

Carbon Footprinting

HEONE Conference 25th March 2009

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Pett Projects

Sustainable energy and buildings research

Outline

- Carbon footprints – what and how
 - Act on CO2
 - Other aspects
- Carbon footprints and fuel poverty
 - Fuel Poverty Carbon Footprint research project (Pett Projects)
 - Carbon footprints and income (CSE)
- Climate change policy issues
 - Personal Carbon Allowances

What is a carbon footprint?

- Measures annual CO₂ emissions (or equivalent) in tonnes from a range of lifestyle (or business) environmental issues:
 - Fuel use: heating, transport, appliances
 - Other processes that require fuel use or cause carbon emissions: food, water provision, other services
 - In industry, other volatiles e.g. methane, VOC emissions

Act On CO₂

- Developed by Energy Saving Trust for the Government
- Concentrates on *direct residential emissions* i.e. from
 - Heating (gas, electricity, solid fuels)
 - Appliance use (estimating apportionment of electricity bill)
 - Personal car transport
 - Flights taken
- Online database engine used by many other applications

Flash version

Flash version

Calculator

Flash version

Flash version

H

Ho

£/)

or

litre



Your carbon footprint

Your CO₂ Result is 7.22 tonnes per year.

This is the amount of CO₂ produced from heating and lighting your home and appliances.

[Continue with calculator](#)

Your carbon footprint

Congratulations. You've successfully completed the Act on CO₂ calculator. The tables below represent your CO₂ emissions from all three areas of your life.

Your CO₂ result is 7.22 tonnes per year.

The breakdown of your carbon footprint is shown in the table below. For example in your 'Home' section, we break down your footprint so you can see how much of your footprint is due to heating and how much is due to lighting. In the 'Appliance' section we break it down into appliances in various rooms of the house, so you can see how much is used in the kitchen, study and so on. In the 'Travel' section you can see how much carbon your vehicle is producing and how much comes from the flights you take. If any area is particularly high, you can concentrate on lowering the carbon footprint of that area first.

All figures are in tonnes per year.

Breakdown of sections	CO ₂ Footprint
Total Footprint for Home	4.68
Heating & Hot Water	4.53
Lighting	0.15
Total Footprint for Appliances	1.18
Kitchen	0.72
Entertainment	0.09
Study	0.05
Other	0.31
Total Footprint for Travel	1.36
Vehicle	1.36
Flights	0
Total Carbon Footprint	7.22

Your target footprint total is 5.77 tonnes per year.

Everybody likes to have a target to reach their goals. In the table below we have given you an aspirational



What it doesn't cover

- Business or work related emissions
 - except for people who occasionally work from home?
- Food footprint
 - Estimated average is 2.0 tCO₂/yr per household
- Water, waste emissions
- Public transport
- Are all calculators measuring the same footprint
 - For households, adults, person
 - Domestic, transport, secondary?
 - Does that match with the LA carbon inventory?

Research: footprints & (fuel) poverty

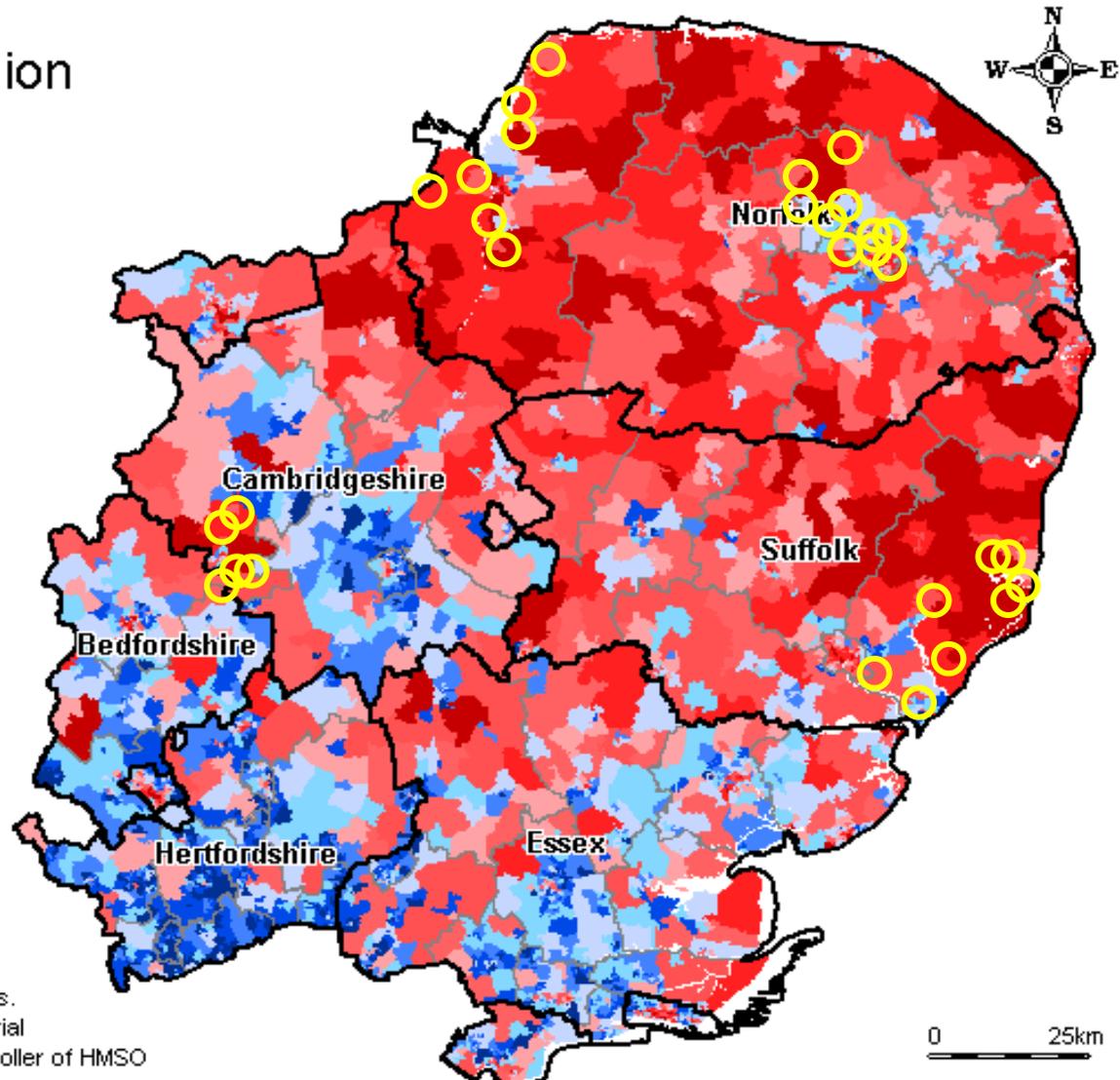
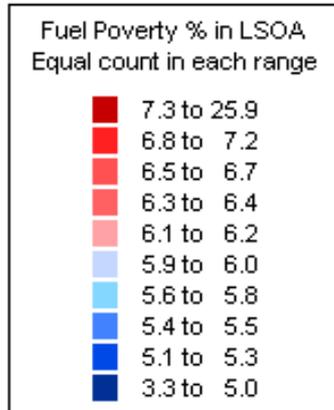
- My research
- CSE research

Purpose of project

- **Purpose**
 - **inform debate on whether fuel poverty programmes conflict with carbon emissions reduction programmes**
- **Objectives**
 - Survey people who had received measures under a fuel poverty programme
 - Establish the household carbon footprint using the Government's Act On CO₂ calculator
 - Compare these with national and local averages
- **Funding: Eaga Partnership Charitable Trust**

Survey coverage

Fuel Poverty in the East of England Region



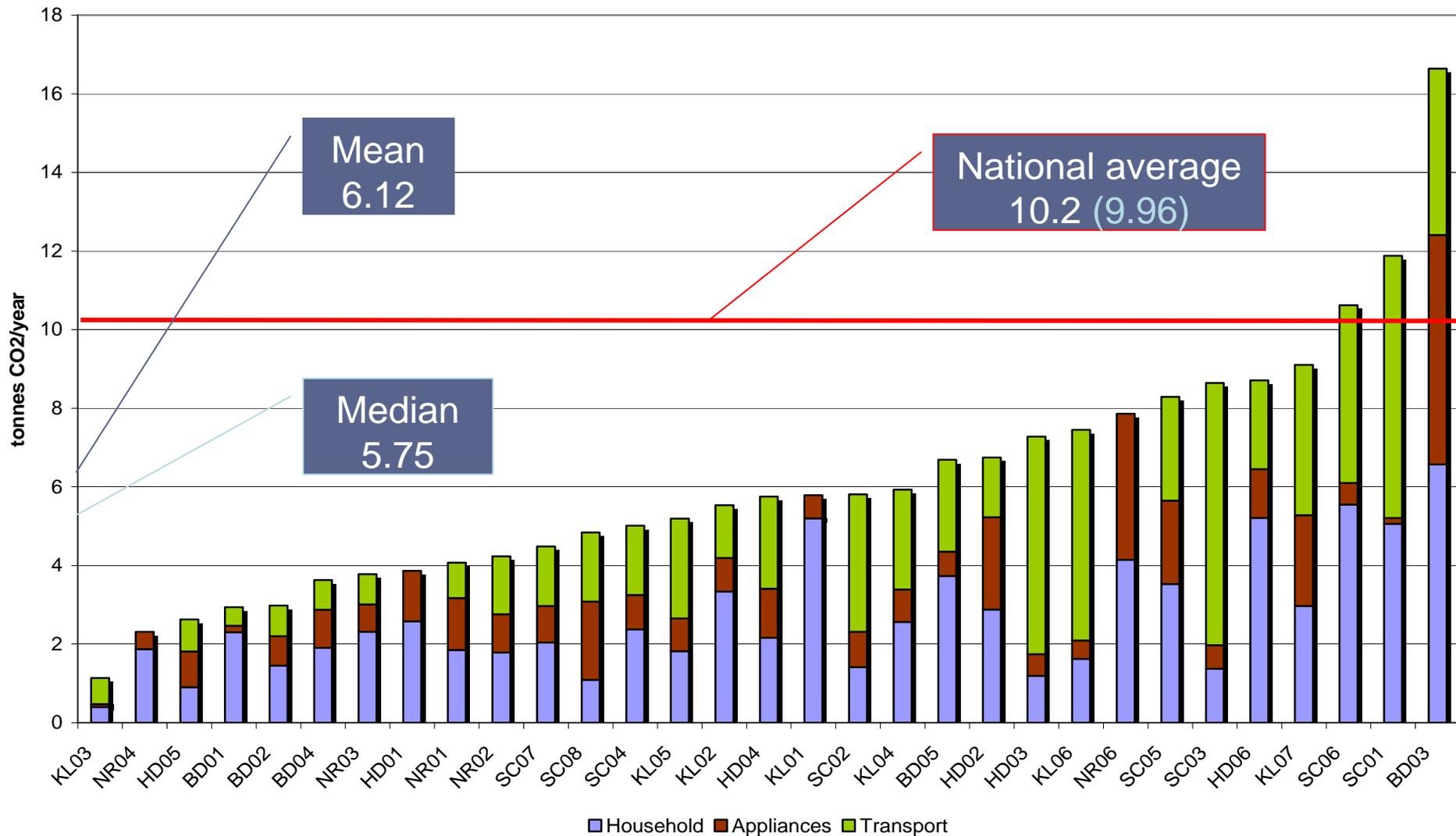
Data modelled by the University of Bristol and CSE from 2001 Census and 2003 English House Condition Survey

Source: 2001 Census, Output Area Boundaries.
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Household types

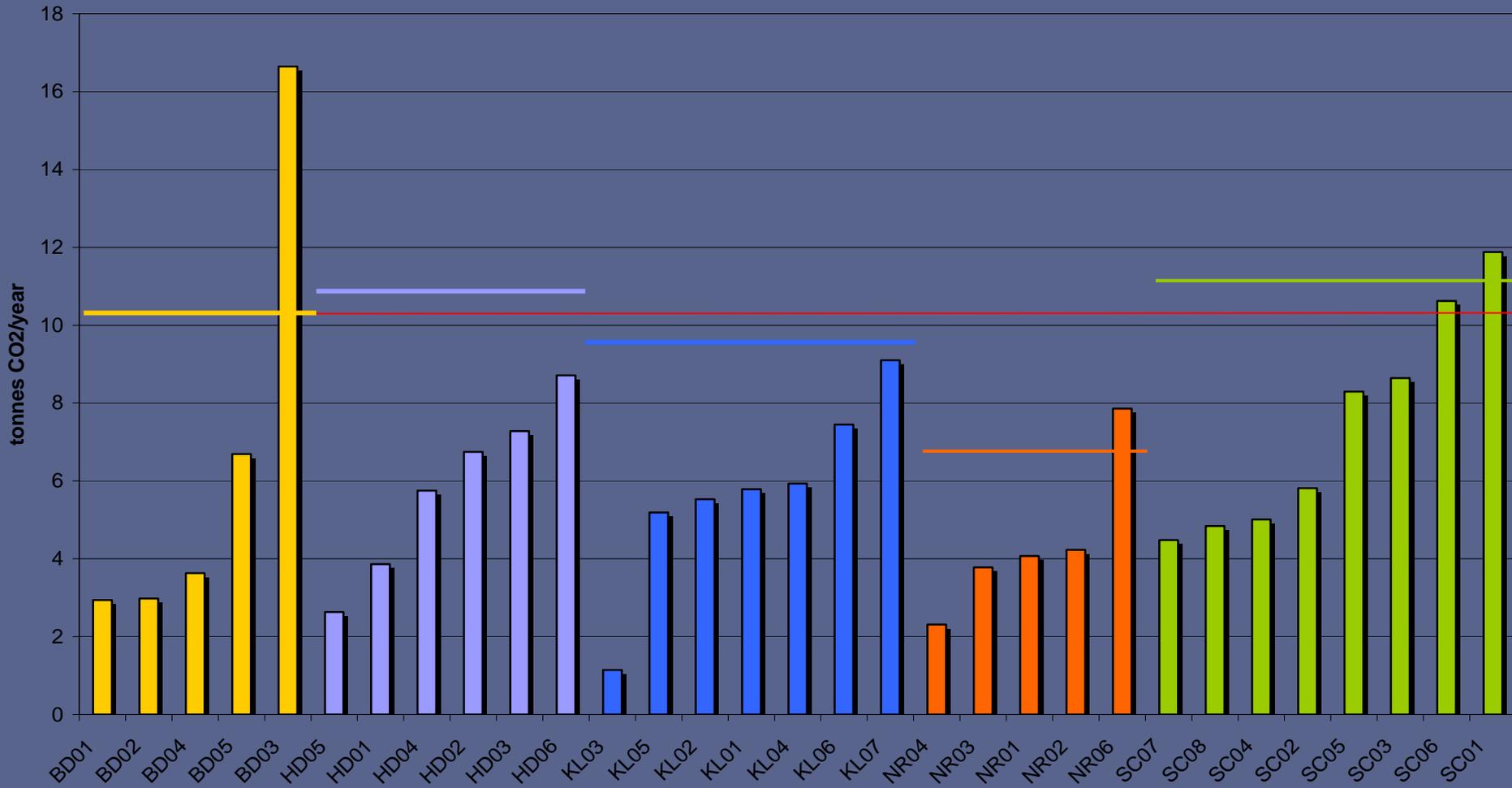
- 10 one-person households, 13 couples
- 22 pensioner (10 over 75)
- 8 families (1 under 3, 4 under 11, 8 over)
- Vulnerability:
 - Housebound/disabled/long-term ill-health (10)
 - Stroke, arthritis, sight, mobility,
 - Down's syndrome
 - Infants/young children (3)
 - Single parents (5 – 3 now with partners)
 - Pensions & benefits
- 11 in lowest income range (<£181/wk) ; 7 in second

Carbon footprints of the group



LA footprints and averages

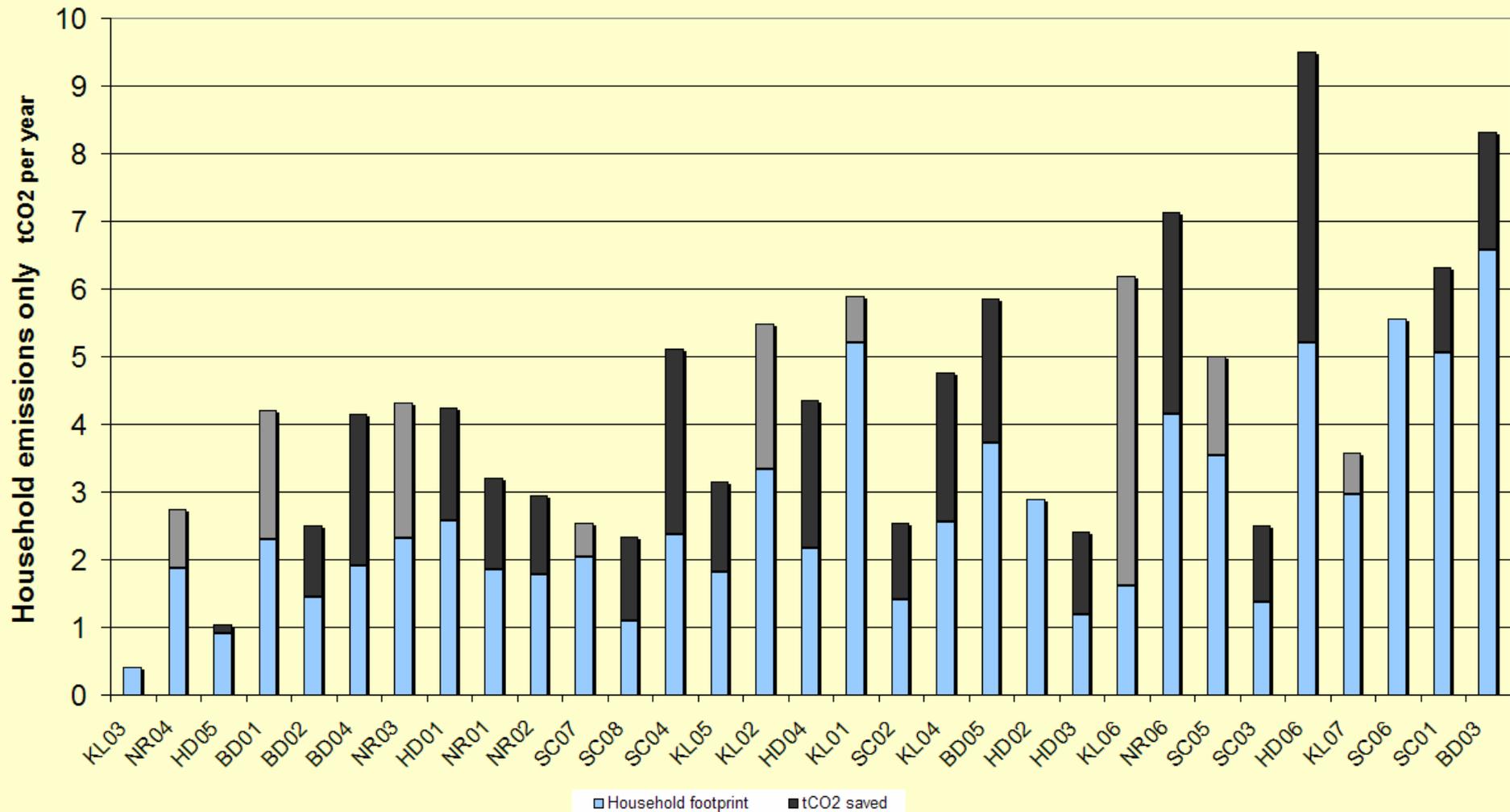
Footprints by LA



Est. footprints before / after measures

- Household part of footprint measured
 - Heating, hot water, lighting
- Average before measures (based on stated bills and measures installed) 4.39 tCO₂/yr
- Average after measures 2.68 tCO₂/yr
- Av. reduction 1.71 tCO₂/yr
- Compares well with Warm Front measured average 1.2 tCO₂/yr
- Included 5 hard to treat homes in survey
- Gives average 22% reduction on *total* carbon footprint

Household footprints before/after



What did they do with their savings

- Average saving for 12 'actual' bills:
 - £200 per year on all fuels before and now
 - £430 per year based on what cost would have been now
- Most were able to afford food and other bills more easily (£4 a week)
- No evidence of 'high carbon' spending such as more air travel or plasma TVs

Carbon reduction vs. fuel poverty

- Carbon saved by these 31 households
47.9 tCO₂/yr
 - Equal to or better than Carbon Emissions Reduction Target (CERT) assumptions
- Suggests if cost to LA similar to CERT,
 - value of programmes for 'fuel poor' the same or better than to 'fuel rich'
- No change to what they do with their lifestyles – apart from feel more comfortable

Case studies



- Five candidates
 - Four vulnerable households, other 'young' pensioners
- Average Act On CO₂ footprint **8.9** tCO₂/yr
- Average total footprint (including food, water, waste, public transport) **10.5** tCO₂/yr



Research Conclusions

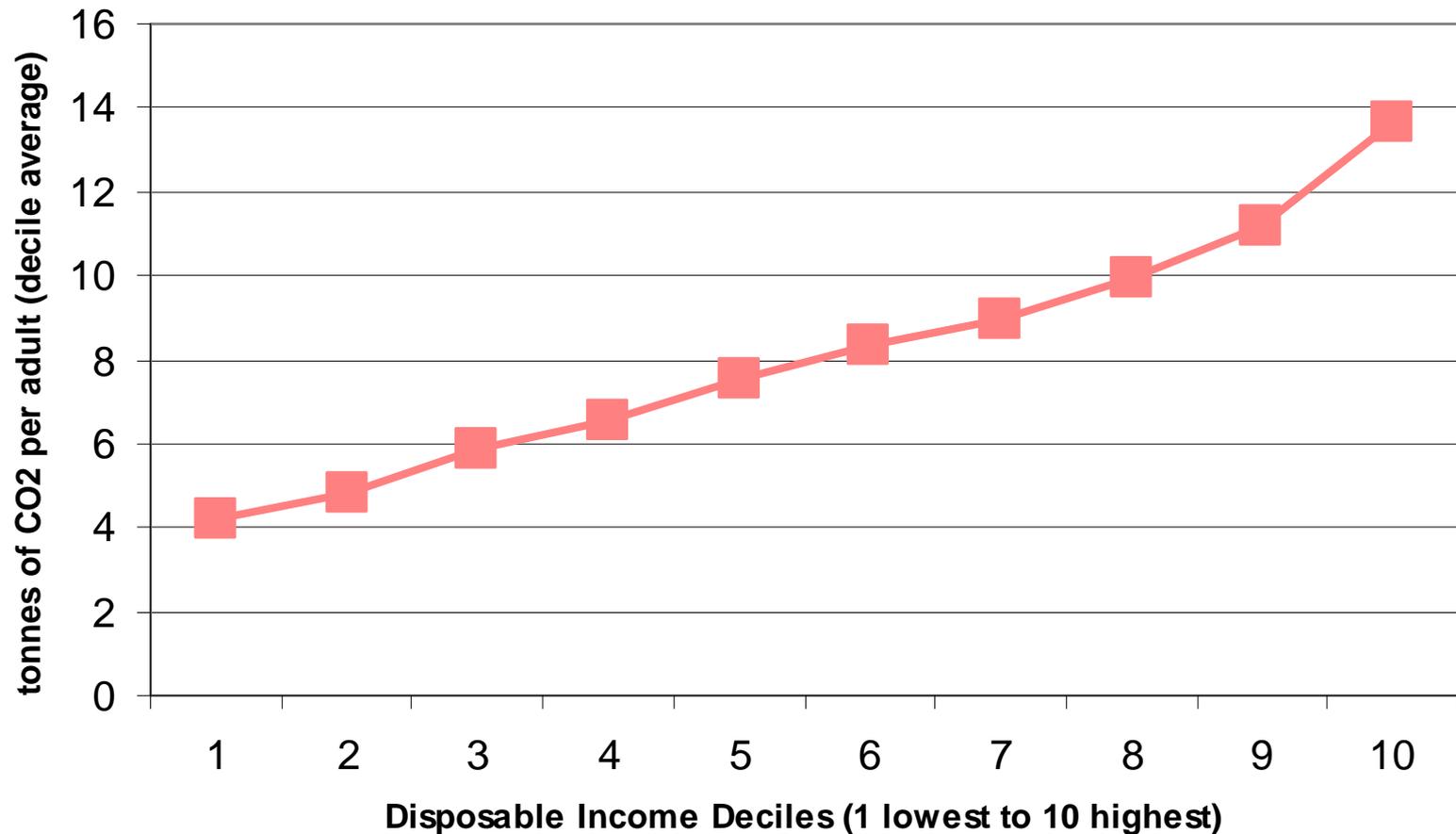
- Rebound effect, if any, does not lead to an increase in carbon footprint.
 - Whether this is the case for all types of households requires further study.
- More research needed on carbon savings and social benefits for vulnerable people
 - esp. in HTT homes (may be bigger than we thought)

Research on footprints and income

- “Distributional Impacts of Personal Carbon Trading” Defra 2008
 - Research by CSE
- Modelled household carbon footprints based on EHCS and Family Spending data
 - Looked at the household and road transport footprints per adult in income deciles
- Who would gain from a trading system?

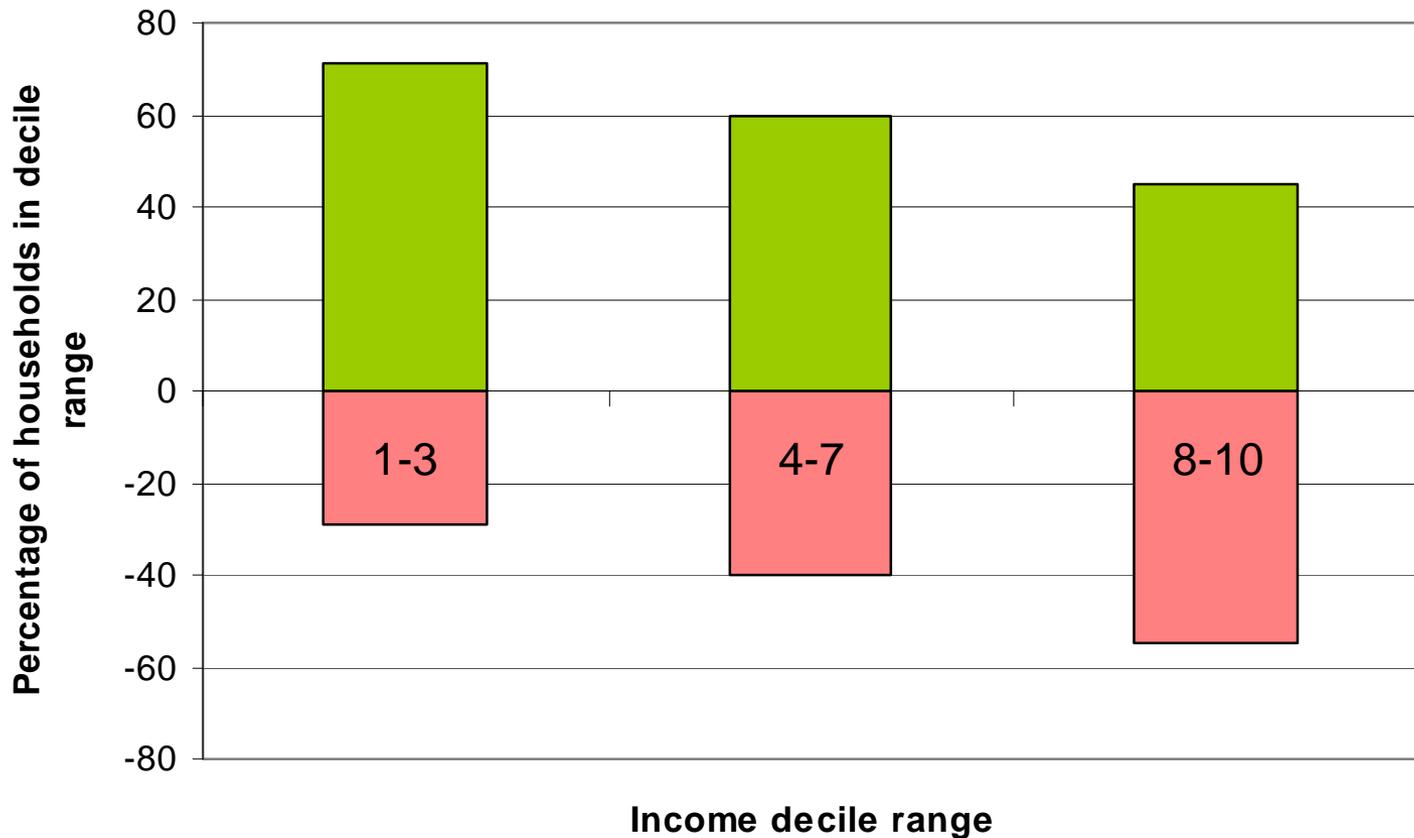
Carbon footprint & income

Distribution of emissions



Winners & Losers with PCT

Winners and losers by income decile



Case studies

- Average Act On CO₂ footprint **8.9** tCO₂/yr
- Range **6.7 to 11.8** tCO₂/yr



11.8

10.6



6.9



8.9

6.7



Climate change policies

- Personal Carbon Trading
 - Shelved
- Energy efficiency programmes
 - CERT
 - CESP
 - HES
- Should help to reduce carbon footprints
 - BUT need to address big carbon savers at bigger costs
- Role of Carbon Footprints in behaviour change

Conclusions

- Concern for vulnerable people and real issues on lifestyles
- Carbon footprint must not further marginalise people
- Concern for proxy for fuel poverty (Priority Group)
 - Sefton research – focus on SAP30-
 - NEA Energy Efficiency Strategy



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