

This section of the Economic Blueprint focuses on our potential local retrofit sector, and how we might grow it. Given the limited number of new homes being built here, our scope included only existing domestic housing and had to exclude commercial building for reasons of project resource constraints, and lack of publicly available data. All numbers should be taken as roughly indicative rather than an accurate set of figures – this is especially true in this sector, where there can be massive variation between properties and we have had to use averages and assumptions in most cases. For more information about this project, why we’re doing it, who and what’s behind it, please see the Totnes & District Economic Blueprint Project Overview (available on the Transition Town Totnes website in the Economic Blueprint section).

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## A. ABOUT OUR HOUSING STOCK TODAY

The housing stock in the South Hams has been broadly characterised in the South Hams District Council Private Sector House Condition Survey<sup>1</sup>. Other information sources have been consulted in an effort to hone in on the housing stock in Totnes and District, however piecing together data to form a complete, accurate and detailed picture has been challenging. There are data gaps which required approximations where it would be helpful in furthering the aims of this report. Where information specific to Totnes and District (T&D) is available this has been used, otherwise information relating to South Hams has been used.

That said, the overall picture given of the housing stock within the larger geographical area of the South Hams is important, given that the supply side may have a relatively large natural geographic range of operation. Supply chains for finished goods and materials extend beyond the EU and service providers – assessors, installers, builders, etc. – are mostly mobile workers who may operate within a radius of 50 miles or more.

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### AGE AND TYPE

There are around 42,340 private sector dwellings in the South Hams characterised in the SHDC Private Sector House Condition Survey 2010 (PSHCS), including those owned by registered social landlords (RSLs), such as housing associations. The PSHCS provides a good breakdown of this stock by age, type, and tenure.

Age and dwelling types are two salient factors providing prima facie indicators of potential need for energy efficiency measures. Older buildings tend to be much less efficient than newer ones. In the South Hams, over a quarter of the homes were built before 1919. (See Figure 1, below, depicting relative dwelling ages compared with England as whole.) But age is just one potential indicator of energy performance. The type of dwelling, including its design and materials used, provide another set of factors. Converted flats, bungalows, end terraces, etc. tend to be less efficient than other dwelling types. The chart in Figure 2 depicts the proportion of dwelling types in the South Hams, which includes a large percentage of bungalows, around 22%.

The tenure of these dwellings and other information about the occupants are also important factors. Around 72% of homes in the South Hams are owner occupied, which also includes many that are considered second or holiday homes. Owner occupiers may have greater economic incentive, all things being equal, to undertake energy efficiency improvements, assuming that they are directly responsible for heating and lighting their homes. However, income levels for owner occupiers in the South Hams are only two thirds the national average and about 18% of such households receive a benefit. In addition, about 12% of owner occupied homes face fuel poverty. So, while there may be need and economic incentive, financial capacity may be a limiting factor.

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<sup>1</sup> Private Sector House Condition Survey 2010, DRAFT REPORT (REVISION 1), January 2011, South Hams District Council, Working in partnership with CPC

Figure 1, Dwelling age profile. (PSHCS 2010)

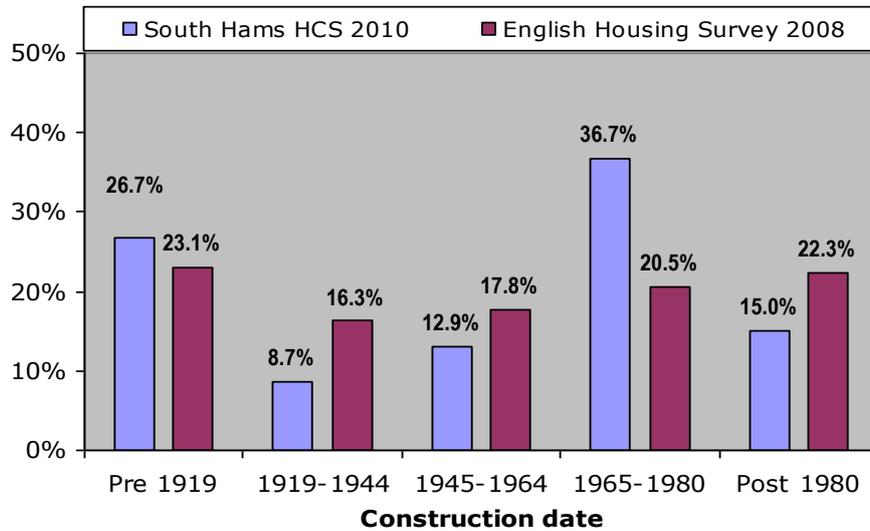
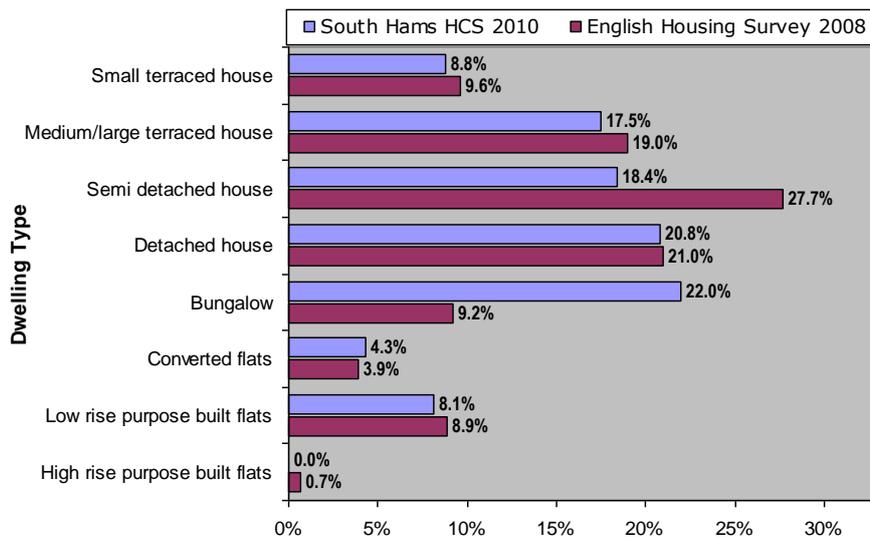


Figure 2, Dwelling type. (PSHCS 2010)



The situation for renters, private landlords and RSLs is more complex. Approximately 28% of homes are rented, (17% private rental, 11% social housing) and where renters are paying energy bills, landlords will have little economic incentive to invest in energy efficiency measures that reduce costs for their renters if they're unable to realise a return through higher rent or other means. Meanwhile 35% of private renters and 50% of social renters are on benefits, and 25% and 19% respectively are in fuel poverty.

By extrapolating data from the PSHCS and piecing together data from other sources, we can begin to sketch a similar picture for Totnes and District. According to the Devon County Council’s Totnes Mosaic Update 2010<sup>2</sup>, there are around 9,980 households in Totnes and District (note that the food report uses a slightly higher, more recently available figure for households from 2011), providing a reasonable proxy for the number of dwellings. Extrapolating from the South Hams data, we may assume what the approximate age and types these dwellings might be, as shown in Tables 1 and 2, below.

Table 1 - Estimated T&D age of dwellings

Construction Date	South Hams proportion	Totnes and District*
Pre-1919	26.7%	2,665
1919-1944	8.7%	868
1945-1964	12.9%	1,287
1965-1980	36.7%	3,663
1980+	15.0%	1,497
<b>Totals</b>	<b>100.0%</b>	<b>9,980</b>
* estimated from PSHCS and other data		

Table 2 – Estimated T&D dwelling types

Dwelling type	South Hams Proportion	Totnes and District*
Small terraced house	8.8%	878
Medium/large terraced house	17.5%	1747
Semi detached house	18.4%	1836
Detached house	20.8%	2076

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<sup>2</sup> Totnes Mosaic Update 2010, [http://www.devon.gov.uk/text/index/councildemocracy/neighbourhoods-villages/devontownprofiles/totnes\\_devontown.htm](http://www.devon.gov.uk/text/index/councildemocracy/neighbourhoods-villages/devontownprofiles/totnes_devontown.htm)

## ECONOMIC BLUEPRINT FOR TOTNES & DISTRICT: OUR LOCAL RETROFIT SECTOR

Bungalow	22.0%	2196
Converted flats	4.3%	429
Low rise purpose built flats	8.1%	808
<b>Totals</b>	<b>100.0%</b>	<b>9,980</b>
* estimated from PSHCS and other data		

Data from the Energy Savings Trust Home Energy Efficiency Database (HEED)<sup>3</sup> provide the basis for further characterisation of the housing stock within Totnes and Bridgetown, as shown in Table 3, below. Although the data is incomplete, it suggests a slightly different mix of housing stock than elsewhere in South Hams.

Table 3 HEED housing stock data

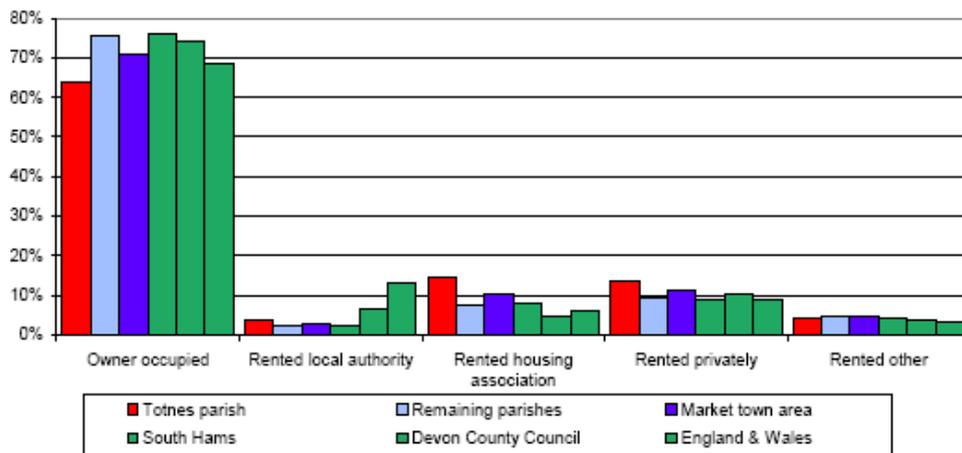
Totnes Property Type			Totnes Property Age		
Flat / Maisonette	256	10.9%	Built Pre-1900	126	5.4%
Mid Terrace House / Bungalow	228	9.7%	Built 1900-1929	133	5.6%
End Terrace House / Bungalow	147	6.2%	Built 1930-1949	306	13.0%
Semi Detached House / Bungalow	516	21.9%	Built 1950-1966	257	10.9%
Detached House / Bungalow	285	12.1%	Built 1967-1975	318	13.5%
House (Unknown Detachment)	214	9.1%	Built 1976-1982	167	7.1%
Bungalow (Unknown Detachment)	25	1.1%	Built 1983-1990	191	8.1%
Unknown	684	29.0%	Built 1991-1995	52	2.2%
<b>Total:</b>	<b>2,355</b>	<b>100%</b>	Built 1996-2002	44	1.9%
			Built 2003-2006		0.0%
			Built Post-2006		0.0%
			Unknown Built Date	761	32.3%
			<b>Total:</b>	<b>2,355</b>	<b>100%</b>

<sup>3</sup> Energy Savings Trust Home Energy Efficiency Database, <http://www.energysavingtrust.org.uk/Professional-resources/Existing-Housing/Homes-Energy-Efficiency-Database/Introduction-to-HEED>

TENURE

Tenure of the housing stock in Totnes & District differs from the South Hams. According to the 2001 Census<sup>4</sup>, it appears that the rate of home ownership is lower and rented housing higher, than in the surrounding parishes and in the South Hams, generally. (See Figure 3, below.)

Figure 3 - Comparative dwelling tenure.



Source: 2001 Census

NEW BUILDS

While this provides a basic understanding of the current residential built environment in the South Hams and Totnes and District, there are plans to build approximately 523 new dwellings in Totnes, with another 180 planned after 2016.<sup>5</sup> There are also plans for 65 new homes in Dartington, with another 30 after 2016, and 10 currently planned for Diptford.

The addition of new homes should raise the average energy efficiency of the housing stock as a whole, although by a small margin. While the focus of this report is on residential buildings, it should also be noted that commercial buildings make up a sizable portion of the overall built environment and could be taken into account in future studies.

<sup>4</sup> 2001 Census, <http://www.ons.gov.uk/ons/guide-method/census/census-2001/index.html>

<sup>5</sup> South Hams Local Development Framework, Totnes Site Allocations Development Plan Document, April 2010 [http://www.southhams.gov.uk/totnes\\_dpd.pdf](http://www.southhams.gov.uk/totnes_dpd.pdf)

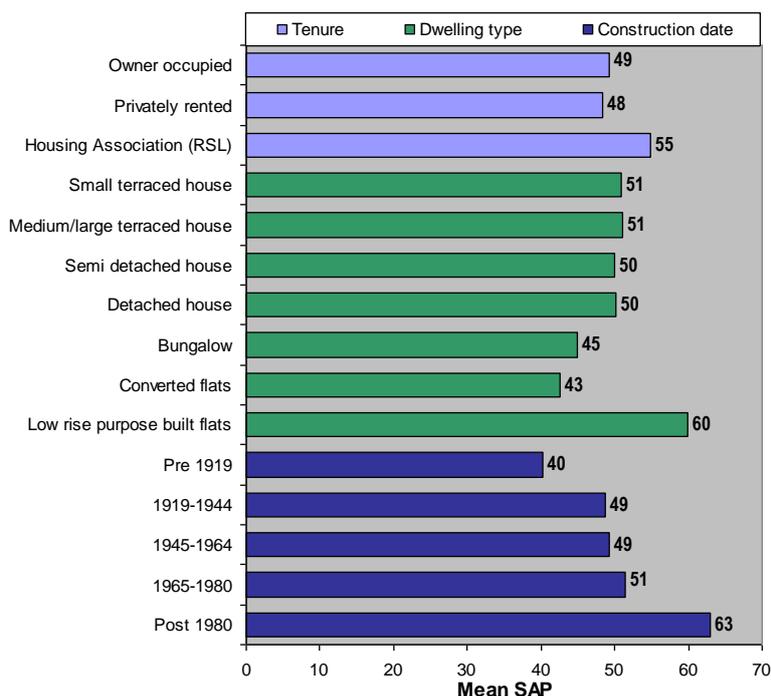
B. ENERGY PERFORMANCE OF OUR CURRENT HOUSING STOCK

HOW ENERGY EFFICIENT ARE OUR HOMES?

The most widely used method for evaluating energy efficiency in homes is the Standard Assessment Procedure, or SAP, which is often mapped to the Energy Performance Certificate (EPC). The EPC is a simple to read graphic with colour bands representing levels of energy efficiency. The SAP and EPC models provide standardised and easily comparable ratings across a range of housing types independent of geographic location or level of occupancy. The PSHCS have used SAP and EPC ratings to further characterise the South Hams housing stock.

Like England as a whole, the housing stock in South Hams is relatively old and inefficient compared with the rest of Europe. And when compared with the rest of the country, the South Hams is roughly on par with an overall average SAP rating of 50, which is the same as for England. Data published in the PSHCS also highlight average SAP ratings across the same categories of age, type, and tenure discussed above. The data shown in Figure 4, below, indicates that newer buildings, purpose built flats, and dwellings owned by RSLs have higher average SAP ratings, while older dwellings, converted flats, and private rental properties have lower ratings.

Figure 4 – Average SAP ratings by general dwelling characteristics.



The PSHCS also indicates the proportion of dwellings by tenure that fall into each of the EPC bands, from band A, the most efficient, to band G, the least efficient. We can see in Table 5, below, that most dwellings in the South Hams, whether owned or rented, fall into the bottom half of energy performance, bands E, F, and G.

Table 5 – EPC ratings by tenure type (PSHCS 2010)

EPC SAP Range Banded	Owner occupied	Privately rented	Housing Association (RSL)	Whole Stock	EHS 2008
Band A/B (81-100)	0.5%	0.9%	1.3%	0.6%	0.3%
Band C (69-80)	9.1%	11.8%	17.1%	10.4%	9.0%
Band D (55-68)	31.0%	27.6%	36.2%	30.9%	34.3%
Band E (39-54)	37.6%	30.1%	33.0%	35.8%	38.6%
Band F (21-38)	16.4%	23.9%	11.5%	17.2%	14.1%
Band G (1-20)	5.6%	5.6%	1.0%	5.1%	9.7%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

There are a number of variables that determine SAP ratings and, more importantly, actual energy performance. These variables include building materials, construction methods, type of heating, level of insulation, occupancy and occupant behaviour, etc. Loft insulation, cavity wall insulation, and central heating are three factors that can often be addressed at relatively low cost while delivering relatively significant efficiency gains, what might be called the “low hanging fruit”. The PSHCS has profiled the current housing stock with respect to two of these factors, the types of heating and levels of loft insulation.

Table 6 – Residential Heating (PSHCS 2010)

Heating Type	Small terraced house	Medium/large terraced house	Detached house	Semi detached house	Bungalow	Converted flats	Low rise purpose built flats
Central Heating	79.1%	77.6%	91.5%	78.3%	61.6%	46.2%	51.9%
Storage Heaters	16.6%	15.2%	8.1%	18.1%	26.0%	41.5%	44.4%
Room Heaters	3.4%	3.8%	0.0%	3.1%	3.8%	7.2%	0.9%
Portable Heating Only	0.8%	3.4%	0.5%	0.5%	8.6%	5.1%	2.8%

In Table 6 above, we find large proportions of housing stock equipped with central heating, approximately 73% overall, much lower than the 89% for England as a whole, according to the 2009 English Housing Survey: Housing Stock Report.<sup>6</sup> That study also indicates that only about a quarter of dwellings with central heating have installed condensing boilers, which are the most efficient and are specified as mandatory when replacing a non-condensing boiler.

Similarly, a large number of dwellings lack adequate loft insulation, as shown in Table 7, below. The EST currently recommends 270mm.

<sup>6</sup> 2009 English Housing Survey: Housing Stock Report, <http://www.communities.gov.uk/documents/statistics/pdf/1937212.pdf>

Table 7 – Loft insulation by dwelling type

Dwelling Type	No Loft Insulation	Less than 50mm	50mm to 100mm	100mm to 150mm	150mm to 200mm	200mm or more	No Loft
Small terraced house	7.2%	0.0%	4.0%	9.5%	19.4%	58.4%	1.6%
Medium/large terraced house	4.3%	1.1%	3.1%	7.4%	21.8%	59.4%	2.9%
Semi detached house	2.3%	1.3%	0.9%	8.9%	25.9%	59.8%	0.9%
Detached house	1.1%	0.0%	2.0%	2.3%	24.0%	69.1%	1.6%
Bungalow	1.9%	0.4%	5.4%	6.7%	22.0%	61.6%	2.1%
Converted flats	1.8%	0.0%	1.8%	5.8%	10.2%	25.5%	55.0%
Low rise purpose built flats	0.9%	0.0%	0.2%	6.5%	10.4%	55.3%	26.7%
South Hams	2.6%	0.5%	2.7%	6.5%	21.4%	60.1%	6.2%
<b>EHS 2008</b>	<b>3.1%</b>	<b>2.6%</b>	<b>19.8%</b>	<b>31.8%</b>	<b>12.6%</b>	<b>20.8%</b>	<b>9.3%</b>

In summary - our 9,980 or so homes have an average SAP energy rating of 50 (in band E, about the same as the rest of the UK), with older homes, converted flats, bungalows and privately rented properties scoring lowest. 58% of all our homes fall into the lower SAP ratings E-G. Central heating is installed in 73% of homes (16% less than the rest of England), and only 1/4 of those have the most efficient boilers. At least 40% of homes lack sufficient loft insulation. Clearly there is much scope for improvement.

## DO OUR HOMES PROVIDE “DECENT” ENERGY PERFORMANCE?

The PSHCS also compared the condition of homes against the four criteria that make up the Government’s Decent Homes Standard. One of these is a Category 1 Hazard, which covers several factors including excess cold, and therefore provides another indication of overall energy performance. Where a dwelling has a SAP rating of less than 35, it automatically produces a Category 1 Hazard score. In the South Hams, around 6,900 dwellings failed the Category 1 Hazard, and of these, about 70%, or about 4,800, failed due to excess cold.

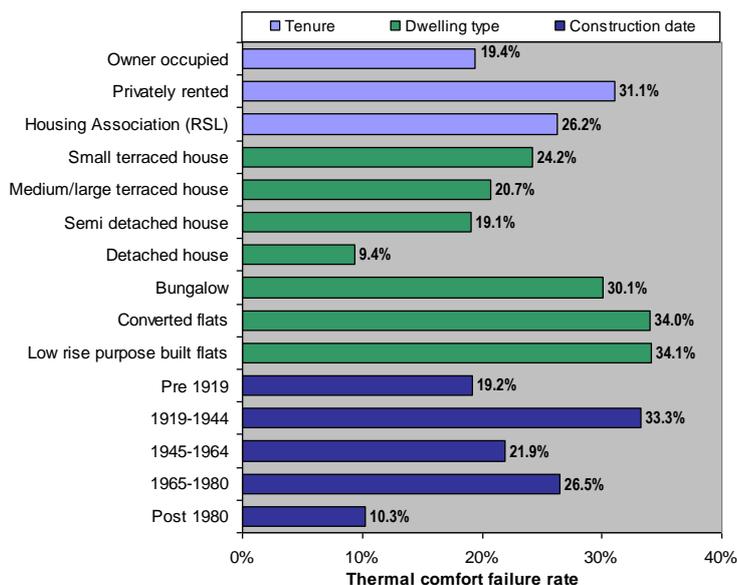
A second criterion is Thermal Comfort, which heavily overlaps the excess cold Category 1 Hazard. Dwellings with poor thermal comfort are identified in part by heating type and level of insulation. There are three requirements to meet the thermal comfort criterion:

- For dwellings with gas/oil programmable heating, cavity wall insulation (if there are walls that can be insulated effectively) or at least 50mm loft insulation (if there is a loft space) is an effective package of insulation.
- For dwellings heated by electric storage heaters/ LPG/ programmable solid fuel central heating a higher specification of insulation is required: at least 200mm of loft insulation (if there is a loft) and cavity wall insulation (if there are walls that can be insulated effectively).

- All other heating systems fail (i.e. all room heater systems are considered to fail the thermal comfort standard).

Over 22% of dwellings in the South Hams, about 9,400, were deemed to fail the Thermal Comfort criterion, nearly twice the national average of 12.9%. See Figure 4, below, to see how these were distributed among tenure, age, and type of dwelling. The report also indicates that about 21% these dwellings, nearly 2,000, are located in the Totnes and East sub-area, which includes Torquay and Paignton.

Figure 4 – Dwellings failing Thermal Comfort criterion



The Energy Saving Trust’s HEED database provides some interesting, but incomplete, information about the Totnes housing stock with respect to loft insulation, cavity wall insulation, heating system, levels of window glazing, and other measures. Because it’s incomplete, it doesn’t add important details to the general picture provided by the PSHCS yet. It does provide some additional data, for example, the PSHCS did not look at renewable energy installations. A study conducted by Transition Town Totnes, documenting the Transition Streets programme, indicates that at least 141 dwellings in Totnes and District were fitting with PV by this programme.

The next section will look at the potential for energy improvements.

**In summary the housing stock in the South Hams is relatively old and inefficient. Around 11% of homes fail the Decent Homes Standard due to excess cold, a Category 1 Hazard. Over 22% of all dwellings are deemed to fail the Thermal Comfort criteria, nearly twice the national average. Privately rented older flats are the biggest issues. Social issues and care of the most vulnerable sit alongside our need to reduce carbon emissions and pay the true cost of the energy we use.**

### C. POTENTIAL ENERGY EFFICIENCY IMPROVEMENTS AND COSTS

#### WHAT'S THE SCALE AND COST OF IMPROVEMENTS NEEDED?

The ultimate goal of 'energy retrofits' is to make buildings zero net energy consumers through efficiency measures, and replacement of fossil-fuel energy sources with renewables. Given that there are virtually no dwellings within the South Hams or Totnes and District that meet this goal, there is great potential for improvement.

However, whether all homes could achieve this goal is another issue. Every home can be made more efficient, but there are practical constraints defining the upper limit attainable for most dwellings. The condition of the property – age, design, materials, state of repair, siting, etc. offer some technical constraints. Financial considerations offer another set of constraints.

Various studies around the country have set out to determine scale, scope, and costs of bringing England's housing stock, or some portion of it, to a target energy performance standard. The government has set targets for dramatically reducing carbon emissions – 80% by 2050. And because the residential sector is responsible for about a third of emissions, the government has launched a scheme to enable property owners to undertake energy efficiency improvements.

The Green Deal is to be launched in October 2012, and is meant to offer a practical framework for helping property owners finance approved work through certified service providers. The government's goal is to bring 14 million homes up to a higher efficiency standard by 2020. We'll return to the Green Deal and what it may mean for the local economy, below.

The SHDC's PSHCS study also looks at the feasibility and costs associated with bringing homes in the area up to a higher level of energy efficiency. It determined that nearly 70% of the housing stock in South Hams could benefit from one or more of the following measures:

- Loft insulation to 270mm
- Cylinder insulation to 70mm Jacket (unless foam already)
- Double Glazing to all windows
- Cavity wall insulation
- Installation of a modern high efficiency gas boiler where none is present
- Full central heating where none is present

If these measures were undertaken for the roughly 29,500 dwellings that could benefit from one or more measures, the projected total cost would be about £111 million or an average of £3,800 per dwelling. If we assume a similar distribution of need for Totnes and District, the total value would run around £26.4 million. See Table 8, below.

Table 8 – Potential energy efficiency measures for South Hams and Totnes & District dwellings. Estimate for Totnes and District extrapolated from PSHCS.

Measure	SH Dwellings	T&D (est.)	Percent of stock
Loft insulation	25,700	6,058	60.7%
Wall insulation	13,500	3,184	31.9%
Double glazing	11,400	2,685	26.9%
Cylinder insulation	6,200	1,457	14.6%
New boiler	7,300	1,717	17.2%
New central heating	1,300	309	3.1%
<b>Any measures</b>	<b>29,500</b>	<b>6,956</b>	<b>69.7%</b>
<b>Total potential value</b>	<b>£ 111,000,000</b>	<b>£ 26,433,028</b>	

Assumptions from the PSHCS include: “loft insulation will be an improvement on existing insulation, rather than an installation where none exists. With cylinder insulation, most improvements would be the replacement of old cylinders with jackets, for new integral foam insulated cylinders. Installation of new central heating is only indicated where the dwelling currently relies solely on room heaters as the primary heating source.”

Another study looking at a nation-wide retrofitting proposal offers additional insight. A Consumer Focus study undertaken in 2009 and produced by the Association for the Conservation of Energy (ACE) and the Centre for Sustainable Energy (CSE), examined a proposal to bring all homes in England up to an average SAP level of 76, or EPC Band C.<sup>7</sup>

Because the proposal would seek to treat all homes, it looked at all appropriate measures, including those listed above, as well as interior/exterior wall insulation, air and ground source heat pumps, solar thermal and solar PV, etc. The average cost per property was estimated at £7,560 and would reduce fuel bills by 46%. Applying this model to the South Hams, as well to Totnes and District, the projected costs of raising the average SAP from 50 to 76 would be over £320 million and £75 million, respectively as shown in Table 9.

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<sup>7</sup> “Raising the SAP: Tackling fuel poverty by investing in energy efficiency”; Pedro Guertler, ACE and Ian Preston, CSE, Edited by William Baker, Consumer Focus, May 2009, <http://www.consumerfocus.org.uk/files/2011/01/Rising-SAP-Nov09.pdf>

Table 9 – Projected cost of raising average SAP to 76

Raising average SAP to 76	South Hams	Totnes & District
Number of dwellings	42,340	9,980
Average cost	£7,560	£7,560
<b>Total cost</b>	<b>£320,090,400</b>	<b>£75,448,800</b>

We estimate that if all T&D homes were retrofitted with basic measures including insulation, double glazing and new boilers where needed, the total cost would be around £26m, or £111m across the South Hams. To bring homes up to an average SAP rating of 76 (band C), it would cost around £75m for T&D, or £320m for the South Hams.

#### WHAT IF WE STARTED WITH THE HIGHEST PRIORITY HOMES?

A study by the Energy Savings Trust called “F & G banded homes in Great Britain: Research into costs of treatment”, focused on bringing the homes in the two lowest EPC bands up to the E band.<sup>8</sup> The premise behind the study was that this approach would address non-decent home and help most people facing fuel poverty.

Those F&G homes broke down into categories of:

- “cheaper to treat”, about 37% of F&G homes, which could be addressed with loft and cavity wall insulation, with average costs below £1000
- “boiler replacement”, around 47%, which entails replace inefficient boiler with an efficient, condensing boiler, with average cost around £3000
- “window glazing”, 1.5% that would benefit from secondary glazing, for between £3000-£5000
- “expensive to treat”, 15%, that require more expensive measures running between £5000-£9500

<sup>8</sup> “F & G banded homes in Great Britain: Research into costs of treatment”, Energy Savings Trust, 2010, <http://www.energysavingtrust.org.uk/Publications2/Housing-professionals/Refurbishment/F-G-banded-homes-in-Great-Britain-research-into-costs-of-treatment>

If we apply this approach to the South Hams and Totnes & District housing stocks, keeping in mind that the correlations with the study, which looked at all homes in Great Britain, would differ, we can gain a very rough understanding of the cost of improving the performance of our least efficient dwellings as shown in Table 10.

Table 10 – Estimated costs of improving F&G housing stock.

F&G "Bands"		SH F&G Homes	Cost	T&D Homes	Cost
Easy	37%	3493	£3,493,473	823	£823,450
Boiler	47%	4438	£13,312,966	1046	£3,138,011
Glazing*	1.50%	142	£566,509	33	£133,532
Expensive**	15%	1416	£10,267,979	334	£2,420,275
<b>Totals</b>		<b>9442</b>	<b>£27,640,928</b>	<b>2237</b>	<b>£6,515,268</b>
* Average estimated cost of £4,000 ** Average estimated cost of £7,250					

Finally, the PSHCS also looked at the potential for bringing homes that failed the Thermal Comfort criterion of the Decent Homes Standard into passing condition, as well as those dwellings where occupants were in “fuel poverty.”

The report estimated that it would cost £17 million to adequately improve those homes that fail the Thermal Comfort test.

About 14.6% of dwellings in South Hams were in fuel poverty – including over a quarter of those in private rental housing. The PSHCS includes estimated costs for minimally improving some of the 6,000 dwellings of those in fuel poverty - £5.1 million for the 3,600 owner occupied homes, £1.5 million to improve the 1,200 in private rental. If these proportions are applied to Totnes & District, the total estimated costs for ameliorating those dwellings in fuel poverty (not including RSLs) the costs would be just over £900,000.

Given the condition of housing stock indicated in the PSHCS, the ambition of the Consumer Focus study notwithstanding, there remain additional opportunities to improve energy efficiency of the housing stock. It’s probable that most dwellings could benefit from a simple draught proofing programme.

If we conservatively estimate that 70% of homes, the same proportion identified by PSHCS as needing improvements, received £100 worth of draught proofing, that’s another £295,000 potential within South Hams, and £69,560 for Totnes and District.

Starting with those that most need it... focusing on the lowest rated housing stock – to bring F&G rated properties up to an E might cost £6.5m for T&D, or £28m across SH. Focusing on those dwellings in fuel poverty (excl RSLs), the estimated cost is just under £1m for T&D, nearly £7m for the SH.

D. ENERGY SAVINGS AND FINANCING

We've outlined the potential for improving the energy performance of the housing stock in South Hams and Totnes & District, as well as the associated financial cost of doing so.

WHAT'S THE POTENTIAL ENERGY SAVING AND RETURN ON INVESTMENT?

In 2011, the estimated spend on mains gas and electricity in the South Hams was around £16.3 million and £19 million, respectively, and for T&D, around £3.8 million and £5 million. (See Table 11, below.) In the South Hams PSHCS study, a package of improvements was outlined that included improving loft insulation to 270mm, cavity wall insulation, window glazing, water cylinder jackets or replacement, boiler replacements and central heating installation, which would be applied to approximately 70% of the homes in the area.

The Energy Savings Trust provides savings estimates for a range of measures and these figures were used to estimate the potential energy savings of this package for the and South Hams and for Totnes & District, as shown in Table 12, below. The potential savings in South Hams would be over £5 million per year, and about £1.2 million in Totnes & District. The PSHCS estimates a cost of £111 million for this work which, at current energy prices, would put the payback period at almost 23 years.

Table 11 – Gas and electricity spending

Estimated annual energy expenditure, 2011			
		South Hams	T&D
Dwellings		42340	9980
Dwellings on mains gas	62.50%	26463	6238
Average annual gas bill*	£ 617		
<b>Total annual gas spend</b>		<b>£ 16,327,363</b>	<b>£ 3,848,538</b>
Dwellings with electricity	100%	42340	9980
Average annual electricity bill*	£ 450		
<b>Total annual electricity spend</b>		<b>£ 19,053,000</b>	<b>£ 4,491,000</b>

\* Data from DECC.

Table 12 – Potential energy savings based on EST figures<sup>9</sup>

Measure	Annual Savings	SH Dwellings	Estimated Savings	T&D Dwellings	Estimated Savings
Loft insulation (virgin)	£ 175	2455	£ 429,625	579	£ 101,325
Loft insulation (top up)	£ 25	23,245	£ 581,125	5479	£ 136,972
Cavity wall insulation	£ 135	13500	£ 1,822,500	3184	£ 429,840
Double glazing	£ 15	11400	£ 171,000	2685	£ 40,275
Water cylinder	£ 40	6200	£ 248,000	1457	£ 58,280
Condensing boiler*	£ 189	7300	£ 1,379,700	1716	£ 324,324
Central heating**	£ 300	1300	£ 390,000	309	£ 92,700
<b>Total estimated savings</b>			<b>£ 5,021,950</b>		<b>£ 1,183,716</b>

\* assumes upgrades from D, E, F, G boilers are evenly distributed. \*\* uses proxy savings from G to A boiler upgrade

In 2011, the estimated spend in T&D on mains gas was £3.8m and on electricity £4.5m (£16.3m and £19m in the SH). We estimate the potential energy savings for a basic retrofit package would be around £1.2m pa in T&D (£5m for SH). This gives a rough payback period at almost 23 years at current energy prices.

Continually rising energy prices, as well as status and social pressure, are sparking changes in attitudes and behaviour. They're also sparking demand for efficiency measures, but the question of financing is a relevant one. For home owners of means – over a quarter of South Hams households have annual income levels above £40,000 - investing in energy savings that offer marginally higher returns than conventional low-risk investment alternatives might be a rational financial calculation to make.

Also, current interest rates are at a historically low point, making it financially attractive for qualified borrowers wanting to invest in energy cost reductions to do so. However, overall income levels in the South Hams are below national averages. For home owners with low incomes, few liquid assets, or on benefits, the opportunity to invest in energy efficiency measures is less clear without some form of assistance.

<sup>9</sup> Energy Saving Trust estimates e.g. <http://www.energysavingtrust.org.uk/In-your-home/Roofs-floors-walls-and-windows/Roof-and-loft-insulation>

For private landlords, their economic incentives to invest are also less straightforward, given that energy costs are often borne by renters. Renters, on the other hand, have much incentive to reduce their energy bills, but have virtually no incentive to invest in improving a property in which they have no equity stake.

The government's Warm Front scheme is meant to support home owners and private renters who are on certain income benefits and meet other requirements. The scheme provides grants for insulation, draught proofing and other measures up to £3,500. It's unknown how many households in the South Hams or in Totnes & District would qualify for the Warm Front scheme. Another government scheme, the Renewable Heat Incentive is planned for next year and may also provide support for certain kinds of energy upgrades.

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### WHAT ABOUT THE GREEN DEAL?

But the government has plans for a much more ambitious and far reaching plan to support almost everyone. The Green Deal (GD), due to be launched in October 2012, is designed to provide financing for approved work, from approved GD Providers, and making it possible for home owners, whatever their financial condition, as well as private landlords and renters, to undertake energy saving improvements on their homes.<sup>10</sup>

The programme's goal is to upgrade 14 million homes across the country by 2020 and is based on a "pay-as-you-save" model. The basic framework relies on GD approved Providers who "write the deal" – arranging financing and managing the project. The GD Provider may work with internal resources or sub-contract the work. The process is launched with an assessment from an approved GD Advisor, the work is approved and begun by approved GD Installers. Payback begins when work is completed and the repayments will be based on projected savings, and according to the "the golden rule", should not exceed actual savings. Deals can be for as much as £10,000 and for those who need help paying for additional work where required, energy companies are offering grants, called ECOs or Energy Company Obligations, to help cover shortfalls.

The Green Deal is also being touted as a green economic stimulus that will not only boost demand for energy improvements, but will create jobs, too. Estimates run from 100,000 new jobs in the sector in five years, up to 250,000 by 2020. Whether the Green Deal will succeed in meeting its goals is an open question. There are aspects of the programme still being developed and there's no predicting what consumer uptake might be until the Green Deal is launched. Nor is there clarity on where the job growth might be located and what portion would be within large firms or small and medium sized enterprises.

Clearly there are potential economic benefits associated with improving the energy efficiency and performance of the housing stock. Depending on financing, households may use their energy cost savings to repay their loan, or spend it in the local economy. Warmer, more comfortable homes may be healthier, too, contributing to the wellness of occupants, translating into more work days and fewer sick days.

Less energy consumption also means reduced CO2 emissions. Home energy consumption contributes to over a quarter of CO2 emissions and the government has committed to reducing emissions by 80% from 1990 levels, by 2050. And finally, as suggested by the Green Deal, there is potential for job creation. If retrofitting local homes spurred local job growth – in other words, if the work was undertaken by local workers, in local firms, there would be knock on positive effects for the local economy through the local multiplier.

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<sup>10</sup> Green Deal, [http://www.decc.gov.uk/en/content/cms/tackling/green\\_deal/green\\_deal.aspx](http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx)

### E. GREEN JOBS AND OUR LOCAL BUILDING INDUSTRY TODAY

#### HOW MANY NEW JOBS COULD BE CREATED?

Retrofitting the existing housing stock will remain a high priority for policy makers over the next few decades due to carbon reduction commitments and rising energy costs. Demand for energy reduction products and services may grow due to market pressures and shifting cultural attitudes. Programmes like Warm Front, Renewable Heat Incentive, and Green Deal may further drive demand. All of these factors have the potential to boost employment and manufacturing in the sector.

This potential in Totnes & District has yet to be studied directly, but we can begin piecing together a picture based on other studies. The Energy Saving Trust, in their “Home Economics: Cutting carbon and creating jobs, by nation and region”<sup>11</sup> study, looked at the potential employment boost for the UK, and for each region of the country, under three comprehensive retrofitting scenarios.

The first scenario, Level 1, considers effects of installing loft and cavity wall insulation into those homes that require it. Level 2 looks at replacing all G-rated boilers with A-rated boilers in combination with insulation. And the third scenario, Level 3, considers giving every house a full-scale eco-retrofit including everything in Levels 1 and 2, plus:

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

An estimated 5.7 million homes would receive cavity wall insulation, 12.8 million would receive loft insulation to 270mm, 3.5 million boilers would be replaced, and under Level 3, over 67 million measures would be delivered. This translates into jobs. Nationwide the estimate for the full eco-refit scenario is 4.7 million jobs supported.

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<sup>11</sup> “Home Economics: Cutting carbon and creating jobs, by nation and region”, Energy Savings Trust, 2011, <http://www.energysavingtrust.org.uk/Publications2/Corporate/Research-and-insights/Home-economics-cutting-carbon-and-creating-jobs-by-nation-and-region>

These estimates include direct and indirect employment – full time equivalent jobs that would need to be filled during the course of one year to get the work done. This includes those at the service and installation end of the value chain, as well as those working in retail, distribution, and manufacturing – some of those jobs would naturally be overseas where some of the products are made.

If we apply the models used in this study to the local retrofitting scenarios we’ve considered above, we can sketch a rough picture of what impact local energy improvement activity might have on local jobs. (We developed a “jobs per measure-installation” factor through simple division.)

We can see in Table 13, below, the projections developed in PSHCS for South Hams, including extrapolations for Totnes & District, for installations of loft insulation, cavity wall insulation, and new boiler replacements. The new jobs this work might support is also given, suggesting the potential for 305 and 72 new jobs for South Hams and Totnes & District, respectively. If we assume a local retrofit economy based on the full eco-refit scenario suggested in Level 3, the potential new employment jumps to nearly 2,970 and 700 respectively.

Table 13 – Potential new retrofitting jobs.

Measure	SH Dwellings	Potential Jobs	T&D (est.)	Potential Jobs
Loft insulation	25,700	90	6,058	21
Wall insulation	13,500	133	3,184	31
New boiler	7,300	83	1,717	19
<b>Total potential jobs</b>		<b>305</b>		<b>72</b>

The above is a simple exercise and undoubtedly overstates the potential, especially because the Home Economics study calculated potential job growth for the entire value chain, including manufacturing. It does, however, highlight the potential value to the local economy. What the overall impact might be for the local economy requires some new research to be undertaken here in T&D specifically (outside the scope of this study).

It’s clear that the scope of work represented by the scale and condition of the local housing stock would support a large number of new jobs. Local multiplier effects would create a boost to overall economic activity. A recent economic study that looked at the Kirklees Council’s Warm Zone programme offers some corroboration and a hint at what’s achievable. In their programme, they invested in cavity wall and loft insulation for all households in the authority – about 51,000 homes. The total investment was £20.8 million, it generated 243 new jobs, and through multiplier effects, stimulated about £39 million in overall economic activity in the area.

**The installation of loft insulation, cavity wall insulation, and new boiler replacements alone might support around 72 (for T&D) – 305 (across SH) new jobs along the supply chain. If we take the full eco-refit scenario (Level 3) this jumps to around 700 and 2,970 respectively. The local multiplier effects would create additional boosts to economic activity.**

But there are factors that will limit growth of the local industry, at least in the short term. Nearly all the materials and systems we've considered are produced far outside the region. Most of the retail and distribution is through firms headquartered far outside Totnes. Providers currently signed up to the Green Deal are mostly large firms and all are located far from the local area.

It's unclear whether that would change, or how many local trades people would become certified under the Green Deal scheme and/or be sub-contracted for such work. Green Deal advisors, assessors, installers and providers must be certified. It appears that professionals already certified under different programmes, such as EPC and SAP, Microgeneration Certification Scheme, and others, may be grandfathered in or will have met prerequisites for further training. These requirements may serve as opportunities for local professionals already trained and certified, or as a barrier for those seeking acceptance into the GD programme.

Data is outdated and incomplete concerning current local employment in the construction industry, or in the trades specific to the energy efficiency measures we've been considering. According to data pieced together from Devonomics<sup>12</sup> and other sources, around 1,800 are employed in construction in the South Hams. Given the recent economic downturn, which acutely affected the construction industry, employment in this sector has undoubtedly diminished during the past several years.

According to our BVD data<sup>13</sup>, the construction industry in Totnes & District is composed of about 250 firms as shown in Table 14. It's not known how many of these are locally owned, nor how many workers are employed. Some of these would be directly involved in some of the type of retrofitting projects we've considered above. In building trades, however, lines demarcating types of projects pursued are not always clear. What is clear is that there is an existing industry with firms covering a range of activities that could benefit from increased demand for energy efficiency measures. Some of these firms may be poised to grow, such as the 2 insulation companies listed in Table 13, below, and others may find opportunities to shift into new lines of business.

In addition to the formal construction industry, there is an informal industry that may also benefit. In 2005, the Office of National Statistics produced a report, "Identifying Data Sources on Entrepreneurship and the Informal Economy"<sup>14</sup>, which includes a review of two studies examining the sectors in which informal paid work is concentrated. It listed projects that were identified as most frequently using informal labour, including about 25% of all attic conversions, 24% of bathroom installations, 13% of plumbing work, 12% electrical, 12% plastering. It also found that nearly half of all informal work occurs in construction and home repair, providing as much as a 3% boost to the official construction industry figures.

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<sup>12</sup> Devonomics – data about Devon - <http://www.devonomics.info/>

<sup>13</sup> BVD data is commercially sourced data provided to this study. See important data caveats in the summary report.

<sup>14</sup> "Identifying Data Sources on Entrepreneurship and the Informal Economy", Office of National Statistics, 2005, <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/business-and-energy/uk-business--activity--size-and-location/final-report-on-identifying-sources-on-entrepreneurship-and-the-informal-economy.pdf>

Table 14 – T&D construction industry according SIC code, BVD.

DIV GROUP		Count	Est. Turnover
CLASS	CLASS description		th GBP Last avail. yr
4521	General construction of buildings and civil engineering works Total	84	£28,879
4533	Plumbing Total	30	£5,458
4545	Other building completion Total	14	£2,204
4525	Other construction work involving special trades Total	25	£3,823
4544	Painting and glazing Total	25	£2,561
4542	Joinery installation Total	11	£909
4522	Erection of roof covering and frames Total	16	£1,165
4531	Installation of electrical wiring and fittings Total	20	£1,019
4541	Plastering Total	6	£1,175
4534	Other building installation Total	12	£532
4543	Floor and wall covering Total	6	£354
4511	Demolition and wrecking of buildings; earth moving Total	2	£248
4550	Renting of construction or demolition equipment with operator Total	2	£1,324
4532	Insulation work activities Total	2	£310
4512	Test drilling and boring Total	1	£2
		256	£49,961

COULD THE REQUIRED RETROFIT MATERIALS AND SYSTEMS BE PRODUCED LOCALLY?

Much of the retrofitting work could be provided by local workers but few of the goods, if any, could be supplied from local producers now or in the short term. Initial research indicates that all significant products and materials for improving home efficiency and performance are manufactured outside the area. Insulation products, except for a small amount of wool-based products, are not manufactured in the region. There may be growth potential for wool-based insulation products, however.

There may also be a role to play for locally sourced natural building materials on interior or exterior solid wall insulating projects. And there may be opportunities to develop other natural products, such as lumber, plasters, hemp and other fibre-based products, and cellulosic materials made from recycled paper. Boilers are not manufactured in the region, however it may be possible to develop local capacity to manufacture microgeneration systems, such as anaerobic digestion systems, domestic scale wind turbines, hydro, and solar thermal. While window glass profiles are manufactured outside the area there are some fabricators located in the region, as are several secondary glazing outfits.

Many of the systems and materials required for most retrofitting projects would be sourced through the existing distribution channels, such as builders merchants and specialty distributors. In Totnes & District, the channel is dominated by Jewson’s, a subsidiary of global St. Gobain, Travis Perkins, a large national chain, and Inter-Line, a 5 store regional chain based in Torquay. As the retrofitting industry grows, there may be potential for new local merchants, but in the short run, opportunities here would seem relegated to niche products and materials.

## F. GROWING THE LOCAL RETROFIT ECONOMY

## PROPOSED APPROACH, PROJECTS AND ACTIVITIES

So we have shown there is enormous potential for economic growth in this sector. Clearly, a local housing stock that provided warmer and healthier places to live (especially for the most vulnerable), consumed less energy and cost less to operate, and reduced its impact on the environment would be welcome benefits for the community as a whole. If the process of transforming our local housing stock also provided jobs all along the value chain, it would contribute to the prosperity of the local area, as well.

What can we do to better support the growth of this local retrofit sector? We suggest that we need to look at creating demand and raising awareness of the importance of using local suppliers and materials where possible, while at the same time building a local supply chain that can meet the demand.

On the demand side, ONS Family Spending 2011<sup>15</sup> reports that the average household spends around £26.40 per week on home repairs and improvements. Here in T&D that equates to around £13.7 million and of this:

- £1.4 million goes on central heating installation or repair
- £0.4 million goes on improvements including double glazing, new kitchen units etc
- £8.7 million goes on contracted out home improvements

This activity is something to build on. It would be interesting to find out more about where this money goes today – with local independents or with large chain stores? Where do efficiency improvements rate in the ‘home improvements’ spend category? Can we explain better the benefits of spending money on a new boiler rather than a new sofa? Local programmes such as Transition Streets<sup>16</sup> may help drive demand and uptake for retrofit projects, either through self-investment, or via Warm Front, RHI, Green Deal or other scheme.

On the supply side, the picture is mixed. There’s a number of local experienced construction workers, but exactly how many, their skills, and qualifications could not be established with publicly available data. There are few construction and installation firms based locally and they face competition from a wide area, including from large firms based far outside the area.

The supply chain is currently dominated by merchants and distributors owned and headquartered far from the local area, with one exception headquartered in Torquay. Systems and materials required for most retrofitting projects – insulation and boilers, for example – are manufactured far from our area. Sheep wool insulation is one growth area we suspect!

Note that for this plan, we are looking at a 3 year time frame (any longer feels too subject to change) and relatively limited resources. This plan does not include every possible thing that might need to be done to realise the maximum potential, rather this is a set of things we can practically do that will start to turn some of it into reality.

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<sup>15</sup> Family Spending 2011, ONS, <http://www.ons.gov.uk/ons/rel/family-spending/family-spending/family-spending-2011-edition/index.html>

<sup>16</sup> Transition Streets, a Transition Town Totnes project – works with neighbourhood groups <http://www.transitionstreets.org/>

From these activities, we will learn much that will influence our future work, and of course, other things may come along unexpectedly that gains precedence over these suggestions. We welcome input from others to help shape our collective path. So this should be seen as a suggested approach, with some aspects already getting underway, but it's not set in stone.

Our suggested activities and projects for this sector, and their current status, include:

### **Engage local firms**

- Create 'Builders Breakfast' or related forum for bringing local professionals in the construction trades together for learning and networking. (Needs funding/resource.)
- Conduct a survey of all local firms and contractors capable of supporting retrofitting work. Identify current skills and skills gaps for the future – feed into wider training/skills needs analysis (Needs funding/resource.)
- Help this network to create a programme supporting local firms and workers for local projects, including support for "up selling" and "cross selling" energy efficiency measures along with other home improvement, renovation, and repair projects they may be engaged in. (Needs funding/resource.)

### **Raise awareness**

- Expand the existing Open Eco Homes and EcoHome Fair programmes – raises awareness, connects home owners with installers, advisors and other retrofit professionals. (More funding/resource needed to expand this current offer and increase promotion).
- Leverage existing programmes, such as Transition Streets to drive uptake of Warm Front and other schemes that support the most vulnerable households, evaluate feasibility of volume purchasing of low energy lighting, and other user-installable efficiency measures. (TS already underway, these ideas are partially included in current work e.g. bulk buying solar PV, further funding/resource would strengthen this aspect)
- Undertake awareness raising campaign to recognise those private landlords who have undertaken energy improvements, and find ways of promoting energy efficient private rentals. (Needs funding/resource.)

### **Help spark innovation**

- Undertake feasibility studies with partners such as South Devon College and Schumacher College for developing locally produced systems and materials required for improving home energy performance. Possibilities might include evaluating materials like wool, recycled paper, hemp, clay, and others, for use in insulation, panels, high-performance plasters, etc. (Some work already done on this for the ATMOS build see [transitionculture.org/2012/07/12/can-totnes-build-itself-a-new-study-from-atmos-totnes/](http://transitionculture.org/2012/07/12/can-totnes-build-itself-a-new-study-from-atmos-totnes/)).
- Survey local experts to determine potential development of technologies in wood fuel heating, district or community heating etc. (some work already underway at South Devon College).

### **Incubate new enterprise**

- Undertake feasibility study to determine viability of supporting new social enterprises in DIY, builders merchants, and distribution. (Links with incubator set-up work already underway)
- Undertake feasibility study for setting up a community-owned Green Deal Provider or alternative to Green Deal that can offer similar benefits. (Needs funding/resource)

**Support new livelihoods to emerge – identify needs and help fill them**

- Create pathways for developing long term livelihoods from existing programmes, such as Transition Streets’ Draught Busters. (Needs funding/resource.)
- Evaluate feasibility of starting “Green Doctor” programme, modelled on the Groundwork programme ([www.groundwork.org.uk](http://www.groundwork.org.uk)), which could provide easy-to-implement home efficiency measures to low-income and elderly households and livelihoods for young people. Could potentially be linked with Transition Streets. (Needs funding/resource.)

All of the above projects have been considered by the REconomy Forum partners, and priorities have been suggested to help give clarity on where to focus our efforts, including fundraising. A summary is provided in Figure 5, with a traffic light system of red (not yet started), amber (partially underway) or green (fully underway) used to show current status. The priority projects, along with those from the other areas of this work, have been put onto a timeline that reflects what will happen when, any dependencies and who is responsible. The latest version of this plan will be available on the TTT website.



Figure 5 Summary of proposed projects for next 3 years, and current status shown by traffic light colours.

INDICATORS

How will we know if the economy is changing in the desired way? We suggest that a small number of indicators need to be defined, and then monitored long-term. Defining these in more detail is not within the scope of this work, but this will be picked up by the team who takes this work forward as a priority action and in association, we hope, with credible academic partners who can help provide appropriate process and rigour. This work will include providing baselines for each indicator, building on the work in this report.

Suggested indicators include:

- % local homes with acceptable loft insulation
- % local homes with 'reasonable' energy performance rating
- # retrofit-related jobs
- # retrofit-related firms
- Retrofit-related skills profile
- # tonnes carbon saved through local retrofit work

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### RETROFIT PARTNERS, ORGANISATIONS AND LINKS

- UK Green Building Association - [www.ukgbc.org](http://www.ukgbc.org)
- BRE - [www.bre.co.uk](http://www.bre.co.uk)
- Devon Sustainable Building Initiative (DSBI) - [www.sustainablebuild.org](http://www.sustainablebuild.org)
- Energy Action Devon - [www.energyactiondevon.org.uk](http://www.energyactiondevon.org.uk)
- Energy Savings Trust - [www.energysavingtrust.org.uk](http://www.energysavingtrust.org.uk)
- Retrofitting the Future – [www.retrofitforthefuture.org](http://www.retrofitforthefuture.org)
- AECB, the Sustainable Building Association - [www.aecb.net](http://www.aecb.net)
- Totnes Sustainable Construction Company [www.totnessustainableconstruction.co.uk](http://www.totnessustainableconstruction.co.uk)
- Passivhaus Homes - [www.passivhaushomes.co.uk](http://www.passivhaushomes.co.uk)
- TRESOC – [www.tresoc.co.uk](http://www.tresoc.co.uk)
- TTT Building and Housing Group – [www.transitiontowntotnes.org/groups/building-and-housing](http://www.transitiontowntotnes.org/groups/building-and-housing)
- Totnes Housing and Built Environment Forum – Kate Wilson
- Anahat Energy – Fraser Durham – [www.anahatenergy.com](http://www.anahatenergy.com)
- Schumacher College – Natural Building Programme
- South Devon College – Sustainable Building Programme

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