
energy solutions

carbon reduction from existing housing - a lost cause?

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Home Energy Solutions

2003-2007

Objectives

- 450 households participating in a 12-month programme of energy management & energy efficiency measures
- 113 households investing in significant energy efficiency improvements
- 23 installing renewable energy technology

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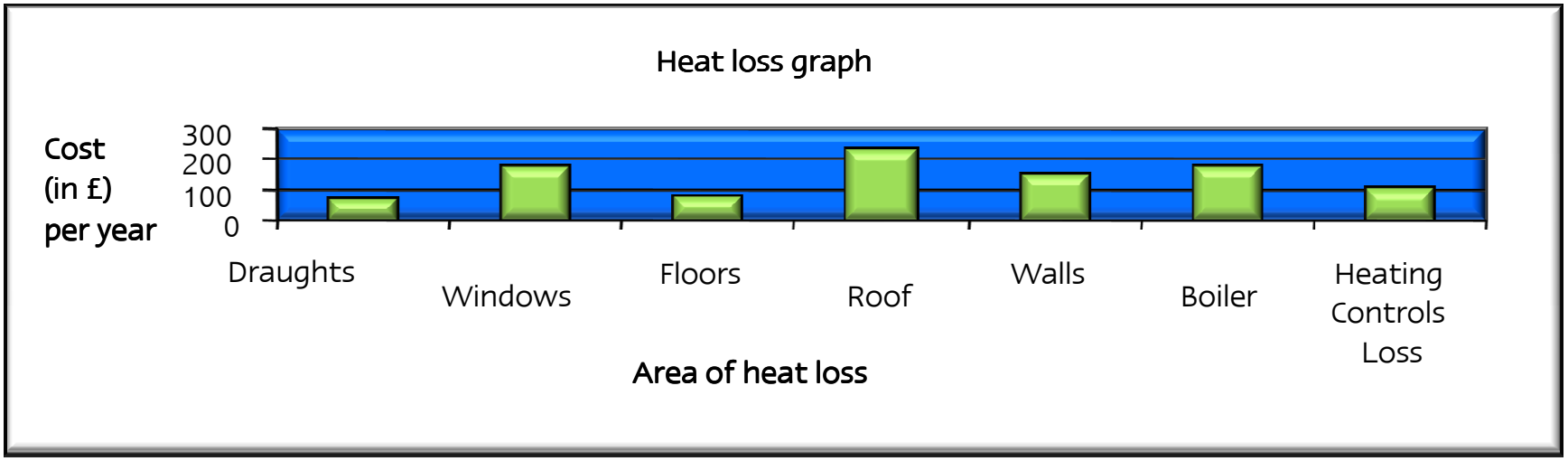
Survey Report

Your home's energy rating

Your home achieved a **SAP rating of 36**, which compares to an average of 45 for this age and type of property in Brent.



Survey Report

Fuel consumption summary

Last years fuel consumption				
Gas:	610 units = 19,220	kwh/yr	3.6	Tonnes C02/yr
Electricity	5,914	kwh/yr	2.4	Tonnes C02/yr
Typical consumption for this type of property				
Gas:	813 units = 25,453	kwh/yr	4.8	Tonnes C02/yr
Electricity:	3,417	kwh/yr	1.4	Tonnes C02/yr

Case study 1

3 bedroom semi detached, Hayes

- Construction: 1930-1949
- Loft Insulation: 100 mm
- Main Walls: Cavity
- Windows: Double glazed
- Heating: Gas Boiler and radiators. Post 1998
- Occupancy: 3 Adults 2 Children

Initial energy rating

- SAP – 54
- CO2 – 5.7 tonnes per annum

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Case study 1

Recommended measures	Cost (£)	Annual savings (£)	Pay back (in years)	Emissions reductions (Tonnes C02)
Loft insulation top up	100	7	14.2	0.1
Cavity wall insulation	125	88	1.4	1.3
TRV's, Room stat	250	23	10.8	0.7
Total	**475**	**114**	**4.1**	**2.0**

Potential rating after improvement measures

SAP - 72 (Previously 54)

C02 - 3.7 (Previously 5.7) (35% saving)

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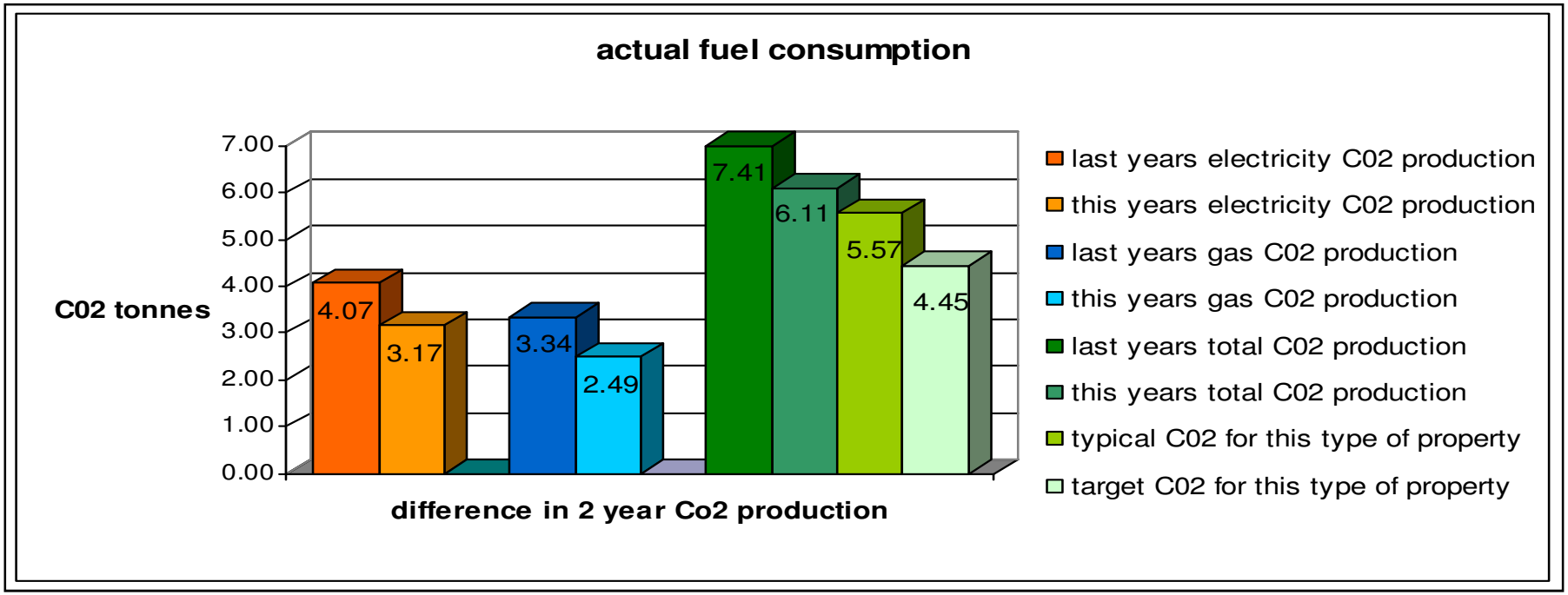
Case study 1

Actions taken: Cavity Wall Insulation

New rating: SAP 65 (from 54), C02 4.4 (from 5.7) 22% saving



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Case study 2

3 bedroom semi detached House, Acton

- Construction: 1930 - 1949
- Loft Insulation: 150mm
- Main Walls: Solid
- Windows: Double glazed
- Heating: Gas boiler and radiators. Post 1998
- Occupancy: 2 Adults 1 child

Initial energy rating

- SAP – 52
- CO2 emissions – 5.5 tonnes per annum

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Case study 2

Recommendations

Recommended measures	Cost (£)	Annual savings (£)	Pay back (in years)	Emissions reductions (Tonnes C02)
Loft top-up	110	8	13-15	0.1
Dry lining	1,200	141	8.5	2.3
Total	**1,310**	**144**	**8.8**	**2.4**

Potential rating after improvement measures

SAP – 73 (previously 53)

CO2 - 4.8 (previously 5.5) 31% reduction

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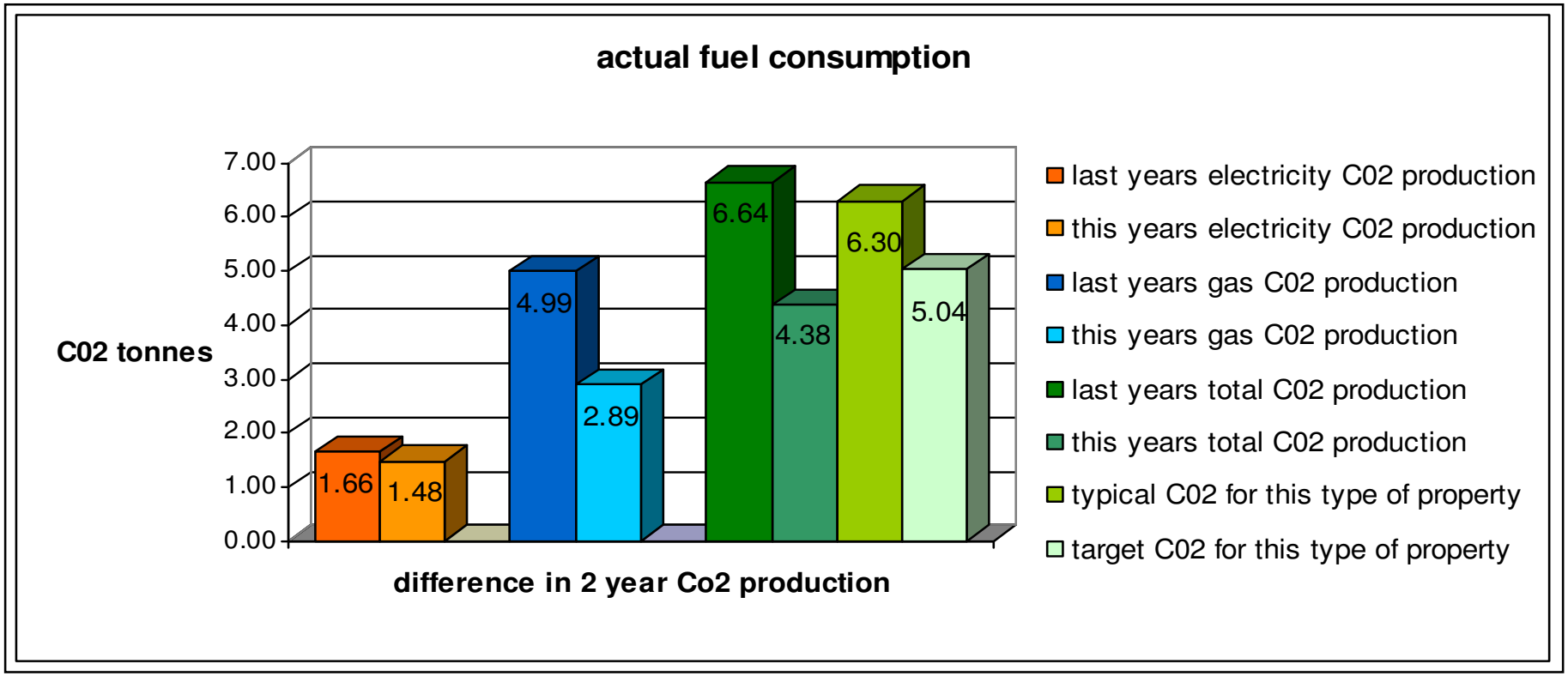
Case study 2

Actions taken: none



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Case study 3

5 bedroom detached House, Acton

- Construction: 1890's
- Loft Insulation: 100mm
- Main Walls: Solid
- Windows: Double and single glazed
- Heating: Old Boiler and radiators. Pre 1998
- Occupancy: 2 Adults

Initial energy rating

- SAP – 42 (49)
- CO2 – 12.8 tonnes per annum

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Case study 3

Recommendations

Recommended measures	Cost (£)	Annual savings (£)	Pay back (in years)	Emissions reductions (Tonnes C02)
Dry lining	1,800	190	9.4	4.0
Boiler replacement	2,600	200	13	3.2
Loft insulation	190	25	2.6	0.2
Total	**4,590**	**475**	**6.1**	**6.40**

Potential rating after improvement measures

SAP - 70 (Previously 42)

C02 - 8.1 (Previously 12.8) 37% reduction

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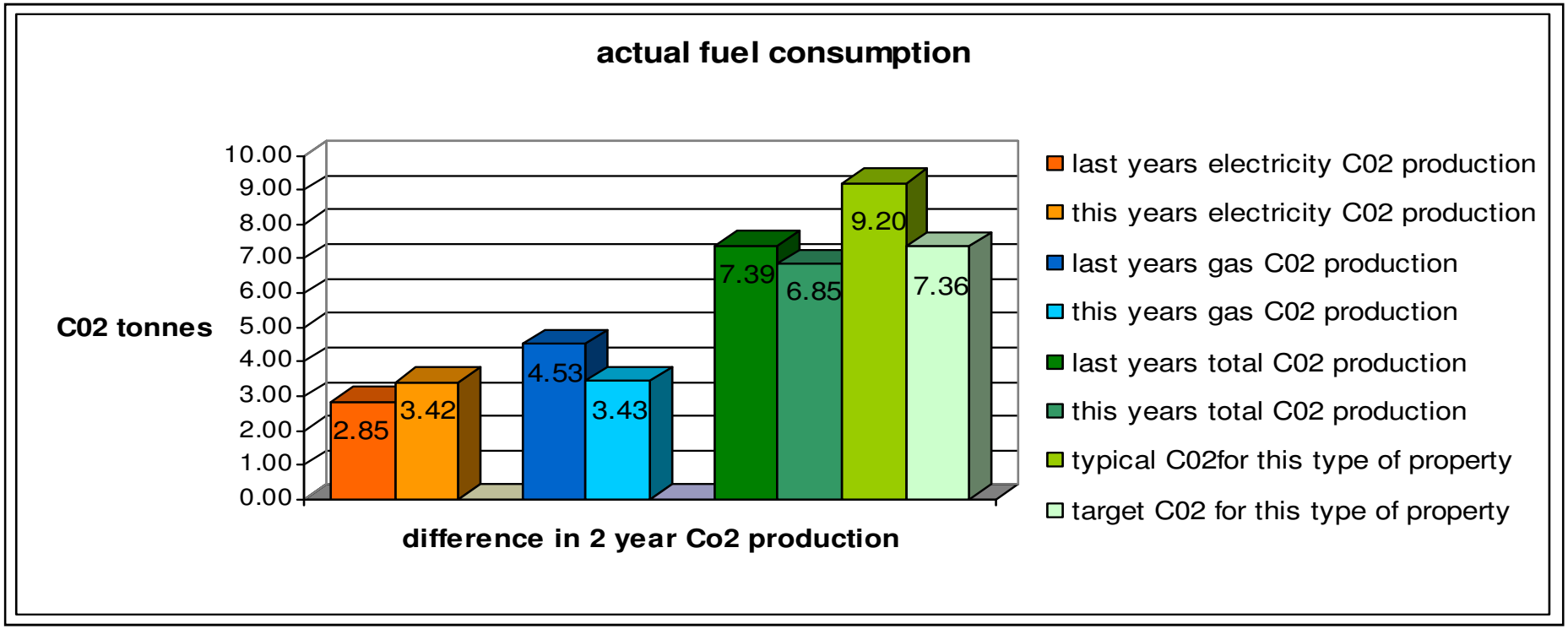
Case study 3

Actions taken: condensing boiler, solid wall insulation, double glazing

New estimated rating: SAP 70, C02 9.8



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Case study 4

1 bed, purpose built local authority flat Brent

- Construction: 1950's
- Loft Insulation: n/a
- Main Walls: cavity
- Windows: Double glazed
- Heating: modern combi Boiler and radiators.
- Occupancy: 1Adult

Initial energy rating

- SAP – 89 (49)
- CO2 emissions – 1.8 tonnes per annum

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Case study 4

Recommendations

Recommended measures	Cost (£)	Annual savings (£)	Pay back (in years)	Emissions reductions (Tonnes C02)
Cavity wall insulation	75	13	6.0	0.2
Total	**75**	**13**	**6.0**	**0.2**

Potential rating after improvement measures

SAP – 97 (previously 89)

CO2 – 1.6 (Previously 1.8) 11% reduction

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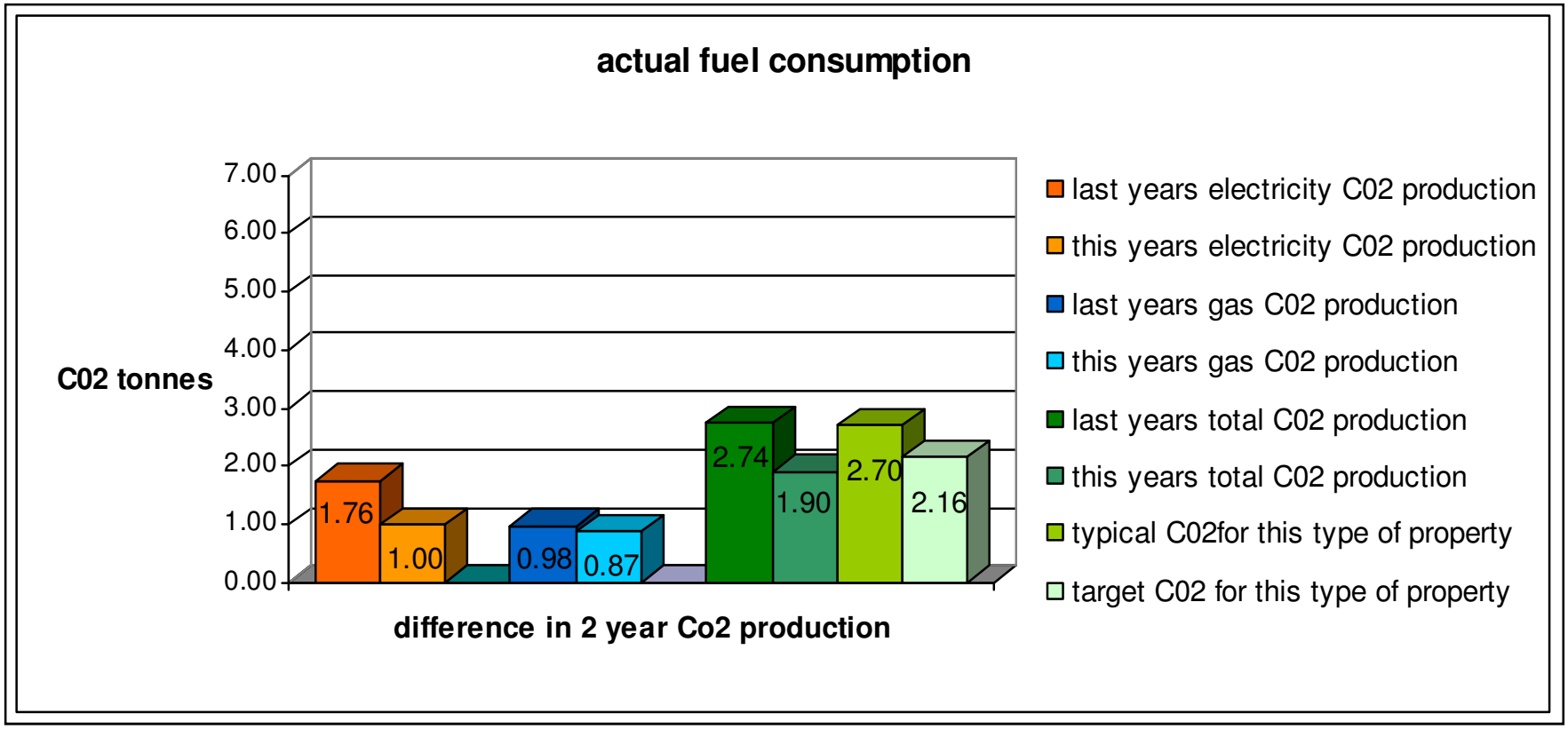
Case study 4

Actions taken: none



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Achievements

Number of measures installed: 242
From 174 Households

Loft Insulation: 63
Cavity Wall: 44
Draught proofing: 43
Condensing Boiler: 6
Heating controls 24
Non-condensing: 7
Complete Heating System: 6
Double Glazing: 12
Solid Wall Insulation: 1
Under floor insulation: 1
Hot water tank Jacket: 34

1 Solar water heating system

Warm Front Referrals: 42
HeatStreets Grants taken up: 120
Harrow Council Scheme: 6

Total reduction in $C0_2$ - 75 tonnes

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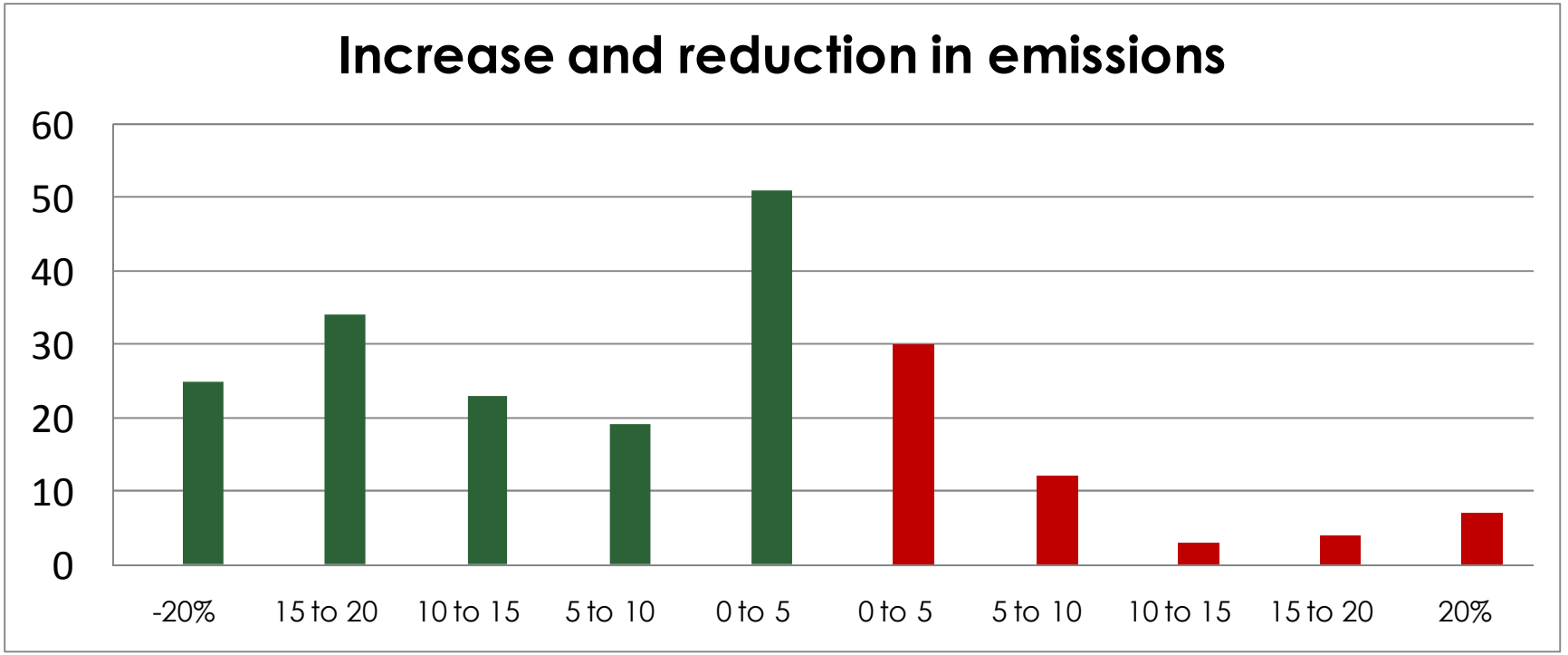
Achievements



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Findings

- Under occupancy
- Interest in Installing measures but not changing lifestyle and behaviour
- Cost saving the main motivation
- Information and advice very hard to find
- Other issues - transport, water, recycling
- Personal interests important

Findings

- Images of achievement
- Information overload
- Renewable energy - high cost, long payback
- Lack of incentives for Landlords
- Tariffs rewarding higher consumption
- Role models – Business, Neighbours, Council

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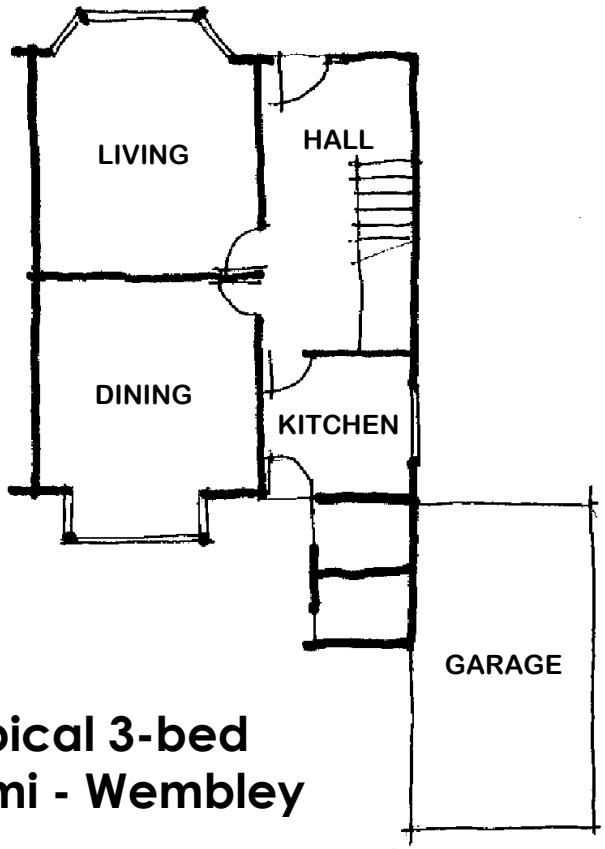
Energy Intelligence
Looking at the detail 1



Typical 3-bed semi - Wembley

- Solid brick walls
- 100mm loft insulation
- Windows wood, single glazed
- Gas fire with back boiler & radiators

SAP 34/8.6 tonnes CO_2 p.a.

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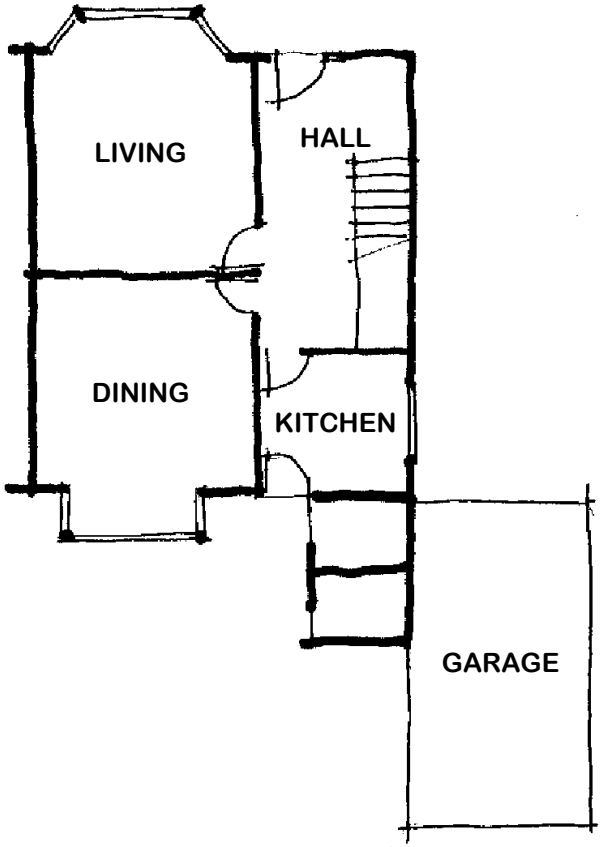
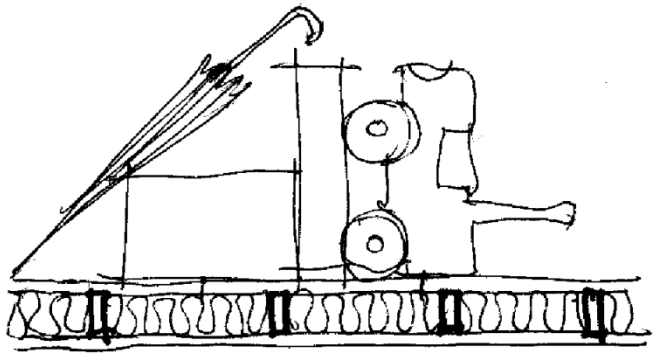
Looking at the detail 1



What can be done?

1.Loft top-up

Savings: £13 a year on gas bills
0.1 tonne CO_2 a year



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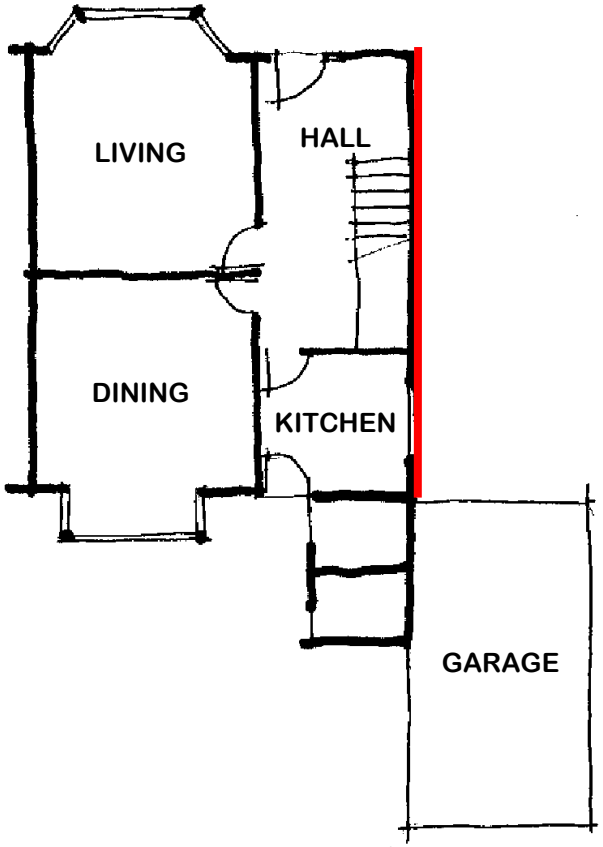
Looking at the detail 1

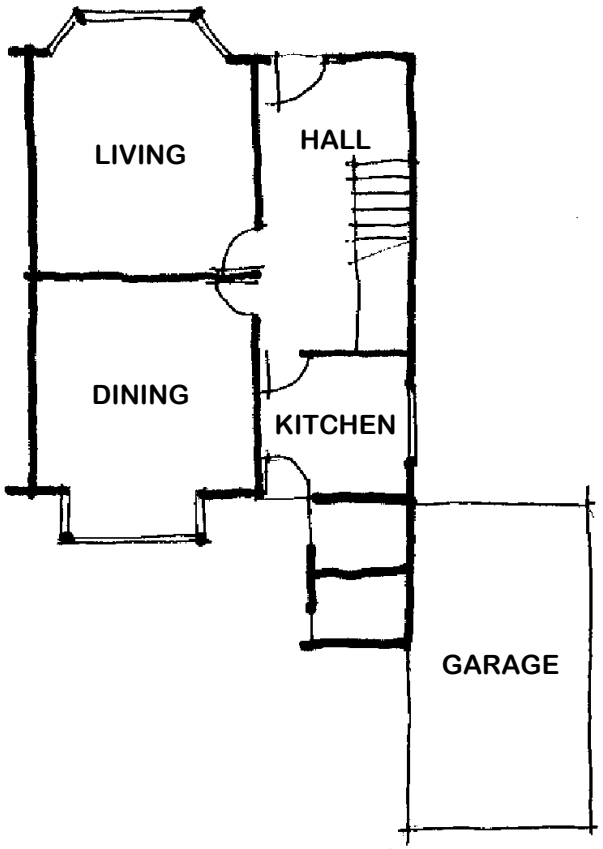


What can be done?

2. Solid wall insulation

- Side wall has 40% of total wall area
- Internal insulation impractical
- External insulation expensive
- Savings: £283 a year on gas bills/ **21% CO_2**
- Payback: 18 years

Looking at the detail 1

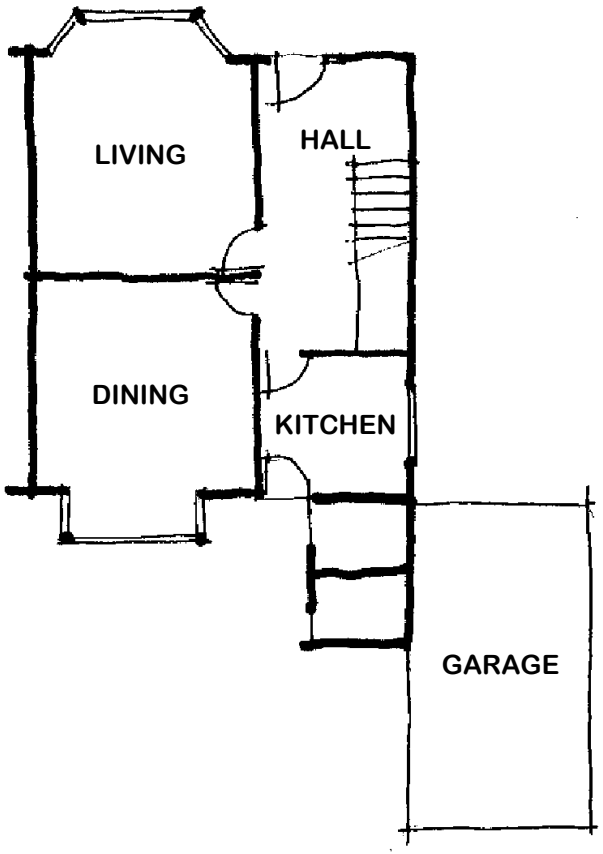


What can be done?

3. New 'A' rated boiler

- +TRVs on radiators
- Savings: £315 a year on gas bills/ **28% CO_2!**
- Payback: 8 years
- If existing boiler 'D' rated, CO_2 saving only 10%
- Do they really work?

Looking at the detail 1



What can be done?

4. Turn down room thermostat

- From standard 21˚ to 17˚
- Savings: £426 a year on gas bills/ **37% CO_2!**
- Payback: instant

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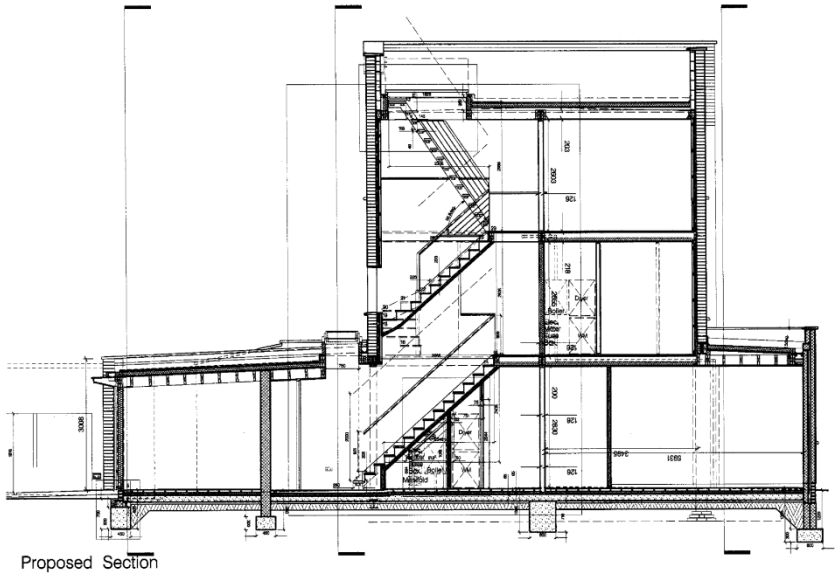
Looking at the detail 2



Before:

- 225mm solid brick walls
- Pitched valley gutter roof, uninsulated
- Windows wood, single glazed

3-storey end terrace shop/flat, Hackney

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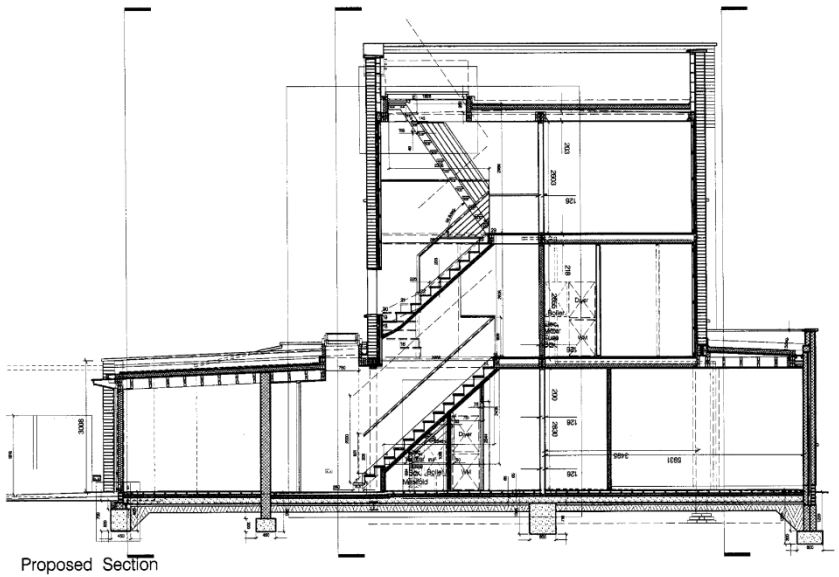
Looking at the detail 2



After:

- Walls drylined with 50mm Celotex tuff R (U=0.37)
- New flat roof insulated to U=0.23
- Floor insulated to U=0.22
- New windows wood, double glazed U=2.00
- 'A' rated boilers

SAP 100/ 2.3 tonnes CO_2/year (each flat)

3-storey end terrace flat/maisonette, Hackney

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Reversing the trend

The barriers

Technical –

- Limitations of conventional mat insulation
- Impracticality of solid wall insulation
- 'reverse' issues e.g. air conditioning

Financial –

- Effective solutions cost too much
- People have other priorities for spending

Behavioural –

- Low carbon isn't sexy
- Housing mobility issues

Reversing the trend

Possible solutions - technical

Lofts –

- simple floor-raising systems
- Boarding/insulation laminates
- Insulation at rafter level

Walls –

- Ultra-thin insulating coatings
- Large scale contracts

Heating –

- Communal heating systems (ESCOs)
- Micro CHP

Reversing the trend

Possible solutions - financial

Sticks/carrots or combinations of the 2 –

- Increase fuel prices dramatically
- "more you use more you pay"
- Sales tax on low-SAP properties/ tax relief on high-SAP
- Widen scope of EEC or add to new fund with different sources
- Carbon rationing – the big one

Reversing the trend

Possible solutions – behavioural

- Creating a bandwagon
- Making low carbon a desirable commodity
- Siege mentality (dig for victory)

Reversing the trend

Conclusions

- 20% carbon reduction won't be achieved without dramatic initiatives addressing all 3 types of barrier

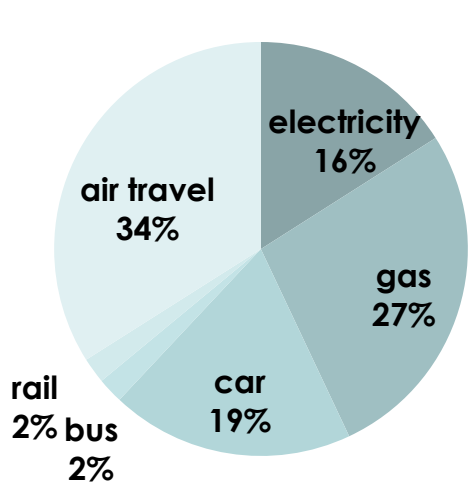
- More research needed on relationship between asset ratings and operational energy use

Reversing the trend

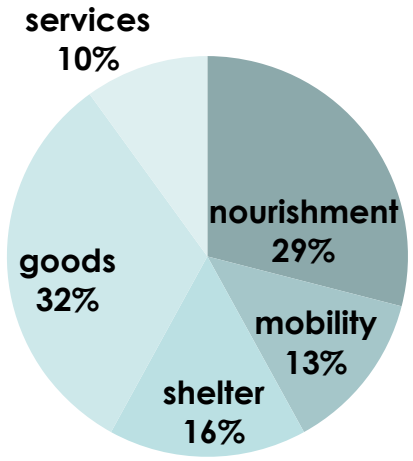
Postscript

Are we addressing the real issue?

London household direct emissions



UK household total carbon footprint



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Thank You