

Existing programmes

Cavity Wall Insulation (B)

All homes with unfilled cavity walls (built 1930 – 1990)
injected with cavity wall insulation

1154 homes improved	Before	After	Improvement
Average SAP	60.2	65.4	5.2
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	3,893	3,311	584 (15.0%)
Average total fuel bill	£1,135	£1,134	£101 (8.9%)
Space & water heating costs			18.2%
Capital cost Payback		£500 4.9 yrs	

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Existing programmes

Cavity Wall Insulation (B)

All homes with unfilled cavity walls (built 1930 – 1990)
injected with cavity wall insulation

Whole stock	Baseline	After	Improvement
Average SAP	64.32	65.5	1.17
Average total fuel bill	£1,105	£1,082	£23 (2.1%)
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	15,620	15,036	584 (3.7%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		577 491 £989	

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Existing programmes

Boiler replacement (D)

All gas boilers installed before 2010

replaced with “A rated” boiler (SEDBUK 2009 88+%)

2466 homes improved	Before	After	Improvement
Average SAP	65.8	74.0	8.2
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	8,233	6,079	2,154 (26.2%)
Average total fuel bill	£1,151	£1,008	£142 (12.4%)
Space & water heating costs			28.1%
Capital cost Payback		£3,526 24.8 yrs	

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Existing programmes

Boiler replacement

All gas boilers installed before 2010

replaced with “A rated” boiler (SEDBUK 2009 88+%)

Whole stock	Baseline	After	Improvement
Average SAP	64.32	68.31	3.99
Average total fuel bill	£1,105	£1,036	£69 (6.2%)
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	15,620	13,466	2,154 (13.8%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		8,695 2,182 £4,037	

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Existing programmes – combined (J)

Cavity Wall Insulation
Loft insulation
Boiler replacement

3494 homes improved	Before	After	Improvement
Average SAP	64.4	73.6	9.2
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	11,365	8,079	3,266 (28.9%)
Average total fuel bill	£1,124	£962	£163 (14.5%)
Space & water heating costs			31.9%
Capital cost Payback		£2,971 18.3 yrs	

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Existing programmes – combined (J)

Cavity Wall Insulation
Loft insulation
Boiler replacement

Whole stock	Baseline	After	Improvement
Average SAP	64.32	70.66	6.33
Average total fuel bill	£1,105	£993	£112 (10.1%)
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	15,620	12,330	3,290 (21.1%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		10,379 1,639 £3,155	

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Existing programmes – combined (J)

Used as NEW BASELINE
to model further improvements

Whole stock	Baseline	After	Improvement
Average SAP	64.32	70.66	6.33
Average total fuel bill	£1,105	£993	£112 (10.1%)
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	15,620	12,330	3,290 (21.1%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		10,379 1,639 £3,155	

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Further improvements modelled individually

- CHP in 2 communal heating systems
- New gas heating (where near gas main)
- Air Source Heat Pump (where no gas nearby)
- Air Source Heat Pump to all homes currently without gas
- Better insulated HW cylinders for economy7 systems
- Replace storage heaters with "Quantum" storage heaters
- ASHP where not existing gas nor Econ 7 nor oil
- Solid walls insulated
- External wall insulation to System-build homes
- Replace pre-2002 glazing with new glazing units
- Solar PV on suitable dwellings
- Solar thermal water heating on economy 7 systems
- Solar thermal water heating on other non-gas systems
- Solar thermal water heating on 50% of all non-combi systems
- Better insulated HW cylinders for non-electric systems
- Improve insulation to flat roofs

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Further improvements

Quantum heaters & HW cylinders

654 homes improved	Before	After	Improvement
Average SAP	65.2	73.3	8.1
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	1,886	1,532	355 (18.8%)
Average total fuel bill	£886	£789	£97 (11.0%)
Space & water heating costs			23.3%
Capital cost Payback		£4,900 50.5 yrs	

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Further improvements

Quantum heaters & HW cylinders

Whole stock	New Baseline (J)	After	Improvement
Average SAP	70.66	71.69	1.03
Average total fuel bill	£993	£981	£12 (1.2%)
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	12,330	11,983	347 (2.8%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		3,204 3,059 £9,239	

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Further improvements

New gas central heating (where near gas main)

611 homes improved	Before	After	Improvement
Average SAP	63.6	79.6	16.0
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	1,861	961	900 (48.4%)
Average total fuel bill	£931	£777	£155 (16.6%)
Space & water heating costs			33.9%
Capital cost Payback		£4,276 27.6 yrs	

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Further improvements

New gas central heating (where near gas main)

Whole stock	New Baseline (J)	After	Improvement
Average SAP	70.66	72.58	1.92
Average total fuel bill	£993	£975	£19 (1.9%)
CO ₂ emissions (Tonnes) (space heating, water heating & lighting)	12,330	11,433	896 (7.3%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		2,613 1,362 £2,916	

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Further improvements combined

The following slides show results of three example combinations of improvements

(all assume that existing programmes will have been completed)

- AA "**Basic**" combination
- AB "**Enhanced**" combination
- AC "**Ultimate**" combination

Further improvements combined

Basic combination (AA)

- Better insulated HW cylinders for economy7 systems
- Replace storage heaters with "Quantum" storage heaters
- ASHP where not existing gas nor Econ 7 nor oil
- Solid walls are insulated
- Better insulated HW cylinders for non-electric systems

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Further improvements combined

Basic combination (AA)

Whole stock	New Baseline (J)	After	Improvement
Average SAP	70.66	71.86	1.20
Average total fuel bill	£993	£975	£18 (1.8%)
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	12,330	11,789	541 (4.4%)
Capital cost (£,000)		4,380	
£,000 / SAP unit		3,629	
£ / Tonne CO ₂ saved		£8,099	

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Further improvements combined

Enhanced combination (AB)

- CHP in 2 communal heating systems
- New gas heating (where near gas main)
- Air Source Heat Pump (where no gas nearby)
- External insulation to System-build homes
- Replace pre-2002 glazing with new glazing units
- Better insulated HW cylinders for non-electric systems
- Improved insulation to flat roofs

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Further improvements combined

Enhanced combination (AB)

Whole stock	New Baseline (J)	After	Improvement
Average SAP	70.66	73.85	3.19
Average total fuel bill	£993	£950	£43 (4.4%)
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	12,330	10,708	1,622 (13.2%)
Capital cost (£,000)		11,977	
£,000 / SAP unit		3,751	
£ / Tonne CO ₂ saved		£7,385	

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Further improvements combined

Ultimate combination (AC)

- CHP in 2 communal heating systems
- New gas heating (where near gas main)
- Air Source Heat Pump (where no gas nearby)
- Solid walls insulated
- External insulation to System-build homes
- Replace pre-2002 glazing with new glazing units
- Better insulated HW cylinders for non-electric systems
- Improve insulation to flat roofs
- Solar PV on suitable dwellings

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Further improvements combined

Ultimate combination (AC)

Whole stock	New Baseline (J)	After	Improvement
Average SAP	70.66	76.33	5.67
Average total fuel bill	£993	£913	£80 (8.1%)
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	12,330	9,729	2,601 (21.1%)
Capital cost (£,000) £,000 / SAP unit £ / Tonne CO ₂ saved		20,058 3,536 £7,712	

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Further improvements combined

Ultimate combination (AC)

Whole stock	Original Baseline (A)	After	Improvement
Average SAP	64.32	76.33	12.01
Average total fuel bill	£1,105	£913	£192 (17.4%)
CO ₂ emissions (Tonnes) <small>(space heating, water heating & lighting)</small>	15,620	9,729	5,891 (37.7%)
Capital cost (£,000)		30,335	
£,000 / SAP unit		2,527	
£ / Tonne CO ₂ saved		£5,149	

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