# Household waste composition, arisings and collection systems: exploring the dynamics

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# Coverage

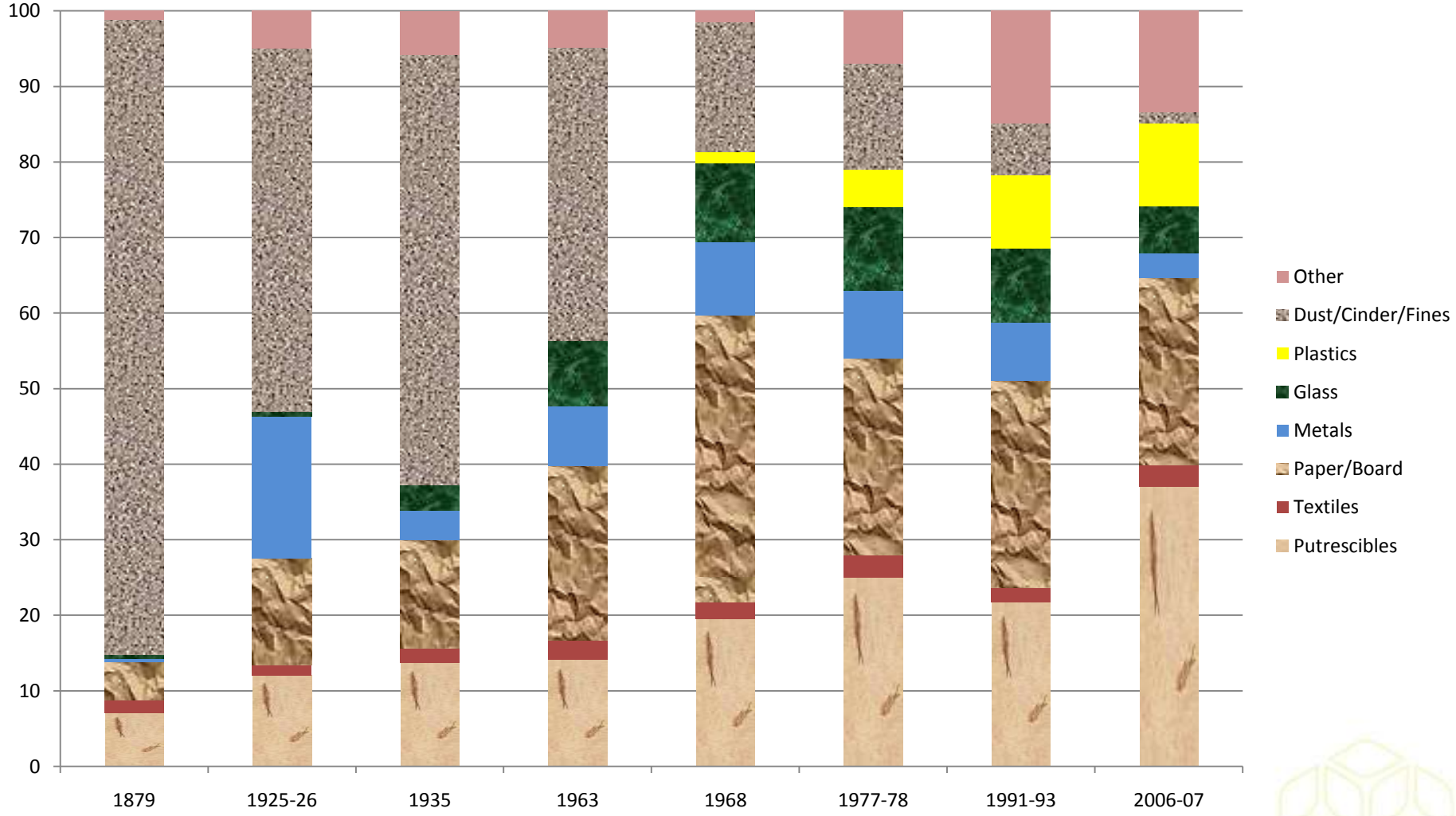
1. Historical time series
2. Rates of change
3. Household waste drivers
4. Understanding trends at local level
5. Future household waste
6. Conclusions

# 1. Historical time series

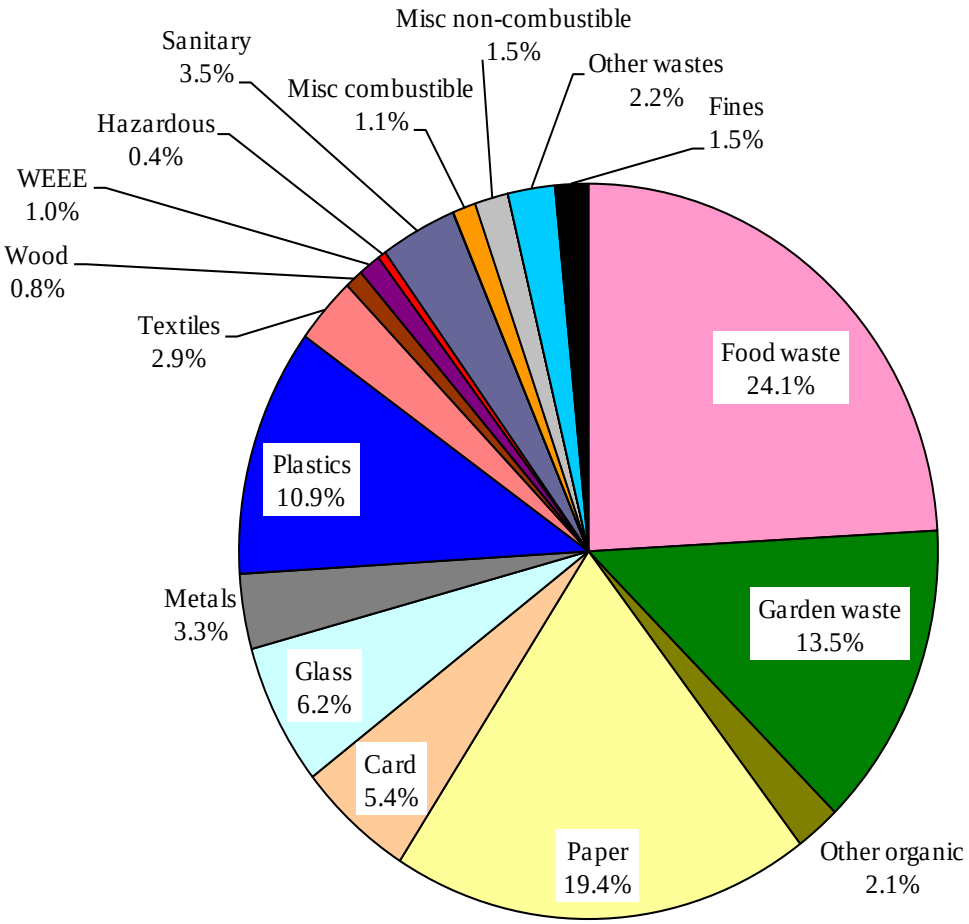
- No chance of predicting future if no understanding of historical data


Source: Resource Media 55, 2010

# 1. ‘First 140 years of UK dustbin’



# 1. Estimated composition: kerbside residual + recycling England 2006/07



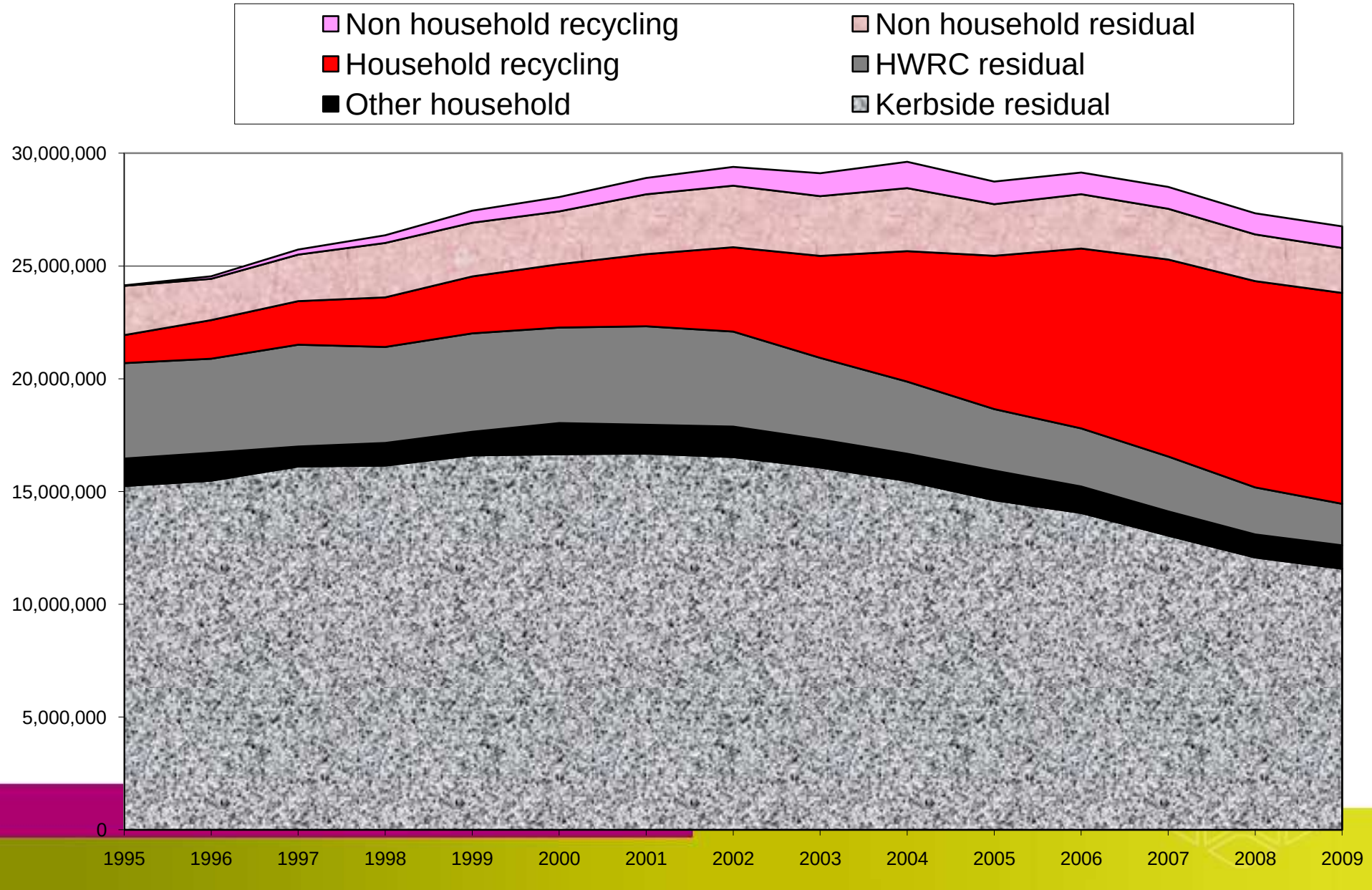
## 2. Municipal waste: assumed annual rates of change

- 2002: 2-3% / year increases
- 2007: 0.5% (base case)
- Since 2008: falling MSW
  - What are links between GDP, disposable income & MSW?
  - What role national policies/ drivers
  - What role local policies/ drivers?

# 3. Household waste drivers

- **Post-consumer wastes**: consumption driven: discarded products, packaging, food
- **Non-consumer wastes**: driven by other factors: e.g. Household cleaning, gardening.
- Regularly produced v sporadic & bulky items
- Household waste from non-household sources
- Household waste discarded into non-household streams

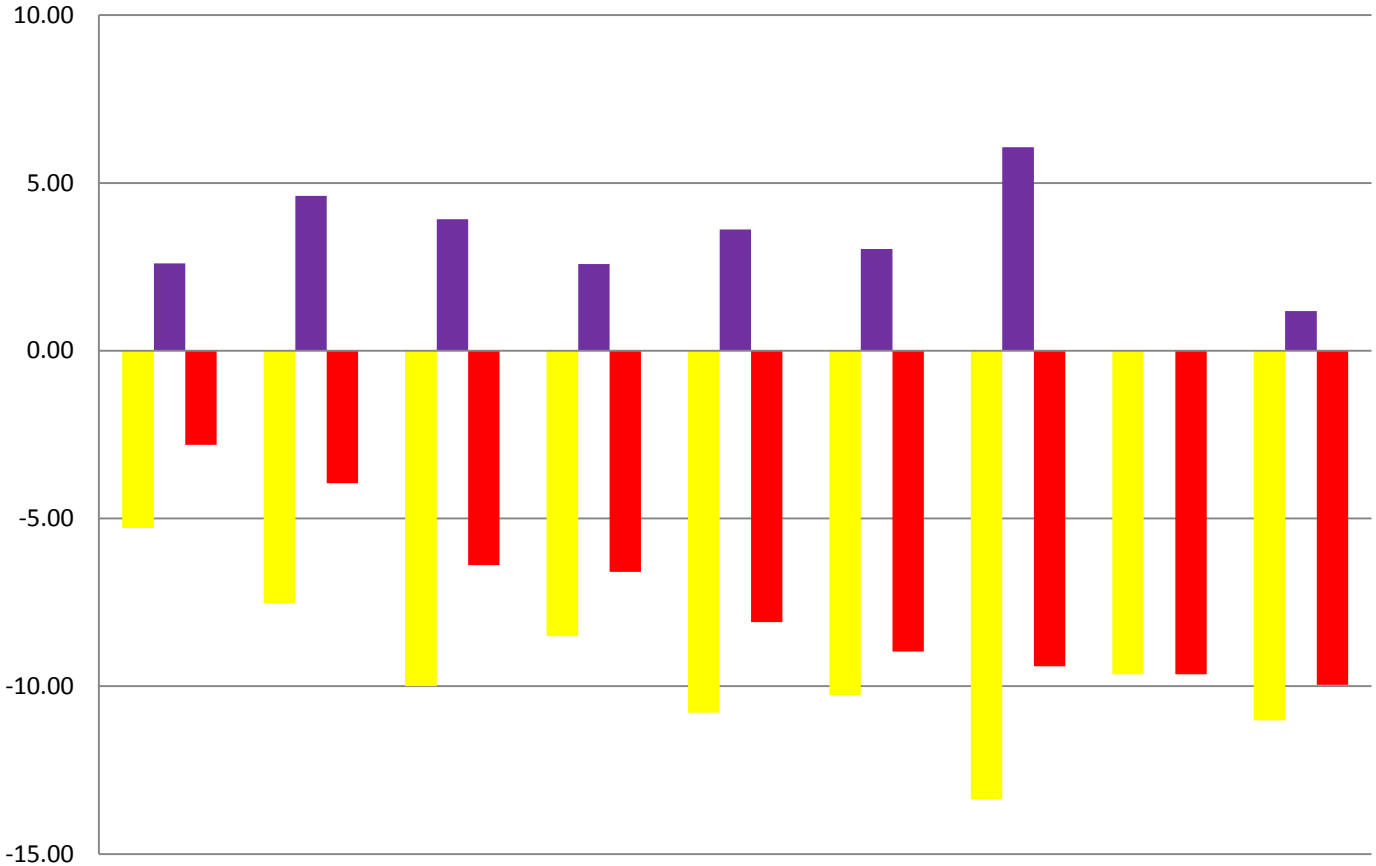
# 3. Municipal waste: England 1995-2009



# 4. Understanding Waste Trends at Local Authority Level: UK study

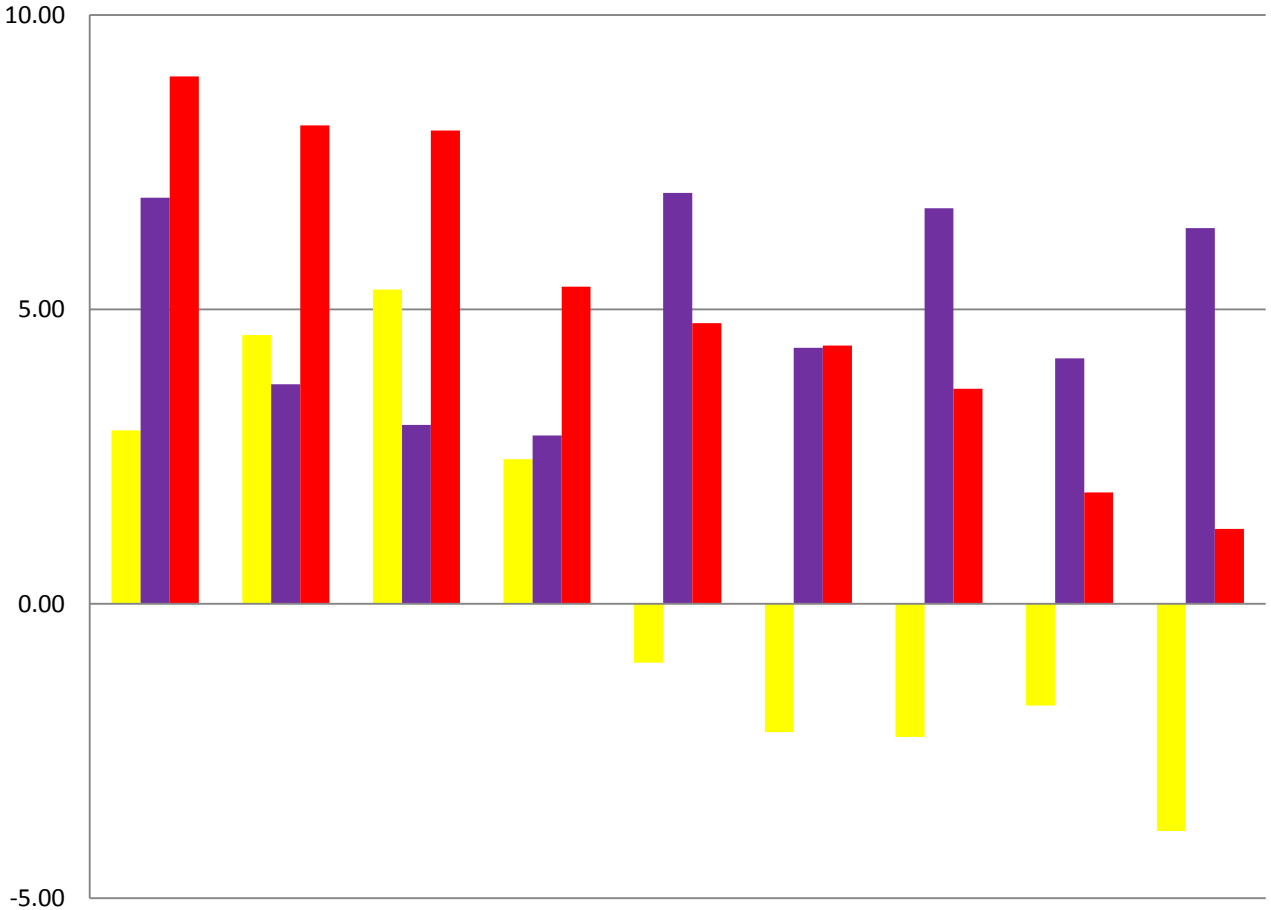
- Explored reported household waste trends 2000-07 in relation to local waste policy influences
- total waste arisings and waste arisings per household
- changes to household waste collection infrastructure & collection policies
- key demographic changes, including in-migration & household numbers

# 4. Selected LAs with decreases, 2003-2007




| | Sutton LB (weekly) | South Somerset District Council (AWC) | Broadland District Council (AWC) | Sandwell MBC (weekly) | Islington LB (weekly) | Hyndburn Borough Council (AWC) | Hart District Council (AWC) | Mole Valley District Council (AWC) | Gateshead MBC (weekly) |
|---|---|---|---|---|---|---|---|---|---|
| % Change waste per household | -5.28 | -7.53 | -9.99 | -8.51 | -10.79 | -10.27 | -13.37 | -9.64 | -11.02 |
| % Change in household numbers | 2.60 | 4.62 | 3.92 | 2.59 | 3.61 | 3.03 | 6.06 | 0.00 | 1.18 |
| % Change household waste arisings | -2.81 | -3.95 | -6.39 | -6.59 | -8.09 | -8.97 | -9.40 | -9.64 | -9.96 |

# Selected LAs with increases, 2003-2007




| | Milton Keynes (weekly) | Wake -field City (weekly) | Birming -ham City (weekly) | Hamble -ton (AWC) | Ton - bridge & Malling (AWC) | Ribble Valley (weekly) | East Riding Yorks (weekly) | Derby City (AWC) | South Norfolk (AWC) |
|---|---|---|---|---|---|---|---|---|---|
| % Change waste per household | 2.95 | 4.57 | 5.34 | 2.46 | -1.00 | -2.18 | -2.26 | -1.73 | -3.86 |
| % Change in household numbers | 6.90 | 3.73 | 3.04 | 2.86 | 6.98 | 4.35 | 6.72 | 4.17 | 6.38 |
| % Change household waste arisings | 8.96 | 8.13 | 8.04 | 5.39 | 4.76 | 4.39 | 3.65 | 1.89 | 1.27 |

# 4. Demographic influences

- Reduction in average household size – 2.4 persons/hhld (2000/01) to 2.33 persons/hhld (2006/07).
- No correlation across case studies between changes in **mean household size** per district and changes in household waste arisings.
- Three case studies with highest level of growth in household numbers exhibited household waste growth.

# 4. Other local factors

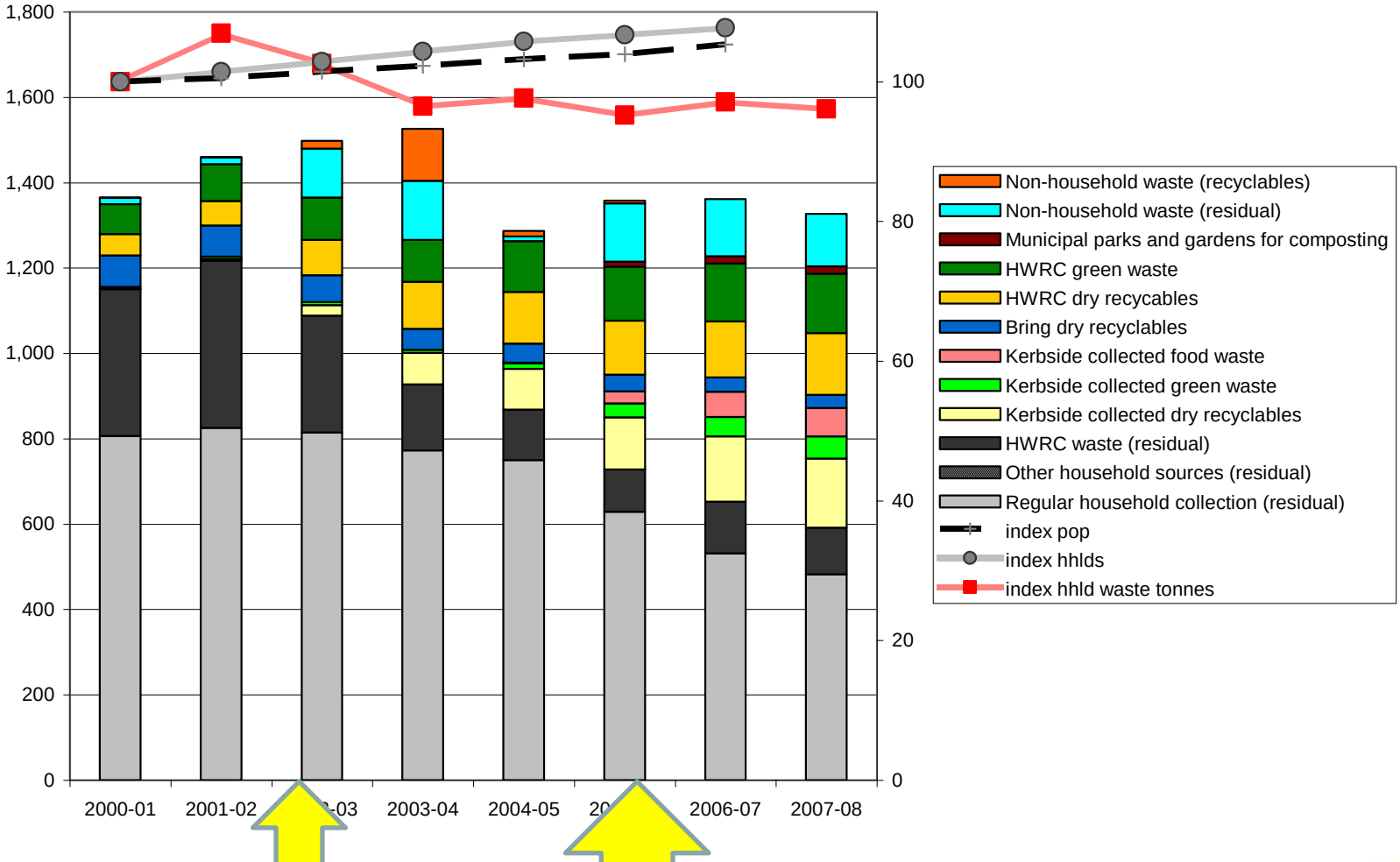
- *'Ikea effect'* – introduction of budget furniture outlets leading to influx of redundant furniture.
- *Weather* – can affect seasonal green waste generation in particular & spending patterns.
- *Credit crunch* – residents becoming more frugal, less waste? Conversely redundancies =more household waste generated at home.
- Recession impact: 3rd quarter 2008/09, largely outside study period, early signs: Birmingham, Sutton, Belfast, Derby.

# 4. local waste collection policies

- Difficult to isolate particular policies from one another

- A number of policy measures were identified as potentially easier to isolate from others:
  - HWRC controls / trade waste permitting systems.
  - AWC for refuse.
  - Free collections for garden waste.
  - Side waste bans/ enforcement.

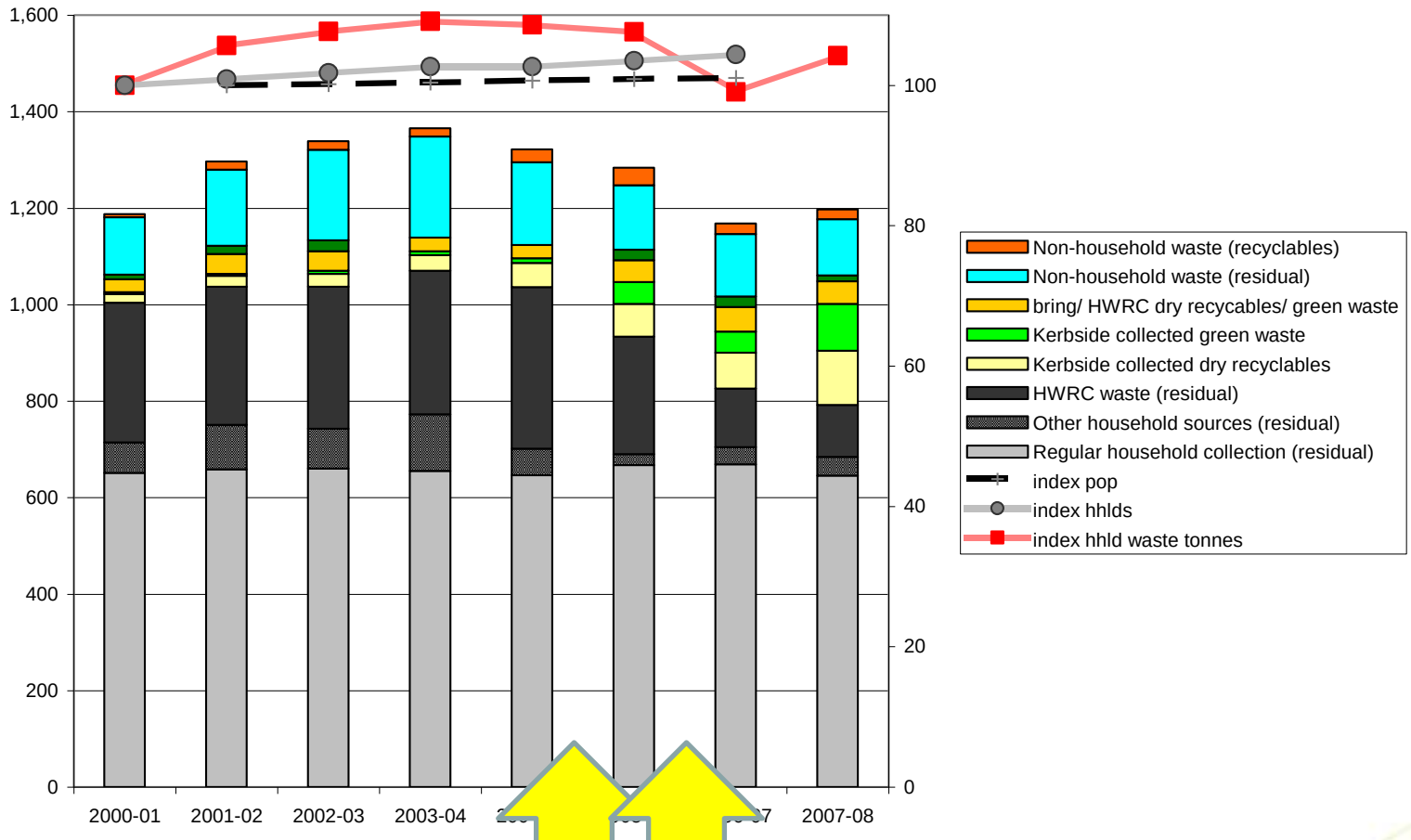
# 4. CA site controls, AWC, GW charged, food waste



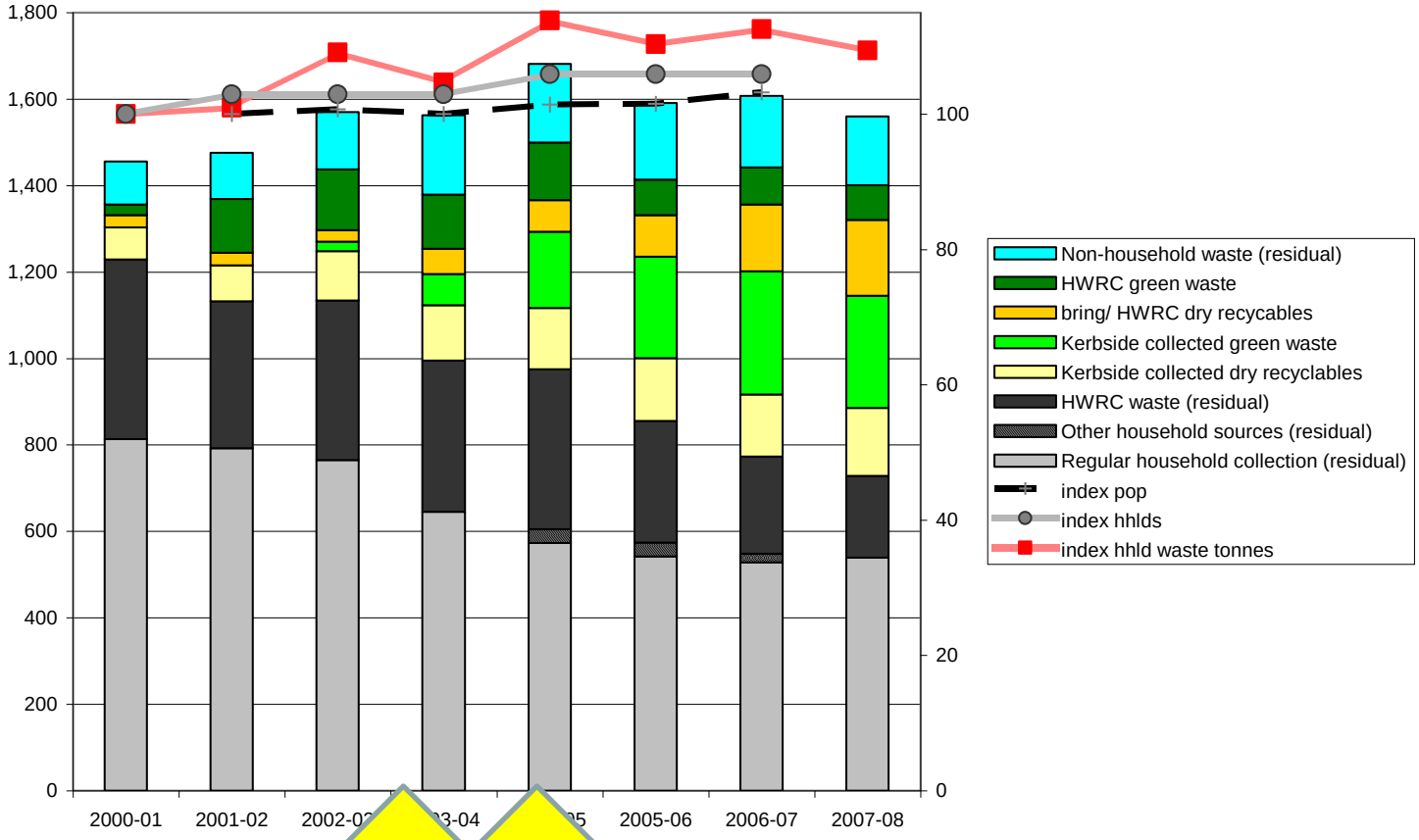

HWRC controls

AWC refuse, weekly recycling + separate food waste, GW charged

# 4. Weekly refuse + free garden waste collection



# AWC refuse and free garden waste collection, few/no bin capacity restrictions



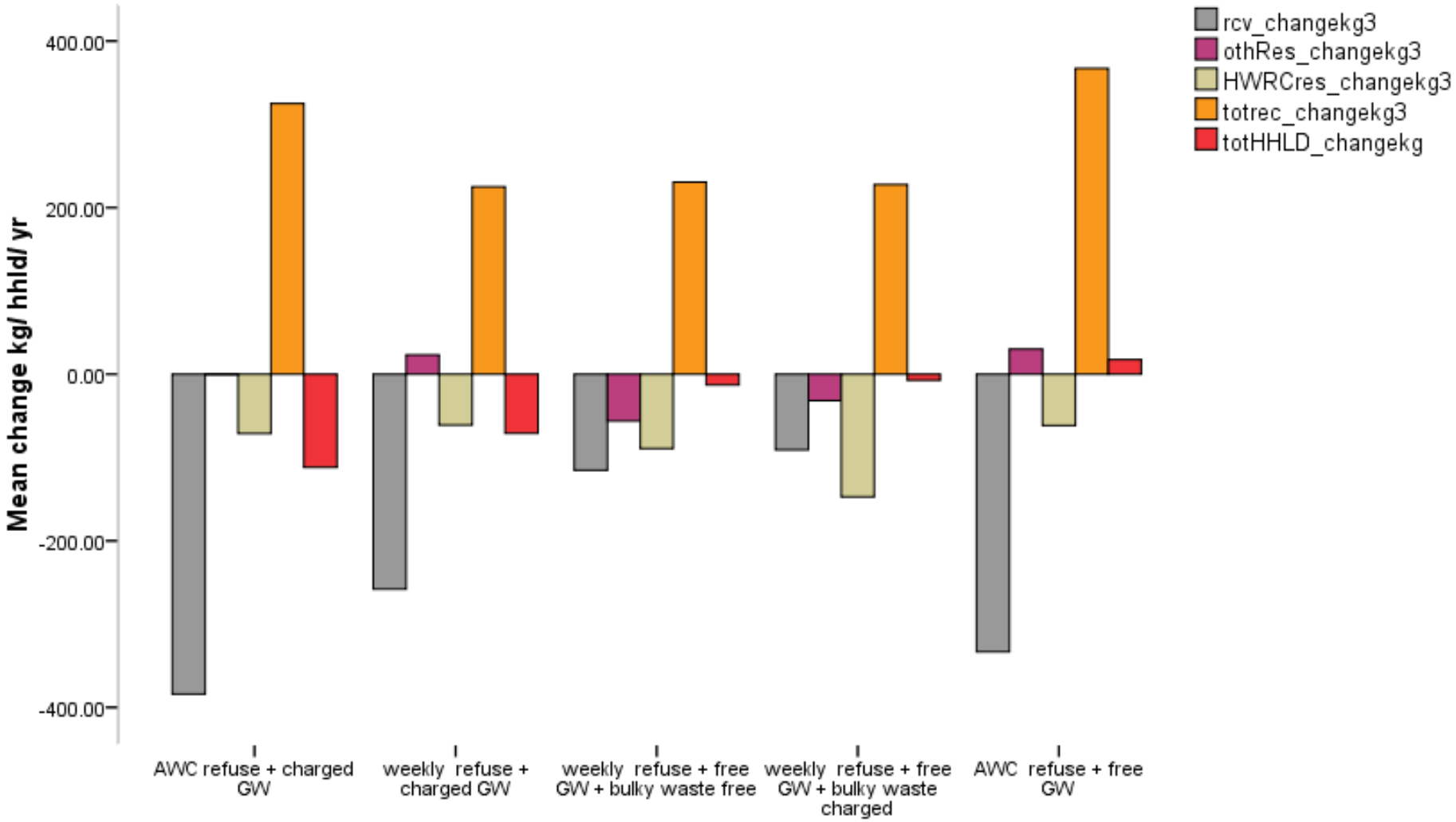

AW

Free GW

# 4. Waste collection policies – impacts of AWC on residual waste

| | Pre | Post | difference |
|---|---|---|---|
| 1. AWC refuse: areas with charged garden waste: kerbside hhld waste | 901.9 | 780.9 | -121.0 |
| 1. AWC refuse: areas charged garden waste: kerbside + bring hhld waste | 939.1 | 820.1 | -119.0 |
| 2. AWC refuse: areas with free garden waste: kerbside hhld waste | 926.6 | 913.4 | -13.1 |
| 2. AWC refuse: areas with free garden waste: kerbside + bring hhld waste | 1140.4 | 1148.1 | -29.6 |

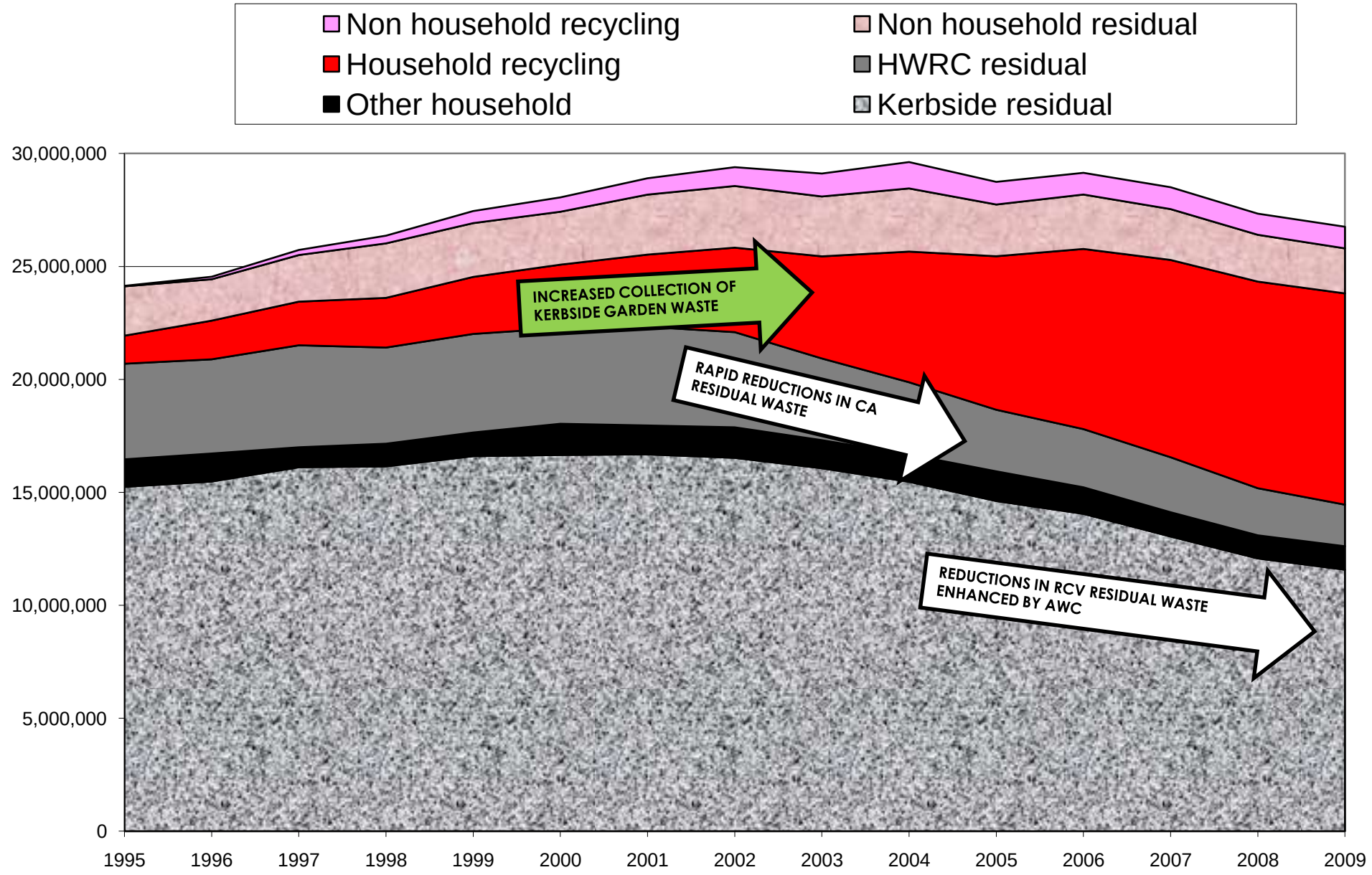
# 4. Case study findings by policy group– change in arisings by waste stream (2000/01 – 2006/07)



# 4. General conclusions from waste trends study

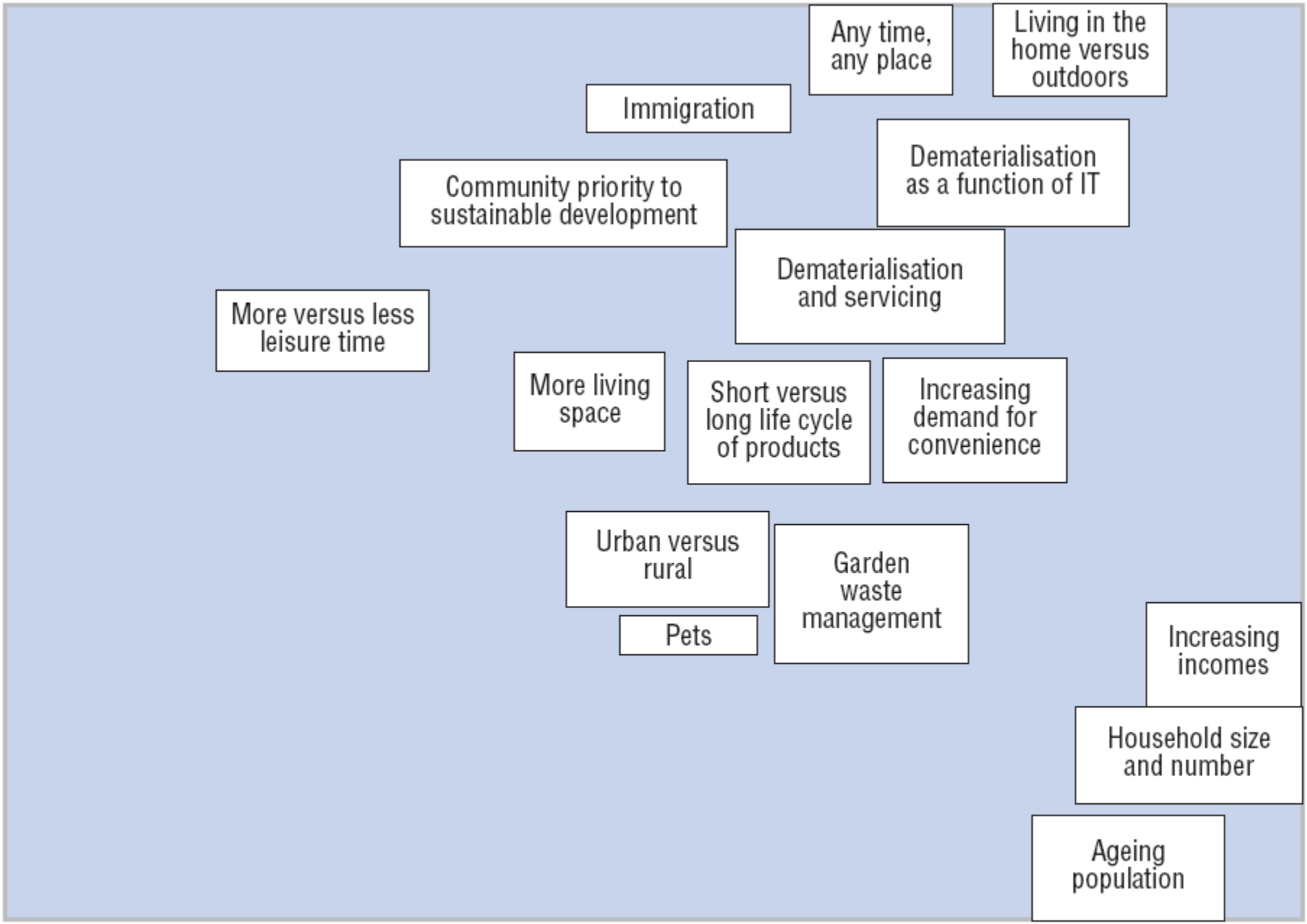
- Waste collection system design has very significant influence on household waste composition & quantity
- Waste prevention initiatives more likely to succeed in areas with 'balanced' residual & recycling collection capacities
- AWC is a key element in achieving this balance
- Controls at CA sites & garden waste policy have also been key local influences

# Municipal waste: England 1995-2009



# 5. What might future household waste look like?

- Need to consider current arisings & links with consumer expenditure patterns
- …..but dangers of not considering less certain / high consequence changes (technological & societal)


Any time, any place
Living in the home versus outdoors
Immigration
Dematerialisation as a function of IT
Community priority to sustainable development
Dematerialisation and servicing
More versus less leisure time
More living space
Short versus long life cycle of products
Increasing demand for convenience
Urban versus rural
Garden waste management
Pets
Increasing incomes
Household size and number
Ageing population
Very uncertain
Uncertain
Impact
Very high impact

| *Function* | *Subdivision* | *Sort of waste* | *Waste type* |
|---|---|---|---|
| Feeding | | | |
| | Eating | | |
| | | Kitchen waste | Organic waste |
| | | | Bread |
| | | Food packaging | Paper and cardboard |
| | | | Plastics |
| | | | Glass |
| | | | Metals |
| | | Small Durable Goods | Ceramics |
| | Drinking | | |
| | | Drink packaging | Paper and cardboard |
| | | | Plastics |
| | | | Glass |
| | | | Metals |
| | | Small Durable Goods | Glass |
| | | | Plastics |
| Recreation | | | |
| | | Pet waste | Other |
| | | Yard waste | Organic waste |
| Care | | | |
| | Health | | |
| | | Medicines | Various |
| | | Packaging | Various |
| | Personal | | |
| | | Cosmetics | Various |
| | | Diapers | Paper and cardboard |
| | | Cleaning | Various |
| Infotainment | | | |
| | Personal | | |
| | | Newspapers | Paper and cardboard |
| | | Electronics | Small Chemical Waste |
| | | Books | Paper and cardboard |
| | Commercial | | |
| | | Advertising | Paper and cardboard |
| | | Post Waste | Paper and cardboard |
| | | Plastic bags and sacks | Plastics |
| | | Electronics | |
| Clothing | | | |
| | | Disposal | Textile |
| | | | Leather |
| Not Allocated | | | |

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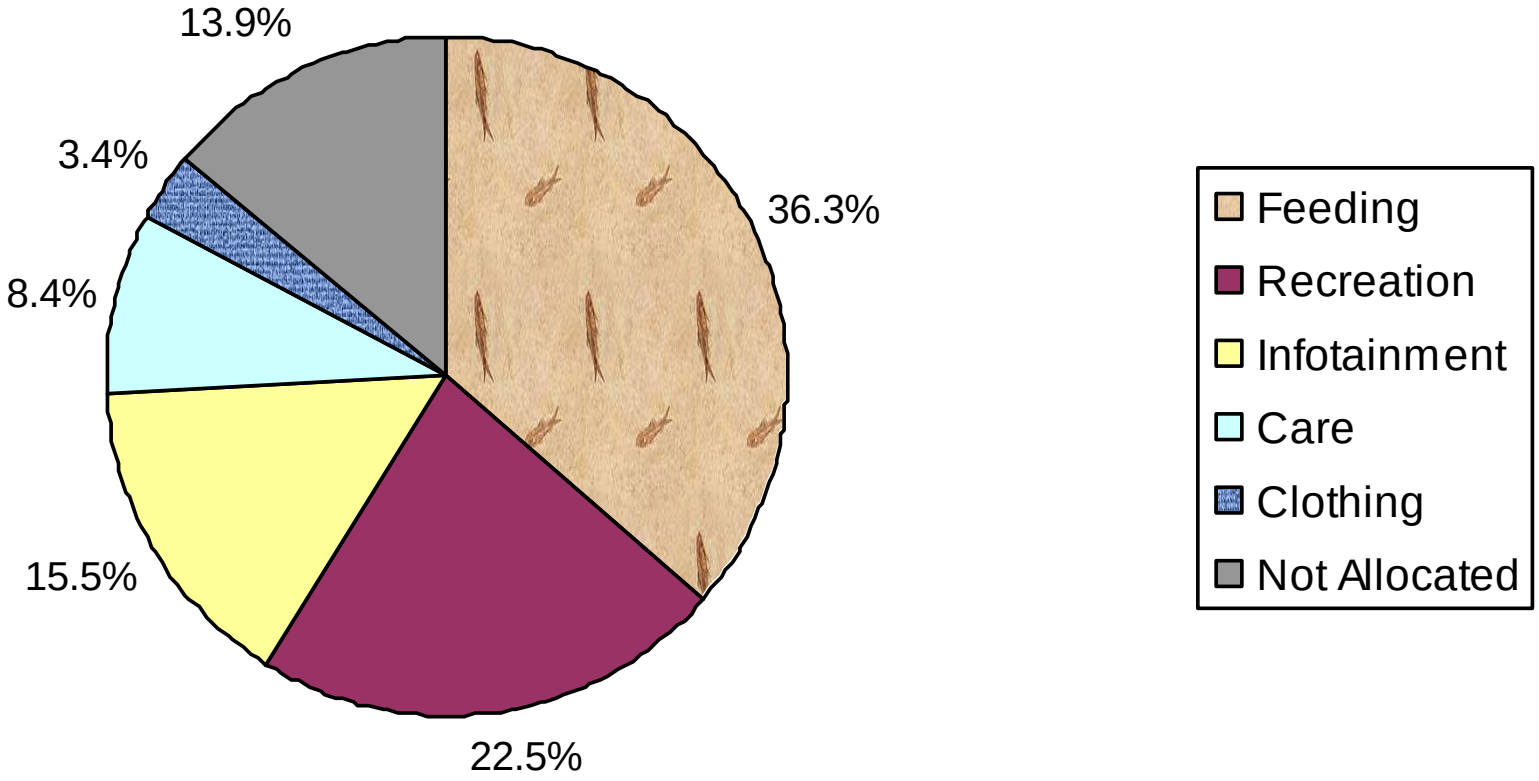
# Functions in the home & waste types generated (ESTO 2003)

**Household waste driven by way in which household needs are fulfilled by different material use**

**HOW WILL THESE NEEDS CHANGE?**

**HOW WILL THESE MATERIALS CHANGE?**

## 5. Household waste composition by function (ESTO 2003)



I. Media@home

II. On the road

materialisation

indoor

outdoor

dematerialisation

IV. Home sweet home

III. Comfort community

# 6. Conclusions

- Local waste policies can make significant difference to trends in reported household waste.
- Elements of behavioural change/ waste prevention: more difficult to quantify within operational statistics.
- Future household waste: lifestyles, technology, demography, climate change

# Thank you

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