Area Based Schemes (ABS) 2023/24

City of Edinburgh Council
Impact report

CHANGEWORKS.

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Key findings

Household energy bills decreased

- Installation of the measures lowered energy bills by an average of £53 on electricity and £623 on gas, per year.
- Half of households said they are now ‘rarely’ or ‘never’ worried about their energy bills, an increase of 38 percentage points.
- Households in fuel poverty account for 7% of the total sample, down from 25%.

Household comfort increased

- Healthy heating regime was met more often after installation.
- Healthy humidity levels achieved more often after installation.

Home energy efficiency ratings increased

- Average home energy efficiency ratings increased from EPC band D to C.
- External wall insulation and solar PV in combination increased energy efficiency ratings by 13 SAP points.



1. Introduction

1.1. Project overview

City of Edinburgh Council carried out installations of energy efficiency measures in 321 residential properties (213 privately owned and 108 social housing). The works were grant funded through the Scottish Government's Area Based Scheme (ABS). Installs were completed by BCA Insulation, MP Group, SERS, Valley Group and IRS.

A total of 540 measures were installed across the project. **Table *1*** shows the different schemes and measures installed.

1.2. Project aims

The ABS programme supports large numbers of homeowners and tenants who are struggling with fuel poverty by installing energy efficiency measures in their homes. After measures are installed, homes should consume less energy to achieve (and maintain) a comfortable environment, meaning residents should feel warmer at home and worry less about their energy bills. In delivering these results, ABS ultimately aims to reduce carbon emissions from domestic buildings and reduce the role of energy bills as a driver of fuel poverty.

The intended outcomes are to:

- Reduce energy consumption
- Improve health and wellbeing outcomes
- Increase energy efficiency ratings of Scotland's housing stock

Table 1: Measures installed across properties

Scheme	Measures installed	Properties engaged	Total measures installed
Crewe Road	External wall insulation Roof replacement	64 (13 private, 51 social)	66
Gilmerton	External wall insulation Solar PV Batteries	78 (50 private, 28 social)	218
Muirhouse	External wall insulation	20 (4 private, 16 social)	20
Oxgangs	External wall insulation	36 (31 private, 5 social)	36
Area wide IWI	Internal wall insulation Secondary glazing Draught proofing Loft insulation	46 (All private)	54
Area Wide HTTC and SPV&B	Cavity wall insulation Solar PV Batteries Loft insulation	77 (69 private, 8 social)	146
	TOTAL	321	540

1.3. Evaluation

Changeworks were engaged to evaluate how well the project met the overall aim of the ABS programme: to support fuel poor households to improve the energy efficiency of their homes.

To evaluate the project, Changeworks used:

- **Household surveys:** One survey at the very start, a second survey immediately after install to gather feedback about the installation process, and a third survey 9-12 months after works were complete. The data from these surveys gives a picture of how people's lived experiences changed over time.
- **Environmental monitoring:** Changeworks worked with a sample of households to measure the temperature and humidity in the main living spaces of the home before and after measures were installed.
- **Energy consumption:** A sample of households provided data from their energy supplier about how much energy they used before and after measures were installed.
- **Energy Performance Certificates (EPCs):** Changeworks compared the EPC created before and after the measures were installed.

1.4. Selecting the project area

A central aim of the ABS programme is to support fuel poor households. Area selection is used to identify clusters of households likely to be in fuel poverty and target energy efficiency measures.

To identify areas at high risk of fuel poverty, three data zone level statistics were used: income deprivation,[1] percentage of properties with Council Tax bands A-C,[2] and fuel poverty risk.[3] The areas were considered for the ABS project if they were above the average of the local authority for at least two, but preferably three of these statistics.

For example, addresses in Muirhouse were targeted as they fell into two datazones with an average of 98% A-C Council tax band and are in the bottom 25% SIMD. Extreme fuel poverty in this area was relatively high at 37% compared with the local authority average of 24%.

Of the completed properties, 62 households (19%) qualified as Extreme Fuel Poor and received additional funding support.

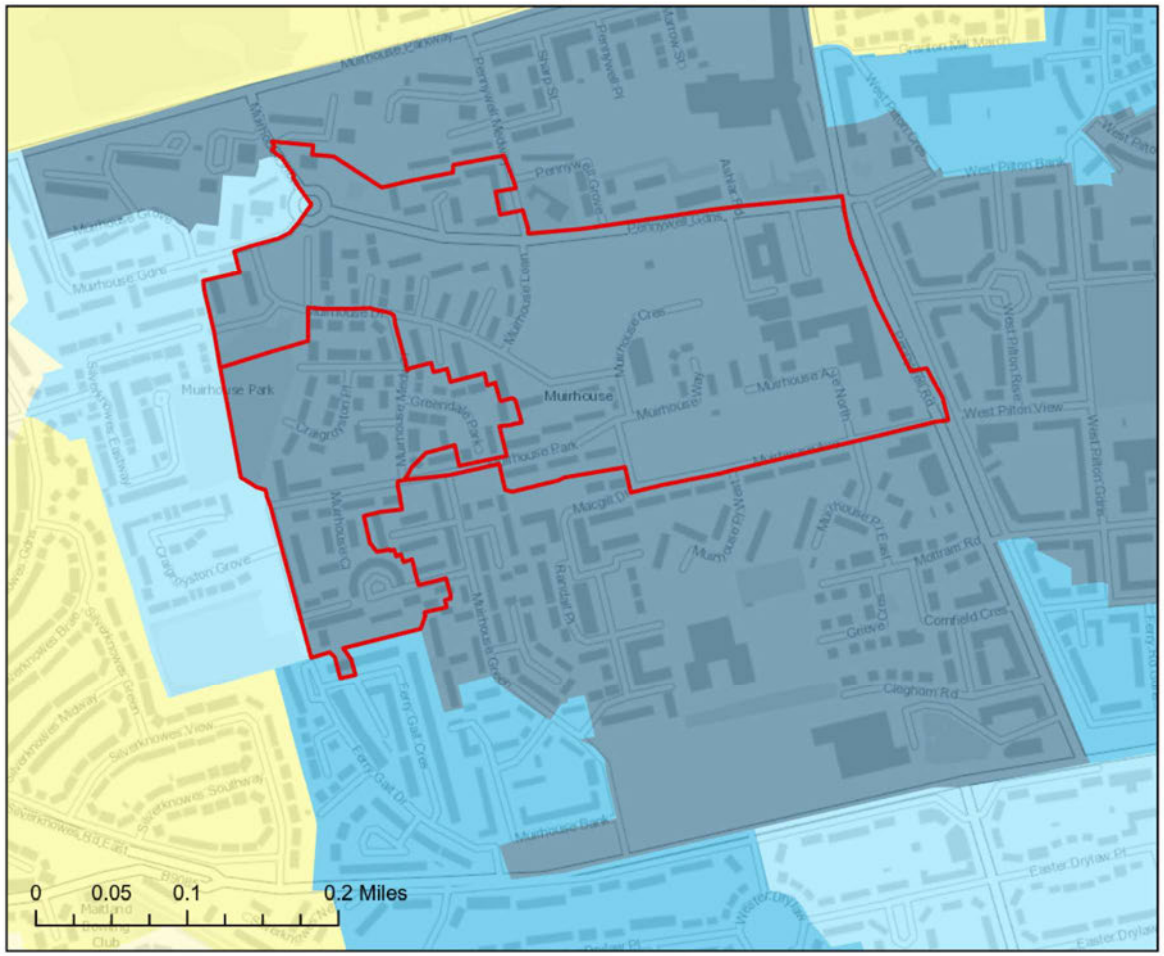
[1] Scottish Index of Multiple Deprivation (2020) https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/

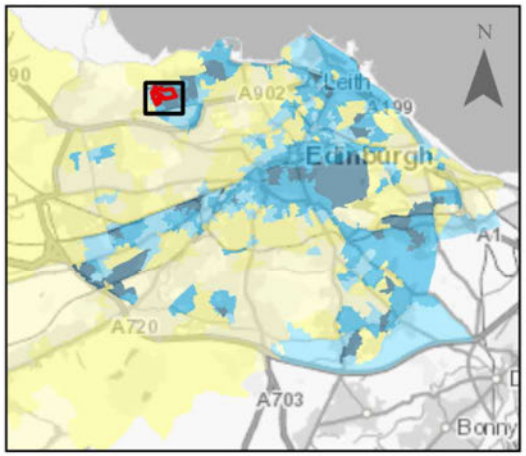
[2] National Records of Scotland (2022) https://statistics.gov.scot/data/dwellings-by-council-tax-band-detailed-current-geographic-boundaries);

[3] Home Analytics (2025) https://energysavingtrust.org.uk/service/home-analytics/

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External wall and roof insulation (Muirhouse)





Fuel Poverty (%)

- <13
- 13 - 20
- 21 - 23
- 24 - 28
- 29 - 49

Potential datazones

Probability of fuel poverty (fuel bill >10% of income after housing) (datazone level) (CEC average = 21%)

Datazone code	Datazone name	Est. props
S01008930	Muirhouse - 02	108
S01008933	Muirhouse - 05	90
Total		**198**

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2. Findings

2.1. Reducing fuel consumption

Changeworks undertook surveys of households before installations and 1 year after. This included questions on their energy usage and costs. 10 households provided estimated annual electricity consumption data from their energy bills, 9 provided the same for gas consumption.

Energy consumption

Energy bills show that **two thirds of households reduced gas consumption**, with an average saving of 2.0 kWh per household, per day. **Half of households reduced electricity consumption**, with an average of 0.5 kWh of electricity per household saved each day.

This equates to reductions of 1,284kg CO_2e and 31kg CO_2e per year from gas and electricity savings, respectively.[4]

Of the properties that received solar PV and battery measures and provided energy consumption data, 4 of 6 reduced their electricity consumption by up to 2 kWh per day. The largest increase in electricity usage (over 1 kWh per day) was seen by two properties that received insulation measures only.

The largest gas consumption savings were seen in a property that received internal wall insulation (at around 6.5 kWh per day) and a household that received solar PV and battery (at over 4.5 kWh per day).

Cost savings[5]

Installation of the measures lowered energy bills by an average of £53 on electricity and £623 on gas per household per year.

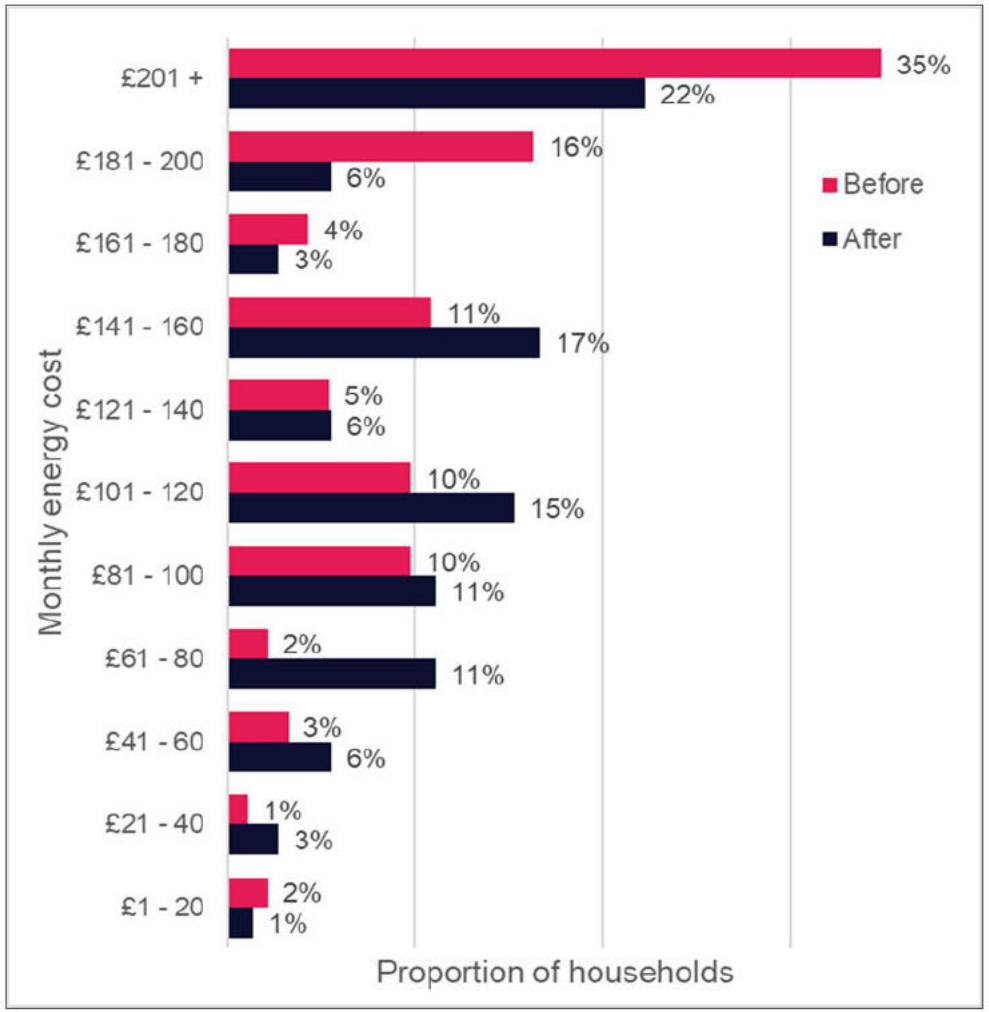
Self-reported energy costs indicate that, after the project, fewer people were paying over £200 a month on their energy bills (22% compared to 35% before). Similarly, those paying between £181 and £200 a month accounted for less than 7% of total respondents after the project, down from over 16% (**Figure 1**).

Fewer respondents felt worried about their bills after measures had been installed. **After installs, no respondents said that they 'always' felt worried or stressed about their energy bills, down from 30%** before the project. The proportion of respondents saying that they 'sometimes' worried about this reduced from 58% to 50% after the project.

[4] Carbon Factors obtained from Greenhouse gas reporting: conversion factors 2022 - GOV.UK (www.gov.uk) (Total kg CO_2e per unit: 0.19338 - Electricity, 0.20188 – Gas)

[5] Energy costs obtained from: Energy Price Guarantee: regional rates, January to March 2023 - GOV.UK (www.gov.uk) (£ per kWh ex VAT; £0.3230 – Electricity, £0.0979 – Gas)

Figure 1: Change in monthly household energy bills before and after installation of measures (Base: 92/72)



Far more households said they now 'rarely' or 'never' worried about their energy bills. Before installation of measures, this accounted for 12% of respondents, increasing to 50% afterwards.

> ***"I've experienced a 40% drop in my energy bills and a 100% drop in stress levels."***

Supporting fuel poor households

Scottish legislation[1] defines fuel poverty as:

- Having energy costs which exceed 10% of household income, after housing costs have been deducted.
- Remaining household income is not enough to maintain an acceptable standard of living (90% of the UK Minimum Income Standard [MIS] once childcare and disability costs are deducted).

After installation, the proportion of households in fuel poverty fell from 25% to 7%.

After measures were installed, the difference between the median energy costs and 10% of median household income increased, which indicates **that there was reduction in energy bills as a driver of fuel poverty** (**Table** 2).

Table 2: Annual fuel poverty thresholds and energy costs before and after installation of measures

	Before	After
Energy costs fuel poverty threshold (annual)	£2,445	£2,445
Median self-reported energy cost (annual)	£1,950	£1,440

2.2. Improving home environment

Both before and after the project, respondents were asked about how they used the heating in their home.

Changes in energy consumption

Low response rates for this section of the follow-up survey makes direct comparisons with the pre-installation data less reliable. This means that findings should be interpreted with caution.

Household indoor conditions were measured using monitors installed throughout properties, collecting temperature and humidity levels over 9-12 months. Full data was returned for 15 properties that received measures.

Household comfort

Heating regime and comfort

For **comfort**, the Energy Saving Trust recommends maintaining internal temperatures between 18 and 21°C.

The standard recommended **heating regime** for domestic properties is 21°C for living rooms and 18°C for other rooms, for 9 hours per day during the week and for 16 hours per day at the weekend.

Most respondents said that their home was too cold before the project. 58% said this was the case 'often', while 38% said it was 'occasionally'. After the project, none of the 8 respondents were 'often' too cold in their home, while 7 'occasionally' were.

The standard heating regime was met in main bedrooms and hallways on 39% of the days monitored after installations. Living rooms only met this standard on 5% of days (**Figure** 2).

Average home temperatures stayed broadly the same after installations (**Table 3**).

> ***"Downstairs is slightly better but upstairs has really benefited"***

Figure 2: Proportion of days heating regime met (Base: 17)

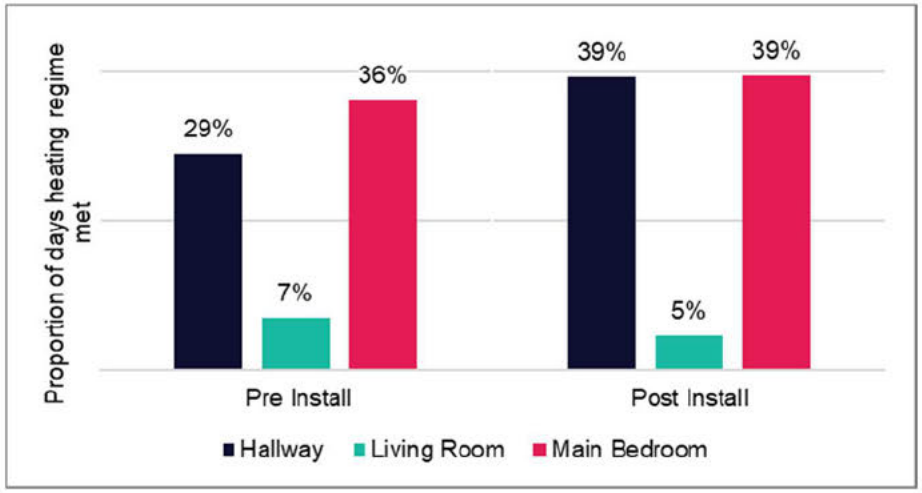


Figure 3: Proportion of days with healthy humidity (Base: 17)

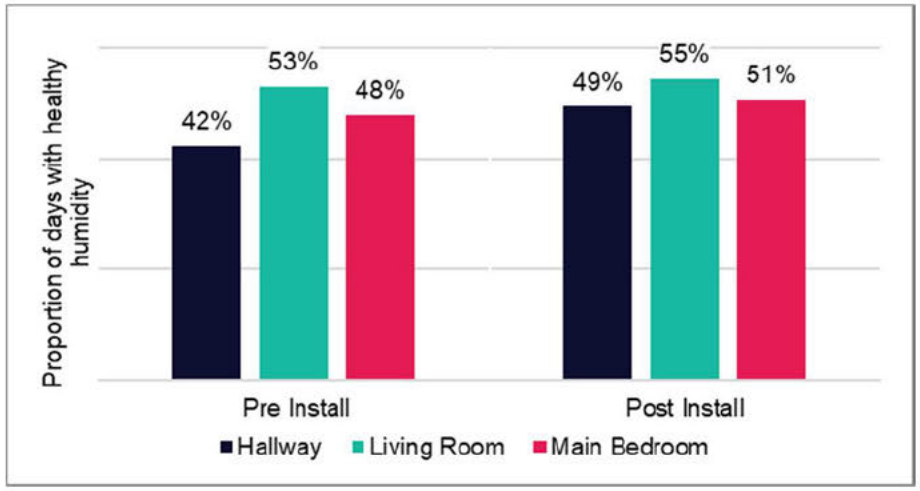


Table 3: Average temperatures before and after installation of measures (Base: 17)

Room	Before	After
Main Bedroom	18.0	17.6
Hallway	17.6	17.3
Living Room	18.3	17.9
Average	17.9	17.6

Indoor air quality

Indoor air quality improved slightly, with healthy humidity levels more consistent across properties after installs. The largest increase in healthy humidity levels was seen in hallways, which increased 7 percentage points after installs (**Figure** 3).

2.3. Increasing energy efficiency

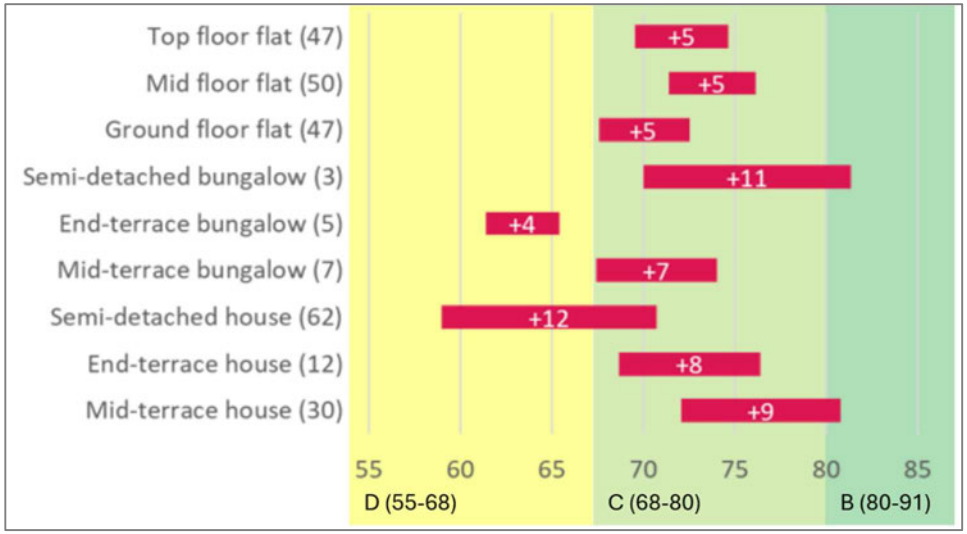
Improvements in energy efficiency are measured by analysing Energy Efficiency ratings (EE rating) from Energy Performance Certificates (EPC) before and after the work was completed. This data is available for 263 properties, across 11 different property types.

EE ratings

Following installations, **average EE ratings increased by 7 SAP points**, from 67 (D) before, to 74 (C), which is higher than the Scotland national average (68).

Of the nine property types included in the project, mid-terrace houses were the most energy efficient before improvements, with average EE ratings of 72 (C). After improvements mid-terrace houses and semi-detached bungalows were the most efficient with an average rating of 81 (B). **Semi-detached houses saw the largest improvement in EE, with an additional 12 SAP points** (**Figure 4**).

Figure 4: Energy efficiency change after installation (SAP score)



Improving the property

Of the single fabric measures, internal wall insulation showed the most impact with an increase of 8 SAP points. **The greatest impact from a combination of measures was shown by external wall insulation and solar PV, with an increase of 13 SAP points** (**Table *5***).

EPC bands

There was a clear upward trend across all properties after the project: 50 properties were in band B or higher, while the proportion of properties in band D more than halved. The majority of properties remained in EPC band C.

3. Methodology

Table 4: Overview of response rates and available monitoring data

Number of Properties	Survey response rates		Technical monitoring	
	Pre-install	Follow up	Energy consumption	Home environment
321	29%	22%	10	17

Householder surveys

Changeworks employs a three-survey approach to gather household perceptions of their installed measures. Survey responses are incentivised through an optional prize draw.

This approach captures the impact of the measures on household comfort and satisfaction. By surveying households at several key points, the method builds an evidence base showing the impact over time.

Response rates for this project are shown in **Table *4***.

Energy consumption data

Energy consumption data is gathered from households via a direct request for the annual consumption estimates shown on their energy bills. This request is sent at the end of the monitoring period, asking for two separate figures from the last two years.

With the exception of one property that was electricity-only, all participating households had both gas and electricity records available. For this project, **10 properties submitted electricity consumption data** and **9 properties provided gas consumption data**. In most cases, households supplied two annual estimated consumption figures, providing a dataset of **365 days pre-installation and 365 days post-installation**. One property, however, submitted monthly totals, resulting in **30 days of pre-installation data and 30 days of post-installation data**.

Environmental monitoring

Changeworks monitors indoor conditions using TinyTag (TGU-4500) monitors. To gather a full picture, three monitors are placed throughout the property to measure temperature and humidity levels. Monitors are installed as soon as possible, to gather a minimum of 3 weeks baseline data before measures are installed. They remain in place for 9-12 months following the installation to gather data on the impact of the measures. This ensures that monitoring covers a heating season to determine the impact on temperature and humidity during the coldest months.

For this project, monitors were installed in **19 properties**, with **17 sets successfully returned**. Of these, **two sets were incomplete**: one was missing a living room monitor and another a hallway monitor.

Energy Performance Certificates (EPCs)

Changeworks compares SAP scores from before and after the measures are installed to show the impact of the measures on the score and overall EPC rating. The SAP scores of the retrofitted properties are also compared to Scottish averages from the latest Scottish Housing Condition Survey and any Scottish Government requirements and targets.

For this project A total of 321 properties were worked on, however comparative data is only available for 263 properties.

Details of measures were provided for all properties, with various combinations of fabric and renewable measures recorded. 11 combinations were identified and are outlined below, showing the average increase in the EE rating for each combination.

At the time of conducting the EPCs, battery storage could not be accounted for in the software. Therefore, there is no increase in the EE rating for that measure.

Table 5: EE change from combinations of measures

Measures	No. properties	Average EE rating before	Average EE rating after	Average change in EE
Cavity wall insulation (CWI) only	14	70	74	3
External wall insulation (EWI) only	104	71	75	4
Internal wall insulation (IWI) only	38	63	71	8
Virgin loft insulation (VLI) only	2	73	80	7
IWI & draughtproofing (DP)	1	77	79	2
IWI and glazing (DG)	4	59	64	6
Solar PV with battery storage (SPVB)	42	72	82	10
EWI & VLI	2	74	78	4
SPVB & CWI	13	72	80	8
EWI & SPVB	42	54	67	13
IWI, DG, DP & LITU	1	39	51	12
Totals/ averages	**263**	**67**	**74**	**7**

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