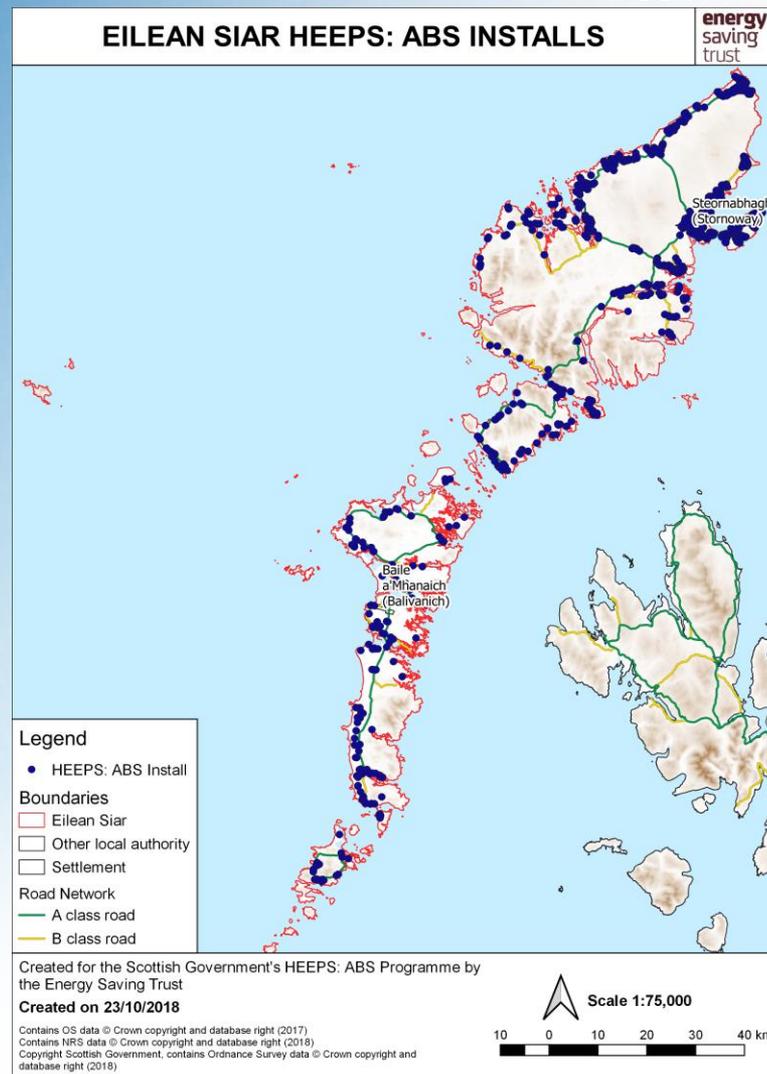


Eilean Siar HEEPS: ABS Case Study

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22/10/2018



Overview

The Scottish Government's HEEPS: ABS* team requested 8 case studies to compare the available HEEPS: ABS install data, alongside other energy efficiency related characteristics, with three goals in mind:

- To provide a more detailed breakdown of the installed measures data to date.
- To allow greater comparison between the different local authorities as well as across the duration of the HEEPS: ABS programme.
- To provide a series of illustrations that the Scottish Government or local authorities can use to promote the work achieved under the HEEPS: ABS programme.

This presentation contains the full case study and illustration set for Eilean Siar (excluding GIS maps – please see appendix files).

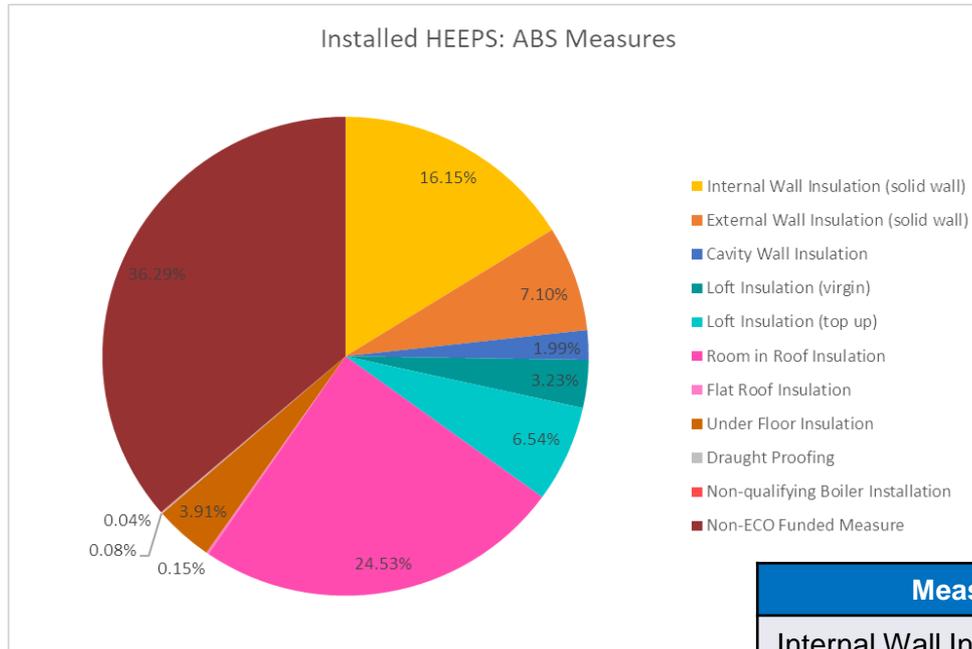
The Eilean Siar HEEPS: ABS dataset

| Financial Year | Number of records | % of records | Notes |
|-----------------------|-------------------|---------------|--|
| 2013/14 | 257 | 9.65 | |
| 2014/15 | 429 | 16.12 | |
| 2015/16 | 1,023 | 38.43 | |
| 2016/17 | 526 | 19.76 | |
| 2017/18 | 420 | 15.78 | |
| NULL | 7 | 0.26 | The exact financial year is unknown but these 7 installs do predate 2016 |
| Total Installs | 2,662 | 100.00 | |

| Reference numbers | Number of records | % of records |
|------------------------------------|-------------------|--------------|
| With pre-installation EPC | 1,687 | 63.37 |
| With post-installation EPC | 0 | 0 |
| With pre and post-installation EPC | 0 | 0 |
| With GDAR | 0 | 0 |
| With measure reference number | 0 | 0 |
| Total Installs | 2,662 | -- |

Eilean Siar has reported 3.8% of the total HEEPS: ABS installs known to date (22/10/2018).

Installed Measures

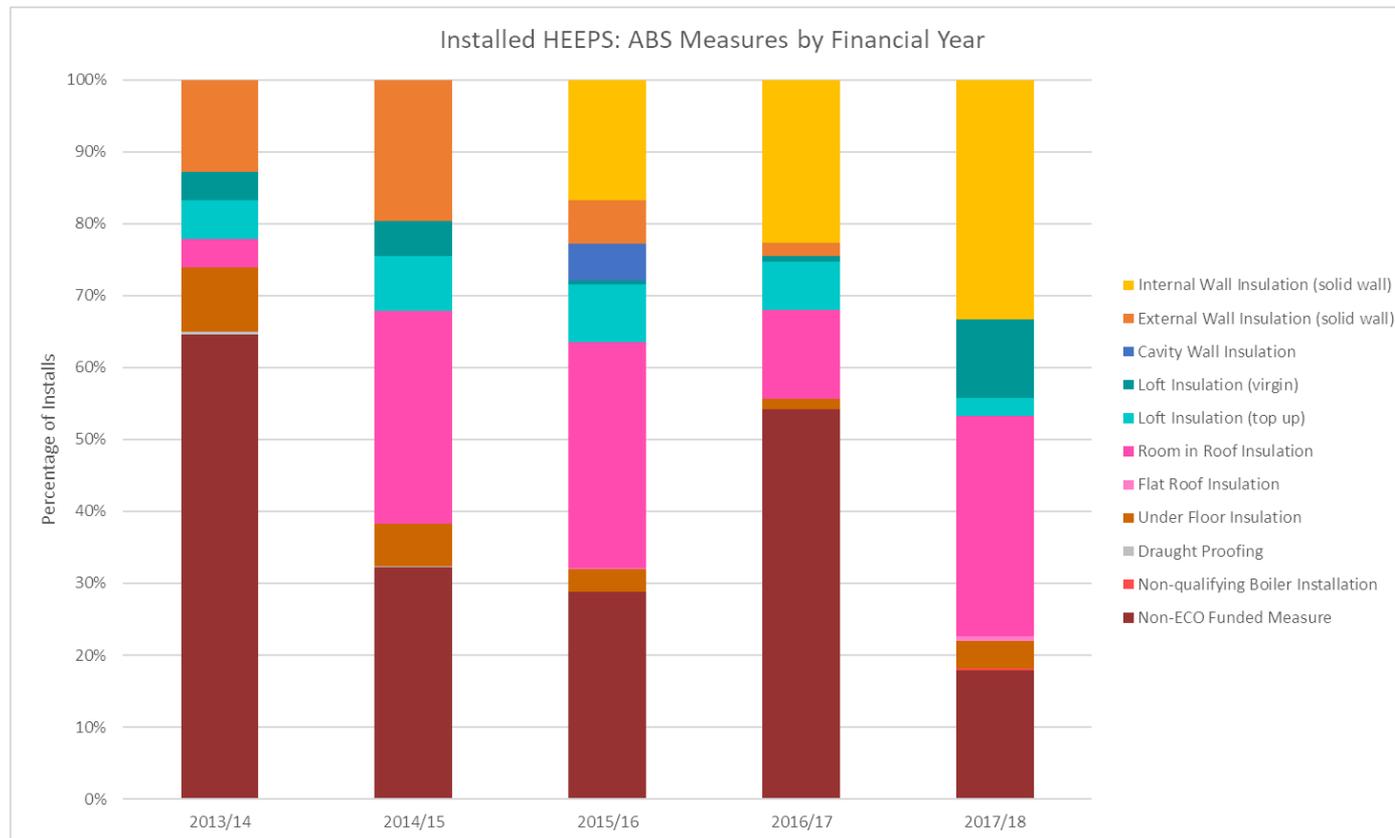


Eilean Siar’s HEEPS: ABS programme has provided a variety of measures including insulation, heating systems and draught proofing. Overall the work taken place has helped tackle most avenues of heat loss within a property.

Around 25% of Eilean Siar’s installs were for wall insulation, and 34% of installs treated the loft or roof spaces – the two largest sources of heat loss within the typical home. There is also a considerable amount of Non-ECO funded measures which will be examined in more detail later.

| Measure Name | Number of records | % of records |
|---------------------------------------|-------------------|---------------|
| Internal Wall Insulation (solid wall) | 430 | 16.15 |
| External Wall Insulation (solid wall) | 189 | 7.10 |
| Cavity Wall Insulation | 53 | 1.99 |
| Loft Insulation (virgin) | 86 | 3.23 |
| Loft Insulation (top up) | 174 | 6.54 |
| Room in Roof Insulation | 653 | 24.53 |
| Flat Roof Insulation | 4 | 0.15 |
| Under Floor Insulation | 104 | 3.91 |
| Draught Proofing | 2 | 0.08 |
| Non-qualifying Boiler Installation | 1 | 0.04 |
| Non-ECO Funded Measure | 966 | 36.29 |
| Totals | 2,662 | 100.00 |

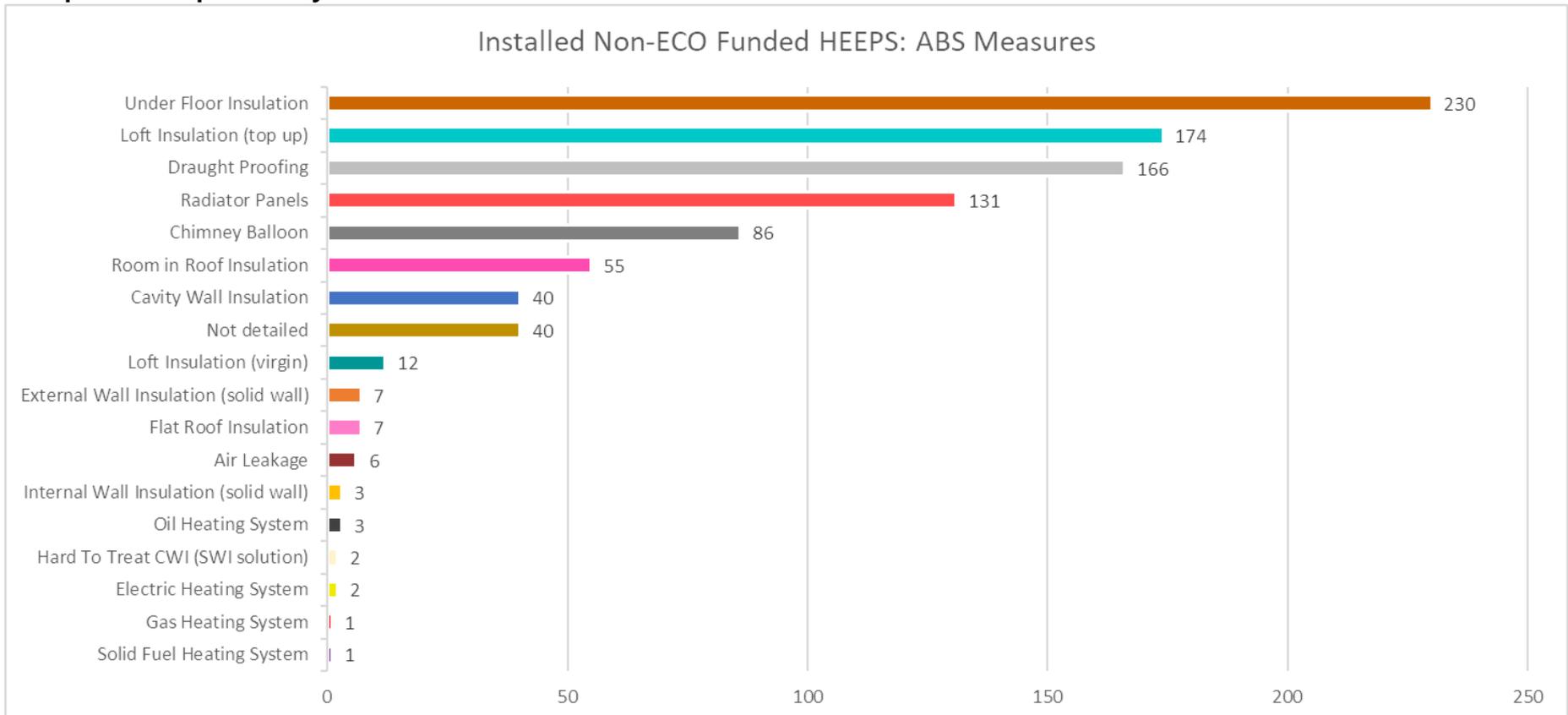
Installed Measures by Financial year



Most of the measures installed are present from one year to the next. One exception is EWI which decreases as IWI increases throughout the duration of the programme. Large percentages of Non-ECO funded measures are consistently present, ranging from 28.4% to 64.6% of each financial year's total installs.

Non-ECO Funded Measures

The most frequently installed non-ECO* funded measures tend to be those which are less expensive and quicker to install, such as loft insulation top ups. Many of Eilean Siar's non-ECO funded measures either cannot be installed using ECO at all, such as radiator panels, or can only be installed in combination with a more impactful primary measure.



*ECO = Energy Company Obligation

Non-ECO Funded Measures II

The following table shows which of Eilean Siar's Non-ECO funded measures were eligible for ECO funding (as of ECO2t). The high number of non-ECO funded measures shows that there can be difficulties in obtaining ECO on a case by case basis, and perhaps in particular for rural and island settings. OFGEM currently stipulates that 15% of ECO funding must go to remote rural areas which may help redress some of these difficulties.

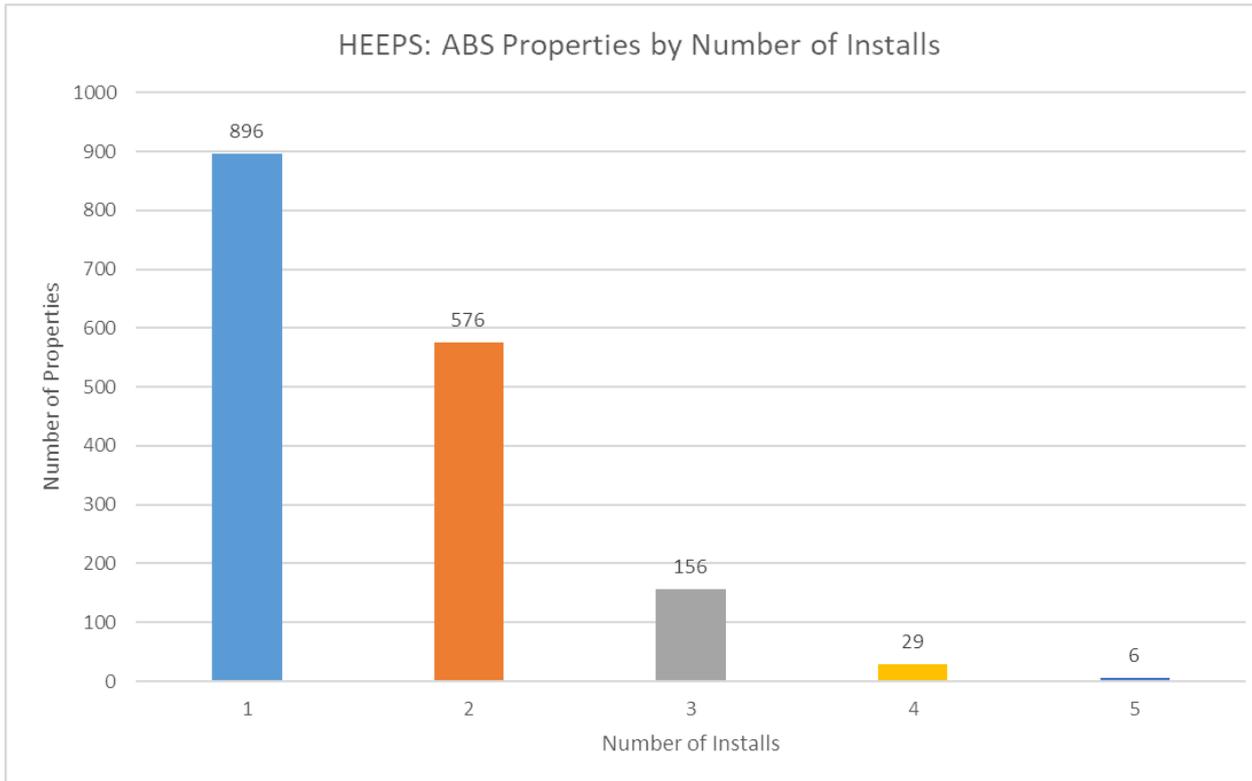
Examining Eilean Siar's non-ECO funded component in the future may also be useful in measuring the impact of ongoing ECO changes. With CERO being discontinued there will be a greater focus on the circumstances of the individual households as the criteria for both HHCRO and ECO Flex are more restrictive.

| Measure Name | Installs | CERO* | HHCRO** |
|---------------------------------------|----------|--------------|--------------|
| Under Floor Insulation | 230 | Secondary | Primary |
| Loft Insulation (top up) | 174 | Primary | Primary |
| Draught Proofing | 166 | Secondary | Primary |
| Radiator Panels | 131 | Not Eligible | Not Eligible |
| Chimney Balloon | 86 | Not Eligible | Not Eligible |
| Room in Roof Insulation | 55 | Primary | Primary |
| Cavity Wall Insulation | 40 | Primary | Primary |
| Loft insulation (virgin) | 12 | Primary | Primary |
| External Wall Insulation (solid wall) | 7 | Primary | Primary |
| Flat Roof Insulation | 7 | Primary | Primary |
| Internal Wall Insulation (solid wall) | 3 | Primary | Primary |
| Oil Heating System | 3 | Not Eligible | Primary |
| Hard To Treat CWI (SWI solution) | 2 | Primary | Primary |
| Electric Heating System | 2 | Not Eligible | Primary |
| Gas Heating System | 1 | Not Eligible | Primary |
| Solid Fuel Heating System | 1 | Not Eligible | Primary |

*CERO = Carbon Emission Reduction Obligation

**HHCRO = Home Heating Cost Reduction Obligation

Number of Installs per Property

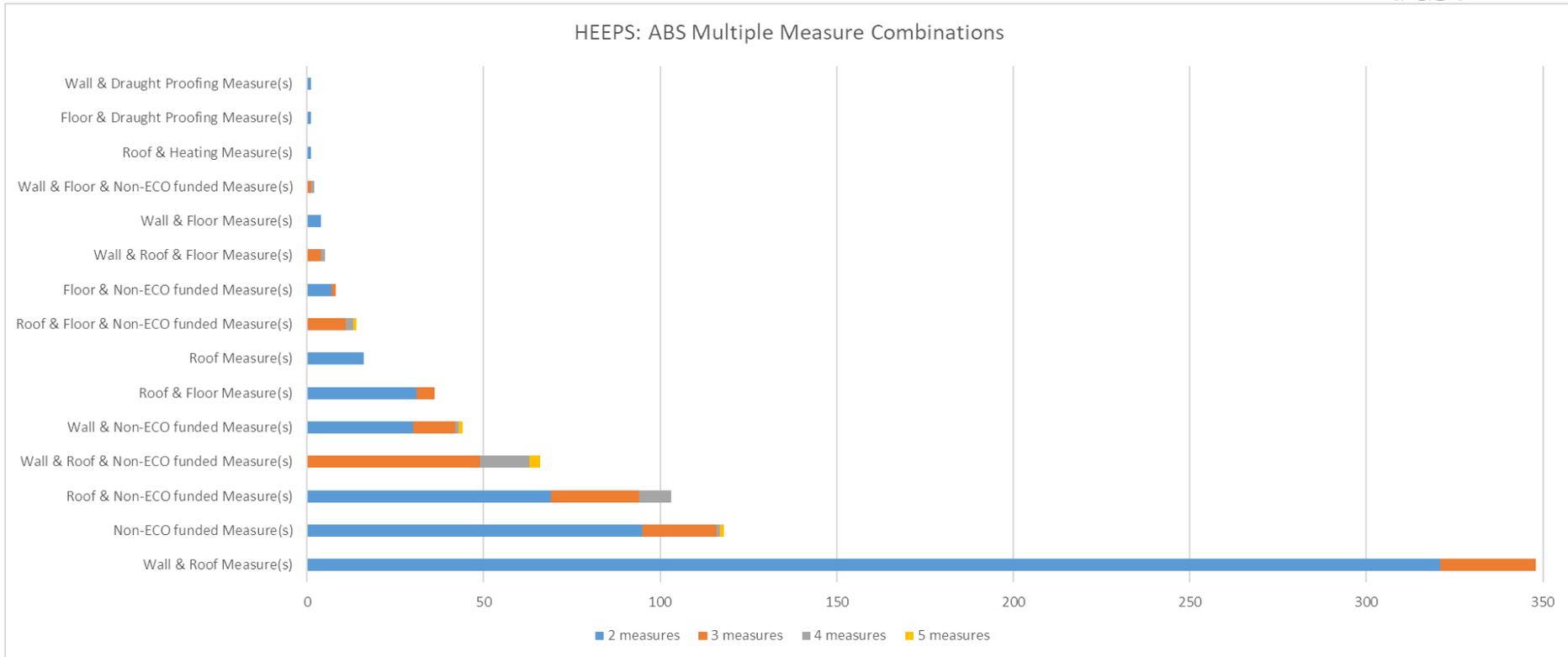


Almost half (46.1%) of Eilean Siar's targeted properties received more than one measure.

Alongside the wide variety of measures offered, this implies a robust approach to improving a property's energy efficiency by tackling several avenues of heat loss

together. Although not all of the work will necessarily have been completed at the same time or even within the same financial year. 188 out of the 767 properties in receipt of more than one measure (or 24.5%) had the multiple measures installed across more than one financial year.

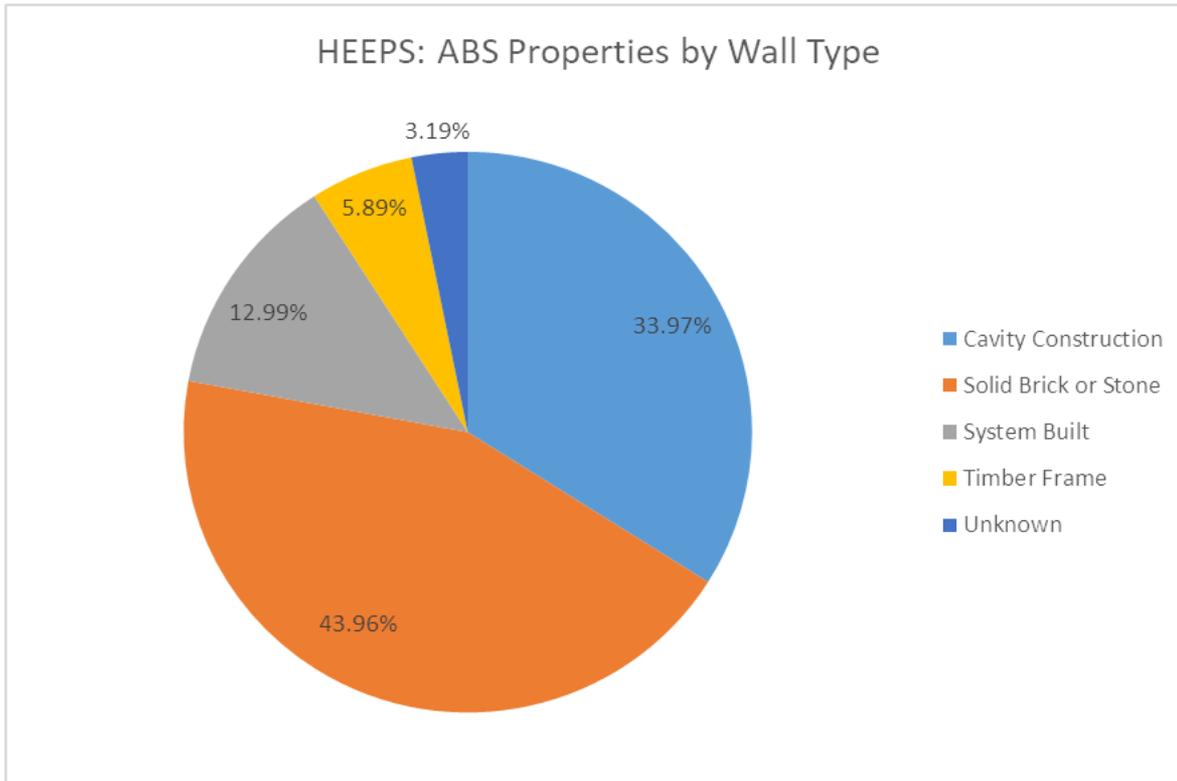
Multiple Measure Package Combinations



Insulating the wall and roof areas was the most common combination of measures offered, and again this shows a commitment to tackling the two largest areas of heat loss from a property. The second to fourth most common packages, or 46.3% of the properties in receipt of more than one measure, all include at least one non-ECO funded measure. Again this highlights some issues with obtaining ECO funding.

Note that in some cases the multiple measures were all applied to the same part of the property – for example ‘Roof’ from the above chart may include both room in roof and loft insulation.

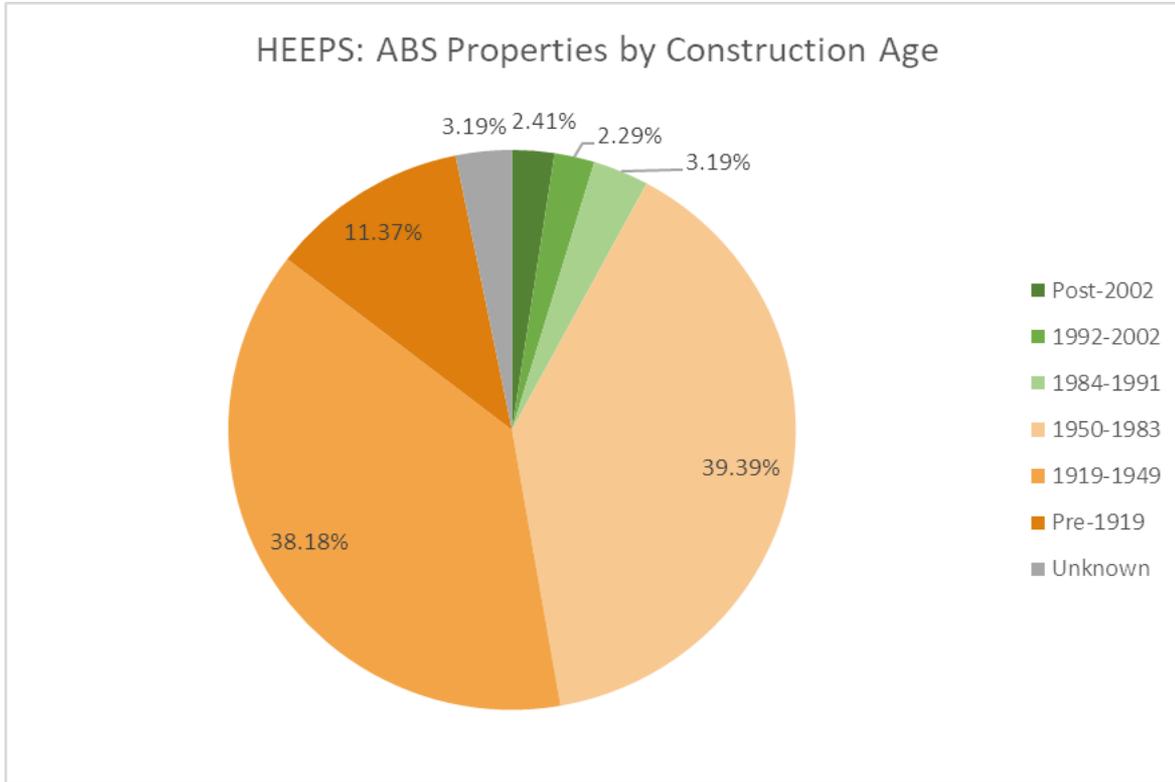
Wall Type



Most of the measures offered by Eilean Siar are not specific to certain wall types and many properties did not receive wall insulation as part of the programme at all. As a result there is no dominant build type found for Eilean Siar's HEEPS: ABS projects.

Note: Wall type is taken from EST's Home Analytics dataset which is a combination of EPC and modelled data.

Construction Age



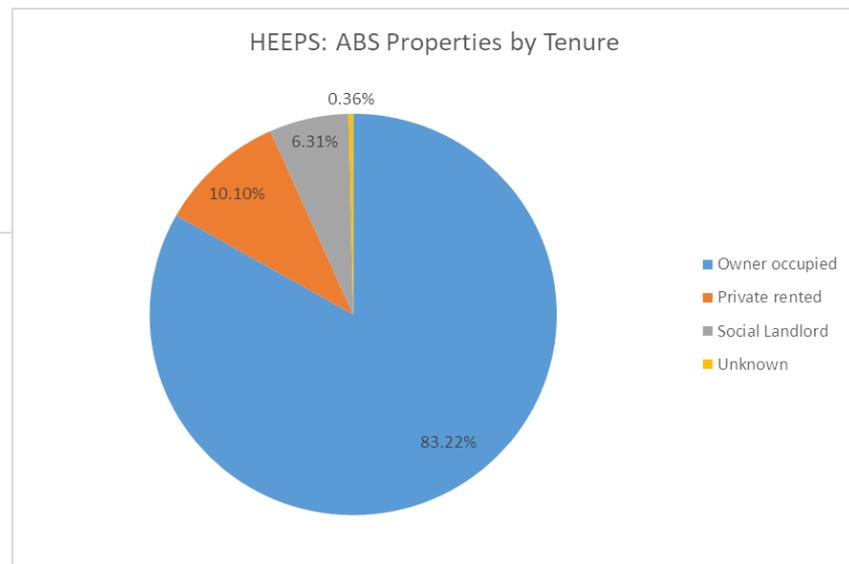
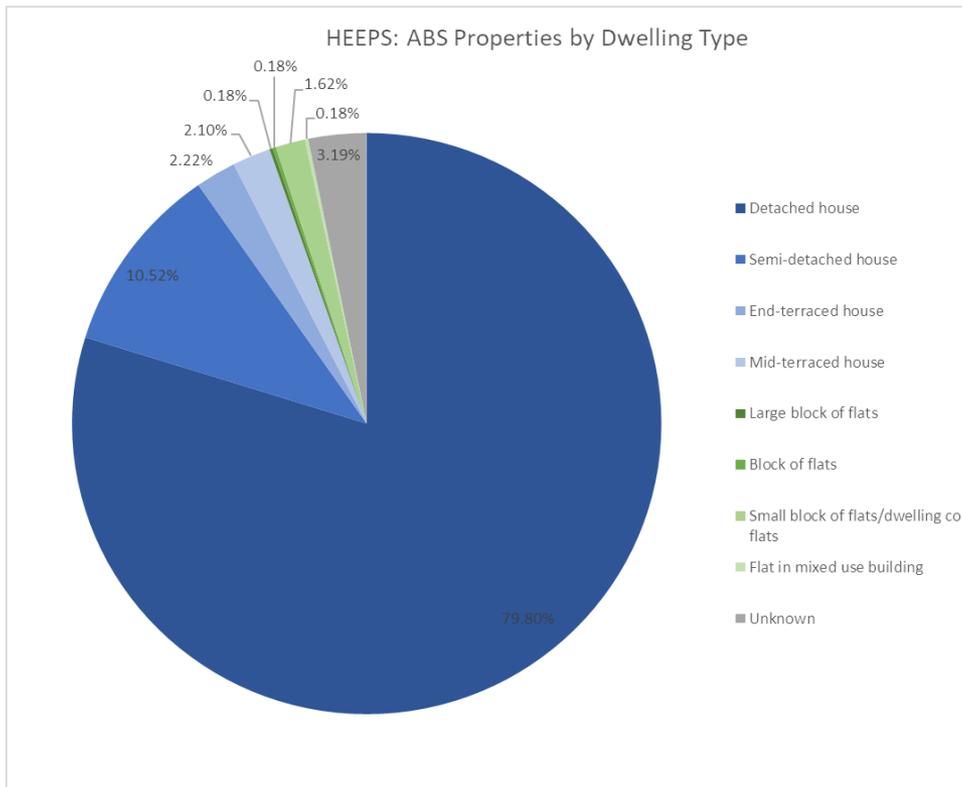
The majority of properties treated in Eilean Siar were built shortly before or after WWII.

7.9% of properties have been identified as being 34 years of age or younger. This is unexpected because newer builds typically do not need energy efficiency retrofit. We can therefore presume most of these cases are due to misidentification

by EPC assessors. However, this potential error rate is much higher than is found in the other HEEPS: ABS case studies, where on average it is less than 1.3%. Perhaps then the properties targeted in Eilean Siar were more difficult to date or more open to interpretation.

Household Characteristics

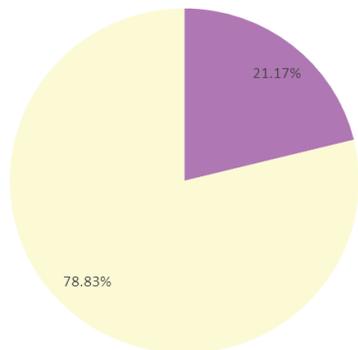
Most of the HEEPS: ABS work in Eilean Siar has been in the owner occupied sector and for detached or semi-detached homes.



This is broadly in line with the distribution of different property types in the Outer Hebrides, with only a slight under representation in the proportion of flats.

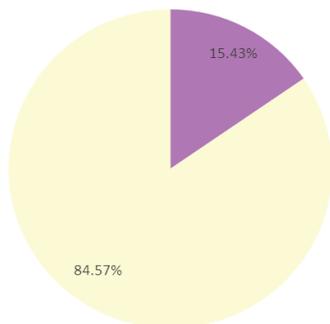
Rural Urban Classification

Eilean Siar Properties by Rural Urban Classification



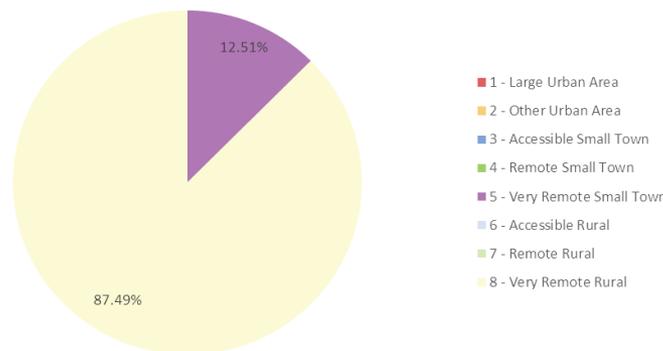
The Rural Urban classification of Eilean Siar has only two categories. Stornoway is the only town large enough to fit the 3,000 – 9,999 population bracket required to be classified as a Very Remote Small Town. The remainder of Eilean Siar is classed as Very Remote Rural.

Uninsulated Eilean Siar Properties by Rural Urban Classification



The breakdown of installs between these two classifications broadly aligns with the total dwellings found within each. Whilst installs outside of Stornoway are slightly over-represented, the properties outside the town are also more likely to be uninsulated and thereby in greater need of energy efficiency retrofit.

HEEPS: ABS Properties by Rural Urban Classification



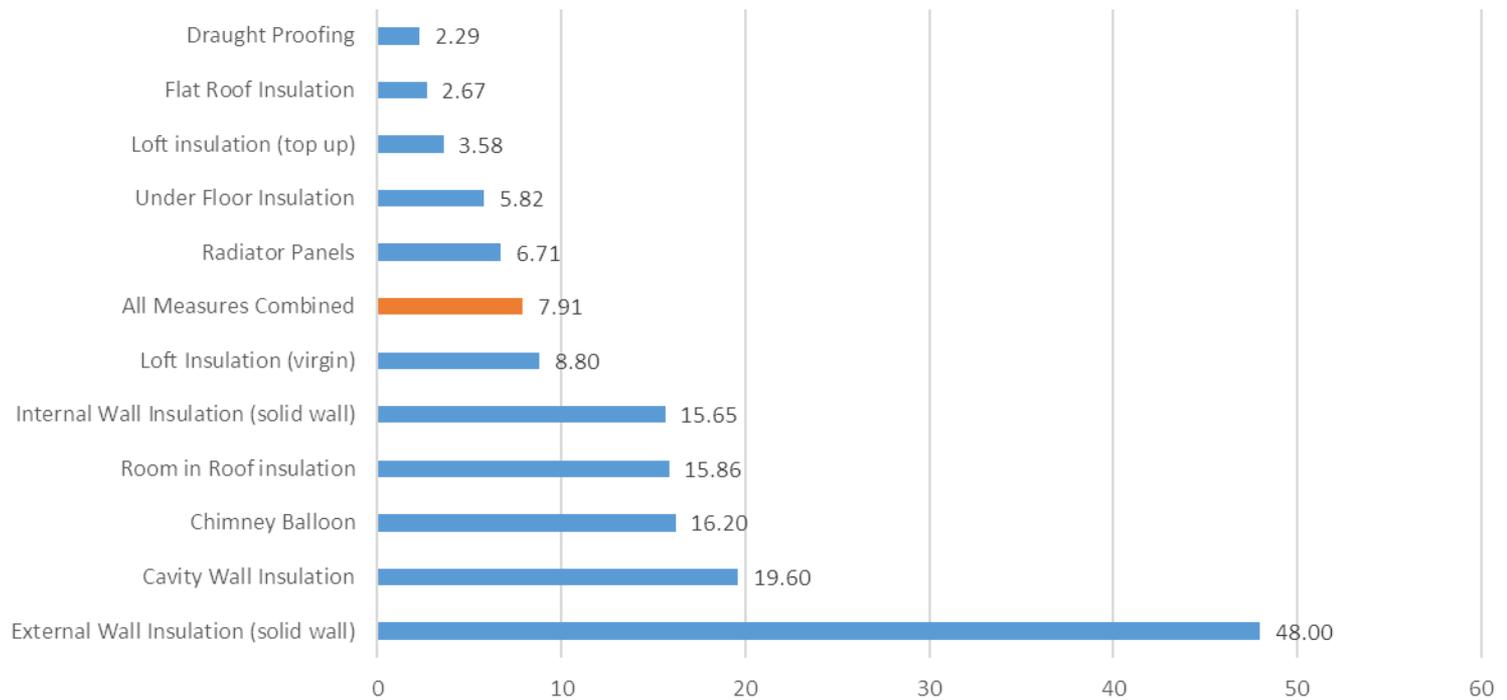
- 1 - Large Urban Area
- 2 - Other Urban Area
- 3 - Accessible Small Town
- 4 - Remote Small Town
- 5 - Very Remote Small Town
- 6 - Accessible Rural
- 7 - Remote Rural
- 8 - Very Remote Rural

For more information see the HEEPS: ABS Installs by Rural Urban Classification map.

Install Measures by Rural Urban Classification

Most of the measures installed through Eilean Siar’s HEEPS: ABS programme can be found both inside and outside of Stornoway. However, the ratio of installs between the two Very Remote Rural Urban Classifications is much closer for the cheaper and easier to install measures such as draught proofing and loft insulation. The more expensive measures such

For every one of the following measures installed in Stornoway the corresponding number were installed in other Very Remote Rural areas

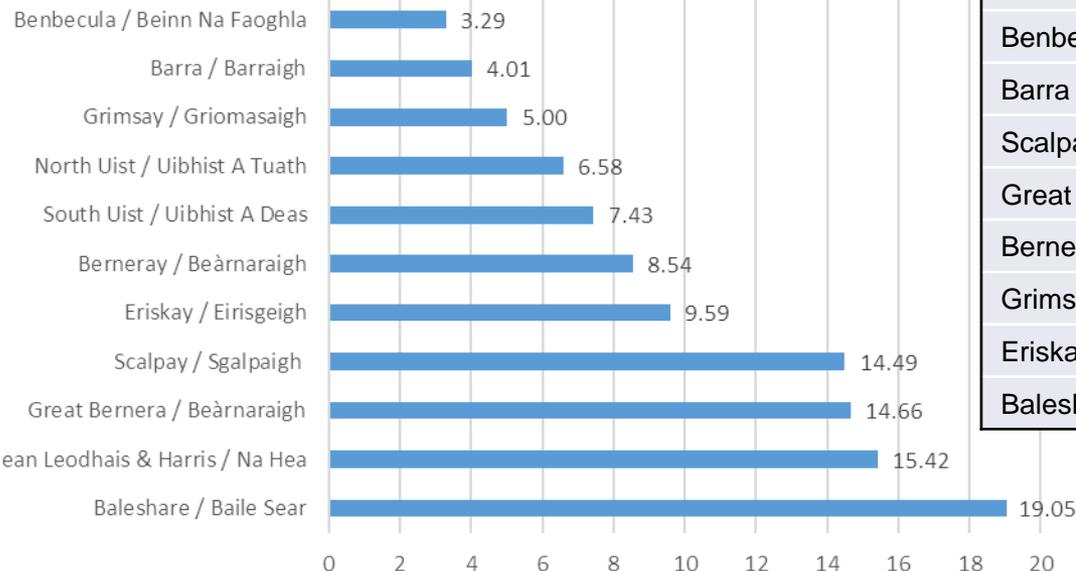


as IWI and EWI are more commonly found across the rest of the Isles. This again may suggest that properties in the Very Remote Rural areas are relatively harder to treat and/or in need of more work.

Install Distribution by Island

Though the vast majority of installs are found on the most populated Isles of Lewis and Harris, many of the other inhabited islands which make up Eilean Siar have received some HEEPS: ABS work. When weighting the number of installs against the total number of dwellings found on each island the work is broadly distributed in line with the total population. Most of Eilean Siar has therefore been reached by the HEEPS: ABS programme to date, including several islands where the overall population is very low such as Baleshare.

Number of Installs per every 100 Dwellings by Island

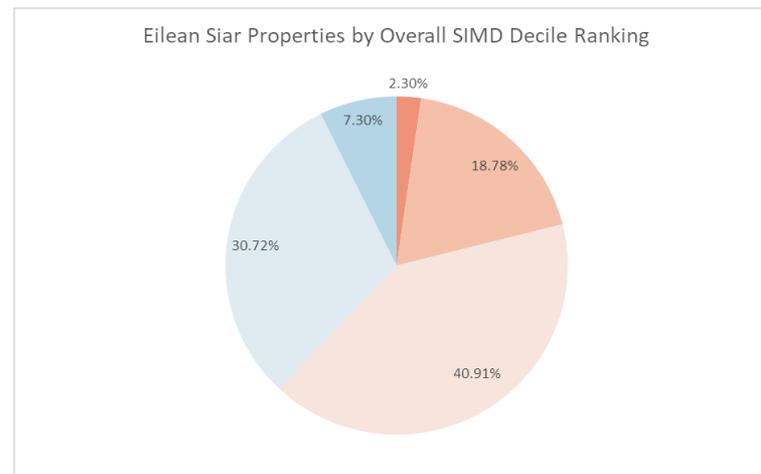
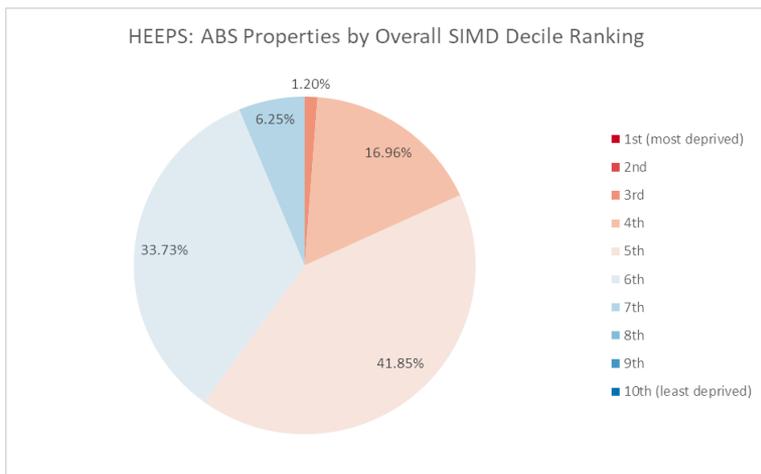


| Island Name | Total Dwellings | HEEPS: ABS Properties |
|------------------------|-----------------|-----------------------|
| Isle of Lewis & Harris | 9,503 | 1,465 |
| South Uist | 781 | 58 |
| North Uist | 608 | 40 |
| Benbecula | 577 | 19 |
| Barra | 549 | 22 |
| Scalpay | 138 | 20 |
| Great Bernera | 116 | 17 |
| Berneray | 82 | 7 |
| Grimsay | 80 | 4 |
| Eriskay | 73 | 7 |
| Baleshare | 21 | 4 |

Scottish Index of Multiple Deprivation (SIMD)

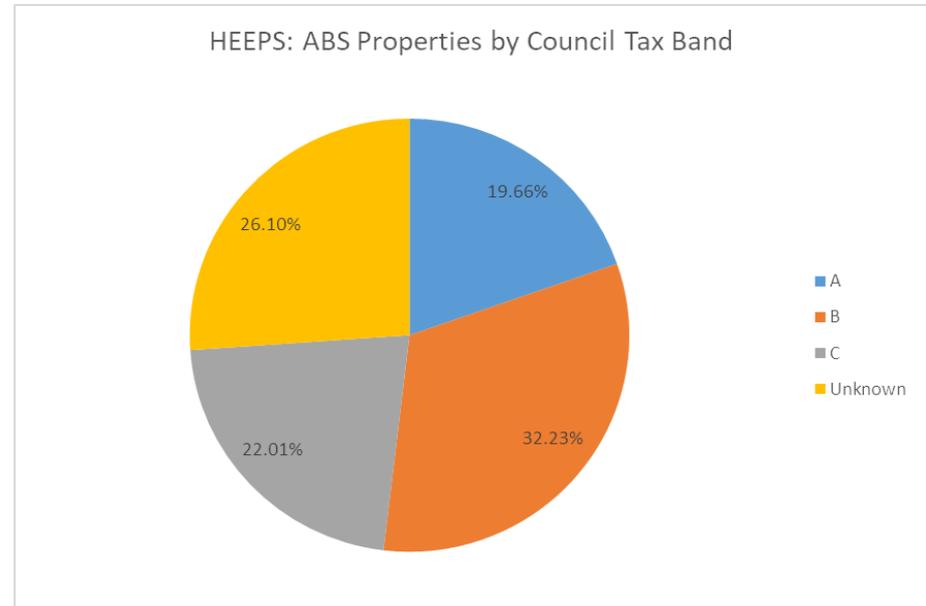
There is no clear relationship between the location of HEEPS: ABS properties and the SIMD decile rankings in Eilean Siar. The installs are all fairly evenly distributed throughout each SIMD rank in correlation with the population and number of households within.

This shows that there is an issue with using the SIMD for rural settings. When the statistical units were created, they all contained between 500 and 1000 properties each. As rural populations are much more dispersed, this meant creating very large catchments in order to reach the desired range. This increases the chances of including deprived and non-deprived people together over a wider area, and as a result the rural SIMD rankings tend to gravitate towards the median. Eilean Siar’s HEEPS: ABS projects may well be helping deprived individuals to a certain extent, but we cannot use the SIMD to precisely evaluate this.

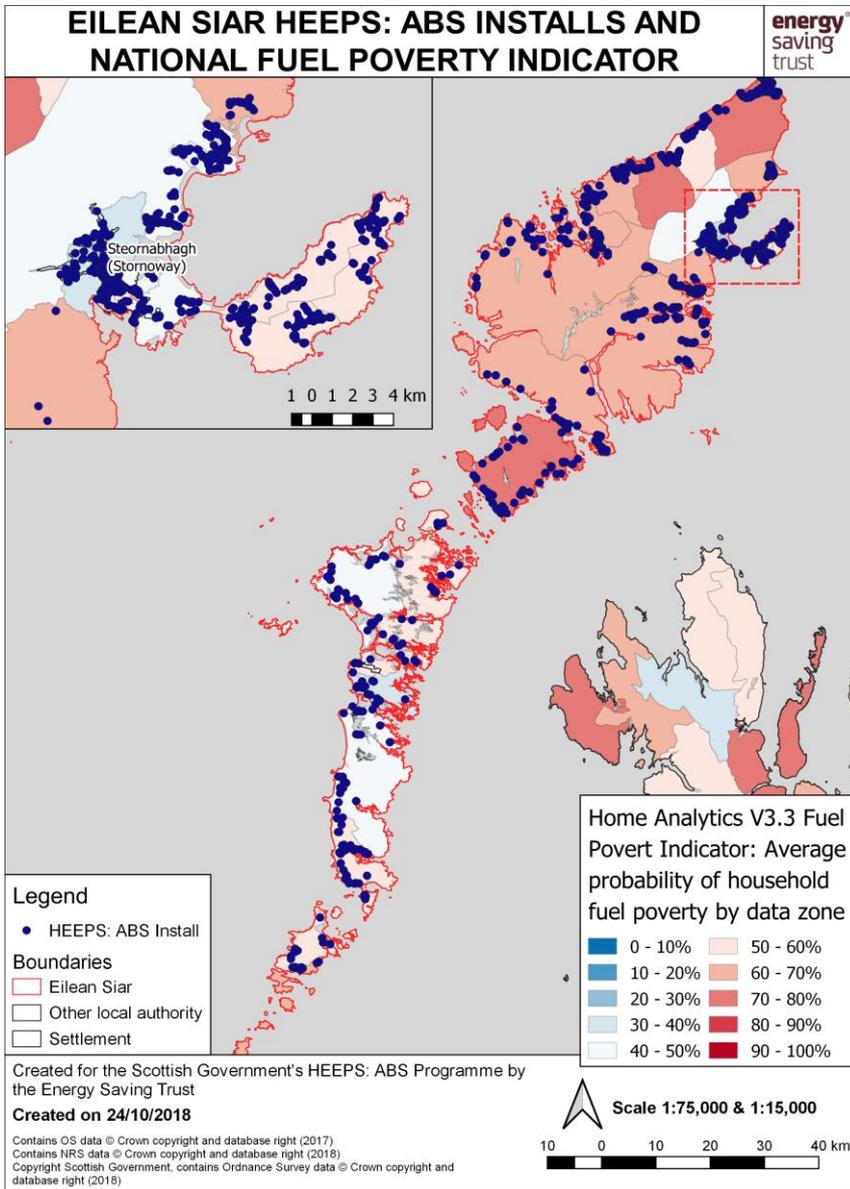


HEEPS: ABS Installs by Council Tax Band

Council tax banding is one metric frequently used to target HEEPS: ABS work. The Scottish Government's HEEPS: ABS guidance indicates that any property with a council tax band of A, B or C, or those in band D but with EPC ratings of E, F or G, can be eligible for support. 73.9% of Eilean Siar's properties fall within bands A, B and C.



The Home Analytics database used for this analysis only contains council tax band information for properties in bands A, B or C. We therefore presume that most of the properties in the 'Unknown' council tax band category will be from band D. This is corroborated somewhat by the high prevalence of E, F and G rated EPC properties (see later slides). A small number of properties may have a council tax band greater than D, as households can be deemed eligible on a case by case basis when taking into account any extenuating circumstances.



National Scottish Fuel Poverty Indicator

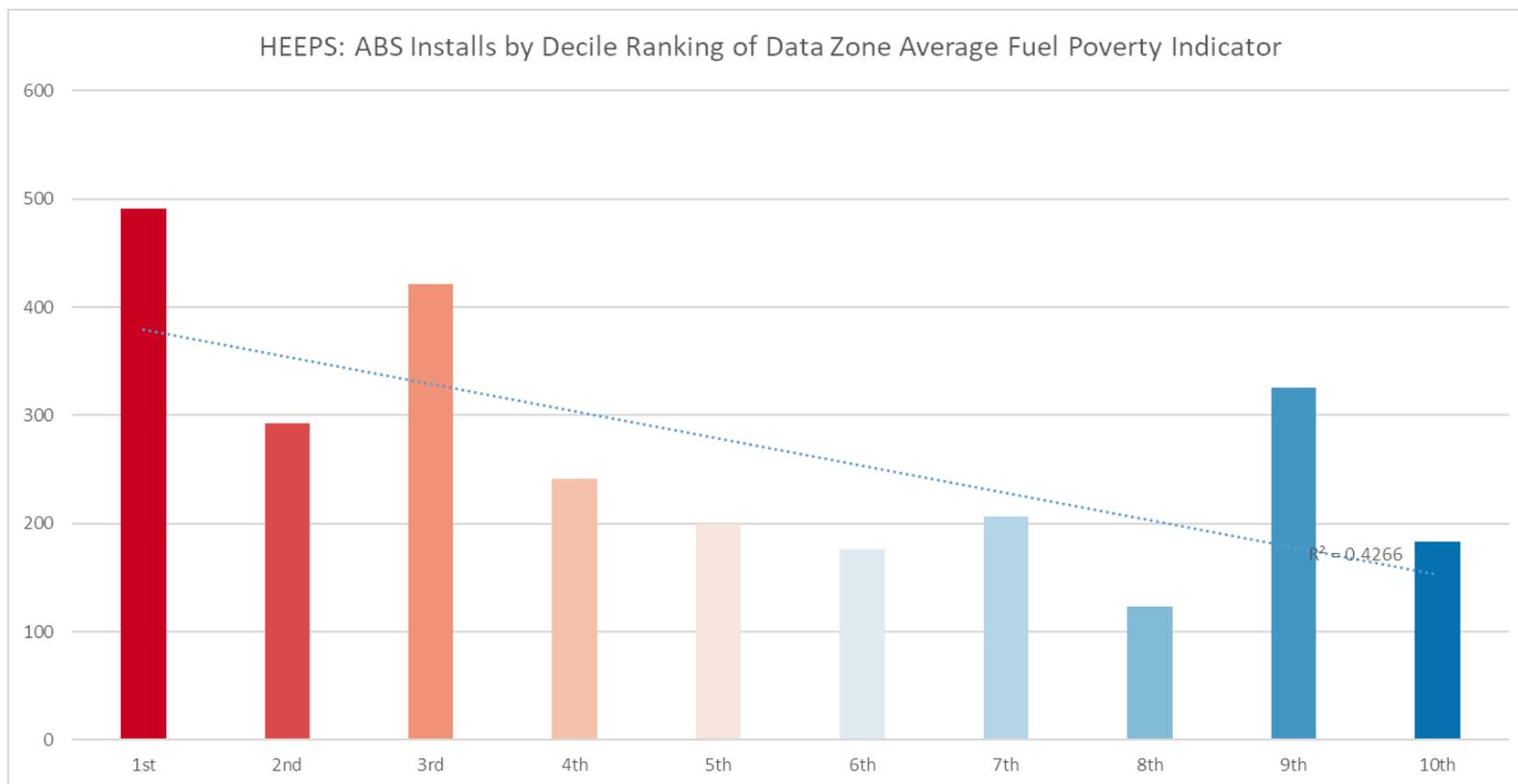
According to the Scottish Housing Condition Survey (SHCS); Eilean Siar has an average fuel poverty rate of 56%. This is considerably higher than the Scottish national average of 31% and places them as the 2nd worst ranked local authority in the country for fuel poverty.

There are many factors which will contribute to this reality, including a low number of households being able to access mains gas or off-gas grid renewables. Many of the properties on the Isles are uninsulated. The electricity tariffs are much more limited than what is available on the mainland and many off-gas grid properties will use electricity as the main fuel type. All of these issues contribute to a low overall SAP, high fuel bills and a higher rate of fuel poverty.

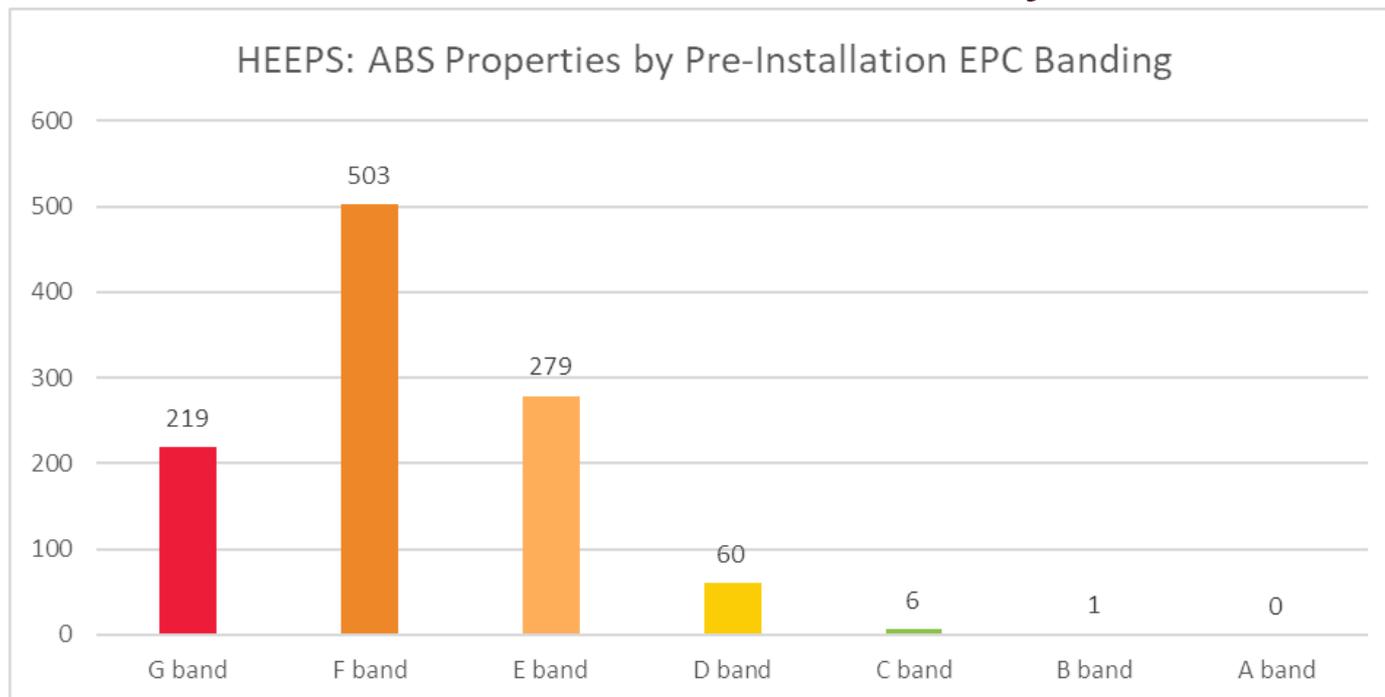
Eilean Siar Fuel Poverty Indicator

When the data zones of Eilean Siar are decile ranked by their average fuel poverty rate from best to worst you get the following distribution of installs. You can see a focus upon some of the most fuel poor data zones found in the region.

However, as the Home Analytics fuel poverty indicator represents the present situation, i.e. post-install, the HEEPS: ABS work achieved by the local authority will have already lowered the average data zone fuel poverty rates to some extent. The trend between installs and fuel poverty may have been more pronounced prior to energy efficiency retrofit.



HEEPS: ABS SAP Band Analysis



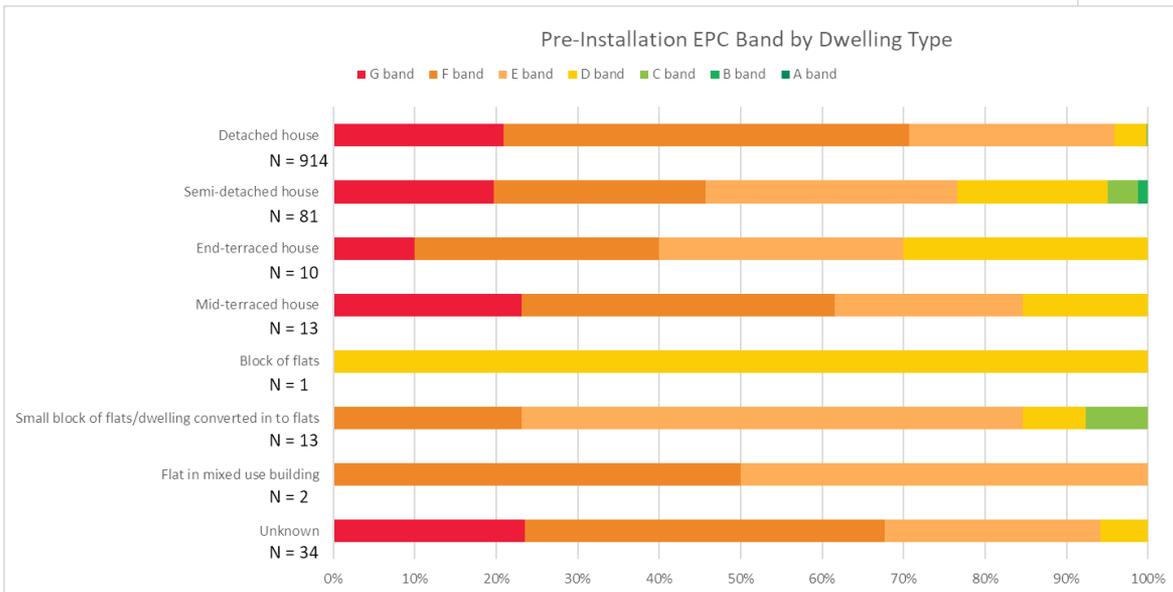
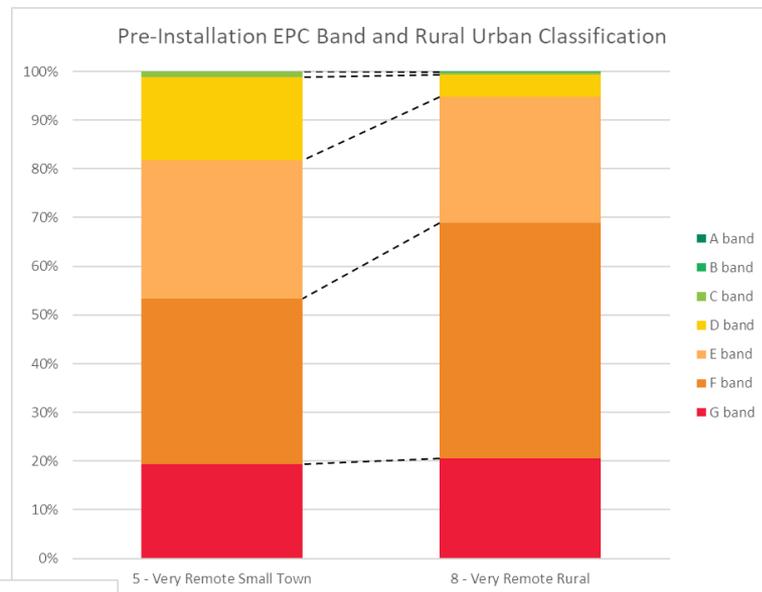
The vast majority of properties (93.73%) treated in Eilean Siar’s programme are found within bands E, F or G. Only seven properties started off the programme with an EPC banding above the national average of D. This is a considerably higher percentage of the worst performing energy efficient properties than is found in the HEEPS: ABS projects of other local authorities.

Note that it is possible for the same property to appear in this chart more than once if it received multiple measures across two or more financial years and a distinct pre-installation EPC was carried out before each installation.

HEEPS: ABS SAP Band Analysis II

There are small differences between the starting EPC bands of the Very Remote Small Towns and the Very Remote Rural Areas. Stornoway has less F and more D band treated properties. This again implies that the starting state of the Very Remote Rural properties is on average worse than those found within Stornoway.

Note: Dwelling type is taken from EST's Home Analytics dataset which is a combination of EPC and modelled data.



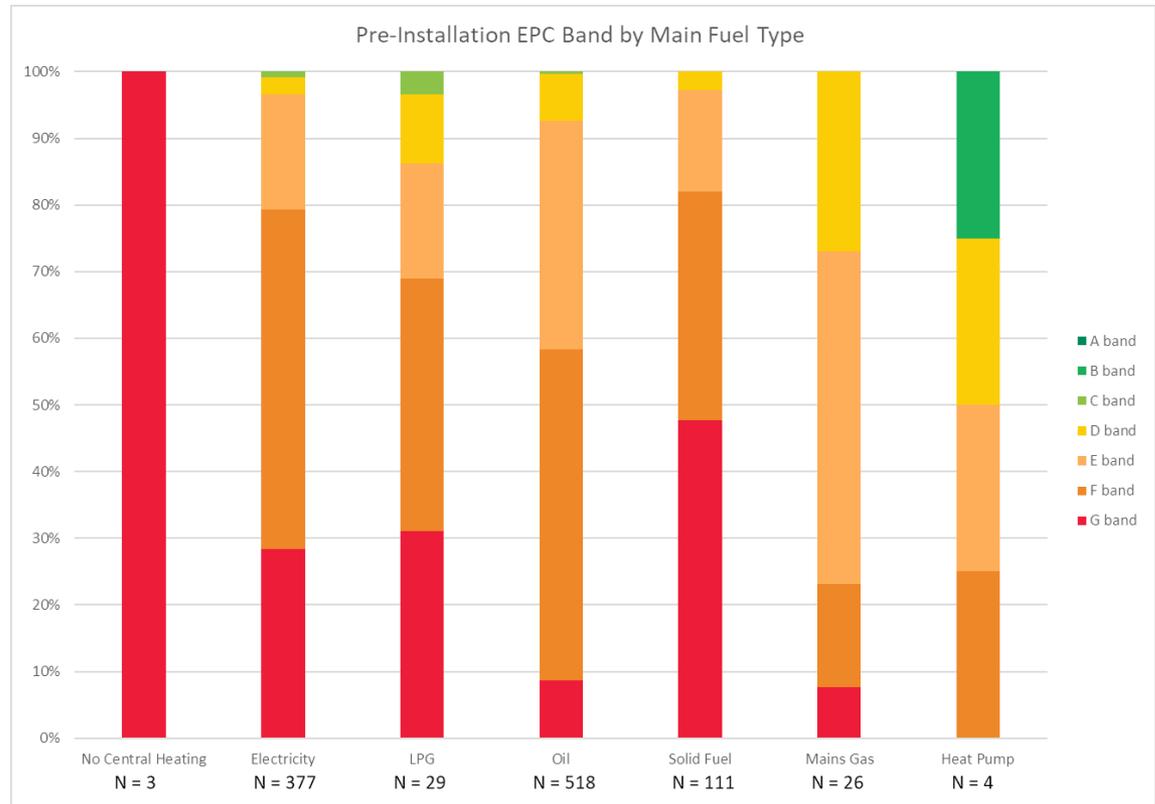
The (presumably) smaller flats also tend to have a higher starting SAP band than the more detached properties. However, as the counts of many property types are very low it is unlikely any correlations here are statistically significant.

HEEPS: ABS SAP Band Analysis III

Of the properties with no central heating or with main fuel types of electricity, oil or solid fuel; over 90% had starting SAP bands of E, F or G. Only 73% of the mains gas and 50% of the heat pump properties were in those same below-average bandings of E, F or G.

However this trend is

complicated further because many of the properties have more than one main fuel type listed and often a secondary fuel type too. Where this occurred, the main fuel type with the highest pence/kWh cost was chosen, as detailed on the EST website.



Conclusions and notes

Overall, Eilean Siar's HEEPS: ABS programme achieves several feats:

- The installs are well dispersed between Stornoway, the Isle of Lewis and Harris and the other islands of Eilean Siar.
- The typical property treated is solid walled and built shortly before or after WWII. Most of the installs were in the owner occupied sector, but this is in line with the housing stock breakdown of the area.
- The majority of properties targeted started the programme with a below-average SAP banding of E, F or G. Eilean Siar has contributed many of the worst performing energy efficient properties for the entire HEEPS: ABS programme.
- The properties with the lowest starting SAP bands tend to be detached homes outside of Stornoway with high fuel cost heating systems such as oil or electricity.

Sources

| Variable | Source | Notes |
|---|-----------------------|--|
| HEEPS: ABS Measure, Address and Tenure | Local Authority | Held on behalf of the Scottish Government's HEEPS: ABS programme by EST. |
| Dwelling Type, Construction Age, Council Tax Band, Fuel Poverty Probability | Home Analytics | Combination of EPC and modelled data created by EST. Typically not for publication. |
| Main heating fuel type, EPC SAP scores and bands | Scottish EPC register | Obtained by cross referencing EPC Report Reference Numbers provided by the local authority with Scottish EPC register extracts |
| Scottish Housing Condition Survey | Scottish Government | Available online. SHCS 2014-16 used. |
| SIMD | Scottish Government | Available online. SIMD (2016) used. |
| Urban Rural Classification | Scottish Government | Available Online. 8-Fold classification (2013/14) used. |

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