Statistical Analysis and Mapping for HECA Further Report

A.2.1 Analysis of ECO measures

A.2.1.1   The Fuelsavers team has undertaken some additional analysis to give confidence that the council can deliver a target of 2,000 homes per year over three years. This has been done using bottom up analysis of homes that we have a very high, high and medium confidence of actively taking up the Green Deal or ECO.

A.2.1.2 The analysis constitutes three main areas:

    a. Areas that are eligible for CSCO ECO funding;
    b. People who are eligible for HHCRO ECO funding;
    c. Homes which are eligible for CERO ECO funding.

    The most complicated factor is that there is overlap between the three different ECO funding regimes. An attempt has been made to de-duplicate the lists.

A.2.1.3   This is also complicated by properties that have already been improved, or are likely to be improved between now and the launch of the scheme. Where we are aware of significant work that has been undertaken, or is planned, we have removed these properties from the accessible market and commented on this in the methodology below.

    The following definitions have been used:

    a. **Very strong likelihood**. This category is either for properties where the council or its partners have a high degree of control over the investment decision or where there is experience to suggest that the available incentive will make the offer so attractive that some people will definitely take up the offer.

    b. **Strong likelihood**. This category is similar to the above where there is a good degree of control or the incentives are good. However, due to management capacity constraints or possible uncertainty over the attractiveness of the incentives, they are not seen as definite.

    c. **Medium likelihood**. This should be seen as a stretch target, where with the right approach to management and promotion, these numbers could be secured.

    All categories have been calculated separately, not cumulatively.

A.2.1.4 Table 1 below gives our current best estimate of the types of properties that will contribute to the total target of 6,000 homes.

Table 2 below, gives a more detailed breakdown of "Accessible Stock" by each element of ECO funding

		Potential Accessible Stock	Likelihood			
			Very Strong	Strong	Medium	Remainder
ALMO	System Build	3,40	680	340	340	2,042
	Hi-Rise	1,650	80	170	170	1,230
	Solid Wall	2,700	260	260	520	1,660
Private	System Build	4,400	230	230	690	3,250
	Solid Wall	61,800	150	750	2250	57,750
	Narrow Cavity		300	300	300	
	Cavity	10,900	430	430	860	9,180
	Heating (Only)	-	300	300	300	-
	Heating (with Ins)		300	300	300	
Housing Association	Solid Wall	2,700	500	500	500	1200
	Total Properties		3,230	3,580	6,230	

Table 1. Approximate breakdown of ECO interventions to meet the 6,000 homes target.

		ECO Eligible Elements							
CERO		x	x	x			x		
CSCO			x	x	x	x			
HHCRO				x	x		x	x	
ALMO	System Built	1,065 – 1,700	1,239 – 2,800	n/a	-	n/a	n/a	n/a	**2,304 – 4,500**
	Hi Rise	120 approx	1,669 approx	n/a	-	n/a	n/a	n/a	**1,523 - 1,789**
	Timber Frame	69	90	n/a	-	n/a	n/a	n/a	**158**
	Solid Brick	911	1,732	n/a	-	n/a	n/a	n/a	**2,643**
	Solid Stone	98	3	n/a	-	n/a	n/a	n/a	**101**
	Cavity	n/a	n/a	n/a	594	n/a	n/a	n/a	**594**
	Insulated (all)	n/a	n/a	n/a	28,078	n/a	n/a	n/a	**28,078**
Owner Occupier	System Built	1,597	1,712	304	-	-	184	-	**3,797**
	Timber Frame	127	363	87	-	-	14	-	**592**
	Solid Brick	17,349	8,362	1,497	-	-	1,132	-	**28,340**
	Solid Stone	15,107	139	17	-	-	700	-	**15,964**
	Cavity	n/a	n/a	n/a	5,310	846	-	2,774	**8,929**
	Narrow Cavity								**0**
	Insulated (all)	n/a	n/a	n/a	13,327	1,650	-	4,834	**19,811**
Private Rented	System Built	223	226	130	-	-	35	-	**613**
	Timber Frame	142	136	75	-	-	3	-	**356**
	Solid Brick	8,587	4,303	1,162	-	-	467	-	**14,519**
	Solid Stone	2,610	89	11	-	-	245	-	**2,955**
	Cavity	n/a	n/a	n/a	1,077	414	-	470	**1,960**
	Insulated (all)	n/a	n/a	n/a	4,083	748	-	737	**5,568**
Housing Assoc.	System Built	39	54	n/a	-	n/a	n/a	n/a	**92**
	Timber Frame	32	22	n/a	-	n/a	n/a	n/a	**54**
	Solid Brick	747	1,775	n/a	-	n/a	n/a	n/a	**2,522**
	Solid Stone	176	28	n/a	-	n/a	n/a	n/a	**204**
	Cavity	n/a	n/a	n/a	423	n/a	n/a	n/a	**423**
	Insulated (all)	n/a	n/a	n/a	5,550	n/a	n/a	n/a	**5,550**
		48,999 – 49,634	**21,942 – 23,502**	**3,282**	**58,443**	**3,657**	**2,781**	**8,814**	

Table 2. – Calculated breakdown of ECO eligible elements, using EPC data

NB: It is not possible to estimate the number of Narrow Cavity properties from the EPC data, as these will already be counted within the Solid Brick / Stone and Cavity wall types.

It is estimated that there are approx 3,000 narrow cavities, suitable for cavity bead insulation.

The number of uninsulated ALMO system build properties is also difficult to quantify, with the lower estimate calculated from the EPC analysis, and the higher figures from an ALMO/Strategic Landlord generated table (with areas totals extrapolated by System Build type/location).

Methodology notes

A.2.1.5   General

Energy Performance Certificate (EPC) data has been address matched to the Leeds BLPU and duplicate EPC data removed. Council Tax profiles generated for each Lower Layer Super Output Area (LSOA) for private sector and ALMO stock, were then used to calculate a weighting factor for each EPC household, combined with a LSOA Tenure weighting derived from the 2001 Census and EPC "transaction type". The resulting data was then checked against Citywide Tenure breakdown from the 2007 Stock Condition Survey.

Additional data sets were added to the EPC household info, including:-

- Wrap Up Leeds – cavity installs & cancellation data relating to wall type.
- Leeds private sector Stock Condition 2007 survey data (wall type & insulation)
- Known Warmfront jobs & known 'Warmfront eligible' households, plus probable Cavity Wall installs on the scheme.
- Partially complete Virtual desktop survey of CSCO areas
- Fuelsavers grant claims data for ALMO properties where cavity insulation grant claimed under EEC and CERT
- Fuelsavers wall insulation data for ALMO properties from old KPI 63 reporting.
- ALMO System Build database
- NGN Gas Pipe data – distance from GIS household centroid to nearest Gas pipeline or IGT area.

The assembled data set, consisting of approx 104,000 records was then processed to identify which sample households were likely to be eligible for each element of ECO & totals calculated using the EPC weighting:-
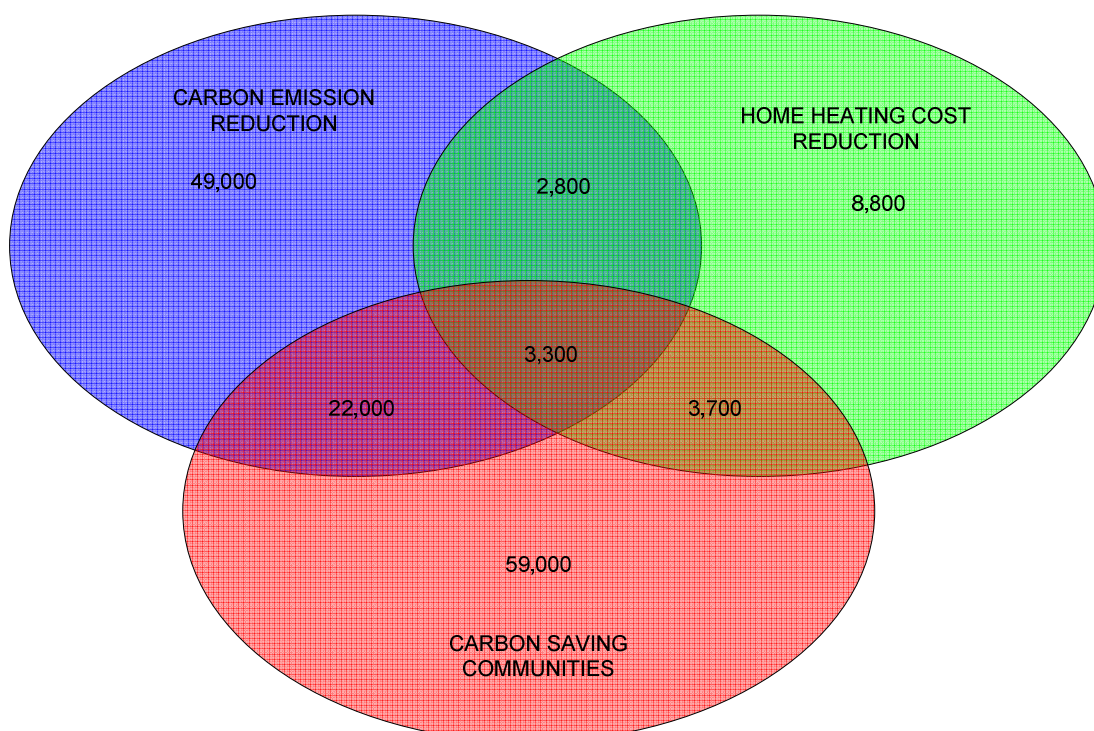
A.2.1.6   **Carbon Saving Communities Obligation (CSCO) ECO**.

CSCO eligible properties consist of properties in the lowest 15% of the Index of Multiple Deprivation (Income Domain). In Leeds 118 of the 476 Lower Layer Super Output Areas (LSOA's) are eligible, however none of the 118 areas meet the "Rural" requirement of the scheme. (15% of the Energy Companies CSCO saving must be in "Rural" LSOA's, where population is <10,000 per hectare.)
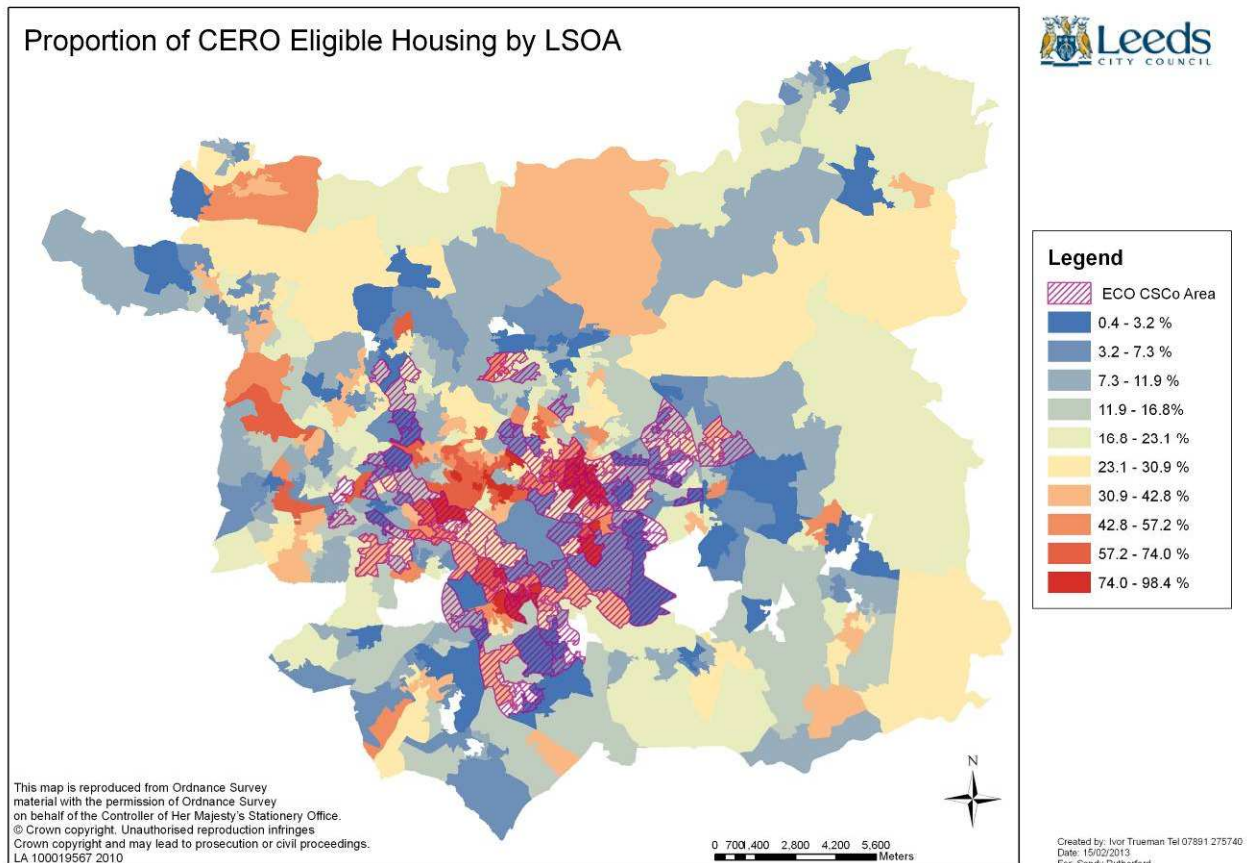
All tenures are eligible for CSCO funding.

CSCO eligible properties have been calculated using the EPC data. A ranking of areas has also been generated, based on the number of ALMO system built properties and DECC published Fuel Poverty figures.
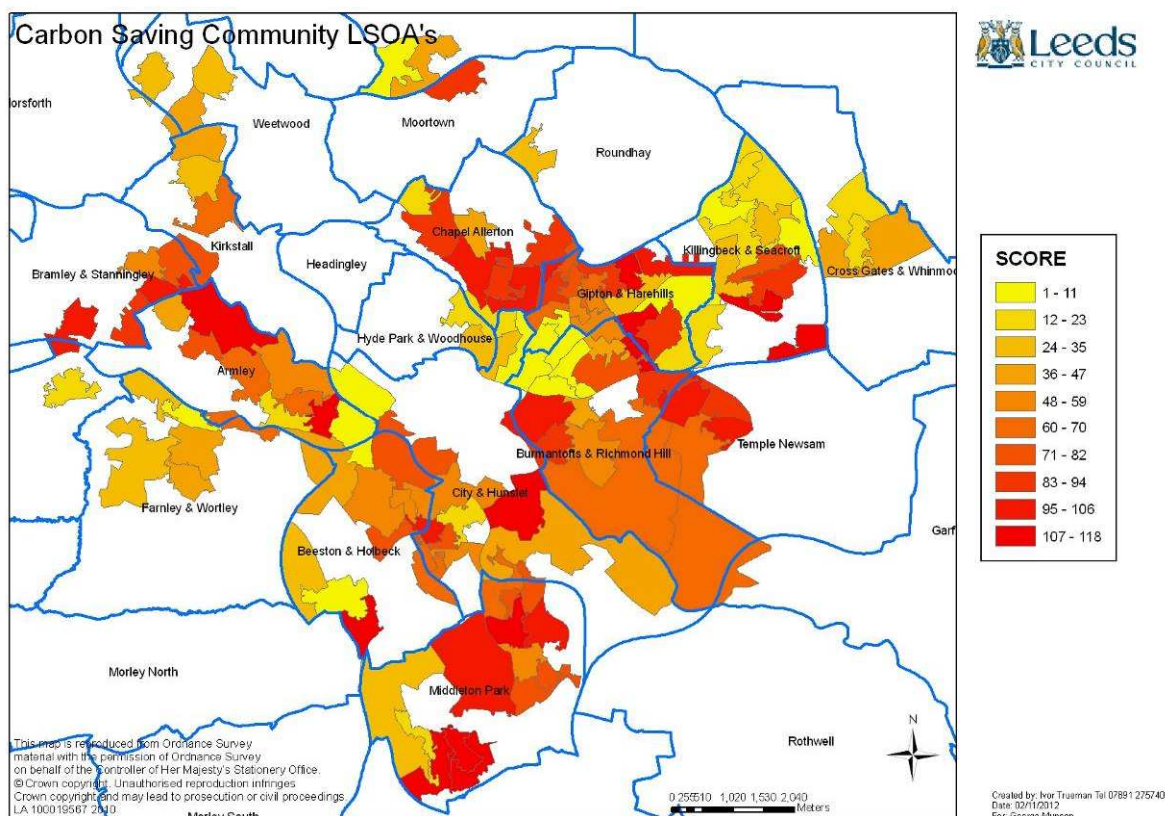
A.2.1.7   **Carbon Emission Reduction Obligation (CERO) ECO**

The CERO element is applicable to all tenures, with properties that have solid, system built and non traditional cavity walls. The EPC data and other datasets have been used to generate a map of the proportion of CERO Eligible housing.

Proportion of CERO Eligible Housing by LSOA

Legend
- ECO CSCo Area
- 0.4 - 3.2 %
- 3.2 - 7.3 %
- 7.3 - 11.9 %
- 11.9 - 16.8%
- 16.8 - 23.1 %
- 23.1 - 30.9 %
- 30.9 - 42.8 %
- 42.8 - 57.2 %
- 57.2 - 74.0 %
- 74.0 - 98.4 %

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0 700 1,400 2,800 4,200 5,600 Meters

Created by: Ivor Trueman Tel 07891 275740
Date: 15/02/2013
For: Sandy Rutherford

A.2.1.8   **Home Heating Cost Reduction (HHCRO) ECO**.

The HHCRO element is only applicable to owner occupiers and private rented properties, and households must be in receipt of one of the following benefits:-

- Pension Credit – the Guaranteed Credit or Savings Credit element
- The support or work related element of income-related Employment and Support Allowance
- Child Tax Credit (income <£15,860)
- Working Tax Credit (income <£15,860 & either: a) responsible for a child under 16 (or 20 if in education/training); b) receive Disabled worker or severe disability element; c) aged over 60.
- Income Support or income-based Jobseeker's Allowance & either: a) responsible for a child under 16 (or 20 if in education/training); b) receive disability or severe disability element of Child Tax Credit; c) receive the severe of enhanced element of Disability Premium; d) receive the higher or enhanced premium of Pensioner Premium

As a proxy for this, known Warmfront jobs, and recent Council produced benefits data sets have been used to identify non-ALMO benefit recipient households.

The number of Households benefiting from Warmfront has varied annually according to changes to the eligibility criteria.

Year	Households
2011-12	464
2010-11	2615
2009-10	2587
2008-09	4201

For the first half of 2012-13, 327 properties have benefited.

As the HHCRO criteria is the same as the most recent Warmfront criteria, it may be best to assume that the number of Households benefiting citywide will be 500 – 600 per year.

From the EPC analysis, approx 50% of HHCRO eligible households are not eligible for other ECO elements, so it is likely that heating work will be evenly split, with approx 300 receiving heating & wall insulation and 300 receiving heating only.

The 6,000 target needs to be calculated excluding the heating/insulation jobs, to avoid double counting.

A.2.1.9   **ALMO Tower Blocks**.

There are 108 multi-story blocks with 7,568 ALMO flats (and 27 private flats). Many of these have been partially insulated to one or more elevations and others which have ring-bound construction have been cavity filled. Other blocks have had external cladding.

Blocks which are thought to have had either partial or full insulation have been counted as insulated and not included in the ECO analysis.

22 of the blocks (1,523 ALMO flats) do not appear to have any wall insulation based on an extract of data from the Keystone Asset Management system & by comparison with results from a previous drive by survey, EPC and grant data.

The EPC analysis however suggests a slightly higher figure (1,789), which is probably as a result of the weighting applied to correct for Council Tax band profile, and presumably higher 'churn' in Hi-rise tenancy.

A.2.1.10   **ALMO System Built**.

The number of ALMO System Built properties requiring insulation has been estimated using the above EPC / install data.

A recent analysis by Strategic Landlord indicated that there were 2,462 system built House/Bungalows and 2,059 Low/Medium Rise Flats which would be suitable for External Cladding. The total (4,521) is significantly higher than the EPC analysis (2,304), and it is difficult to say which is the more reliable figure.

A comparison of the two datasets by System Build type, indicates that the discrepancy is largely due to differences in the proportion of insulated/unimproved "Livett Cartwright", "Reema", "Wates" and "Wimpey No Fines" properties.

Some "Livett Cartwright" and "Wates" properties have been known to have had cavity fill installed (as have some bricked-up gable ends of some "Wimpey No Fines"), so this will have to be investigated further.

As the Strategic Landlord figures are city wide, a breakdown by CSCO and CERO could only be obtained by apportioning the number of properties according to the relative proportion by System Build type from the EPC analysis.

The ALMO System Build database has also been used in conjunction with a desktop survey to help identify system build types for each of the 118 CSCO LSOAs. This database identifies approx 60 different built types.
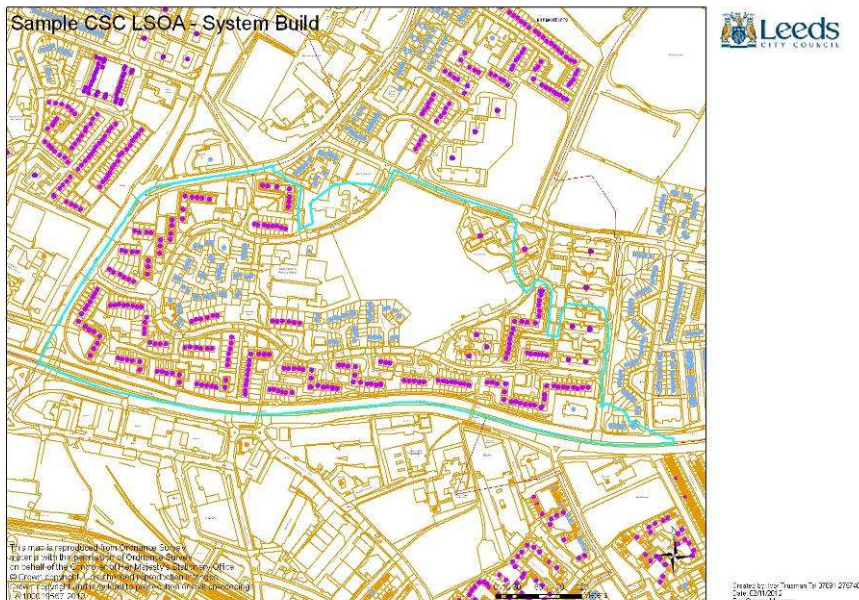
A.2.1.11   Private System Built.

The EPC data suggests there are 4,410 system built properties in the private sector, which compares reasonably well with the figure derived from the 2007 Stock Condition Survey data (5,318).

According to the EPC data 77% of the System Built properties are Owner Occupier, compared with 86% in the Stock Condition Survey data.

A.2.1.12   Housing Association Solid Walls.

The EPC data suggests that the number of uninsulated solid wall / system built housing association built properties is 2,818. This compares to 2,546 properties from the 2007 Stock Condition survey dataset.

In both calculations, 87 - 90% of the properties have Solid Brick walls.

A.2.1.13 **Private Narrow Cavities**.

The Wrap Up Leeds cancellation data, and a virtual desktop survey of neighbouring properties has been used to estimate the number of narrow cavities.

Extrapolating from the Wrap Up Leeds cancellation data suggests that there are approx 8,400 narrow cavities; but from the current bead scheme, it is likely that only about a third are suitable for cavity fill with polystyrene bonded bead.

i.e. roughly 3,000 suitable cavities.

A.2.1.14 **Private Solid Walls**.

The EPC data suggests that the number of private sector Solid walls is 61,778 which compares well with the figure derived from the 2007 Stock Condition Survey data (61,486).

The Owner Occupier / Private Rented split in the two data sets also compare well with 68-72% of the solid wall properties being Owner Occupier.

There is however a difference in the split between Solid Brick and Solid Stone properties, with the EPC data suggesting 69% and the Stock Con data suggesting 89% are Solid Brick. This discrepancy could be due to assumptions in apportioning the Stock Con data to either "Solid Brick" or "Solid Stone" based on the wall width. (The Stock Condition data only specifies "Mason Single Leaf / 9 inch solid & >9 inch solid").

A.2.2 ECO mapping

A.2.2.1 The ECO mapping aims to provide a complete list of properties which could benefit from the Green Deal. It also will provide better data for modelling of domestic energy use, than has been previously available.

A.2.2.2 Following on from the EPC analysis, address level data is being generated, using a combination of GIS and virtual desktop survey using internet aerial maps and street views. Initially the 118 CSCO areas were mapped using the ALMO Generic Archetypes database to rank LSOA's by the likely proportion of System Build properties, and then completing the missing information based on the visual clues / similar build types on known ALMO stock. Age band data and some Housing Association properties have also been recorded using the planning portal.

The Solid Wall EPC data has been compared with the virtual desktop survey and shows good correlation:-

CSCo Solid Wall - EPC vs Desktop Survey

$$y = 0.8672x$$
$$R^2 = 0.9668$$
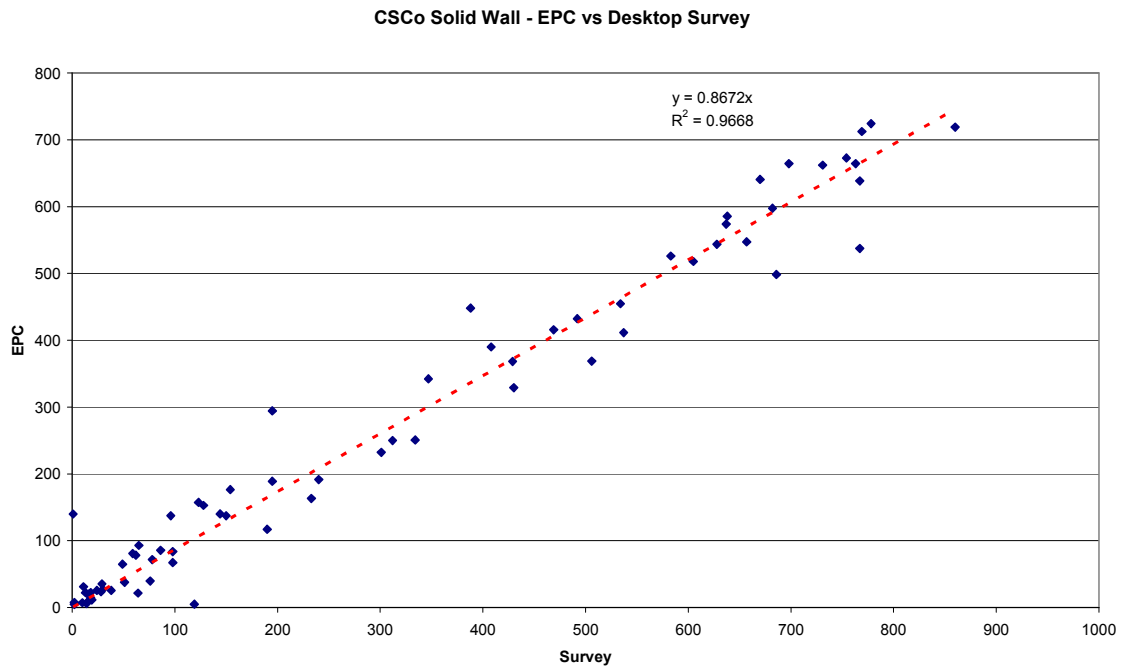
Whilst there is good correlation between the solid wall EPC data and virtual survey, there are noticeable discrepancies in the EPC data with surveyors classifying identical dwellings in an block or terrace as different wall types. This is most noticeable with system build types.

A.2.2.3 Once the CSCO areas were mapped, the remaining 358 LSOA's were ranked according to the proportion of ALMO system build and according to the number of Solid Walls (using EPC data). Collection of this data is ongoing, with an estimated 65% of ALMO non traditional and 40% of solid wall properties identified so far in the non CSCO areas.

A.2.2.4 The virtual survey information collected includes the likely system build type (of which there are approx 60 types), the build age band, and wall type. Fuelsavers will also be processing the data to add in the likely build form (flat, semi-detached, end/mid terrace etc), using an automated program which looks at the number of neighbouring building polygons/number of party walls. It is hoped that this can then be combined with known heating and insulation data, to model energy usage.

A.2.3   LCR Modelling of Potential Measures

A.2.3.1 Prior to the availability of the EPC data, the 2007 Stock Condition survey data and available ALMO data was used to model the maximum potential for insulation and heating improvements for the Leeds City Region (LCR). The work was intended to give a rough scope only, extrapolating from the Leeds stock figures and typical cost of installing heating / insulation. This gave a max cost of £3.4 billion with an ECO subsidy of over £500 million.

A.2.3.2 To obtain the total figures, the average SAP improvement / energy, cost and carbon saving was calculated by build form / wall type and the results

extrapolated by local authority stock level and summed to give the overall cost of works and ECO subsidy.

A.2.3.3 The ECO element was calculated as that which would be required for the modelled measures to meet the Green Deal's "Golden Rule" of paying back the cost of the measures within a 25 year period. For this it was assumed that the interest rate was 6% and comfort factor of 30%. The modelling also assumed that all non-condensing boiler systems (including electrically heated properties) would need heating upgrades, and that both heating and insulation would be fitted where required.

		LCR Stock	Current Energy Cost (£/year)	Future Energy Cost (£/year)	Average Cost of works (per Property)	Simple payback (Capex) years	Annual Interest Rate (pa)	Average ECO Required	Simple payback (inc cost of debt) years		Total Cost of Works		Total ECO Required
Trad Brick Cavity	No Attic	718,513	£1,464	£1,191	£1,632	8.9	6%	£127	11.8				
	With Attic Room	87,748	£1,716	£1,314	£2,362	8.3	6%	£65	12.4				
	Total	**806,261**	**£1,491**	**£1,205**	**£1,711**	**8.8**	**6%**	**£120**	**11.9**		**£1,379,547,081**		**£97,149,107**
Solid Brick	No Attic	61,966	£1,755	£1,244	£4,858	14.8	6%	£592	22.8				
	With Attic Room	92,540	£1,757	£1,289	£5,010	16.5	6%	£1,048	23.3				
	Total	**154,506**	**£1,756**	**£1,271**	**£4,949**	**15.9**	**6%**	**£977**	**23.1**		**£764,621,186**		**£150,890,436**
Solid Stone	No Attic	119,220	£1,687	£1,171	£4,880	13.6	6%	£616	21.6				
	With Attic Room	76,474	£2,060	£1,518	£5,759	16.4	6%	£957	24.6				
	Total	**195,694**	**£1,833**	**£1,307**	**£5,223**	**14.7**	**6%**	**£749**	**22.8**		**£1,022,186,539**		**£146,618,717**
System Built	No Attic	52,648	£1,184	£926	£4,104	28.1	6%	£1,844	23.9				
	With Attic Room	2,692	£3,675	£2,150	£8,217	7.0	6%	£586	12.7				
	Total	**55,341**	**£1,305**	**£985**	**£4,304**	**27.1**	**6%**	**£1,783**	**23.3**		**£238,212,346**		**£98,660,893**
Timber Frame	No Attic	2,778	£1,125	£898	£5,889	48.1	6%	£3,913	24.6				
	With Attic Room	0	£0	£0	£0	0.0	0%	£0	0.0				
	Total	**2,778**	**£1,125**	**£898**	**£5,889**	**48.1**	**6%**	**£3,913**	**24.6**		**£16,358,095**		**£10,870,214**
Non Standard Cavity	No Attic	0	£0	£0	£0	0.0	0%	£0	0.0				
	With Attic Room	0	£0	£0	£0	0.0	0%	£0	0.0				
	Total	**0**	**£0**	**£0**	**£0**	**0.0**	**0%**	**£0**	**0.0**				
All Build Types	No Attic	955,126	£1,494	£1,177	£2,395	11.0	6%	£324	14.4				
	With Attic Room	259,454	£1,852	£1,374	£4,368	13.6	6%	£684	19.9				
	Total	**1,214,580**	**£1,570**	**£1,219**	**£2,817**	**11.6**	**6%**	**£415**	**15.6**		**£3,420,925,248**		**£504,189,367**

Table 3. LCR Modelling Results – Financial Totals.

		LCR Stock	Heating Measures	Convention Insulation (Loft/Cavity)	Solid wall insulation	Attic Room Insulation	Approx Cost of Works		Total ECO Required
Trad Brick Cavity	No Attic	718,513	£976,833,088	£195,483,016	£0	£0	0		0
	With Attic Room	87,748	£119,782,132	£28,609,439	£0	£58,839,406	0		0
	Total	**806,261**	**£1,096,615,220**	**£224,092,456**	**£0**	**£58,839,406**	**£1,379,547,081**		**£97,149,107**
Solid Brick	No Attic	61,966	£87,245,498	£10,211,269	£203,577,537	£0	0		0
	With Attic Room	92,540	£117,471,132	£15,015,405	£170,190,318	£90,084,945	0		0
	Total	**154,506**	**£204,716,630**	**£25,226,673**	**£373,767,855**	**£90,084,945**	**£764,621,186**		**£150,890,436**
Solid Stone	No Attic	119,220	£214,610,049	£18,140,386	£348,996,665	£0	0		0
	With Attic Room	76,474	£107,053,491	£13,215,797	£182,671,009	£79,294,784	0		0
	Total	**195,694**	**£321,663,540**	**£31,356,183**	**£531,667,674**	**£79,294,784**	**£1,022,186,539**		**£146,618,717**
System Built	No Attic	52,648	£91,584,414	£4,498,023	£120,008,280	£0	0		0
	With Attic Room	2,692	£4,754,987	£602,817	£13,146,925	£3,616,900	0		0
	Total	**55,341**	**£96,339,401**	**£5,100,839**	**£133,155,205**	**£3,616,900**	**£238,212,346**		**£98,660,893**
Timber Frame	No Attic	2,778	£7,359,111	£255,164	£8,743,820	£0	0		0
	With Attic Room	0	£0	£0	£0	£0	0		0
	Total	**2,778**	**£7,359,111**	**£255,164**	**£8,743,820**	**£0**	**£16,358,095**		**£10,870,214**
Non Standard Cavity	No Attic	0	£0	£0	£0	£0	0		0
	With Attic Room	0	£0	£0	£0	£0	0		0
	Total	**0**	**£0**	**£0**	**£0**	**£0**	**0**		**0**
All Build Types	No Attic	955,126	£1,377,632,160	£228,587,857	£681,326,302	£0	0		0
	With Attic Room	259,454	£349,061,742	£57,443,458	£366,008,252	£231,836,035	0		0
	Total	**1,214,580**	**£1,726,693,902**	**£286,031,315**	**£1,047,334,554**	**£231,836,035**	**£3,420,925,248**		**£504,189,367**

Table 4. LCR Modelling Results – Cost of Measures