 24

South Staffordshire					
Measures installed	SAP initial	SAP final	Annual costs saving (£)	FPI initial	FPI final
No energy efficiency installation received	33	33	0	13.7	13.7
No energy efficiency installation received	12	12	0	17.7	17.7
CWI, loft insulation	14	34	717	10.4	6.6
CWI, loft insulation	4	33	968	30.9	18.1
No energy efficiency installation received	16	16	0	28.1	28.1
Loft top-up	22	32	313	11.9	9.7
CWI	23	48	716	25.9	15.4
CWI, loft insulation	1	32	1058	28.1	15.6
Average	15.6	30	471	20.8	15.6

## Working in partnership with:

- Age UK
- Birmingham City Council
- Citizens Advice
- Durham County Council
- Energy Saving Trust
- Experian
- Loughborough University
- Luton Borough Council
- Manchester City Council
- Money Advice Trust
- National Energy Action
- South Staffordshire Council

## Contact us

If you'd like to find out  
more about Challenge 100,  
please contact the team on

**02476 183 640**

or email [cr@eon-uk.com](mailto:cr@eon-uk.com)