

Herefordshire Economic Evaluation

# Opportunities to grow our local retrofit economy

## **TEEconomy :**

**Establishing the Potential of a Transition Enterprise Economy**

**Detailed report : Housing Retrofit Sector**

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**REconomy Project**

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*Footnote references may be found in the annexed bibliography, which is a separate document*

### Background

This report into the Housing Retrofit Economy of Herefordshire forms part of a larger piece of work in the county under the title “TEEconomy - Establishing The Potential Of A Transition Enterprise Economy In Herefordshire”. Reports on the county’s Food and Drink Economy and on its Energy Economy are already complete.

The TEEconomy work in Herefordshire is itself part of wider ‘economic evaluation’ project being undertaken in Totnes, Devon (South Hams District Council) and Brixton (London), thus covering a rural county, a market town and an inner-city area. The intention is to use the work done in these three areas to develop models for application nationwide and as a springboard to further work.

The work is commissioned by the Transition Network, with funding from the Tudor Trust supporting the Herefordshire part of the project. It takes place under the auspices of the nationwide REconomy Project which supports Transition Initiatives across the UK, including the Herefordshire in Transition Alliance (HiTA) which brings together transition groups in Herefordshire.

The principal outcome is intended to be :

*Better informed strategic economic planning and decision-making that will help build the resilience of the local economy, and so the local community, in the face of economic uncertainty, rising energy prices and climate change.*

### What the report addresses

The report draws together and analyses information from diverse sources. It sets out the results of initial research into the potential for strengthening the local economy by localising the supply of materials and services aimed at improving housing energy-performance, through retrofitting of energy-conservation, energy-generation and heating systems. In so doing, it provides an assessment capable of underpinning ‘better informed strategic economic planning and decision-making’ in Herefordshire. The following questions are addressed:

- **What is meant by ‘housing retrofit’, and why is it needed?**
- **What data sources and assessment tools are available for ‘housing retrofit’?**
- **What are the Built Characteristics of the Herefordshire housing stock related to retrofit and what is the potential for improvements to energy performance?**
- **What are the Household Characteristics of the Herefordshire housing stock and what is the potential for owners or occupiers to make improvements?**
- **How can we best define the extent of the ‘Housing Retrofit’ Economic Sector?**
- **Where and how could this sector best be developed and how far could the Green Deal support this development?**
- **What is the potential economic value of the local energy savings?**
- **What is the potential for localised supply of skills, materials and systems and the value of these to the local economy?**

## Opportunities to grow our local retrofit economy

Each question carries challenges and this report does not pretend to have satisfied any of these fully. There are gaps in the information publicly available, much of the information required is commercially-sensitive and therefore hidden from view, and it has been beyond the resources of the project to engage in primary research or to acquire commercial-quality data. Therefore at this stage some answers can only be partial or to some extent conjectural, requiring further in-depth investigation or primary research to follow, if required.

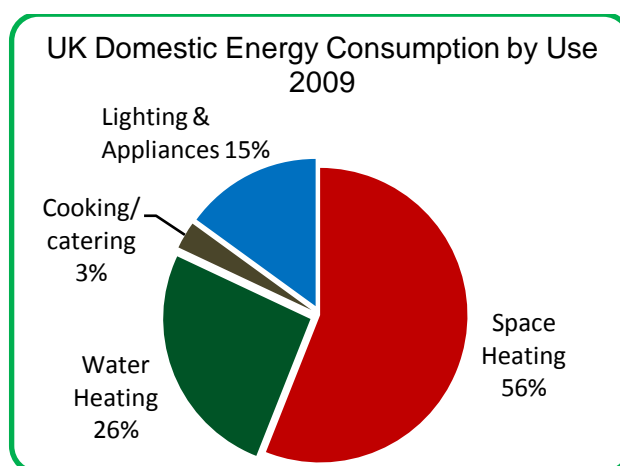
That said, this report does produce helpful information and establishes parameters which can inform present considerations and decision-making. It is also a useful outcome to know what we do not yet know, so as to guide further work.

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### What do we mean by 'housing retrofit' and why is it needed?

There are any number of reasons for 'retrofitting' an existing Herefordshire dwelling with a variety of additions or improvements, many of which do not directly concern us here. This report is concerned specifically with 'energy retrofit' applied to housing : that is, measures which can be installed in existing housing to improve energy performance. <sup>1</sup>

The chart below gives the broad outline of how energy is presently used in UK dwellings.



Source : ZeroCarbonBritain 2030, 2010<sup>2</sup>

Heating of space and water accounts for 82%. The average annual cost of energy in a Herefordshire home is £1,103, with those built before 1919 averaging a remarkable £1800 and those built after 1965 averaging £870 <sup>3</sup>. Energy usage at these levels is increasingly unsustainable, both financially and environmentally.

How can this picture be changed so that consumption decreases becoming less costly and more sustainable, and how can Herefordshire benefit economically from making these changes?

<sup>1</sup> The terms 'energy retrofit in housing' or 'housing retrofit' or 'energy retrofit' will be used interchangeably.

<sup>2</sup> CAT – 1 p88

<sup>3</sup> HHS – 1 p74

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Retrofit comprises a set of measures capable of changing patterns of energy use:

*“Retrofitting domestic buildings offers an effective way not only of decreasing carbon emissions but also of reducing overall energy demand. With appropriate measures, **the average home’s heating and lighting usage could be reduced by 80%**, with the remaining heat and electrical demand being met using renewables. The nation’s building stock could be transformed from among the worst in Europe to a position of leading the low carbon economy.”*

*(ZeroCarbonBritain2030)<sup>4</sup>*

Some retrofit measures aim to reduce the demand-side through energy efficiency or conservation. Others aim to improve the supply-side, providing energy through combinations of technology and energy source which are low-carbon and renewable, and therefore sustainable. Both approaches can and should take into account the ‘triple-bottom-line’ costs of energy production and use – that is, the combined financial, environmental and social impacts.

There is a range of possible objectives:

**Wellbeing** : To improve wellbeing for those who are suffering through lack of heat (or too much of it) and the financial consequences of trying to maintain a comfortable, healthy home.

**Housing quality** : To improve the quality of the existing housing stock, so that better use can be made of it and perhaps fewer new houses will be required.

**Energy usage** : To reduce energy usage and encourage local generation, so that the local area (and the nation) becomes less dependent on imports.

**Carbon emissions** : To reduce carbon emissions and pollution, improve the county’s carbon footprint, meet national and global targets and hence mitigate climate change.

**Saving money** : To enable local people to save money on energy bills without compromising health and wellbeing, money which can then be spent in more beneficial ways.

**Spending and investment** : To enable local people to spend their money into the local economy wherever possible and to invest in ways that benefit themselves and the community.

**Business and Employment** : To create profitable local businesses which provide for real needs, develop new skills and technologies and create stable well-paid employment.

**Sustainability** : To meet pressing needs in ways that contribute social, environmental and economic benefits to local people, creating sustainable livelihoods in a sustainable county.

These illustrate that there is a complex web of interrelated social, environmental and economic objectives, which can all be affected to varying degrees depending on how we go about it. This report aims to identify the best approaches.

Housing energy retrofit is urgently needed because global society faces a ‘perfect storm’ comprising climate change, resource depletion, and economic instability, and also because in the UK on top of these we have a looming crisis due to a combination of import-dependency and lack of capacity in energy-supply<sup>5</sup>. Fully three years ago the energy regulator Ofgem warned :

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<sup>4</sup> CAT – 1 p88

<sup>5</sup> TP - 1

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*“The unprecedented combination of the global financial crisis, tough environmental targets, increasing gas import dependency and the closure of ageing power stations has combined to cast reasonable doubt over whether the current energy arrangements will deliver secure and sustainable energy supplies.”<sup>6</sup>*

In response to which a leading national property company commented :

*“It's a crisis against which the credit crunch and recession could pale in comparison. Our security of supply is becoming less secure by the day and only a concerted strategy will turn this around. The major campaign of the coming years [will be] creating energy and protecting its supply.”<sup>7</sup>*

And the press then reported :

*“Britons may not be able to afford to heat their homes beyond 2015, with gas and electricity bills reaching nearly £2,000 a year, unless drastic action is taken to shore up supply, says Ofgem.”<sup>8</sup>*

In February 2013, Ofgem issued another “stark warning over shrinking energy supplies and a looming energy gap”, stating that reserve margins for generation capacity would be down from 14% to only 5% in three years, and that power cuts would have to be anticipated<sup>9</sup>.

Having energy enough to meet our needs is critical to wellbeing and to survival - economically, socially and physically. To meet the certainty of forthcoming challenges and the probability of deeper crises – which could be nearly upon us<sup>10</sup> - local communities need to become more *resilient*, able to absorb sudden impacts and ‘bounce back’. In terms of energy-use this means :

- **Being less exposed** to rising energy prices and the consequences of living in under-heated homes, so that impacts are mitigated and communities are able to withstand sudden changes while maintaining social wellbeing;
- **Having alternative strategies and opportunities** available, so that communities can take positive action to reduce energy needs and boost supply, improving their local situation economically, socially and in other ways.

As identified above, the crisis facing us is in part an economic one where a conjunction of factors is driving prices skywards. Therefore resilience needs to be underpinned economically, with a strong local economy offering sustainable jobs and sustainable housing solutions.

Below we quantify the potential economic value of housing retrofit activities in Herefordshire, and suggest ways in which the opportunities presented by this crisis can be used towards strengthening the local economy and creating resilience in local communities.

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<sup>6</sup> OFGM - 1

<sup>7</sup> GDN - 1

<sup>8</sup> GDN - 2

<sup>9</sup> GDN - 3

<sup>10</sup> OFGM - 2

## What principal retrofit measures should we consider?

There are approximately fifty different types of ‘energy efficiency measures’<sup>11</sup> with no certainty as to which of these would be most useful, other than a widespread recognition that insulation generally should be a priority.

The UK Energy Efficiency Strategy provides a yardstick through its Energy Efficiency Marginal Abatement Cost Curve (EE-MAC) approach which identifies the maximum energy savings from a raft of different possible measures<sup>12</sup>. The table below is derived from EE-MAC data and shows the different levels of contribution each measure or group of measures could make in the short term to domestic energy savings :

DOMESTIC ENERGY SAVINGS BETWEEN PRESENT & 2020		
MEASURE	AVG %	
Products: Best Available Technology Domestic Lighting	0.0%	
Domestic: Smart Meters	1.1%	6.1%
Products: Best Available Technology Domestic Appliances	5.0%	
Domestic: Loft Insulation	7.3%	7.3%
Domestic: CESP	5.3%	
Domestic: CERT (20% Uplift and Extension)	5.8%	11.1%
Domestic: Easy to Treat Cavity Insulation	6.8%	
Domestic: Hard to Treat Cavity Insulation	7.9%	14.7%
Domestic: 2013 Part L Existing Homes - Extensions and Windows *	8.5%	17.4%
Domestic: 2010 Part L Existing Homes *	8.9%	
Domestic: External Solid Wall Insulation	9.7%	21.0%
Domestic: Internal Solid Wall Insulation	11.3%	
Domestic: Air Source Heat Pumps	10.7%	22.4%
Domestic: Ground Source Heat Pumps	11.7%	
	100.0%	100.0%
<i>CESP : Community Energy Saving Programme; CERT : Carbon Emissions Reduction Target</i>		
* Building Regulations : Approved Document L1B: Conservation of fuel and power (Existing dwellings) <sup>13</sup>		

<sup>11</sup> HHS – 1 p(147) Appendix 1

<sup>12</sup> DECC – 5 p83

<sup>13</sup> HMG - 1

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As shown above, DECC expect that cavity and solid wall insulation will together contribute a massive 35% of savings in this sector to 2020, with a further 7% from loft insulation making 42% all told. Installation of heat pumps will account for over 20%, and a variety of measures covered by building regulations under 'conservation of fuel and power' (including extensions and change of use or energy status) add a further 17%.

While there may be disagreement as to whether DECC's expectations are well-judged, this does provide a guide as to where grants or other incentives are likely to drive retrofit activities : principally towards installation of wall insulation, loft insulation and heat pumps.

It is widely recognised that an integrated 'whole-house' approach should be taken and retrofit measures implemented in a planned sequence that minimises expense and maximises effect. According to recent Consumer Association research, however, many householders are unclear what they should be doing on energy efficiency, and do not think of it as requiring a plan but as measures that can be introduced separately and ad hoc.<sup>14</sup>

There is also the danger that governmental and energy-industry schemes may be target-driven, aiming for the 'quick wins' which will tick boxes and provide payouts, rather than delivering far-reaching long-term benefits to properties and to householders.

Preferably, the selection of retrofit measures appropriate to Herefordshire will reflect a proper consideration and identification of areas of greatest need and greatest benefit - in terms of properties and people alike. Applying external wall insulation may be cost-effective and beneficial in some cases, inappropriate and counterproductive in others. Heat pumps will be viable in some homes, out of the question in others. Some individuals and communities will require special forms of consideration and above-average expenditure to keep them safe and viable into the future.

So, while having regard to DECC and national-level policy intentions is essential, it is in addressing the actual circumstances of Herefordshire and its people, both rural and town, that we can set out to identify what particular measures might make a real difference to the wellbeing of people and provide a basis for new skills and better livelihoods.

Before we turn to looking at the 'raw material' for building this sector, namely the county's housing stock and the needs of its inhabitants, we must first consider the nature of the data available to help us do so.

### What data sources and assessment tools are available for 'housing retrofit'?

We are fortunate that the 'Healthy Housing Survey 2011' (HHS11) commissioned by Herefordshire Council has recently been released containing much useful information<sup>15</sup>. The first such survey since 2005, this is based on a 1.5% random sample of the county's 82,521 domestic properties – therefore the numbers and percentages produced are statistical extrapolations which are said to be

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<sup>14</sup> DECC – 5 p74

<sup>15</sup> HHS - 1



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accurate within a 3% spread.<sup>16</sup> The report concludes that the county “faces exceptional challenges in relation to the age and type of housing, the availability of mains gas, and the population profile.”<sup>17</sup>

The HHS11 relies extensively on other sources and assessment tools. This is a complex and rapidly-changing area of public policy, so it is not always easy to see at first glance how the different sources of information fit together, or on what assumptions they are constructed.

Much of the HHS11 refers to the national Decent Homes Standard (DHS). Superficially, it would be an attractive proposition for this report to rely on DHS categories such as ‘non-decent’, ‘disrepair’ and ‘thermal comfort’ as guides to the performance characteristics and geographic distribution of Herefordshire houses in need of improvement.

The devil is in the details however : for example, a house cannot fail the DHS test for ‘disrepair’ on condition alone but must also match other criteria such as age, so that results are skewed. Furthermore, under Part D ‘Thermal Comfort’, as little as 50mm of loft insulation can enable an oil- or gas-heated dwelling’s insulation to be classed as ‘effective’, or astonishingly even 0mm if there is wall insulation instead.<sup>18</sup>

Justifiably therefore, in its March 2010 report ‘Beyond Decent Homes’ the Communities and Local Government Select Committee commented that “*the Decent Homes Standard remains a low benchmark*”<sup>19</sup>.

The bigger picture regarding energy efficiency – and hence retrofit - places Carbon Emissions Reductions Targets (CERT, now superseded by Energy Company Obligation or ECO) as a principal driver, with both the DHS (in an upgraded form) and the Standard Assessment Procedure (SAP) used conjointly towards identifying where improvements to housing stock are most needed.

In analysing the local survey results the HHS11 features extensive use of both DHS and SAP approaches - the two are related in that a building with a SAP rating of less than 35 automatically fails the Health and Safety criterion of the DHS : this applies to no less than 9.4% of Herefordshire dwellings<sup>20</sup>.

For the above reasons this report will not place reliance on DHS categories. We turn now to the SAP and its derivatives – the RDSAP, the GDSAP and the EPC.

Originally introduced in 1995, updated in 2005 and 2009, the SAP is the government’s system for rating the energy performance and CO2 emissions of buildings, and is among other things used to establish compliance with UK building regulations. Since 2006 these require measures for energy conservation under parts L1A for all new build and L1B for existing, as some renovations require a

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<sup>16</sup> HHS – 1 p (125)

<sup>17</sup> HHS - 1 p.ix

<sup>18</sup> HHS – 1 p (135)

<sup>19</sup> CLG - 1

<sup>20</sup> HHS – 1 p37

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SAP.<sup>21</sup> Parts of SAP2005 were until recently still in use alongside SAP2009 – for example the outgoing Warm Front scheme still ‘adheres’ to SAP2005.<sup>22</sup>

Based on ‘standard occupancy’, the SAP assesses how much energy is required by a building in order to provide a defined level of comfort and service provision, and how much CO<sub>2</sub> will be emitted in doing so. It estimates annual energy consumption for heating, hot water, lighting and ventilation and quantifies building performance in terms of three factors : energy use per unit floor area; energy efficiency related to fuel cost; and CO<sub>2</sub> emissions. Since being revised in 2005, the SAP scale runs from 1 to 100, the upper limit representing absolute energy efficiency, or ‘zero cost’. Being standardised, it enables comparisons across types and geographic boundaries.<sup>23</sup>

A simplified version known as RDSAP (Reduced Data SAP) is used in the production of the Energy Performance Certificate (EPC).

The EPC is one of a number of ‘labels’ available to categorise buildings.<sup>24</sup> Introduced in 2007 as an element of the Home Information Pack (HIP), despite withdrawal of the HIP in 2010 an EPC is still required when a domestic property is sold. Using a scale of A to G where A is optimal, the EPC rates a building’s energy-efficiency and also its environmental impact (CO<sub>2</sub> emissions) – UK homes average D or E on both counts.<sup>25</sup> An EPC for a domestic dwelling is usually £60 but can cost as little as £45.<sup>26</sup>

Domestic EPCs are subject to criticism on the grounds that they fail to deal adequately with older buildings using non-standard construction, especially listed buildings, and may be inaccurate : the inspection of inaccessible features such as insulation relies on information provided by the householder who may be ill-informed.<sup>27</sup>

SAP assessments are also subject to criticism, notably from proponents of ‘passivhaus’ principles.<sup>28</sup> <sup>29</sup> SAP methodology although evolving has in the past been based on assumptions which mismatch with environmentally-aware building technology and lifestyle practices, using ‘standard occupancy’ and factoring in the building’s age along with the cost of its primary fuel, rather than focusing on constructional details alone.<sup>30</sup> Where construction has been carried out to a higher standard than required by building regulations this will not be recognised by SAP unless evidence is provided, so SAP ratings can be under-estimates of true performance.

The foregoing assessments will also underpin the forthcoming Green Deal programme which was included in the 2011 Energy Act and launched in October 2012, although initial implementation plans will only be finalised in January 2013. An adapted version of RDSAP known as GDSAP (or the Green Deal Occupancy Assessment tool) was released in December 2012 as a stopgap and is set to

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<sup>21</sup> WKPD - 2

<sup>22</sup> DECC - 2

<sup>23</sup> HHS – 1 p73

<sup>24</sup> ECI – 1 p20ff

<sup>25</sup> WKPD - 3

<sup>26</sup> GLEPC – 1 *EPCs are also required for non-domestic buildings though using a different methodology and assessment scale. These cost upwards of £200.*

<sup>27</sup> WKPD - 3

<sup>28</sup> PSVH – 1 p9

<sup>29</sup> AECB – 1 p34ff.

<sup>30</sup> GBF - 1

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be withdrawn in a few months “once the third-party software market has sufficiently matured.”<sup>31</sup> The GDSAP assessment will be used in conjunction with an EPC to provide a Green Deal Advice Report for participating households.

The Green Deal will be an important feature in determining take-up for energy retrofit nationally, and will be examined in more detail below. However there is already criticism of some of the assumptions built into the software of the EPC which produce unrealistically low estimates for key measures such as installation of wall and floor insulation. As upfront installation cost is a crucial element in the Green Deal assessment any proven under-calculations would prove damaging to credibility and take-up of the scheme, by installers as well as potential clients. Barriers such as legal frameworks (eg. controlling procurement procedures), high costs of entry and market risks may have the effect of excluding sole traders and SME’s from participation in developing this market<sup>32</sup>.

Widespread doubts persist as to the fundamental objectives of Green Deal and ECO and the principle means for achieving these, particularly the lack of clear targets and use of EPC’s to underpin such targets<sup>33</sup>. As the ECO is funded by energy supply companies who aim to satisfy their legal obligations at the lowest cost, there is also the probability that wherever allowable funds may be directed to areas where ‘economies of scale’ apply (i.e. urban areas) and away from dispersed and hard-to-treat areas such as rural Herefordshire<sup>34</sup>. However the legislation does make a requirement that 15% of the companies’ obligations must be met by “promoting carbon saving community qualifying actions to domestic energy users who are members of the affordable warmth group living in a rural area.”<sup>35</sup> It will be crucial to ensure that this funding is spent in rural areas as directed and in ways that maximise benefits to householders.

Notwithstanding the possible limitations of the DHS or the SAP, as these are intrinsic to national and countywide housing assessments there is little option other than to provisionally – and in some cases cautiously - accept reports which place reliance on these, such as particularly the HHS11.

In addition, national periodic assessments are commissioned by the Department for Communities and Local Government (DCLG) in the form of the English House Survey (EHS), previously known as English House Condition Survey (EHCS). Like the HHS11 this is a sampled survey which “provides an accurate picture of the type, condition and energy efficiency of housing in England, the people living there, and their views on housing and their neighbourhoods.”<sup>36</sup> As with the HHS11 at county level, at national level the EHS features numerous references to both DHS and SAP in analysing its findings.

There are other databases of potential help to us, such as the Homes Energy Efficiency Database (HEED) run by the EST. Data on individual dwellings is entered onto this database by suppliers when upgrading is carried out, which could be extraordinarily valuable to research, however doubts

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<sup>31</sup> BRE - 1

<sup>32</sup> PL - 1

<sup>33</sup> PARL - 1

<sup>34</sup> PL – 1;

<sup>35</sup> HMG – 2 p10

<sup>36</sup> DCLG - 2

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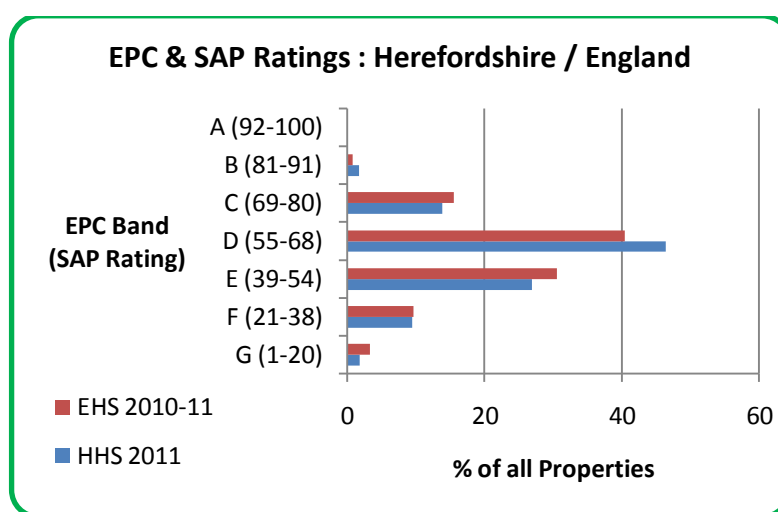
as to its reliability have also been raised. This report has not had access to this database, as it is not open-access.<sup>37</sup>

Having briefly mapped the data landscape we can now use these sources to help us understand firstly, the actual fabric of the county's housing stock and secondly, the nature of its households, and where their characteristics have inferences for growing a housing retrofit economy.

### What are the Built Characteristics of the Herefordshire housing stock, related to retrofit?

If there was no scope for improving local housing – for example if it was already in optimal condition or if there was some insurmountable obstruction to making changes – there would be no potential for growing this part of Herefordshire's economy. As a first step therefore we need to establish the state of the local housing stock, within the constraints of information in the public domain.

As noted above, the 'energy efficiency profile' of the county as a whole compares well with England nationally : there are 5% more properties in EPC bands D to A (SAP 55 and over) and less in the lower categories :<sup>38</sup>



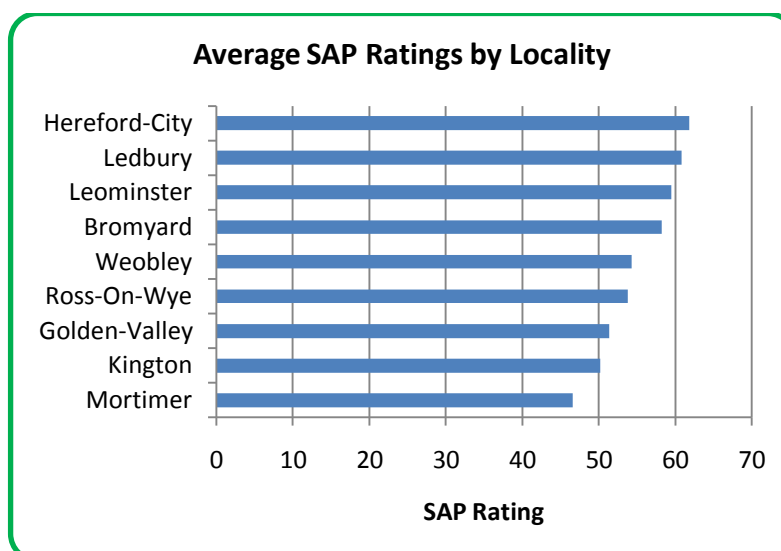
The county average is SAP 58.1, however on closer inspection we see that the more rural areas away from the centre and main trunk routes fall significantly below this, as in the following chart based on information in HHS11<sup>39</sup>:

<sup>37</sup> EST - 4

<sup>38</sup> HHS – 1 p 82

<sup>39</sup> HHS – 1 p 81

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To look in more detail, the following property characteristics are of fundamental importance in assessing the retrofit potential :

- Age of properties : provides some indication as to the likely construction, materials, services and energy performance; however, newer does not necessarily imply less need for improvement or better scope for doing so.
- Type of properties : some types of property are inherently less efficient, and some are inherently difficult to insulate; for instance, detached houses and bungalows have higher proportions of external surfaces. Nationally, approximately 50% of those in fuel poverty live in 'hard-to-treat' (HTT) housing, with complex factors affecting the scope for improvements<sup>40</sup>.
- Size of properties : as illustrated above in the chart "UK Energy Consumption by Use", 56% of domestic energy consumption is due to space heating. Also, many of the costs of retrofit will reflect volume and surface areas. Therefore it is important to know the prevalence of large properties. A single person living in a large detached house or bungalow might be unable to heat it properly, even if it was reasonably well insulated.

To these we will also add a further factor : whether they are off-mains-gas. With escalating prices for oil and electricity in recent years, and decline in availability of coal and firewood, the many households in Herefordshire which do not have the option of cheaper, more efficient mains-gas and gas boilers are at the 'sharp edge' of retrofit.

Often in remote areas and hard-to-heat, these properties are likely to present greater levels of need, but also often greater opportunities for retrofit innovation, including technical and skills development. Herefordshire could potentially grow a retrofit economy specialising in this particular area, one which could then profitably export its knowledge, skills and materials to other parts of the country.

The HHS11 local survey is necessarily our key source. It makes extensive reference throughout to the DHS standard and at many points in its analysis reflects the four principal elements of the DHS:

Health and Safety - State of repair - Modern facilities - Thermal comfort

<sup>40</sup> EEPH – 1 p5

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The overall DHS ‘compliance rate’ for Herefordshire at 73% very closely matches the national rate.<sup>41</sup> We will draw below from the HHS11, but where possible will avoid reliance on the DHS, for the reasons explored in the section above.

There are 82,521 dwellings in the county. Registered Housing Providers (RHPs) such as housing associations account for some 12,000 or 7% of the total. There is no Local Authority housing. This will be broken down further below.

The following table summarises the county’s housing stock in terms of Age, Type and Size.

Herefordshire Housing Stock – Age / Type / Size			
	No. Of Dwellings	%	%
<b>Age-Band</b>			
<-1919	16920	20.5%	29.6%
1919-1944	7480	9.1%	
1945-1964	15292	18.5%	39.6%
1965-1980	17403	21.1%	
1981-1990	9591	11.6%	30.8%
1990+	15835	19.2%	
<b>Total</b>	<b>82521</b>		
<b>Type</b>			
Bungalow	10074	12.2%	37.1%
House-Detached	20510	24.9%	
House-Semi-Detached	20781	25.2%	25.2%
House-Terrace	21143	25.6%	37.8%
Flat	10014	12.1%	
<b>Size (Bedrooms)</b>			
1	6309	7.6%	33.4%
2	21242	25.7%	
3	37238	45.1%	45.1%
4	14147	17.1%	21.5%
5+	3585	4.3%	

*Table based on information in Healthy Housing Survey 2011<sup>42</sup>*

<sup>41</sup> HHS11 – p x.

<sup>42</sup> HHS – 1 p6ff

## Opportunities to grow our local retrofit economy

From the above we can select the following relevant facts, each of which raises issues bearing on retrofit which we need to take into account:

- Some 30% of the county's were constructed before the end of World War II, and 20% before the end of World War I.
  - Cavity wall construction, although first pioneered in the Victorian era as a measure against damp, was only introduced as an accepted construction technique starting from about the 1930s<sup>43</sup> - an era when very few houses were being built in the county. Therefore we can reasonably infer that at least a third of the county's housing stock cannot benefit from cavity wall insulation, one of the easiest and lowest-cost retrofit improvements.
- 37% of dwellings are either bungalows or detached houses.
  - These have more external surfaces than other types and are more likely to be located outside urban areas quite possibly off-gas-grid. Unless recently constructed, this category therefore tends to be hard-to-heat and depending on circumstances may offer not just greater need but also greater scope for a wider range of retrofit measures, such as external wall insulation and ground-source heat.
- 25% are semi-detached.
  - These could be located in rural or urban areas. As illustrated below, the local RetroPhit initiative has demonstrated that a semi-detached Hereford cottage in a typical urban street can be successfully upgraded to 'EnerPHit' passivhaus standard, given sufficient will and investment.<sup>44</sup>



*Grove Cottage before (left) and after (right, infrared) : SimmondsMills / Thermal Inspections Ltd*

- 38% are either flats or terraces.
  - These are more likely to be in urban areas and on-mains-gas, with the least external surfaces and best access to cheaper fuel. However taking ownership, party-walls, access and other issues into account they possibly present both lower motivation and less scope for insulation measures and for alternative energy-sourcing : few flats and terraces would be able to consider external wall insulation, solar PV or ground-source heating unless they were able to form a joint community initiative.
- In terms of size, some 67% are larger dwellings with 3 or more bedrooms.
  - If we consider this alongside information regarding occupancy rates, we find that an extraordinary 80% of larger dwellings are either 'underoccupied' or 'severely

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<sup>43</sup> EST – 2 p6 et al

<sup>44</sup> SMA - 1

## Opportunities to grow our local retrofit economy

underoccupied’, and even more remarkably so are 91% of detached houses <sup>45</sup>. While there are undoubtedly multiple and complex reasons for these figures, the situation they describe has clear implications for the relationship between scale of work, investment needed, and benefit to the occupant(s) – in how many cases will the ratio be seen as worthwhile or affordable?

The table below correlates building type with SAP ratings and average energy costs per dwelling <sup>46</sup>:

<b>Herefordshire Housing Stock - SAP Rating &amp; Energy Costs per annum by Type</b>		
<b>Dwelling-Type</b>	<b>Average-SAP-Rating</b>	<b>Average-Total-Energy-Costs p.a.</b>
House-Detached	51.2	£1645.51
Bungalow	56.4	£971.70
House-Semi-Detached	59.6	£1006.81
House-Terrace	62.2	£871.06
Flat	66.6	£630.34
<b>Overall Average</b>	<b>58.1</b>	<b>£1103.18</b>

With the county’s average SAP at 58.1 it can be seen that – on average – it is detached houses and bungalows which hold this figure down. Detached houses in particular are associated with high energy-consumption and expenditure, but whether due to size or location or age or underinvestment or household income and lifestyle choices is unclear. We can look further into this using the table below :<sup>47</sup>

Herefordshire Housing Stock - by Type & Household Income Group										
	Income Group									
Dwelling Type	up to £20000			£20000 to £40000			More than £40000			Total
	No	% Income Group	% Type	No	% Income Group	% Type	No	% Income Group	% Type	No
Bungalow	7008	15.8	69.6	2503	9.0	24.8	562	5.5	5.6	10073
Flat	8511	19.2	85.0	1503	5.4	15.0	0	0.0	0.0	10014
House-Detached	7255	16.4	35.4	8523	30.5	41.6	4732	46.2	23.1	20510
House-Semi-Detached	9650	21.8	46.4	7906	28.3	38.0	3226	31.5	15.5	20782
House-Terrace	11880	26.8	56.2	7531	26.9	35.6	1733	16.9	8.2	21144
Total	44302	100		27966	100		10253	100		82521
	53.7%			33.9%			12.4%			

Amongst other things, this tells us that 23% of detached houses are occupied by households with incomes over £40,000 – in fact nearly half of all households in this income bracket live in detached houses – whereas a further 35% are occupied by households existing on less than £20,000. The inferences for our purposes are fairly obvious : around a quarter of detached houses are occupied by households for whom energy-expenditure could be a low-priority in relation to income, who may be able to afford comfortable whole-house heating even without energy-efficiency and feel no immediate necessity to make improvements; on the other hand, over a third of such houses are inhabited by low-income families likely to be struggling to balance comfort with expenditure, for

<sup>45</sup> HHS – 1 p32

<sup>46</sup> HHS – 1 p75

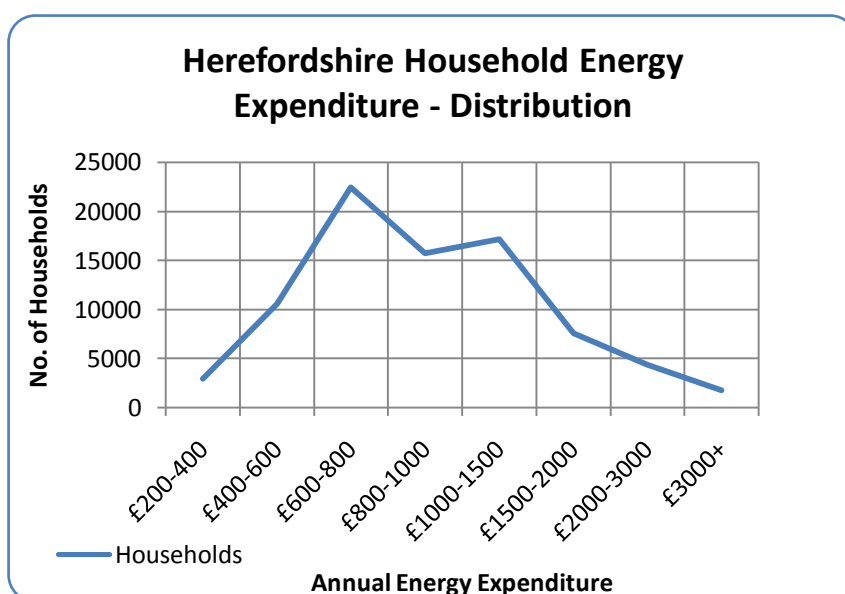
<sup>47</sup> HHS – 1 p20



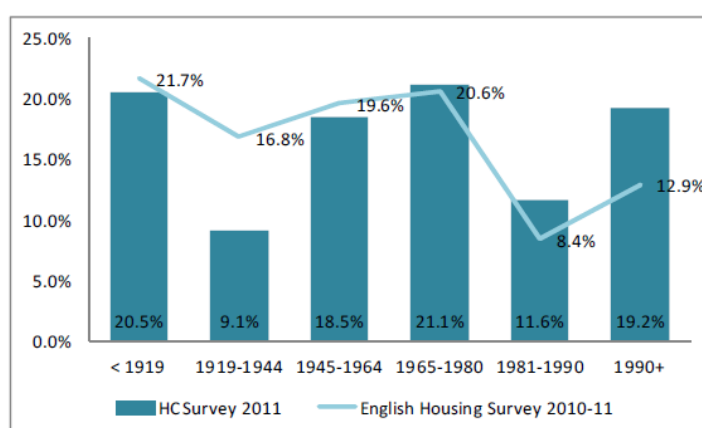
## Opportunities to grow our local retrofit economy

whom improvements to energy-performance could make a significant difference financially and in terms of wellbeing.

There is a limited extent to which it is possible to rely on tables of averaged data for useful information. For example, in the HHS11 we learn that an ‘average’ family of 2 or more adults with 2 or more children spends only slightly more on energy than an ‘average’ single non-pensioner, £1074 and £1029 annually respectively. We can understand this better by referring to the chart below which shows the distribution of county energy expenditure : there is a clear peak of over 20,000 households spending £600-800 annually, but a long ‘tail’ including more than 6,000 households spending over £2,000.<sup>48</sup>



The graph below from HHS11 compares the age of houses in Herefordshire with nationally, using the EHS 2010-11:<sup>49</sup>



*From Herefordshire Council Healthy Housing Survey 2011*

Compared with nationally, it may be seen that Herefordshire has about the same number of aged properties from before 1919, many fewer from between the wars, and nearly 50% more from the period since 1981. Interestingly this differs markedly from South Hams in Devon, the subject of a

<sup>48</sup> HHS – 1 source information : pp76-7

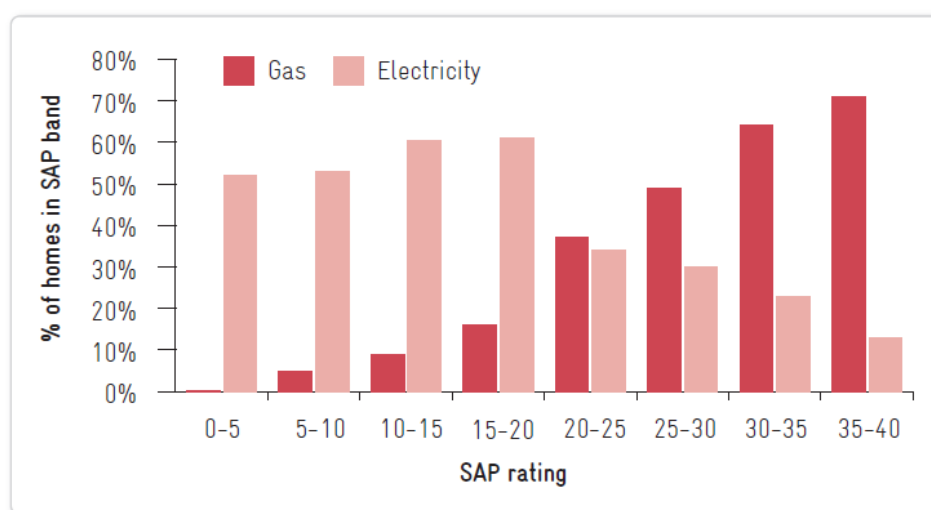
<sup>49</sup> HHS – 1 p7

## Opportunities to grow our local retrofit economy

parallel economic evaluation report to this one, which has a profile including 6% more properties from before 1919 and 16% less built since 1980.<sup>50</sup>

Overall therefore, based on age profile of its housing stock Herefordshire's present position appears to be above average nationally in terms of energy-efficiency - on the assumption that the last 30 years have seen better construction standards locally, which remains to be verified. The HHS11 confirms that at 58.1 Herefordshire now scores 3.6% higher than the national SAP rating of 54.5, and has improved from 52.0 in 2005.<sup>51</sup> We will look at the SAP banding for the county in more detail below.

However energy-efficiency applies as much to energy input as to energy loss. The housing stock may be average in terms of SAP, but is well below-average in terms of access to cheap, efficient energy in the form of mains gas. According to HHS11, only 69% of Herefordshire properties have mains-gas available, compared to 87% nationally.<sup>52</sup> There is an established connection between higher SAP ratings and availability of mains gas, as illustrated in the chart below from the EST :<sup>53</sup>



*From report "F & G Banded Homes" by Energy Savings Trust, 2010*

Further, there is a clear connection to levels of poor household health and wellbeing, as a SAP rating of under 35 is accepted as a "proxy for the likely presence of a Category 1 hazard from excess cold." Thus levels of need and benefit to the individuals in these households are both great, however the report concludes : "An important question remains about the relationship between a Category 1 excess cold hazard, F&G banding, and therefore the expected basic decent level for energy efficiency in English and Welsh rented homes."<sup>54</sup>

The HHS11 enquired as to perceived connections between housing and health, and discovered that although 9.4% of dwellings have an SAP rating under 35 and are therefore classed as an 'excess cold' hazard, only 1.2% of households (957) felt that health had been affected. Of these 89% had sought medical advice as a result. 700 instances of 'damp and mould growth' (a Category 2 hazard)

<sup>50</sup> TDEB – 1 p3

<sup>51</sup> HHS – 1 pp xi, 74

<sup>52</sup> HHS – 1 p ix, 84ff.

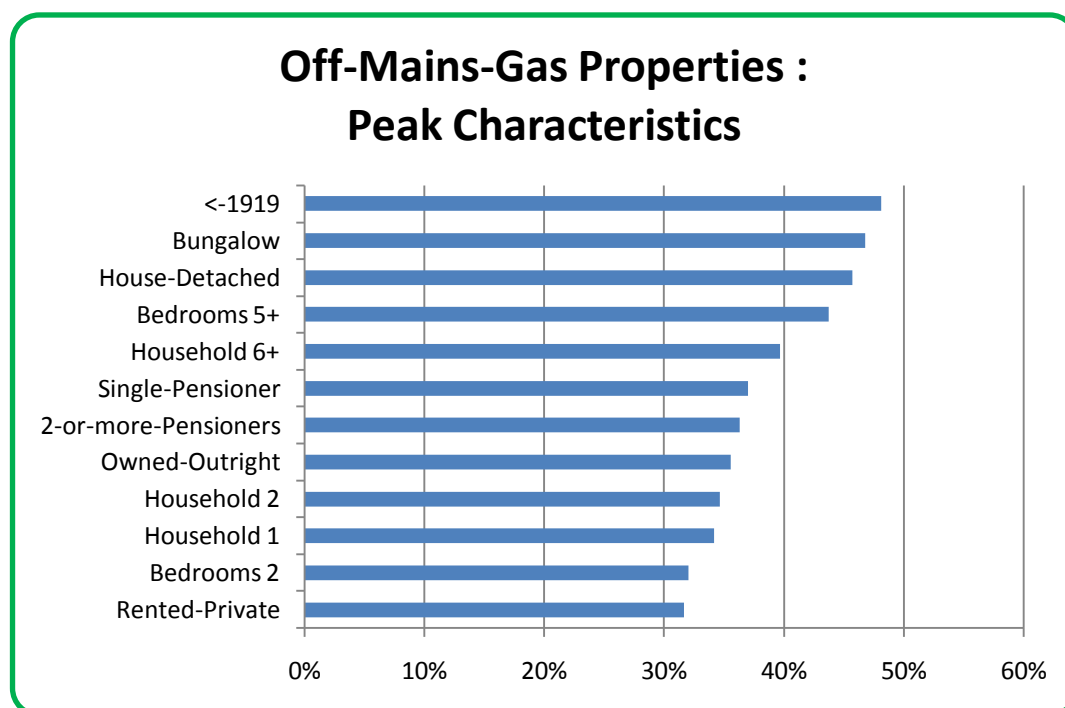
<sup>53</sup> EST – 3 p9

<sup>54</sup> EST – 3 pp 10-11

## Opportunities to grow our local retrofit economy

were also identified and together with 'excess cold' these accounted for 35% of incidences in this group. The report comments : "It may be that households are under estimating or under reporting the health effects of their housing conditions."<sup>55</sup>

The chart below is calculated from HHS11 data and collates together the 'peak' characteristics of off-mains-gas properties and households : those where 30% or more of the dwellings with that characteristic are also off-mains-gas.



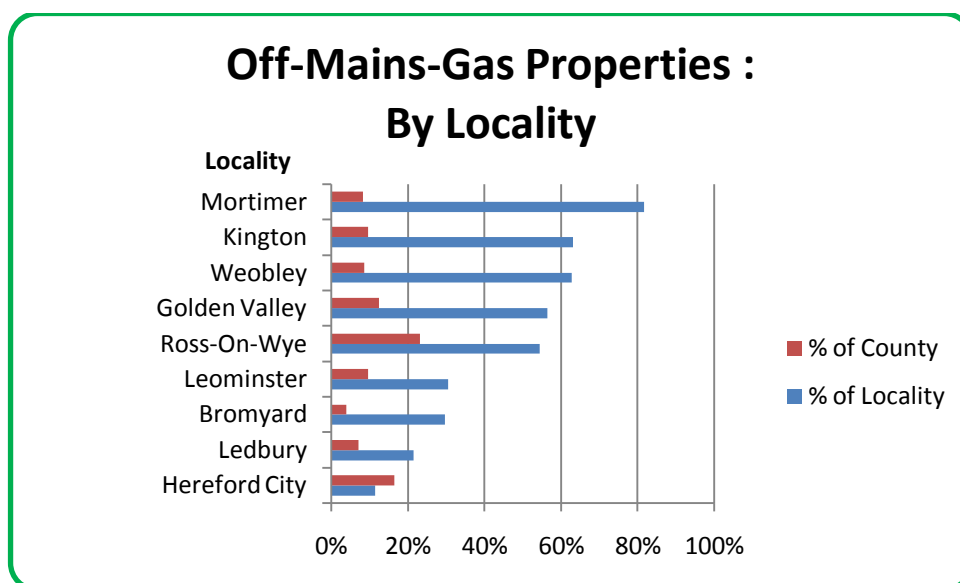
In terms of build characteristics, the above shows that 40% or more of dwellings built before 1919 in age, or detached or bungalows in type, or 5 or more bedrooms in size, are off-mains-gas. In terms of household characteristics, we note that 35% or more of properties occupied by 6 or more people, or by pensioners, or by outright-owners are off-mains.

When we put these together, we begin to see a target profile emerge for properties which require retrofit more than most, because they do not have the option of mains gas.

We can also take a different section through the data and look at the geographic distribution of off-mains-gas properties :<sup>56</sup>

<sup>55</sup> HHS1 – pp42, 67-8

<sup>56</sup> HHS – 1 pp85-7



*From data in Healthy Housing Survey 2011*

Over 80% of the properties in Mortimer Locality lack mains gas, however these represent only 8% of the county's off-mains properties as it is very sparsely populated. Kington and Weobley Localities are similar, with over 60% lacking mains gas but only comprising some 10% of the county's total off-mains. This probably connects to the figures for EPCs in localities, which show Mortimer and Weobley as having the highest proportion of EPC band F-G, that is below SAP 39.<sup>57</sup> Ross-on-Wye is the Locality with the greatest number of off-mains-gas properties, some 23% of the county's total.

Where there is a clustering of properties with similar energy problems – in this case for example lack of mains gas availability around Ross on Wye in terms of numbers and Mortimer in terms of local ratio – this opens opportunities for a community-based approach to procuring energy retrofit, if further detail could be acquired.

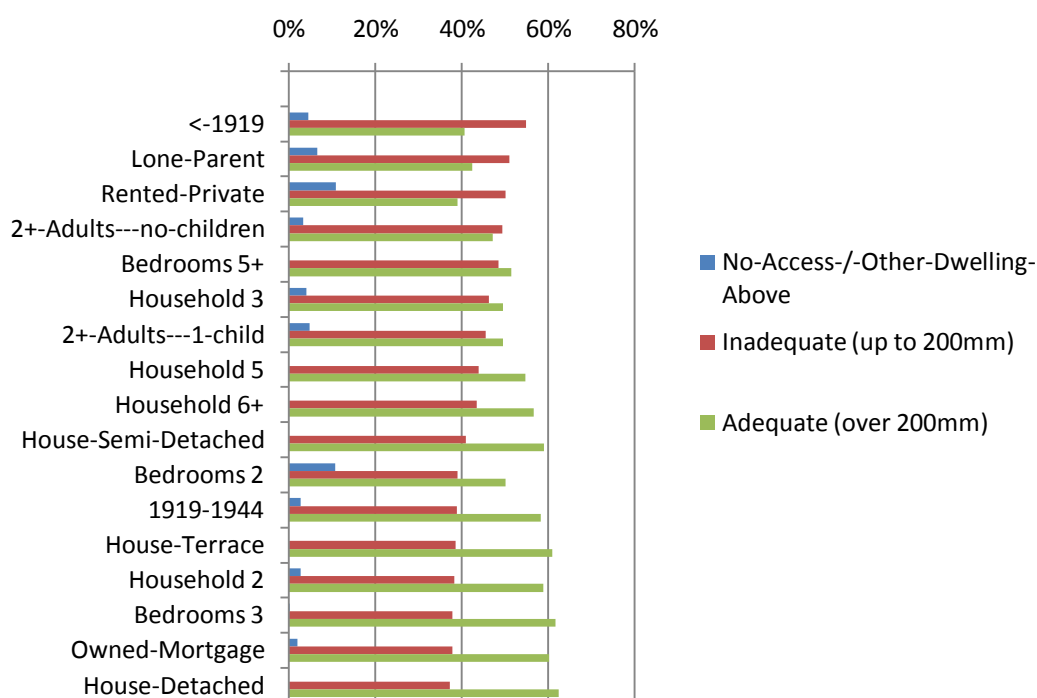
HHS11 also includes information about existing loft insulation. The chart below summarises this information so as to identify the top 50% of buildings and household characteristics in the county most closely associated with inadequate levels of insulation – taken here to mean less than 200mm of glass-fibre or similar, although 270mm or more is actually recommended.<sup>58</sup> DECC defines lofts as 'uninsulated' if they have less than 125mm, but HHS11 data was collected with different banding making it impossible to match this category.<sup>59</sup>

<sup>57</sup> HHS – 1 p83

<sup>58</sup> HHS – 1 p87ff; see also DECC – 4 p9 which states 300mm

<sup>59</sup> DECC – 4 p9

## Inadequate Loft Insulation : Peak Characteristics



The chart above identifies local characteristics associated with inadequate loft insulation (red lines) : houses built before 1919, larger houses, private rentals and those inhabited by lone parents are all most likely to lack adequate insulation. We can attribute numbers to these on the table below :

Loft Insulation : Herefordshire Properties by Peak Characteristic					
Peak Characteristic	No-Access or Other-Dwelling-Above	Adequate (over 200mm)	Inadequate (up to 200mm)	Inadequate as % of Characteristic	Inadequate as % of Housing Stock **
	No.	No.	No.	%	%
<-1919	768	6879	9273	54.8	11.2
Lone-Parent	273	1747	2099	51.0	2.5
Rented-Private	1841	6554	8415	50.1	10.2
2+Adults no-children	801	11347	11874	49.4	14.4
Bedrooms 5+	0	1845	1740	48.5	2.1
Household 3	516	6223	5818	46.3	7.1
2+Adults 1-child	340	3439	3165	45.6	3.8
Household 5	43*	1846	1483	44.0	1.8
Household 6+	0	956	735	43.5	0.9
House SemiDetached	0	12268	8514	41.0	10.3

## Opportunities to grow our local retrofit economy

Bedrooms 2	2299	10645	8299	39.1	10.1
1919-1944	211	4356	2913	38.9	3.5
House Terrace	92*	12891	8159	38.6	9.9
Household 2	899	18886	12294	38.3	14.9
Bedrooms 3	130	22989	14120	37.9	17.1
Owned-Mortgage	307	9120	5738	37.8	7.0
House Detached	68*	12801	7641	37.3	9.3

*Build Characteristics in dark; Household Characteristics in light; \* small sample size; \*\* 82,521*

*Data extracted from Healthy Housing Survey 2011*

Of the 8 peak Build Characteristics identified in dark on the table above, there are five which each account for approximately 10% of the total housing stock, ranging from 7,641 up to 9,723 properties : Detached, Semi-Detached and Terrace houses; 2-bedroom houses; and those built before 1919 all figure as substantial target areas by volume. Interestingly, bungalows do not appear here. We do not presently have information enabling us to calculate the overlap between these characteristics, although this will have been collected as part of the HHS11 sample. The outlier is 3-bedroom houses, of which 17% (14,120) are inadequately insulated.

Of the Household Characteristics, 2-person households stand out at just under 15%, with private-rental also significant at 10%. Perhaps there is an association here.

The table below, drawn from HHS11<sup>60</sup>, summarises the numbers of properties at each level of loft insulation. It shows there are 4,488 properties (5.4%) without lofts or loft-access, leaving 78,033 (94.6%) with lofts able to be insulated, of which 47,170 (57.2%) already have an adequate level:

Loft Insulation : Herefordshire Properties by Build Date					
	No-Access or Other- Dwelling- Above	Adequate (over 200mm)	Inadequate (up to 200mm)	Total	
Build- Date	No.	No.	No.	No.	%
<-1919	768	6879	9273	16920	20.5
1919-1944	211	4356	2913	7480	9.1
1945-1964	622	9018	5651	15292	18.5
1965-1980	1061	10924	5418	17403	21.1
1981-1990	724	5526	3341	9591	11.6
1990+	1102	10467	4266	15835	19.2
<b>Total</b>	4488	47170	<b>30862</b>	82521	100
	<b>5.4%</b>	57.2%	<b>37.4%</b>		100

By this calculation there are some 31,000 properties (37%) requiring loft insulation in Herefordshire. However the RDSAP does not always take account of uninsulated sloping

<sup>60</sup> HHS – 1 p88

## Opportunities to grow our local retrofit economy

ceilings where there is an insulated attic – a feature of many older Herefordshire properties – so there may be more need for roof insulation than the loft insulation figures suggest.

Although there is a major discrepancy regarding properties ‘without lofts’ – 5.4% vs 12.4% - the table below derived from the ‘Target H’ proposal (April 2012 using April 2011 statistics) helpfully corroborates the HHS11 figures, agreeing almost exactly with the above number:<sup>61</sup>

<b>Target H : Analysis of Herefordshire Loft insulation installed &amp; potential</b>				
	<b>Total Properties</b>	<b>Properties with Lofts</b>	<b>Loft Insulated to 125mm</b>	<b>Potential for loft insulation</b>
Target H	77,765	68,117	38,590	29,527
%	100	87.6%	49.6%	38.0%
Applied to HHS11	82521	72283	40950	<b>31333</b>

How do these figures compare nationally? DECC’s most recent release<sup>62</sup> cites that nationally 34% (7.9m) of homes with lofts are uninsulated (under 125mm of insulation), but continues that of these 1.7m – 7.2% of all homes with lofts or 21.5% of all uninsulated lofts - are “hard to treat or unfillable which means the loft would be hard/costly to insulate or could not be insulated” such as where roofs are flat or with shallow pitch. Therefore according to DECC nationally, only 78.5% of uninsulated lofts have potential to be insulated. However this figure may be an underestimate reflecting earlier CERT criteria which was restrictive – many lofts with sloping ceilings are treatable albeit at higher cost, and lofts ‘without access’ can be fitted with access hatches.

<b>Loft Insulation : DECC UK figures for installed &amp; potential vs. HHS11</b>				
	<b>Total Properties</b>	<b>Properties with Lofts</b>	<b>Loft Uninsulated (&lt;125mm)</b>	<b>Potential for loft insulation</b>
UK nationally (DECC)	26.9m	23.5m	7.91m	6.21m
%	100	87.2%	29.4%	23.1%
% Applied to Herefordshire (HHS11)	82521	71968	24265	19050
HHS11 Figures	82521	78033	30862	30862
Discrepancy ( + )		<b>8%</b>	<b>27%</b>	<b>62%</b>

*Figures from DECC and Healthy Housing Survey*

There is unfortunately a marked discrepancy of as much as 62% between the figures for ‘loft insulation potential’ provided at county level by HHS11 and Target H, and those provided by DECC at UK level applied locally. A principal reason appears to be the gap between the local estimation of properties with lofts able to take insulation, and DECC’s national estimation. As

<sup>61</sup> LEAF - 1

<sup>62</sup> DECC – 4 pp1, 9

## Opportunities to grow our local retrofit economy

all figures are based on sample data, it is beyond the scope of this report to examine the possible reasons for the discrepancy. We will provisionally accept the HHS11 figures for loft insulation potential, but with a caution that these could possibly prove to have been significantly overestimated.

Given appropriate data, the above approach to establishing the potential for loft insulation retrofit – partly through identification of ‘peak characteristics’ - could be applied to other specific aspects of the housing stock, such as the potential for cavity wall insulation or for ground-source heat.

However, while we need where possible to establish deeper understanding of and confidence in the figures that establish the volume and scope for growing the local energy retrofit economy, that is not the sole focus of this report. We do not have the scope here to elaborate in a similar way on other aspects of the housing stock and will for the rest accept provisionally the figures supplied by the HHS11.

Extraordinarily, although the HHS11 survey queried householders on wall (including cavity) insulation, in the published report there is no information whatever regarding the extent of this. A formal request has been made to Herefordshire Council for access to the full database but at the time of writing has not yet been fulfilled.

### What are the Household Characteristics related to retrofit?

While the age, type and size of housing gives us useful information about potential for retrofit in terms of building fabric, equally important is tenure and other information about how the building is possessed, by whom and over what period of time. These factors determine what scope for improvement is realistic, and hence the scale of the economic potential.

One of the key findings of the HHS11 could be seen, on the face of it, as starkly disappointing in this respect : 52% of households “are not in a position to improve their home” – in part this is due to tenure, with 37% of this cohort explaining they are not owners and therefore lack responsibility; however 45% reported they could not afford it. Others said they were hampered by planning, conservation or listed-building constraints and only 4% of owner-occupiers were willing to consider using equity in the property to fund improvements.<sup>63</sup>

We need to drill a little deeper however. The chart and table below from HHS11 summarise the county’s present tenure position, comparing it with the EHS and also with the previous 2005 survey<sup>64</sup> :

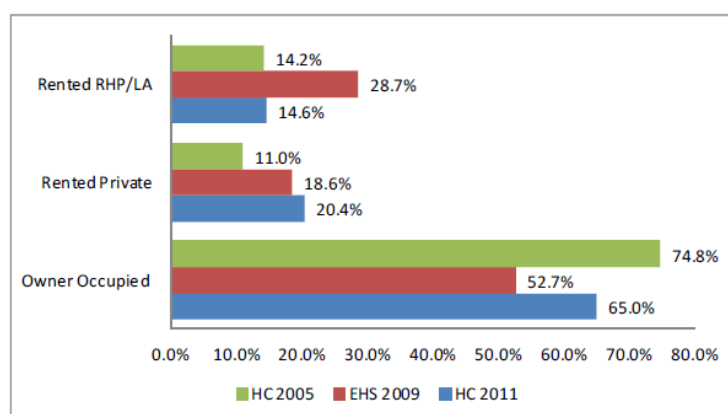
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<sup>63</sup> HHS – 1 pp xi, 69

<sup>64</sup> HHS -1 p12



## Opportunities to grow our local retrofit economy



Tenure	HC Survey 2011		EHS 2010-11	HC Survey 2005
	No	%	%	%
Owned-Mortgage	15167	65.0	52.7	74.8
Owned-Outright	38511			
Rented-Private	16809	20.4	18.6	11.0
Rented-RHP	12034	14.6	28.7	14.2
Grand-Total	82521	100.0	100.0	100.0

*From Healthy Housing Survey 2011*

65% of dwellings are owner-occupied and 35% rented, of which 15% is social housing. Note that there is no Local Authority owned housing in Herefordshire.

The significantly lower-than average rate for rented social housing (represented above as RHP : Registered Housing Provider) – at only half the national EHS rate – reflects the ‘not in a position to improve’ figures quoted above, but is not helpful in terms of retrofit improvements, as many RHPs have a good record of upholding responsibilities building to better-than-average standards or of making improvements.

Nor is the higher-than-average rate for private-rented, where the occupier has no responsibility for making improvements while the owner may lack the means as well as the incentive, if the cost cannot be passed on as increased rental.

The exceptionally high rate of private ownership (nearly 25% above EHS) could indicate positively towards retrofit potential, but this needs to be taken along with other information about these households, such as age, income, occupancy and length of tenure. For example, take an owner-occupier pensioner living alone in a large under-occupied detached dwelling or bungalow, wishing to downsize or move into a retirement home when market conditions permit; although he or she is perhaps in urgent need of ‘thermal comfort’ improvements, circumstances may make it too difficult or not worthwhile to undertake a large-scale retrofit project.

## Opportunities to grow our local retrofit economy

Confirmation of the above comments is to be found in the HHS11 figures for 'non-decent' homes (i.e. those which fail the DHS) : 31% of private rented, 28% of owner-occupied, but only 17% of social rented dwellings in Herefordshire fail the DHS.<sup>65</sup>

Short-term tenure or transience does not usually support incentives for carrying out retrofit or property improvements of any type. It is somewhat reassuring therefore that according to the HHS11 62% of households intend to remain in situ for 10 years or more - however to assess the import for growing the retrofit sector we need to correlate this with other information which is not provided.

It would, for example, be helpful to know how many of those who intend to remain are also owner-occupiers or in an age or income bracket allowing for improvements to be made; this information will have been collected on the survey forms but does not form part of the report analysis. Similarly, how many of the 23% who intend to move in the next 5 years are doing so not just in pursuit of a larger/smaller dwelling (54%) but a more energy-efficient one: cheaper to run, more comfortable to live in and less damaging to the environment? This area of motivation was not offered on the survey form and therefore remains unidentified, presumably subsumed in 'other' (34%).<sup>66</sup>

	Tenure Type													
	Mortgage		Owned-Outright		Rented-Private		Rented-RHP		Total					
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
2+Adults 1-child	2764	39.8	1203	17.3	2030	29.2	948	13.6	6945	100	21228	25.7		
2+Adults 2+children	4213	41.4	1658	16.3	2254	22.2	2040	20.1	10164	100				
Lone-Parent	668	16.2	468	11.4	1966	47.7	1018	24.7	4119	100				
2+Adults no childrn	5282	24.8	8894	41.7	4497	21.1	2902	13.6	21576	100	29406	35.6		
Single non-pensioner	1133	14.5	1690	21.6	2923	37.3	2083	26.6	7830	100			23292	28.2
Single-pensioner	580	3.8	10490	67.8	2166	14	2226	14.4	15462	100				
2 + pension's	528	3.2	14108	85.9	973	5.9	817	5	16426	100	31888	38.6		
Total	15167	18.4	38511	46.7	16809	20.4	12034	14.6	82521	100				
	53678			65.0	28843			35.0						

*From information in Healthy Housing Survey 2011*

Using the table above derived from the HHS11<sup>67</sup>, we can calculate as follows :

- 65% of all properties are owner-occupied and 47% are owned outright (i.e. mortgage free)
- Pensioners account for 39% of all tenures and are owner-occupiers in 25,706 properties or 31% (96% of which are owned outright).
- Families (including lone parents) account for 26% of all tenures and are owner-occupiers in 10,974 properties or 13% (70% of which are owned outright).

<sup>65</sup> HHS – 1 p xi

<sup>66</sup> HHS – 1 pp xi, 6, (see also Appendix A p123 – Socio-survey form 'additional questions')

<sup>67</sup> HHS – 1 p14

## Opportunities to grow our local retrofit economy

- Non-pensioner households without children account for 36% of all tenures and are owner-occupied in 16,999 or 21% (62% of which are owned outright).
- Single-occupation households (including pensioners) account for 28% of all tenures and are owner-occupied in 13,893 or 17% (88% of which are owned outright).

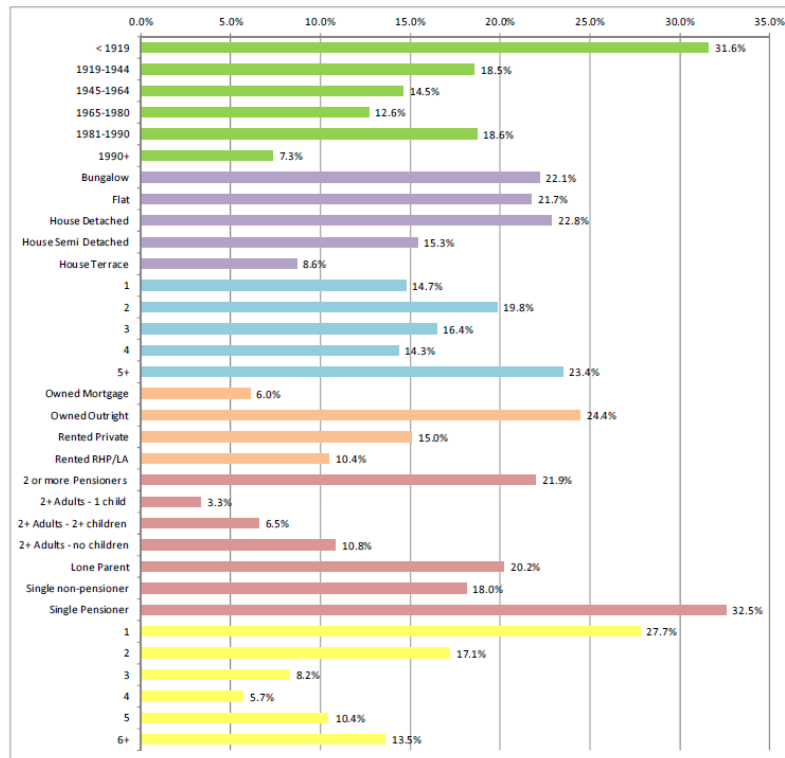
In terms of growing the retrofit economy, what remains to be established is which groups will in practice be willing to upgrade their dwellings, whether from low-performance (e.g. 'non-decent') or otherwise. Outright ownership should provide an indicator here and it is notable that there are very high levels of this type of tenure amongst pensioners and single-occupation households.

If we use fuel poverty as a crude indicator and correlate with the above, we begin to see a picture. The following table and graph are drawn from the HHS11<sup>68</sup> :

<b>Herefordshire Fuel Poverty</b>				
	<b>Total Dwellings, no.</b>	<b>In Fuel Poverty, no.</b>	<b>% Of All-in-Fuel-Poverty</b>	<b>% of Row Characteristic</b>
<b>Build-Date</b>				
<1919	16920	5339	37.9	31.6
1919-1944	7480	1385	9.8	18.5
1945-1964	15292	2221	15.8	14.5
1965-1980	17403	2198	15.6	12.6
1981-1990	9591	1787	12.7	18.6
1990+	15835	1154	8.2	7.3
<b>Total</b>	<b>82521</b>	<b>14084</b>	<b>100.0</b>	<b>17.1</b>
<b>Dwelling-Type</b>				
Bungalow	10074	2228	15.8	22.1
Flat	10014	2171	15.4	21.7
House-Detached	20510	4681	33.2	22.8
HouseSemiDetached	20781	3185	22.6	15.3
House-Terrace	21143	1819	12.9	8.6
<b>Total</b>	<b>82521</b>	<b>14084</b>	<b>100.0</b>	<b>17.1</b>
<b>Household-Tenure</b>				
Owned-Mortgage	15167	915	6.5	6.0
Owned-Outright	38511	9390	66.7	24.4
Rented-Private	16809	2523	17.9	15.0
Rented-RHP	12034	1256	8.9	10.4
<b>Total</b>	<b>82521</b>	<b>14084</b>	<b>100.0</b>	<b>17.1</b>

<sup>68</sup> HHS – 1 pp 23-4

## Opportunities to grow our local retrofit economy



What stands out from the table, is that 73% of dwellings in fuel poverty are owner-occupied (nearly all of these owned-outright).

We can see this reflected in the chart, where characteristics exceeding 20% include : owned-outright, single-occupancy, single-pensioner, 2-or-more-pensioners, 5+ households, detached houses, bungalows and flats, and properties built before 1919.

A foreseeable problem with developing the retrofit economy, therefore, will be the overlap between circumstances of greatest need and vulnerability, with least ability to invest.

### How can we best define the extent of the 'housing retrofit' Economic Sector?

An Energy Saving Trust (EST) report identifies three distinct “levels of ambition” for prioritising retrofit into a set of “rationalised measures” : <sup>69</sup>

- Level 1: Lofts and cavity walls: Insulating all the remaining lofts and cavity walls on a national or regional level.
- Level 2: Insulation plus boiler replacement: Insulating lofts and cavity walls and replacing old G-rated boilers with A-rated condenser boilers.
- Level 3: Advanced refurbishment :

Internal solid-wall insulation	External solid-wall insulation
Draught-proofing	Replacing G-rated boilers
Triple glazing	Heating controls
Cavity-wall insulation	Loft insulation
Micro-wind	Solar photovoltaic panels
Solar thermal heating	Air-source heat pump
Biomass	Ground-source heat pump

This approach to retrofit provides a rough guide but is open to criticism : easily-affordable work carried out hastily at an early stage without a long-term integrated plan may fall short and need to be undone later, in order to tackle deeper issues and achieve higher energy performance levels such as those advocated by passivhaus proponents.

Under the 2012 LEAF scheme Herefordshire saw several pilots of RetroPhit - an alternative, bespoke approach which recognises the need for holistic planning aimed at passivhaus standards<sup>70</sup>, or what the ZeroCarbonBritain 2030 report refers to as “A whole house approach... a sequence of events for the house to reach the desired carbon target.”<sup>71</sup>

Nevertheless, the EST proposal above gives us an indication of the range of materials, services, skills and principal activities of the ‘energy retrofit economy’, from insulation through boiler-replacement to introduction of solar / wind / ground or air-source energy. It therefore provides a point from which to consider how best to define the scope of this sector.

Economic activities are generally performed by companies, each of which is registered at Companies House under one or more Standard Industrial Classification (SIC) codes. These codes categorise every form of economic activity and thus provide the analytic basis for most governmental statistics, as well as a means by which to define sectoral boundaries – through an appropriate selection of codes.

However, as noted in the accompanying report in this suite on growing the local Renewable Energy economy, there are serious limitations to using this approach. For example, activities actually associated with the installation of renewable energy – such as solar PV, ground source heat, biomass boilers and others which appear on the lists above - presently still fall under SIC classifications for construction or manufacturing with insufficient resolution to distinguish these

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<sup>69</sup> EST – 1 p6

<sup>70</sup> LEAF - 1

<sup>71</sup> CAT – 1 p90

## Opportunities to grow our local retrofit economy

from others unrelated to either energy or renewables. It is also particularly difficult to distinguish renewable or low carbon activities where organisations cover a wider range of business activities.<sup>72</sup>

A notable case in point cited in the above report is Kingspan Insulation Plc, part of an Irish multinational employing over 400 people in Herefordshire reported to turnover £400m on insulation alone or £1.3bn overall. Known locally and worldwide for manufacture of insulation boards over the last 25 years, the company also has an 'Environmental and Renewables' division supplying solarthermal, air-sourced heat pumps and hot water storage – on all counts therefore squarely part of the housing retrofit sector locally as well as nationally. This company is listed at Companies House under SIC 07 code 43999 : "Specialised construction activities (other than scaffold erection)", a classification which clearly would include activities that have no connection whatever with energy retrofit.

Similarly, a leading local installer of insulation appears under SIC 43290 "Other construction installation", a leading builder specialising in sustainable construction appears under 41100 "development of building projects", and local firms offering household energy surveys appear variously under 71200 "technical testing and analysis", 71111 "architectural activities", 74901 "environmental consulting activities", and even 96090 "other service activities not elsewhere classified".

Difficult and in some ways unsatisfactory decisions have therefore been made as to what SIC categories would be helpful to include in a selection defining the 'energy retrofit in housing' sector in which we are interested. The following list errs on the side of inclusion rather than exclusion. It includes estimates of the numbers employed in the county for each sector and each SIC code. The information has been kindly supplied by the Knowledge and Information Service at Herefordshire Council, using the Business Register and Employment Survey 2010 which requires anonymisation of certain data – the numbers are therefore rounded.

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<sup>72</sup> TEEC – 1 p2

## Opportunities to grow our local retrofit economy

<b>HEREFORDSHIRE HOUSING RETROFIT SECTOR – STANDARD INDUSTRIAL CLASSIFICATIONS &amp; NUMBERS EMPLOYED</b>			
<b>SIC 2007 CODE</b>	<b>Number employed (nominal)</b>	<b>'Housing Retrofit' in sector %</b>	<b>Number employed (approx)</b>
20301 : Manufacture of paints, varnishes & similar coatings, mastics & sealants	0		
23110 : Manufacture of flat glass	0		
23120 : Shaping & processing of flat glass	0		
23130 : Manufacture of hollow glass	0		
23190 : Manufacture & processing of other glass, including technical glassware	0	!	
23320 : Manufacture of bricks, tiles & construction products, in baked clay	0		
23430 : Manufacture of ceramic insulators & insulating fittings	0		
23520 : Manufacture of lime & plaster	0		
23610 : Manufacture of concrete products for construction purposes	0	!	
23620 : Manufacture of plaster products for construction purposes	0		
23690 : Manufacture of other articles of concrete, plaster & cement	0		
25210 : Manufacture of central heating radiators & boilers	0		
27110 : Manufacture of electric motors, generators & transformers	0	!	
27120 : Manufacture of electricity distribution & control apparatus	100	!	
27320 : Manufacture of other electronic & electric wires & cables	0	!	
27400 : Manufacture of electric lighting equipment	0	!	
33140 : Repair of electrical equipment	0	!	
33200 : Installation of industrial machinery & equipment	0		
35300 : Steam & air conditioning supply	0		
<b>Production (Housing Retrofit)</b>	<b>100</b>		
<b>(County Total)</b>	<b>12,300</b>	<b>1.05%</b>	<b>129</b>
41100 : Development of building projects	200		
41202 : Construction of domestic buildings	500		
43130 : Test drilling & boring	0	!	
43210 : Electrical installation	500		
43220 : Plumbing, heat & air-conditioning installation	500		
43290 : Other construction installation	0		
43310 : Plastering	0		
43320 : Joinery installation	200		
43330 : Floor & wall covering	100		
43341 : Painting	100		
43342 : Glazing	0		
43390 : Other building completion & finishing	200		
43910 : Roofing activities	100		
43991 : Scaffold erection	100		
43999 : Specialised construction activities (other than scaffold erection) nec	200		
<b>Construction (Housing Retrofit)</b>	<b>3,000</b>		
<b>(County Total)</b>	<b>4,000</b>	<b>75.15%</b>	<b>3006</b>

## Opportunities to grow our local retrofit economy

46470 : Wholesale of furniture, carpets & lighting equipment	0		
46520 : Wholesale of electronic & telecommunications equipment & parts	0		
46740 : Wholesale of hardware, plumbing & heating equipment & supplies	100		
47520 : Retail sale of hardware, paints & glass in specialised stores	500		
<b>Distribution; transport; accommodation &amp; food (Housing Retrofit)</b>	<b>700</b>		
<b>(County Total)</b>	<b>20,800</b>	<b>3.19%</b>	<b>664</b>
77320 : Renting & leasing of construction & civil engineering machinery & equipt	100		
77390 : Renting & leasing of other machinery, equipment & tangible goods nec	100		
<b>Business service activities (Housing Retrofit)</b>	<b>200</b>		
<b>(County Total)</b>	<b>7,200</b>	<b>2.96%</b>	<b>213</b>
<b>TOTAL HOUSING RETROFIT</b>	<b>4,000</b>	<b>5.61%</b>	
<b>County Total All industries</b>	<b>72,000</b>		<b>4041</b>
<i>! Numbers present but rounded to preserve commercial anonymity</i>			
<i>Source : Herefordshire Council / BRES 2010</i>			

The above table comprises a reasonable approximation of how we might provisionally define the scope of the 'energy retrofit in housing' economy. Some 4,000 people (5.6%) of the county's workforce are presently employed in activities which could in part support housing retrofit, which is approximately the same number as in full-time agriculture. Further research would be required to determine what percentage of these 4,000 are actually involved at present in retrofit but it provides confirmation that there is a basis for growth and also suggests places where there may be entrepreneurial opportunities.

A search on the Herefordshire Council Trade Register produced the following relevant trades and the numbers of local firms registered in each – probably the list is far from complete however.<sup>73</sup>

Builders (313)	Double Glazing (3)	Electricians (259)
Gas Engineers (8)	Heating Systems (9)	Insulation (2)
Plasterers (109)	Plumbers (279)	Restoration Work (2)
Roofing Services (69)	Solar Heating (10)	Ventilation (2)

With some overlap, the Marches Environmental Technologies Network website records the following relevant trades and professions, based mostly in Shropshire and Worcestershire but including Herefordshire<sup>74</sup>:

Air Source Heat pumps (16)	Anaerobic Digestion (AD) (10)	Architects - Sustainable Design, Construction & Retrofitting) (12)
Biomass (24)	Biomass Boilers (1)	Bricks (1)
Control Systems (1)	Construction (8)	District Heating (3)
Double Glazing (2)	Ecological & Env'tl Surveys (10)	Electrical Systems (4)
Electronic Systems (1)	Energy Consultant (29)	Gas Lighting (1)
Ground Source Heat Pumps (19)	Heat Pumps (Ground, Air & Water) (3)	Heating engineers (1)
Hydropower (3)	Insulation (3)	Low Carbon Lighting (8)
Low Carbon Structures (2)	Photovoltaic (PV) Distributors (3)	Planning Process (9)
Plastic Roof Tiles (Recycled) (1)	Plumbers (3)	Power Systems (1)
Rain Water Harvesting (1)	Recycled PVC Building Products (1)	Refrigeration - Sustainable (3)
Renewable Community Projects (5)	Solar Photovoltaic (PV) Installers (50)	Solar Thermal Installers (27)
Solicitors - Renewable Energy (1)	Sustainability Advocates (3)	Wind Energy (7)
Wind Turbines (11)	Wood Fuel (6)	

<sup>73</sup> HC - 2

<sup>74</sup> METN - 1



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While further investigation would be worthwhile these lists confirm that there is already a reasonable base on which to further develop retrofit activities. Some of these firms will require training to move in that direction, while others may already be in a position to provide that training, perhaps in conjunction with local colleges or agencies.

Herefordshire Council estimates that of the total county Gross Value Added of £2,740m, the above SIC code activities contribute £194m or 7%. Of this figure, 85% derives from Construction, 9% from Distribution, and 3% each from Production and Business services.<sup>75</sup> It would help a great deal if we had more detail about this, including the size and profitability of the firms involved - unfortunately this is just the kind of data that is hardest to obtain.

While there can be little doubt about Herefordshire's capacity to develop service and supply activities at any appropriate scale, proposing to grow specialised production or manufacturing capacity in the county might raise doubts related to scale, available skills, materials supply and product distribution.

However it would be unwise to preclude this potential— there is already a well-established local manufacturer of “innovative low-carbon solutions for the heat transfer market including heat recovery, thermal storage and heat pumps” trading near a site which has seen manufacture of low-wattage lighting equipment; high-performance industrial insulation materials are manufactured in the county, while companies making sheep's wool and recycled insulation have a foothold alongside specialists in solar, hydro and wind. One local company makes high-performance roof and wall panels for new housing and another is developing plans for the manufacture of entire passivhaus housing units. As the nascent Hereford Enterprise Zone is prepared to promote possibilities such as aircraft manufacture, there is good reason to believe that other forms of manufacture could equally be considered, especially as these would address a range of local needs and applications hence benefitting local supply chains.

### How could this sector best be developed and what would support this development?

Looking first at the drivers, an obvious one is the present combination of escalating fuel prices with historically low rates of interest on investment accounts. However, many householders simply do not have available funds to invest and others – especially those in rented properties or short-term ownership – do not see it as within their power or to their clear advantage to act.

A recent Consumer Focus report suggests that suitable investment in energy efficiency could reduce fuel poverty by 87% and households could save £200 per year and concludes :

*“[Energy-efficiency] investment in the UK housing stock is one of the best investments possible in terms of boosting short-term employment and economic activity, and it also improves medium to long-term economic efficiency by reducing the economy's dependency on imported gas.* *‘Jobs, Growth and Warmer Homes’, Consumer Focus 2012* <sup>76</sup>

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<sup>75</sup> HC - 1

<sup>76</sup> CF - 1

## Opportunities to grow our local retrofit economy

For these reasons we find a number of government initiatives aimed at promoting energy-efficiency and the creation of related markets (see below)<sup>77</sup>, however some analysts report these as an unsatisfactory “patchwork” :

*“Much of existing policy focuses on individual measures rather than reaching an overall energy or carbon emission performance standard. This is true for both the main uses of electricity and for insulation. In the former, there is a piecemeal, product-by-product approach and with the latter individual measures (loft or cavity wall insulation) are installed, with no focus on the overall performance of the building.*

*The totality of energy use per property is not a major concern for users or for policy.... the process of improving the building stock is left to motivated individuals: it can be done if you feel like it. There is no requirement to achieve a certain standard, let alone by a specific date.”<sup>78</sup>*

*Brenda Boardman : ‘Achieving Zero’, January 2012*

### **Governmental Drivers**

**Feed-in Tariffs (FITs)** – Introduced in April 2010 these aim to allow profitable investment in small-scale solar PV systems generating low-carbon electricity (solar PV systems), competitive with other returns on cash investment.

**Green Deal** – Introduced under the Energy Act 2011, long discussed but only now being implemented (from January 2013), this ‘pay as you save’ scheme aims to tackle barriers to making energy-saving improvements (particularly in rented properties) by allowing the bill-payer (rather than the owner) to invest without having to pay all the costs up front. It is aimed at landlord-tenant situations where the bill-payer – typically a tenant in private rented housing - benefits in the form of reduced energy bills, while the landlord also benefits through improvements to the property and its value. Improvements can include insulation / heating / draught-proofing / double-glazing / renewables (eg. solar or wind).<sup>79</sup> High energy users will benefit most from the Green Deal and those with lower consumption may find it is not worthwhile or unavailable: the so-called Golden Rule specifies that to be acceptable for Green Deal funding projected savings should exceed projected repayments<sup>80</sup>.

**Energy Company Obligation (ECO)** – Introduced in October 2012 under the Energy Act 2011 the ECO replaces both the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP) and complements the Green Deal by requiring the larger energy suppliers to subsidise measures that will generate carbon or bill savings over the lifetime of the measures. ECO essentially replaces previous grant schemes but is aimed at low income communities and vulnerable consumers only with more restricted eligibility - only ‘super priority groups’ qualify for support using benefits-receipt criteria<sup>81</sup>. It applies where Green Deal finance alone will not cover the upfront cost<sup>82</sup>. A combination of Green Deal and ECO is expected to address solid wall insulation especially and there are complex provisions for areas of rural fuel-poverty.<sup>83</sup> It remains to be seen whether these provisions will apply significantly in Herefordshire.

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<sup>77</sup> OFT – 1 p36

<sup>78</sup> ECI – 1 pp16-17, 34

<sup>79</sup> GOV - 1

<sup>80</sup> DGE - 1

<sup>81</sup> DECC - 6

<sup>82</sup> GOV - 2

<sup>83</sup> DGE - 1

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**Renewable Heat Incentive (RHI)** – Not yet operational (consultation closed December 2012 - introduction expected summer 2013), the domestic RHI scheme would support moves away from fossil fuels for heating and towards renewable energy by replacing current heating systems with a ground-source or air-source heat pump or biomass boiler. Solar thermal systems would also be eligible. Until the introduction of the RHI, the Renewable Heat Premium Payment scheme (RHPP) provides vouchers towards the up-front costs of installing renewable heat equipment.

**Warm Front Scheme** – Provided grants for heating and insulation to vulnerable householders but ended in January 2013.

**Minimum Energy-efficiency Standards** – Under the Energy Act 2011 From April 2018 it will be unlawful for privately-rented sector landlords to rent out premises that do not reach a minimum standard – possibly EPC band “E” – affecting 680,000 homes nationally.

**Housing Health and Safety Rating System (HHSRS)** – This forms Part A of the Decent Homes Standards and includes ratings on ‘Excess Cold’ and ‘Damp and Mould’. Any dwelling with an SAP rating under 35 fails the standard and there is a duty on local authorities to take action.

Building Regulations 2010 Part L Conservation of fuel and power (Existing dwellings) – these requiring higher standards of energy efficiency in extensions, conversions and changes of use or energy status, but the 2016 code for sustainable homes level 6 standard does not now apply to all energy use;

**Landlord Energy Saving Allowance (LESA)** – tax offsets for landlords investing in energy efficiency improvements with an allowance for each property, each year.

**Smart Meters** and displays, to be introduced from Summer 2012.

Most attention is at present on the Green Deal and ECO, but it is too soon to say how successful either will be. Concern is widespread that there may be low take-up on the former unless changes are made, while the latter may let many slip through the net.

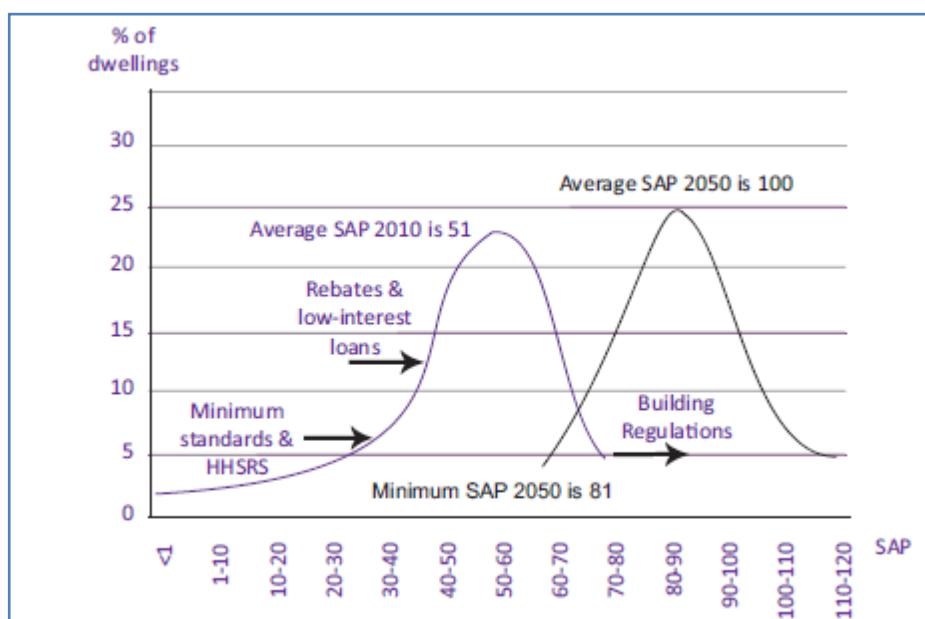
There are of course other drivers, for example in supra-national agreements, EU legislation, and also in growing public awareness of the interrelationship between personal consumption of energy (amongst other consumables), global dependency on fossil fuels, the potential costs of climate change, and economic instability. In short, at every level there is a growing willingness to consider the true costs of present energy consumption, value sustainability and reject a ‘business-as-usual’ approach to housing and energy-use.

Overall, there is a consensus that long-term the central purpose of all such measures is to drive improvements in the housing-stock as measured by SAP, upwards from its present average in the 50’s to a much higher level. The diagram below from ‘Achieving Zero’<sup>84</sup> proposes that by 2050 the minimum SAP should be 81 with an average of 100 (net zero energy use) and many dwellings above this standard, driven by a combination of minimum standards, financial measures and building regulations. Proposals such as this serve to indicate that the retrofit economy has enormous scope for further development.

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<sup>84</sup> ECI – 1 p13

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Having looked at drivers, we need to consider barriers. The DECC Energy Efficiency Strategy points to four interrelated types of ‘market failures and barriers’ standing in the way of economic development in this sector:<sup>85</sup>

**Embryonic markets:** The energy-efficiency market remains underdeveloped in comparison with the United States and needs to develop as ‘mainstream’ activity, for which new forms of financing are essential. However due to being undeveloped there is lack of expertise available to guide investment. This in turn has limited development of financial products hampering both demand and supply and resulting in higher costs all round.

**Inadequate information:** Purchasing decisions can be complex but where information is available it may be generic not specific, which means that potential investors are not able to confidently assess the benefits of energy efficiency investment. There is also a lack of standardised monitoring and verification within the industry, so that the benefits of energy efficiency investments are often regarded as not proven and therefore not prioritised.

**Misaligned financial incentives:** The person responsible for making energy efficiency improvements is not always in a position to decide and would not always receive the benefits : e.g. tenants are responsible for their own bills therefore it is in their interest to reduce these, but the tenancy contract may inhibit investment, while landlords are unlikely to invest unless they realise monetary benefits. For some householders energy costs may be relatively small in proportion to other costs so improvements will not be prioritised. Wider benefits of energy-efficiency - such as national energy security or carbon emission reductions - are not directly felt by those making energy efficiency investments so are often disregarded.

**Undervaluing of Energy-Efficiency : benefits in relation to ‘hassle costs’ and uncertainties:** Energy efficiency changes may involve significant hassle for those carrying out the

<sup>85</sup> DECC – 5 p18 & annexes

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investment - for example, disruption caused by building works - which increases both the financial and other perceived costs of making the investment. If the gain is perceived as small or if there is uncertainty around the benefits, hassle costs act as a significant barrier. Wider economic uncertainty is also reducing willingness to invest.

To these barriers we can add the particular characteristics of Herefordshire, where income levels are lower than average, the proportion of elderly and retired is higher than average, households are dispersed across a rural area, and the public sector is retracting its advisory and information functions hoping these will be taken up by the voluntary and community sector and social enterprises. The challenges of energy-efficiency are therefore not the only challenges faced by the county's householders and as evidenced in the 'disrepair' category of the HHS11 many dwellings need other costly improvements not directly related to energy efficiency.

Perhaps somewhat neglecting to take full account of the retraction in public sector services, the HHS11 concludes that "there is scope for the Council to build on the initiatives it already has in place to improve the living conditions and quality of life of private sector residents through advice, targeted incentives, effective partnerships and robust enforcement action where appropriate"<sup>86</sup>.

It falls short of demonstrating any route map that would link economic costs and economic opportunities however. Rather the opposite, it reports that <sup>87</sup>:

- 52% (43,245) of households are not in a position to improve the condition of their home : over a third of 'those responding' are not owners and therefore not responsible for improvements and of 27,028 owner occupiers nearly three-quarters feel unable to fund improvements.
- 19% (15,958) of Herefordshire household incomes fall below £10,000 annually and the county has more households in lower income bands (below £30,000); and less in higher income bands (over £30,000) than nationally.
- At present only 4.2% (2,228) of owner-occupiers would consider using the equity in their dwelling to fund repairs or improvements.

So, accepting that the market is 'embryonic' in financial instruments at least, that it is premature to be optimistic about the impacts of the Green Deal and ECO, and that many householders feel constrained from taking action on energy efficiency, where are the best prospects for moving forward? Need is great but resources to make a difference are limited – where should they be focused? It may be beyond the scope of this report to crack that nut satisfactorily, but let us turn next to assessing the potential scope or size of the market.

Intriguingly, HHS11 offers the following table of measures and costs<sup>88</sup>, but – except perhaps for loft insulation - without providing either a rationale for the selection of these measures, or any figures to support the calculations. Presumably these details must be available but they are not included in the report or appendices.

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<sup>86</sup> HHS – 1 p.xiii

<sup>87</sup> HHS – 1 p. xi

<sup>88</sup> HHS – 1 p93

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<b>HEALTHY HOUSING SURVEY 2011 – COST OF IMPROVEMENT MEASURES</b>				
<b>Energy-Saving-Measure</b>	<b>Treatments</b>		<b>Total-Cost</b>	<b>Cost-Per-Dwelling</b>
	No. of Dwellings	Housing Stock %	£	£
Cylinder-Insulation-up-to-70mm	45217	54.8	£2,260,850	£50
Cavity-Wall-Insulation	9184	11.1	£4,592,000	£500
Loft-Insulation-up-to-250mm	42434	51.4	£10,608,500	£250
Solid-Wall-Insulation	12861	15.6	£19,291,500	£1,500
New-Central-Heating-System	9591	11.6	£23,977,500	£2,500
Double-Glazing	6939	8.4	£24,286,500	£3,500
New-Condensing-Combi-Boiler	58277	70.6	£58,277,000	£1,000
<b>Total</b>	<b>184,503</b>		<b>£143,293,850</b>	<b>£9,300</b>
<b>Heating Systems</b>	67,868		£82,254,500	£3,500
<b>Insulation Measures (inc glazing)</b>	116,635		£61,039,350	£5,800
<b>Insulation measures (exc glazing)</b>	109,696		£36,752,850	£2,300

These figures – arranged here in ascending order of total cost amounting in all to £143m - appear extraordinary and require corroboration. The propositions that 71% of all households require a new condensing boiler – more than the total of all households which have mains gas – and that 12% require a new central heating system, together total nearly £83m of expenditure on heating systems, for a total housing stock of nearly 83,000 homes : £1,000 per county household. Although the survey included an ‘assessment of suitability for renewable technologies’ including biomass, solar thermal and heat pumps, no correlation to that assessment is made in these propositions.<sup>89</sup>

The companion report to this one, on Herefordshire’s Renewable Energy economy, estimates that £21m would be sufficient to develop solar PV potential on 5,000 of the county’s roofs and £9m would provide Solar Water Heating to a further 2,000 domestic roofs. At nearly three times the combined sum, £83m to replace aged heating systems with new but conventional systems relying on fossil fuels seems on the face of it a questionable project.

The remaining measures are all different forms of insulation, including double-glazing, and total £61m. The figure cited of 42,434 homes requiring loft insulation is actually the total of dwellings with 250mm or less<sup>90</sup>. If we accept the calculations earlier in this report based on 200mm or over as ‘adequate’ (see pp 19-22) this number would be about 31,000.

No text or any details as to cylinders or double-glazing or cavity or solid-wall insulation are to be found elsewhere in the HHS11 document, other than in the table above. It is therefore hard to place reliance on the figures given.

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<sup>89</sup> HHS – 1 p91

<sup>90</sup> HHS – 1 p88

## Opportunities to grow our local retrofit economy

The table below is drawn from work done for the 2012 'Target H' proposal<sup>91</sup>, with figures corrected to the number of households used in HHS11, that is 82,521 :

<b>TARGET H : POTENTIAL FOR INSULATION INSTALLATION &amp; FUEL SAVINGS</b>				
<b>Feature</b>	<b>No. of Dwellings with Feature</b>	<b>With adequate insulation</b>	<b>With potential for installation</b>	<b>Annual fuel savings from installation</b>
Lofts	72283	40950	31333	£1,253,326
Cavity Walls	58012	33505	24509	£2,695,893
Solid Walls	24509	323	24186	£9,069,554
<b>Total annual savings</b>				<b>£13,018,773</b>

Target H did not include consideration of double glazing. It will be seen that there is a marked discrepancy between the potential installations for wall insulation cited above and those in the HHS11 table. If for the moment we accept the HHS11 costings per dwelling and apply these to the Target H numbers we generate the following table of possible costs :

<b>TARGET H : COSTS FOR INSULATION INSTALLATION</b>			
<b>Feature</b>	<b>Potential for installation</b>	<b>£ per Installation (as in HHS11)</b>	<b>Cost per Feature</b>
Lofts	31333	250	£7,833,208
Cavity Walls	24509	500	£12,254,260
Solid Walls	24186	1500	£36,278,891
<b>Total cost</b>			<b>£56,366,358</b>

These figures suggest that the total costs for installing insulation (excluding glazing and cylinders) wherever required across the Herefordshire housing stock could be £56m. For comparison, HHS11 totals these to £34m. However more research is required to establish whether the installation costs are reasonably accurate when applied to Herefordshire.

Clearly much more work could be done within this area given its scale and complexity. We hope this report, constrained as it is by our own resource limits, contributes usefully to increased understanding of the characteristics and potential of the retrofit market in our county and forms a helpful stepping-stone to all those with an interest or a stake in developing that market.

Nick Sherwood

Release date : April 2013

*With sincere thanks to all those who contributed in any way to creating this report – your advice, input and feedback were greatly valued.*

Herefordshire Economic Evaluation - retrofit detailed report- final version ns3.docx

<sup>91</sup> LEAF - 1