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Developing Retrofit Strategies

Building a better world together

Gwyn Roberts, Megan Waller and Jon Gilbert



- 100 years at the coalface of Building Science sector
- Today we will focus on the key aspects of delivering energy efficiency improvement from knowing your stock to sustainability assurance and benchmarking
- We will consider Green Homes Grant and Social Housing Decarbonisation Pilot





Why Retrofitting?

We spend 90% of our time inside.





The home of 2050

99.9% of homes will be around from one year to the next



Where we have come from

1967 English Housing Survey

There were 15.7 million homes in England and Wales

- 40% were built before 1919
- 25% lacked a basic amenity
- 19% had no indoor WC
- 12% were unfit for habitation
- 5% had repair costs exceeding £1,000 (£17,000 at 2017 costs).



Our Housing Today

- 24.2 million homes
- Cost of poor housing £1.5bn (was £600m in 2010)
- 50% of homes over 50 years old, 20% over 100 years old
- Homes will have to last 1,000 years at current rates of change

Figure 1: A typology of English housing

(* The sample size in the EHS data is too small to produce a reliable estimate.)

Dwellings (mean usable m ²)	Pre-1850	1850-1899	1900-1918	1919–1944	1945-1964	1965-1980	1981-2002	2003-2010	All ages
Terrace	185,000 (110)	1,088,000 (89)	1,150,000 (88)	1,036,000 (79)	920.000 (79)	1,049,000 (80)	691,000 (71)	236,000 (93)	6,356,000 (83)
Semi-detached	154,000 (149)	327,000 (121)	307,000 (120)	1,731,000 (93)	1,754,000 (89)	922,000 (87)	539,000 (76)	126,000 (90)	5,860,000 (94)
Detached	279,000 (208)	176,000 (172)	130,000 (190)	449,000 (160)	492,000 (147)	804,000 (133)	1,210,000 (134)	256,000 (153)	3,796,000 (149)
Bungalow	18,000 (*)	30,000 (*)	13,000 (*)	195,000 (79)	594,000 (75)	698,000 (77)	389,000 (91)	60,000 (80)	1,996,000 (78)
Converted flat	105,000 (83)	450,000 (63)	263,000 (62)		22,000(*)	5000 (*)	2000 (*)	•(*)	948,000 (65)
Purpose-built low-rise flat	3000 (*)	79,000 (71)	96,000 (73)	216,000 (57)	541,000 (57)	938,000 (56)	797.000 (50)	370,000 (58)	3,039,000 (56)
Purpose-built high-rise flat	1000 (*)	3000 (*)	8000 (*)	21,000 (*)	73,000 (52)	187,000 (58)	23,000 (*)	74,000 (62)	391,000 (58)
All types	744,000 (150)	2,153,000 (94)	1,967,000 (95)	3,751,000 (93)	4,397,000 (87)	4,602,000 (84)	3,650,000 (89)	1,112,000 (92)	22,386,000 (92)



Data driven approach

Poll Question 1

How comprehensive would you consider the data you hold in relation to the baseline performance of your housing stock?



Identify households likely to be in fuel poverty

Dwelling-level data demonstrating likely carbon emissions, heating costs per annum

A scope to identify likely household income bands

Energy efficiency variables e.g. wall types, uninsulated cavity, loft insulation levels

> Identify likely presences of HHSRS Category 1 hazards & Disrepair

Assess the impact of improvements on dwellings e.g. how to reach an EPC Band C and the likely costs

Providing a scope for improvements

Bolton Council needed to **understand the condition of their private sector housing stock**.

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Bolton used **BRE's Housing Stock Condition Model** to **identify dwellings** at risk of failing decency by **predicting the presence of hazards**, **energy efficiency levels, fuel poverty and low income.**

The data helped the Council **target households with health conditions**, **living in poor housing** such as those with COPD living in cold homes.



2,829 improvement measures implemented



£3 million saving on health and social care over 5 years

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Green Homes Grant response

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We support Local Authorities to **identify** a range of **housing condition** and **energy efficiency** variables, at **dwelling-level**.



Accompanying video link: https://www.linkedin.com/p osts/building-researchestablishment-bre-_supporting-localauthorities-to-identifyactivity-6703978521657655296sxUX/



Strategy development

How would you identify your current strategy position in relation to retrofit strategy



Retrofit Strategies

- 1. Market capacity review local / national low carbon supply chain analysis
- 2. Detailed analysis SAP/ Energy Modelling, whole house refurbishment opportunity, PV expertise.
- 3. Other grand challenges
- 4. Independent monitoring, evaluation and review.

Innovation review



Home of 2030 –
 Innovation Challenge and with Innovation Directory

 Hertfordshire Low Carbon Initiative



Retrofit to improve energy performance, but also health and wellbeing.



Independent Monitoring and Review

Cornwall Whole House Retrofit



 Delivering whole house retrofit under BEIS competition.

 BRE carrying out detailed evaluation and analysis.



Making it happen

Do you think that having an industry recognised framework for assuring the sustainability of retrofit projects would help accelerate the housing sectors push for net zero carbon ?



Frameworks for Sustainability Assurance and benchmarking

BREEAM

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- Most widely used Launched in 1990
- Robust, evidence based criteria that is process and outcome focused
- Third party certification scheme
- Drives innovation and standards above the regulatory minimum
- Credible label
- Differentiate + Information



Private Funding





CERTIFIED V SUSTAINABLE HOUSING



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Public Funding

Search

200 Department for Business, Energy & Industrial Strategy

Green Homes Grant: Local Authority Delivery

Guidance for Local Authorities

August 2020

COV.UK

Coronavirus (COVID-19) | Guidance and support

Home > Environment > Climate change and energy > Energy efficiency > Social Housing Decarbonisation Fund Demonstrator

繱 Department for Business, Energy & Industrial Strategy

Notice **Social Housing Decarbonisation Fund Demonstrator - programme overview**

Updated 16 September 2020

Overview

Overview Eligibility for the SHDF Demonstrator Timeline

On 8 July 2020, the Chancellor's Summer Economic Update announced the UK-wide Social Housing Decarbonisation Fund Demonstrator (SHDF Demonstrator) to start the decarbonisation of social housing over 2020/21, and to support green jobs as part of the COVID-19 Economic Recovery Plan.

Contents



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Thank you

Gwyn Roberts – Principal Consultant, Strategic Advisory Email: <u>gwyn.roberts@bregroup.com</u>

Megan Waller – Strategic Business Manager – Housing & Regeneration Email: <u>megan.waller@bregroup.com</u>

Jonathan Gilbert – Strategic Business Consultant – Housing & Regeneration Email: jonathan.gilbert@bregroup.com





Thirteen

• Thirteen provides customers with homes, support and opportunities to grow.

• In July 2017, Erimus Housing, Housing Hartlepool, Tees Valley Housing, Tristar Homes and Thirteen Care and Support joined in partnership to create one strong social purpose business called Thirteen.

• Our 1,600 colleagues provide services for more than 70,000 customers across Teesside and other areas of the North East, including North Yorkshire, County Durham, and Tyne and Wear.

• Our reason for being is to provide good quality homes and support for those in housing need. We provide support for anyone who needs a little help: help to get on the housing ladder, help to pay the rent, help to keep their home in good repair.

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Current Position

- 34,000 Stock
- £1.2 Billion current 30-year investment spend
- 98.2 % Category C EPC or better
- CO2 production Tonnes/Yr 91,175
- Energy demand Kwh/Yr 443,270,979
- Energy generation Kwh/Yr 10,250,000



Overview of completed component projects

- Installed 750 ASHP
- Installed 60 NIBE units
- Installed 57 GSHP
- Installed 40 Hybrid ASHP
- Installed 2500 PV systems
- Installed 14000 Whole house ventilation systems
- Installed EWI & IWI to around 3000 homes
- Trialled Sprayseal roof insulation
- Trialled SumAmps
- Trialled Smart home IoT integration







Thirteen approach to fabric first full house retrofit

• What should our future homes look like?

• It must integrate new environmental measures to reduce the carbon impact and footprint of our homes, replacing historic fossil fuel heating systems and improving thermal efficiency which in turn will lower carbon production and the fuel bills of our customers.

• Must meet the demands of future customers.

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Thirteen approach to fabric first full house retrofit

The approach encompasses these key areas of improvements.





Asset Planning

• We are currently undertaking a holistic survey in partnership with Savills of our portfolio

• This will allow us to understand the financial requirements of meeting carbon neutral whilst also creating desirable sustainable homes and communities that remain viable

• We are also developing new modelling and digital technology that will allow us to be smarter in the we plan moving forward

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Detailed Project

• 1 Bedroom Bungalow in Coulby Newham

• The property was inspected as a void it was identified that we would need to complete at least £24,000 of improvement works to bring the property up to our minimum lettable standard and was would still not be fit for purpose.

• We have made the decision to utilise the property as a pilot for our new approach to decarbonising out assets through our home of 2030 improvements 6-point approach. This will result in a totally carbon neutral home that is cost effective for the customer to run, easy to maintain, attractive to customers, adaptive to future needs and will have an extended asset life span.

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Property Technology

SunAmp water heater



Thirteen IoT platform





Property Technology Envirovent MVHR

Thermaskirt heating







Property Technology

Ele DC Electric system







Findings

- The key findings:
- Insulation issues with vacuum perforation
- Ventilation heat & humidity increased
- New Technology SunAmp very heavy
- Energy demand & CO2 production reduced by 76%
- EPC Rating Dropped from C to an E

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Costs

 Current data shows that adopting this approach will require an increase of around 52% in budgeted 30-year costs

• Working alongside partners and with the introduction of new technologies, reduction in costs and the decarbonisation of the grid we believe this could be reduced to 35%

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Thoughts...



Retrofit and Performance Management

Sarah McClelland Great Places Housing Group

Existing Assets

- Target 1: All homes to a D by ??
- Target 2: All homes to a C by ??
- Target 3: All homes net / zero Carbon by ??

Retrofit

Programmes of: Loft insulation Wall Insulation Underfloor

Solar Thermal Solar Panels ASHP MVHR

Engagement



EPC

- RdSAP v Full SAP
- Sap 09 v Sap 12 (SAP 2020??)
- LEDs: 1 or 4 points
- Boiler upgrades: 8 or ½ point



- Point Scoring
- Decarbonisation
- Building in obsolescence
- Higher long term costs
- Repeated disruption to customers
- The recalculations: RD SAP 09 v
 12
- What is the real impact on our customers?



How are our homes performing? inytag LII TRA 2 Auto

How are our homes performing?

- An estate of 1970's built homes
 - Electrically heated and **already insulated**.
 - Cavity Insulation sporadic
 - Loft Insulation inconsistently laid and deteriorating
- The original cavity and loft insulation were extracted before retrofit.





Pre-retrofit condition







Monitoring





Detailing





A sea of insulation



Energy Demand Indicators

Negawatt Hours







- 1. Like mpg on a specific car but with driver removed
- 2. Show a specific home 'fabric' rating
- 3. Expressed on a kWh heating scale;
 - How much heat would a typical occupant, in typical weather need to heat home to typical temp
- 4. 1000kwh improvement on Trafford estate = c£200

*NWh show how much extra energy occupant needs to operate old house the way they operate new

Home + occupant – annualized reduction (nWh savings)





What have we learnt?

- 1. No more box ticking
- 2. EPC is a starting point only
- 3. Customer engagement
- 4. Attention to detail
- 5. Specification
- 6. With contractors
- 7. Performance monitoring

