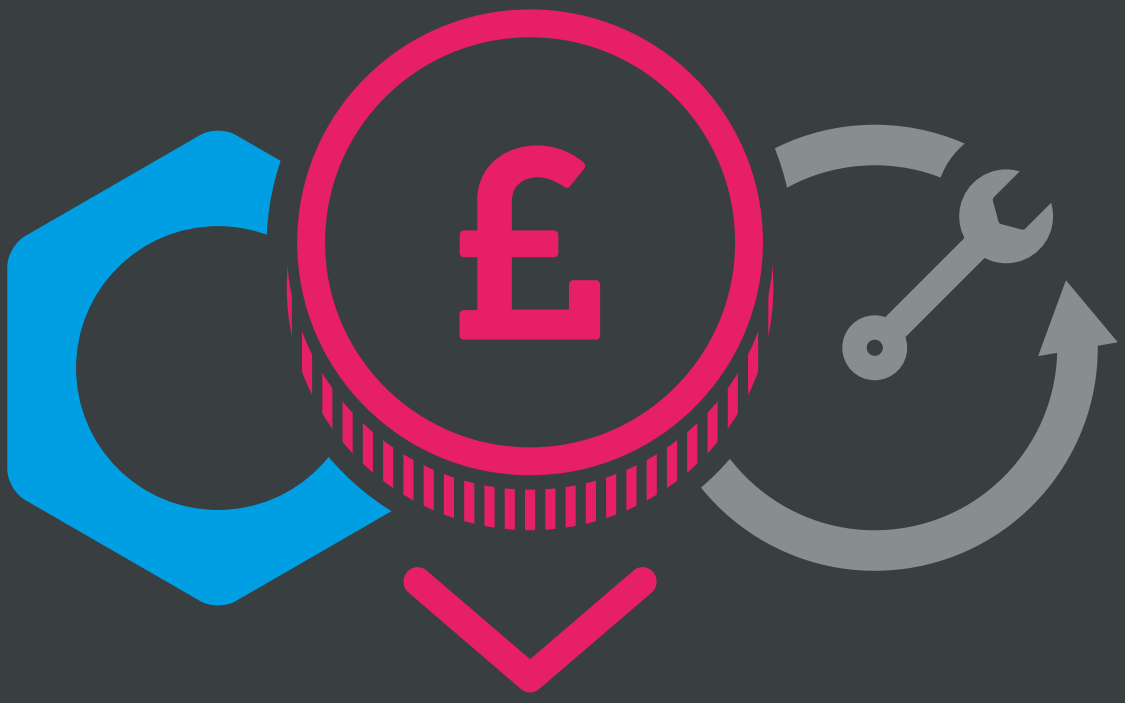
MAYOR OF LONDON



POSITIVE ENERGY– THE BUSINESS CASE FOR RETROFIT

RE:NEW

September 2016

orbit group | building communities

About RE:NEW

RE:NEW is the Mayor of London's award winning programme to help make London's homes more energy efficient. The aim of the programme is to reduce carbon emissions and energy bills in London's homes. These account for around 36 per cent of the capital's total carbon footprint. RE:NEW helps organisations such as London boroughs, housing associations and universities to implement retrofit projects and alleviate fuel poverty. It is doing this through:

- the RE:NEW Support Team, an expert team providing the end to end support needed to get projects up, running and successfully implemented

- the RE:NEW framework of suppliers, which saves time and resources for organisations that are procuring retrofit services and works.

RE:NEW is helping to achieve the Mayor's ambitious target for London to be a zero carbon city by 2050.

Established in 2009, RE:NEW has helped to improve around 120,000 of London's homes, saving around 40,300 tonnes of CO_2 a year. Coupled with wider market delivery, over 570,000 homes in London have been retrofitted through the programme directly and through receipt of the main subsidies.

To discuss any element of this report please contact George Simms in the RE:NEW Support Team.

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Summary

This report demonstrates that Orbit Housing Group could save over £4m in management costs over a 20-year period by investing in the energy performance of their homes.

Extensive analysis of a range of cost, property and household data relating to around 90 per cent (over 27,000) of the properties owned by Orbit revealed a clear link between increased energy performance and lower housing management costs:

- properties in EPC bands E, F and G have 48 per cent more repairs relating to damp and mould growth than the stock average
- the number of customer contacts can be reduced by 75,300 over 20 years
- poor energy performance results in nearly 3,000 additional customer complaints over a 20 year period
- properties in EPC band D or below have longer void periods than the stock average – equivalent to 600 extra voids over 20 years

Over 10,000 of these homes have an EPC rating of D or lower and 92 per cent of these properties could save management costs by installing energy efficiency measures.

Investing in energy efficiency and renewable technologies can provide tangible cost savings. Alongside these, Orbit can reduce fuel poverty, ensure that homes are comfortable and affordable, and cut CO_2. All of these are goals that Orbit and many other housing organisations strive to achieve.

While the findings of this report are specific to the homes managed by Orbit, the evidence uncovered by the analysis – clear financial savings by improving energy performance – rewrites the business case for retrofit for all housing organisations.

building communities

Orbit Group – saving costs through retrofit

As one of the largest housing providers in the country we are passionate about building communities by providing homes and services that people want and need – whilst striving for value for money in everything we do.

In order to reduce the likelihood of customers falling into fuel poverty we have a strategic objective to ensure all of our homes have achieved Energy Performance Certificate (EPC) band C or higher by 2030. We set out in our report, Warm Homes, Better Lives[1], that tackling fuel poverty is a priority because of the multiple benefits that can be realised – reducing customers' bills, achieving health improvements and reducing CO_2 emissions. Despite those benefits, the cost of investment in energy performance needs to be given careful consideration, particularly in the current financial climate.

Participation in this research project with the RE:NEW Support Team presented a great opportunity. Through the analysis provided, we've seen clear evidence showing how poor energy performance contributes to our wider housing management costs and how much can be saved as we move toward our minimum EPC band C target.

We're now working with the RE:NEW team to develop a targeted programme of energy efficiency works to help address the issues identified in Warm Homes, Better Lives whilst helping to reduce housing costs in the process.

John Barnham
Head of Sustainable Investment
Orbit Group

1. For further information on Orbit's report:
http://www.orbit.org.uk/warmhomes-betterlives/

02
Context

Most social landlords are committed to tackling fuel poverty among their tenants and reducing carbon emissions from their stock. Fuel poverty is a function of both the energy performance of a building and household income, and varies significantly across dwelling type and age, household size, age and composition, region, working status and tenure. Around 11 per cent of households in London, including those within the social rented sector, are deemed to be fuel poor.[1]

In recent years, a number of policy and funding changes have added to the pressure on social landlords' budgets. This has created tough decisions, with investment largely directed to where it is seen as resulting in direct benefits or savings to the organisation. To date, despite anecdotal evidence to the contrary, retrofit has been seen as securing social and environmental, rather than financial, outcomes.

The level of retrofit activity has fallen in recent years, and continues to do so. Between the 2014 and 2015 calendar years, government-tracked retrofit to homes in Great Britain fell by 44 per cent, largely driven by the reduction in Energy Company Obligation funding available.[2]

As stated, there is much anecdotal evidence suggesting that poor energy performance contributes to higher housing management costs, such as higher rent arrears, longer void periods, and increased repairs, complaints and customer contacts (see Figure 1). However, until recently there has been a lack of robust information quantifying the cost benefit of retrofit to homes. Interest in gathering that data and strengthening the business case for investing in retrofit is now growing, most recently with the publication of Sustainable Homes' 2016 report Touching the Voids.[3]

1. For the government definition of fuel poverty and breakdown of statistics, go to https://www.gov.uk/government/collections/fuel-poverty-statistics.
2. Household Energy Efficiency National Statistics, headline release August 2016: https://www.gov.uk/government/statistics/household-energy-efficiency-national-statistics-headline-release-august-2016.
3. The report is available here: http://www.sustainablehomes.co.uk/touching-the-voids-report

Figure 1

How are fuel poverty and poor energy performance thought to contribute to higher housing management costs?

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Key findings

Analysis of over 27,000 of the general needs properties owned by Orbit showed a clear and statistically significant link between an improvement in energy performance and a reduction in repairs and customer contacts. It indicated that by making improvements to the energy performance of over 10,000 properties that are currently below EPC band C, total cost savings in excess of £4m over a 20 year period could be made from lower repairs and customer contacts alone. Savings in other areas are also expected:

- properties in EPC band D or below have longer void periods; this is equivalent to 600 extra voids over 20 years
- poor energy performance results in nearly 3,000 additional complaints over a 20 year period
- homes with a high fuel poverty risk factor are more likely to be in arrears

These savings do not include subsidy or external grant funding, which would enhance the savings. We have tracked costs savings over a 20 year period to reflect the average lifetime across different types of measures that need to be installed, for example boilers and insulation. Figure 2 sets out the key findings of the analysis.

The analysis showed greater savings for some types of properties, particularly those with damp, mould and condensation; and some types of households, particularly those at risk of fuel poverty.

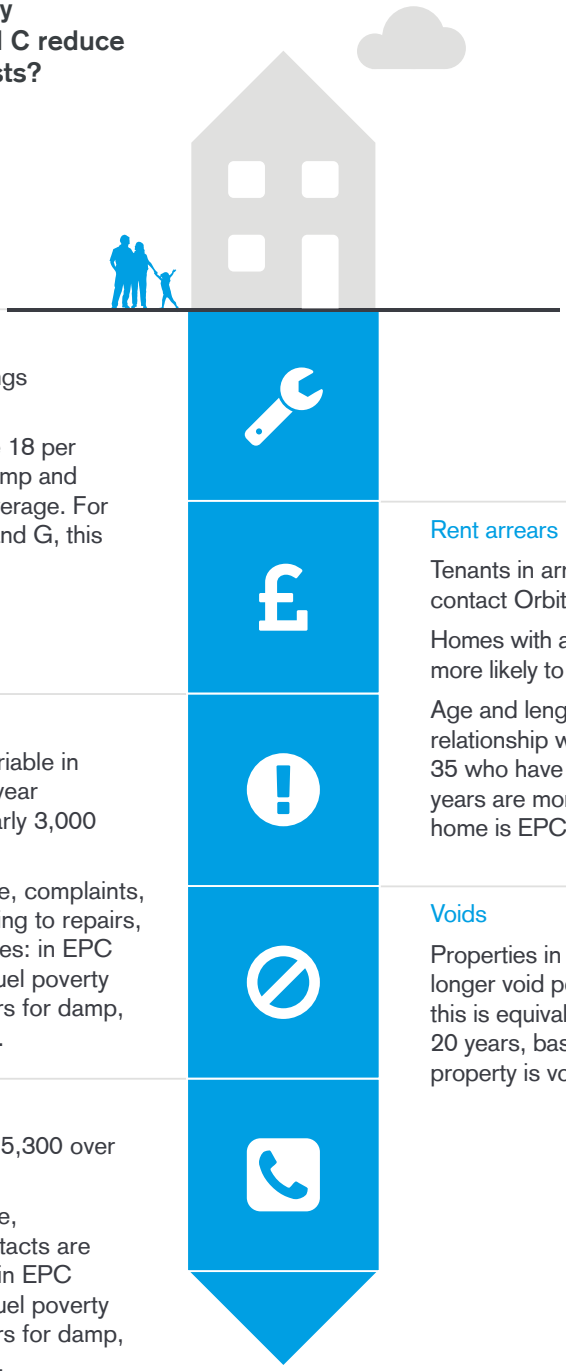
Energy performance was also found to influence the length of voids and number of complaints. In particular, a strong correlation was identified between lower energy performance and homes that need repairs due to damp, mould growth and condensation. The cost of repairs are then exacerbated by the costs incurred in dealing with the customer contacts and complaints specific to those repair needs.

Households identified as at greater risk of fuel poverty also have more repairs due to damp, mould growth and condensation, as well as higher rent arrears, repairs-related contacts and complaints, and higher energy-related contacts. See Section 5 for an explanation of the ‘fuel poverty risk factor’.

Understandably, energy performance is not the only variable found to influence costs. Location, length of tenancy, tenant age, building condition and age, and household size and composition are all among the many factors that can have an impact on housing costs. In order to account for these variables, a commonly used and widely accepted analytics technique for analysing complex data sets was used in our research (analysis of covariance modelling, ANCOVA). Our approach is described in more detail within section 5.

Figure 2

How can improving energy performance to EPC band C reduce housing management costs?



Repairs

Orbit can achieve 20 year savings of £3.84m.

Properties in EPC band D have 18 per cent more repairs relating to damp and mould growth than the stock average. For properties in EPC bands E, F and G, this figure is 48 per cent.

Customer complaints

A lower EPC rating is a key variable in driving complaints. Over a 20 year period, this is equivalent to nearly 3,000 additional complaints.

Compared to the stock average, complaints, both in general and those relating to repairs, are significantly higher for homes: in EPC band D or below; with a high fuel poverty risk factor; that have had repairs for damp, mould growth or condensation.

Customer contacts

Orbit will reduce contacts by 75,300 over 20 years.

Compared to the stock average, repairs and energy-related contacts are significantly higher for homes: in EPC band D or below; with a high fuel poverty risk factor; that have had repairs for damp, mould growth or condensation.

Rent arrears

Tenants in arrears are much more likely to contact Orbit about energy efficiency.

Homes with a high fuel poverty risk factor are more likely to be in arrears than other homes.

Age and length of tenancy have a strong relationship with rent arrears; tenants under 35 who have been renting for less than two years are more likely to be in arrears if the home is EPC band D or below.

Voids

Properties in EPC band D or below have longer void periods than the stock average; this is equivalent to 600 extra voids over 20 years, based on the average time that a property is void.

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Building the business case

By modelling the savings identified against the cost of investment in energy performance our findings strongly enhance the business case for retrofit.

Using cost data we estimated the cost of energy efficiency measures to achieve EPC band C allowing calculation of a simple payback.

In addition to these calculated savings, we identified opportunities to strengthen the business case further through external funding, programme efficiencies and revenue generation, all of which increase the cost-effectiveness of a project by generating additional savings or reducing the marginal (i.e. additional) cost of the works.

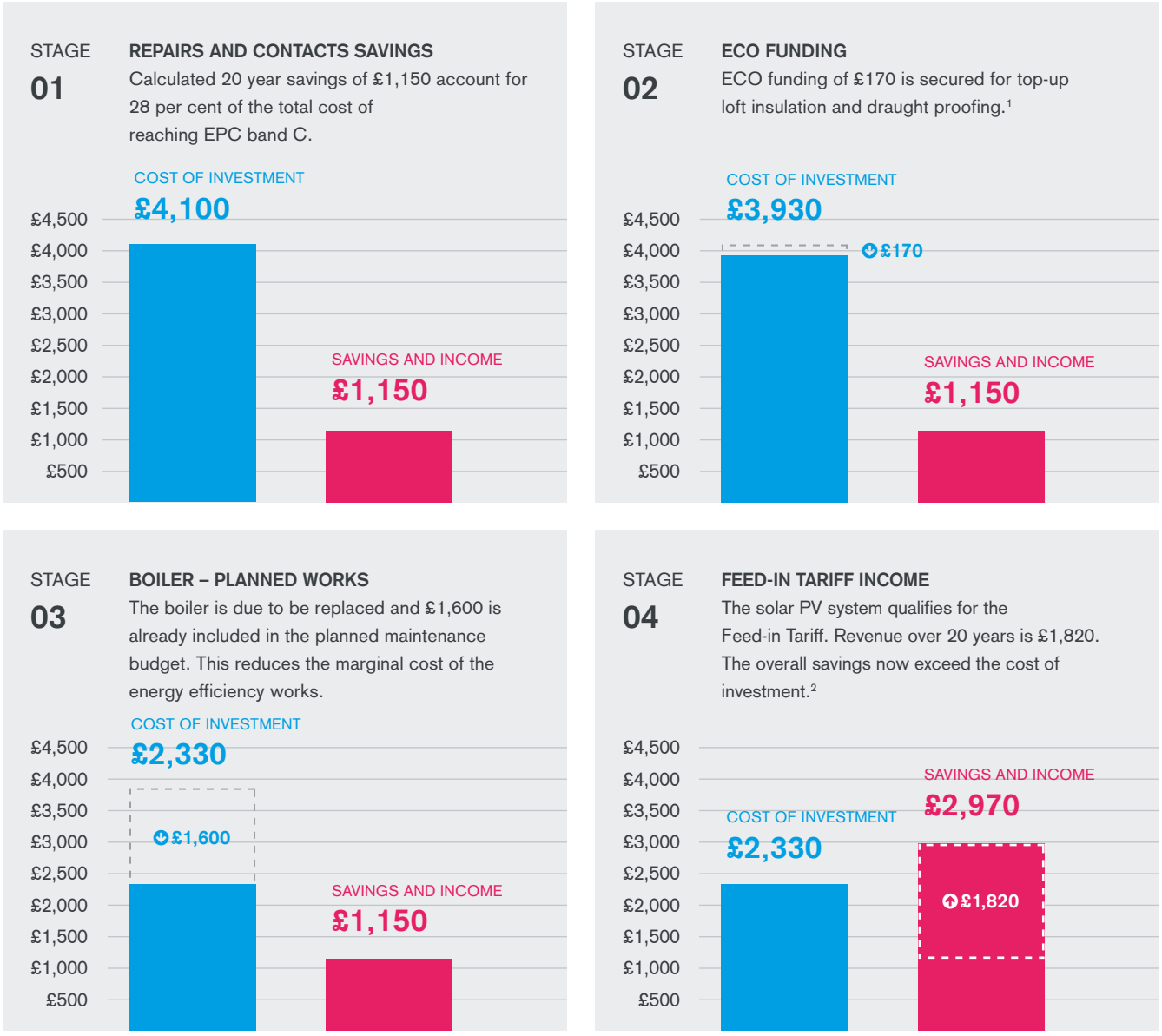
Figure 3 provides a case study of how the approach used in this project can be replicated by other social landlords to strengthen the business case for investing in energy efficiency within part or all of their stock.

The case study is based on an Orbit property: a three-bed terraced house, built in the 1920s, with a current RdSAP score of 60 (EPC band D). The cavity walls are already insulated but there is a 14 year-old boiler. In order to reach EPC band C, the property needs its loft insulation topped up, a new boiler with up to date controls, draught proofing and a 2 kWp solar PV system, costing a total of £4,100.

As shown in Figure 3, even without the income from the solar PV panels, the marginal cost of improving the property to EPC band C is £1,180. Once the Feed-in Tariff income that is accrued over 20 years is taken into account, the savings from the retrofit exceed the costs by £640.

In addition to bringing the property up to EPC band C, carrying out this package of works would provide a good opportunity to undertake any other required maintenance work. In this case, where the property has experienced issues with damp, this might include improving ventilation.

Figure 3
Building the business case – a case study



1. This is an estimated calculation based on the carbon savings set out in Ofgem's ECO2 consultation on deemed scores (https://www.ofgem.gov.uk/publications-and-updates/eco2-consultation-deemed-scores) and our knowledge of current rates for ECO funding.

2. This is based on a Feed-in Tariff rate of 4.18p/kWh, which is valid from 1 October 2016 – 31 December 2016 on systems that are 10 kW or less.

05

How this could work for you

Whilst the findings of this research project are specific to Orbit, the principles and the robust methodology applied are highly transferable. Key considerations for organisations seeking to identify savings through retrofit include the following.

A Housing management costs are influenced by a wide range of variables and it is vital to consider how they interact.

In this research project, we looked at the impact of five cost variables (repairs, customer contacts, voids, rent arrears and complaints) and 25 other variables covering over 27,000 general needs properties, approximately 90 per cent of Orbit's stock. These included dwelling characteristics, household composition, age of tenant, energy performance, tenancy information and housing benefit status. If we had looked at energy performance in isolation, without considering the influence of other variables, there would have been a risk of miscalculating its impact or even overlooking it altogether. If the data is available, an analysis of more variables may unlock greater savings still.

B Employ established analytical techniques to generate confidence in the identified savings.

Within this project, where possible, analysis of covariance (ANCOVA) modelling was applied, in order to identify the significant variables correlating with each cost area and quantify the significance of this relationship.

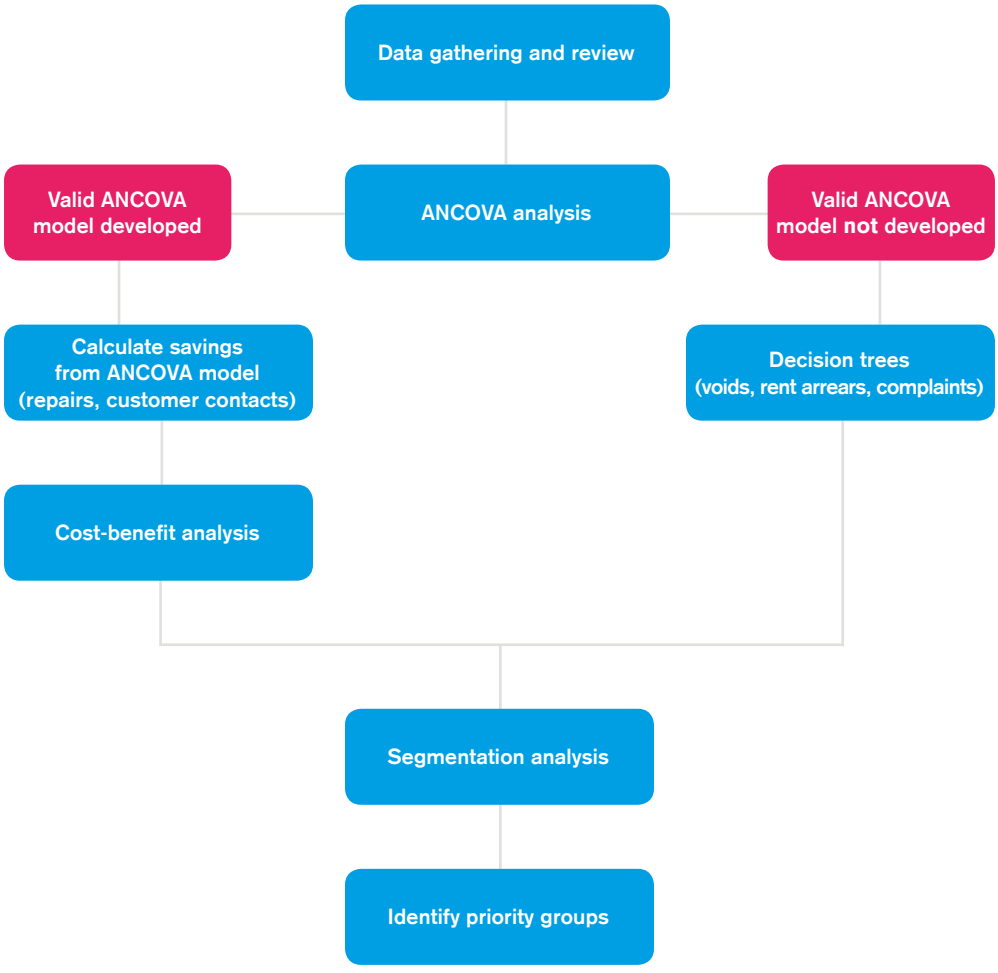
ANCOVA analysis is particularly suited to the evaluation of complex data sets as it allows the evaluation of a variable while allowing for the effects of other variables. In order for an ANCOVA model to be valid, it needs to meet a number of standard statistical tests or assumptions. Where it was not possible to build a valid ANCOVA model, decision trees were used to build up a picture of the key variables affecting costs.

C Use segmentation analysis to prioritise high cost households for investment.

The outputs of the ANCOVA modelling were used to calculate cost savings for each home. Each variable was then divided into segments to identify clusters of homes where costs and therefore savings were higher. The aim of this segmentation analysis was to identify specific groups of homes for inclusion in an energy efficiency programme to take forward the findings of this work. In addition to the available data, a 'fuel poverty risk factor' was calculated, applying Department for Business, Energy and Industrial Strategy statistics to identify households that might be at a greater risk of being fuel poor (see page 12).

The process of analysis is set out in Figure 4.

Figure 4
Process of analysis



WHAT IS THE "FUEL POVERTY RISK FACTOR"?

Fuel poverty is a function of energy costs and household income. It is possible to estimate energy costs by using EPC data, but details of household income may be difficult to access. This creates difficulty in assessing the risk of a household being fuel poor.

However, statistics published by the Department for Business, Energy and Industrial Strategy, identify fuel poverty trends relating to other characteristics for which data is available, for example occupant age and household composition.

We applied this information to the available data to build up a picture of where individual households had a number of characteristics associated with increased incidence of fuel poverty. This information was used to calculate a 'fuel poverty risk factor'.

Results from segmentation analysis indicate that homes with a high fuel poverty risk factor have higher costs in a number of areas, including

- contacts relating to energy efficiency and repairs
- repairs-related complaints
- repairs relating to damp, mould growth and condensation
- rent arrears

06

Support from RE:NEW

Beyond extensive analysis to help build the business case, support services provided by RE:NEW are designed to help scope, shape, finance and procure energy efficiency programmes that minimise cost and maximise both financial and socio-economic returns on investment.

Here are a few of the organisations that we have supported

Tower Hamlets Homes

Tower Hamlets has worked with the RE:NEW Support Team since August 2014. With £180 million to invest in 13,500 homes over five years as part of the Decent Homes programme Tower Hamlets is looking to demonstrate value for money by carrying out retrofit works alongside external repairs.

Read the case study

Moat Housing

Like many social landlords, Moat faces challenges in responding to the housing shortage. Moat has worked with the RE:NEW Support Team since 2013, mainly on its Pollards Hill project in the Borough of Merton where residents have seen many benefits.

Read the case study

AmicusHorizon

AmicusHorizon has recently completed the first of a series of area-based retrofit projects involving multiple energy efficiency measures at properties on and near the Lansdowne Green estate in Stockwell, South London. AmicusHorizon appointed Ecologic Energy to carry out the works following a competitive tender using the RE:NEW Framework.

Read the case study

For further information, or to arrange a meeting, please go to **www.london.gov.uk/renew** or email **renew@london.gov.uk**.

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