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# Environmental policy and the energy crisis in the UK



Economic  
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# Introduction



- Governments face challenge of achieving carbon reductions in a cost effective way
- Situation made more acute by current energy crisis
- Textbook solution is Pigouvian tax
  - Tax carbon emissions according to marginal damage
  - Tax set at constant rate regardless of source
- Not what governments do...
  - More often than not, patchwork of policies with incentives to abate that differ across users of energy and sources of emissions

# This talk

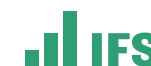


- Discuss UK environmental/energy policy heading into the crisis
- Other countries face similar trade offs and have made similar choices
- Add up effects of different policies that price carbon
  - Quantify differences across sources and users of energy
  - Discuss possible justifications for inconsistencies
  - Make case for greater rationalisation
- Brief discussion of policies during the current crisis

# Summary

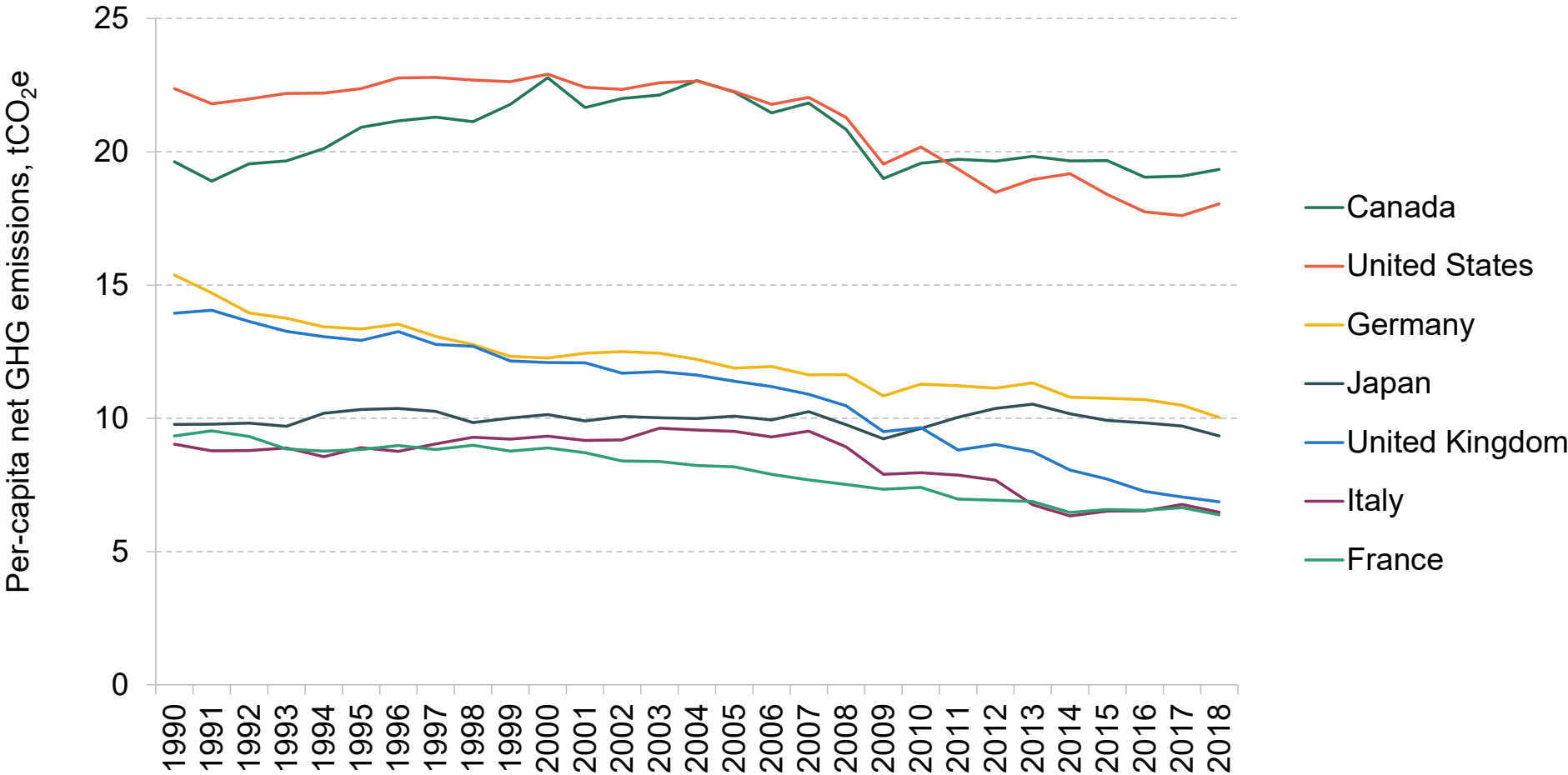
- Like many countries, UK has a goal of achieving net zero by 2050
- Relatively rapid reductions in GHG emissions over past 30 years
- Incentives to abate some emissions much stronger than others
- Emissions reductions focused in key sectors where incentives to abate have increased most
  - Energy supply
  - Waste management
  - Industrial processes
- Less progress in other sectors
  - Suggests differences in marginal costs of abatement/inefficiency

# Outline

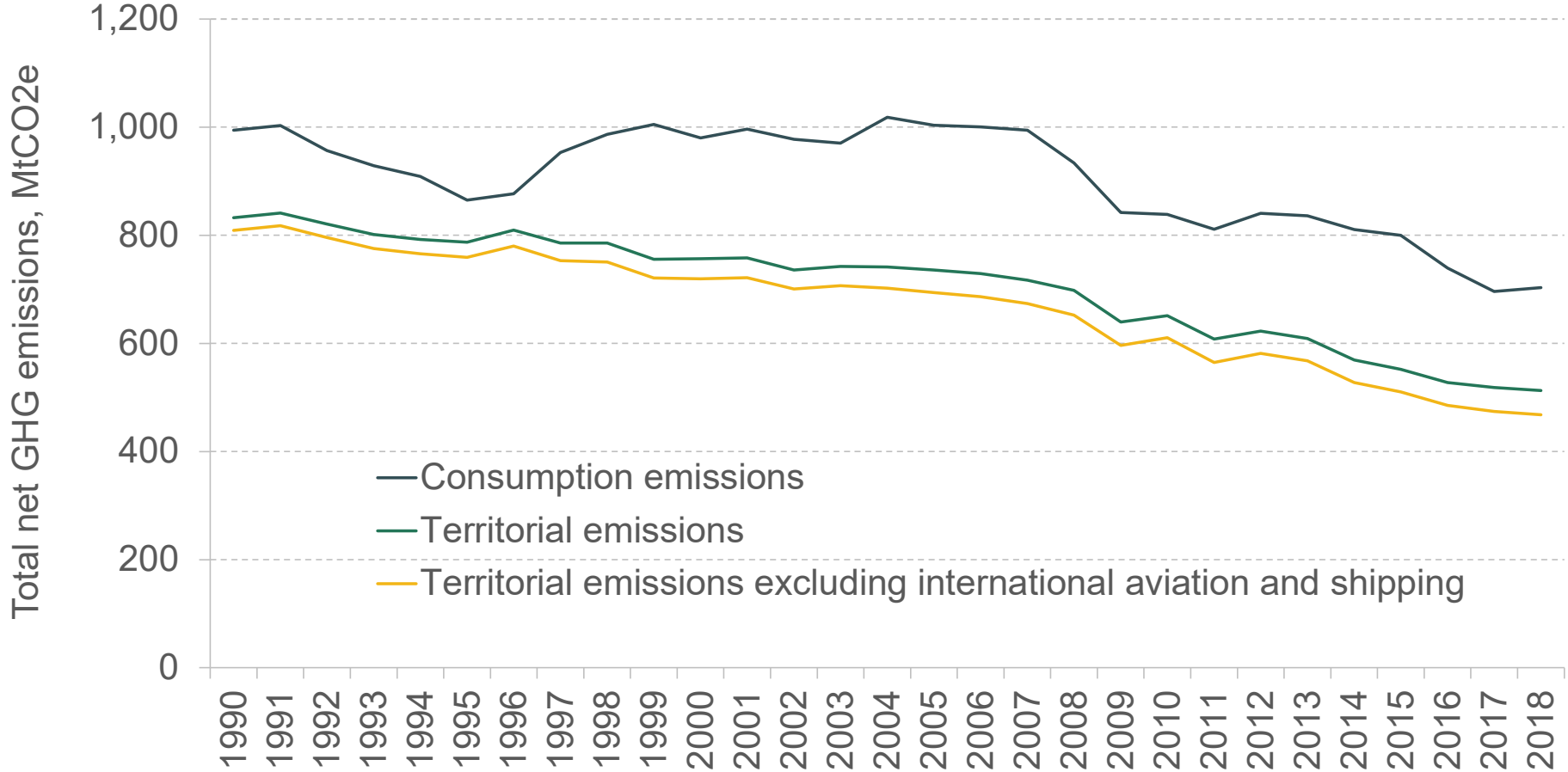


- Scene setting: UK emissions, pattern of emission reductions
- UK environmental policies
  - ‘Implicit carbon taxes’
- Possible justifications for uniformity
  - Other (overlapping) market failures
  - Carbon leakage
  - Distributional concerns
  - Alternative approach: use subsidies for low carbon alternatives
- Conclusion

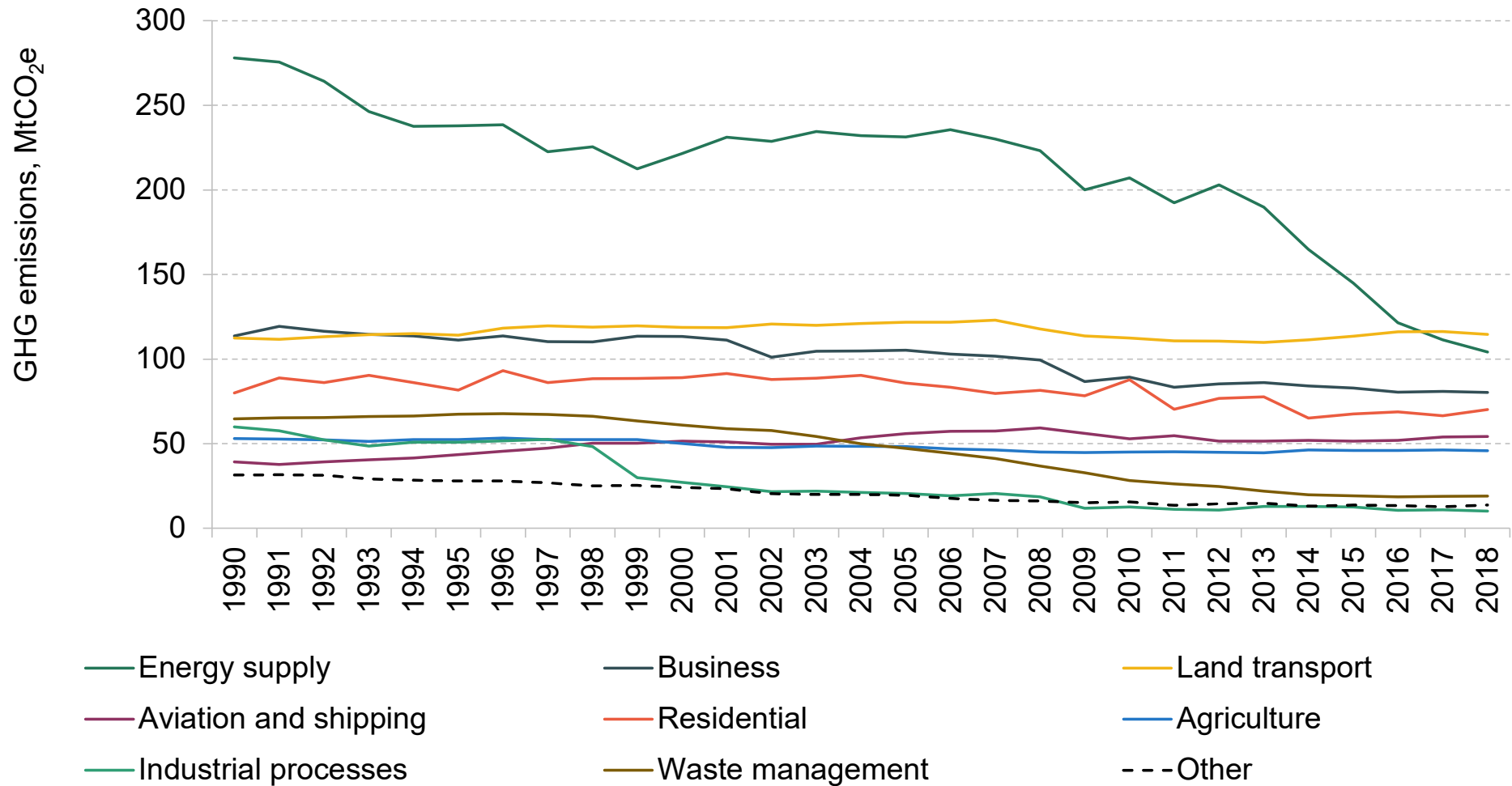
# Progress towards net zero



# Consumption vs production emissions



# Emissions by source





# Carbon Pricing in the UK

# Carbon pricing in the UK

- No single carbon tax
- Patchwork of policies
  - Taxes on carbon from electricity generation and business energy use
  - Charges and obligations on energy suppliers to subsidise renewables/energy efficiency
  - Fuel duties
  - Charges on polluting activities: air travel, landfill
  - Reduced rate of VAT on energy use, air travel
- All layered on tax system that is not neutral

# Exercise

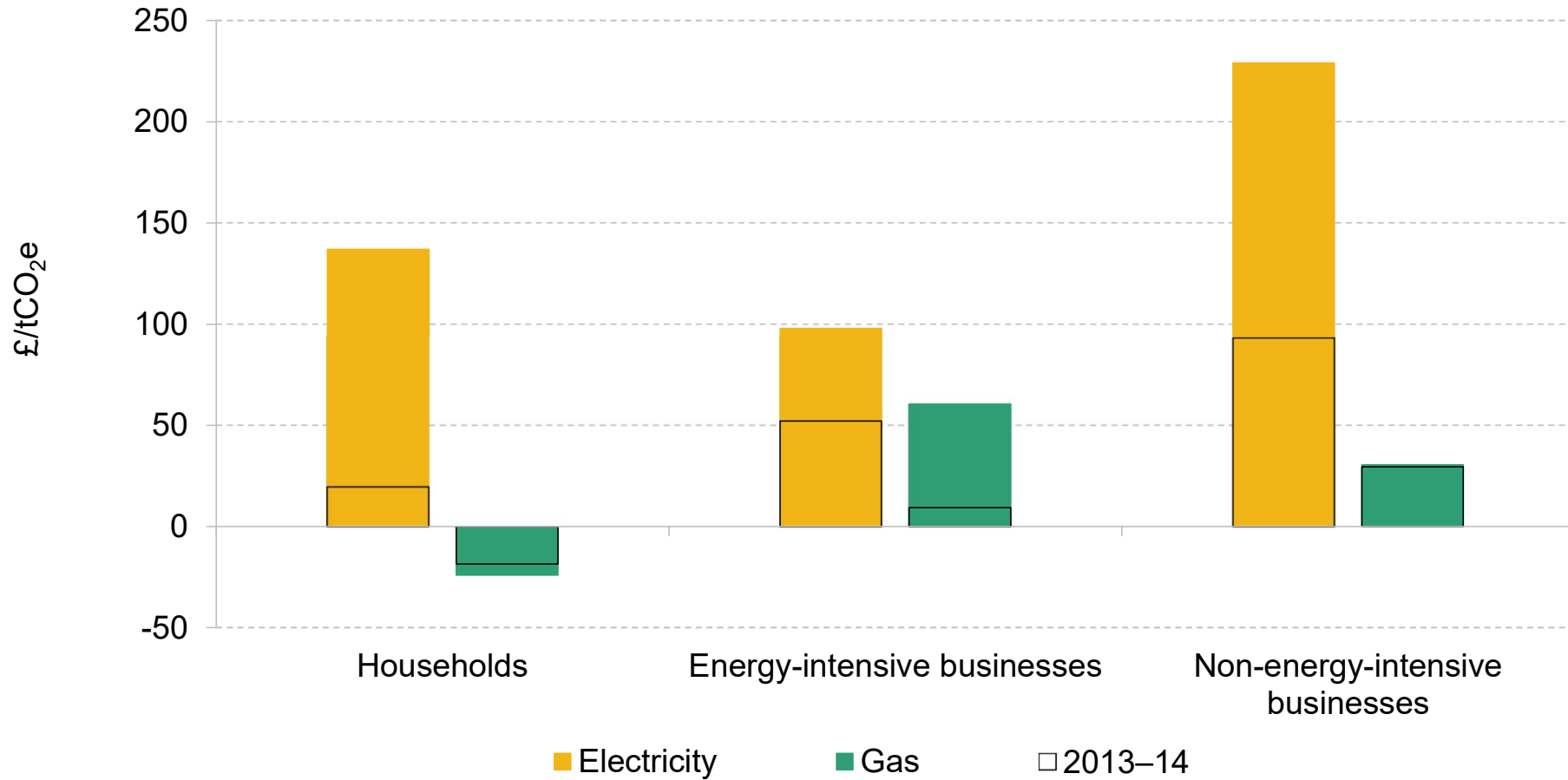
- Take policies raising costs on different sources of emissions
- Combine them to calculate “implicit” taxes
  - E.g. translate taxes on electricity or gas consumption using carbon content per KWh
- Compare for different users and sources of energy
- Note:
  - Different from *average* tax rate (effect on bills)
  - Policy need not be a tax – just raises MC of emissions
  - *Relative* to goods charged at standard rate of VAT (20%)
    - *Relative* to consuming other goods what has happened to incentives

# Main policies in UK energy market



- **UK Emissions Trading Scheme (ETS) – formerly EU ETS**
  - Cap and trade scheme for covered sectors (29% of emissions)
- **Carbon Price Floor**
  - Supplements ETS with £18 per tonne of CO2 charge for electricity generators
- **Climate change levy**
  - Tax on *business* energy use (not explicitly linked to carbon content)
- **Renewables obligation**
  - Old scheme, suppliers had to source certain % from renewable sources or pay a fee
- **Contracts-for-difference**
  - Guaranteed price for output of renewable generators (symmetric), funded by levy
- **Reduced VAT 5% rate on household energy bills**

# Implicit tax rates on GHG emissions in energy market



# Taxes on fuel, waste & aviation



## **Petrol & Diesel**

- Fuel duty (£/litre) – different rates for different fuels
- Renewable transport fuel obligation – mandates supply of biofuel

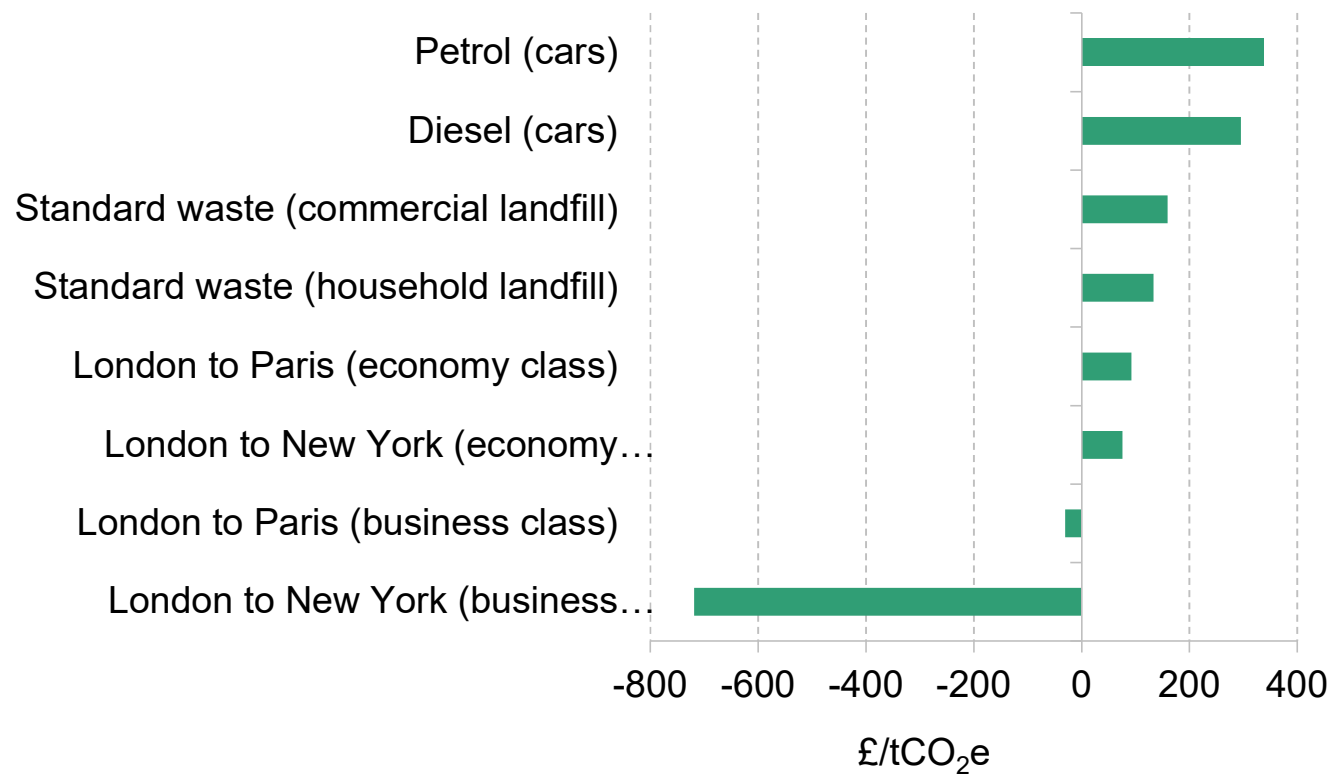
## **Aviation**

- UK ETS – cap-and-trade for flights to the EEA
- Air passenger duty (£/passenger) – rates for long/short haul standard/premium class
- VAT 0% rate on passenger flights

## **Waste**

- Landfill tax (£/tonne)

# Implicit tax rates on GHG emissions for fuel, waste and aviation



# Why deviate from uniformity?



# Deviations from uniformity

- Textbook economics suggests that uniform price is efficient
- Why might UK (and others) deviate?
  1. Other market failures
  2. Carbon leakage
  3. Distributional concerns
  4. Achieving decarbonisation through other means

# Other market failures

- Some consumers might not respond to price signals because they are not salient
- Credit constraints may prevent energy efficiency improvements
- Innovation: a chicken and egg problem (e.g. electric vehicles). Aghion et al 2014
- Incomplete information: landlords and tenants
- Justify lower carbon prices for electricity and gas?
  - Perhaps as a second best solution. First best solutions target these problems directly
- In other cases there are overlapping market failures
  - E.g. fuel duties may also target congestion

# Carbon leakage

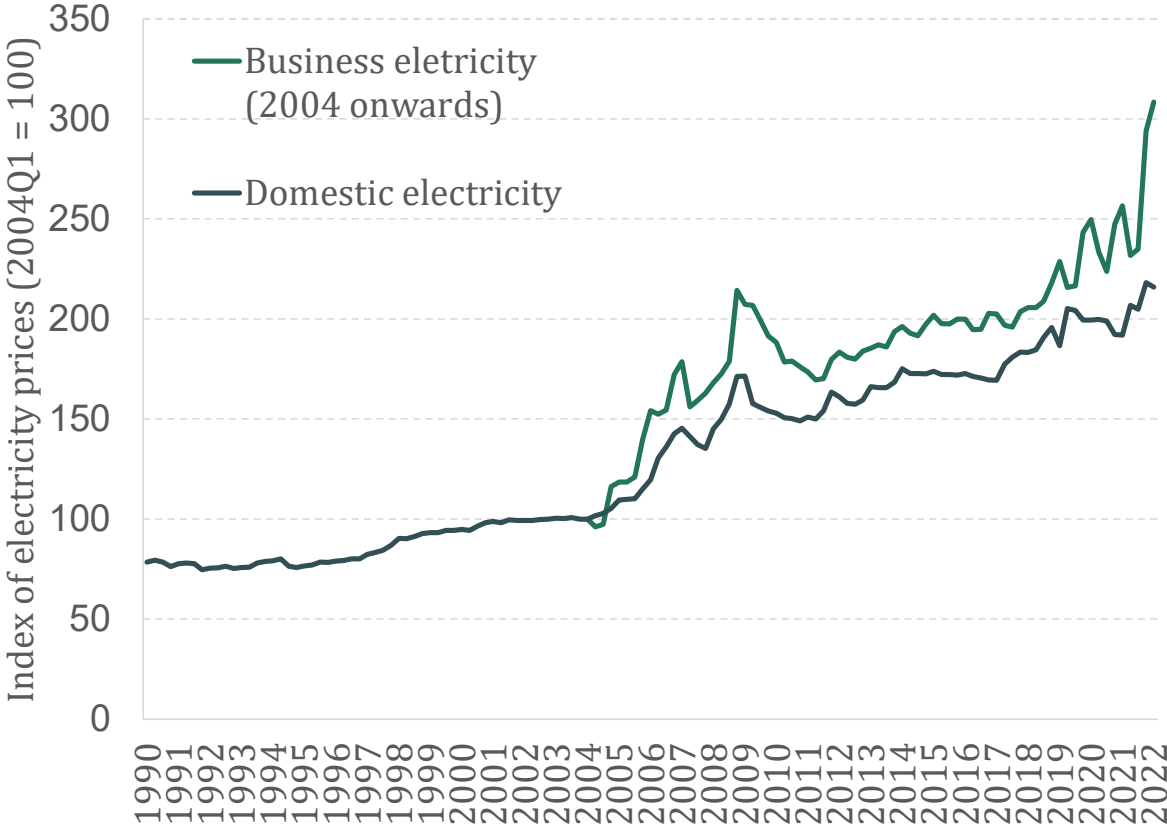
- Other countries may set lower (or no) carbon prices
- Potentially justifies lower carbon taxes for internationally exposed firms
- Downside: reduces incentives to abate in carbon intensive industries
- Current approach: EU and UK allocate free ETS permits to exposed industries (around half)
  - Potentially sensitive to lobbying
  - Forgone revenue
- Alternative is Carbon Border Adjustment Mechanism (CBAM)
  - See Keen et al. (2022)

# Distributional considerations



- UK climate policies undoubtedly affected bills...

# Real electricity prices

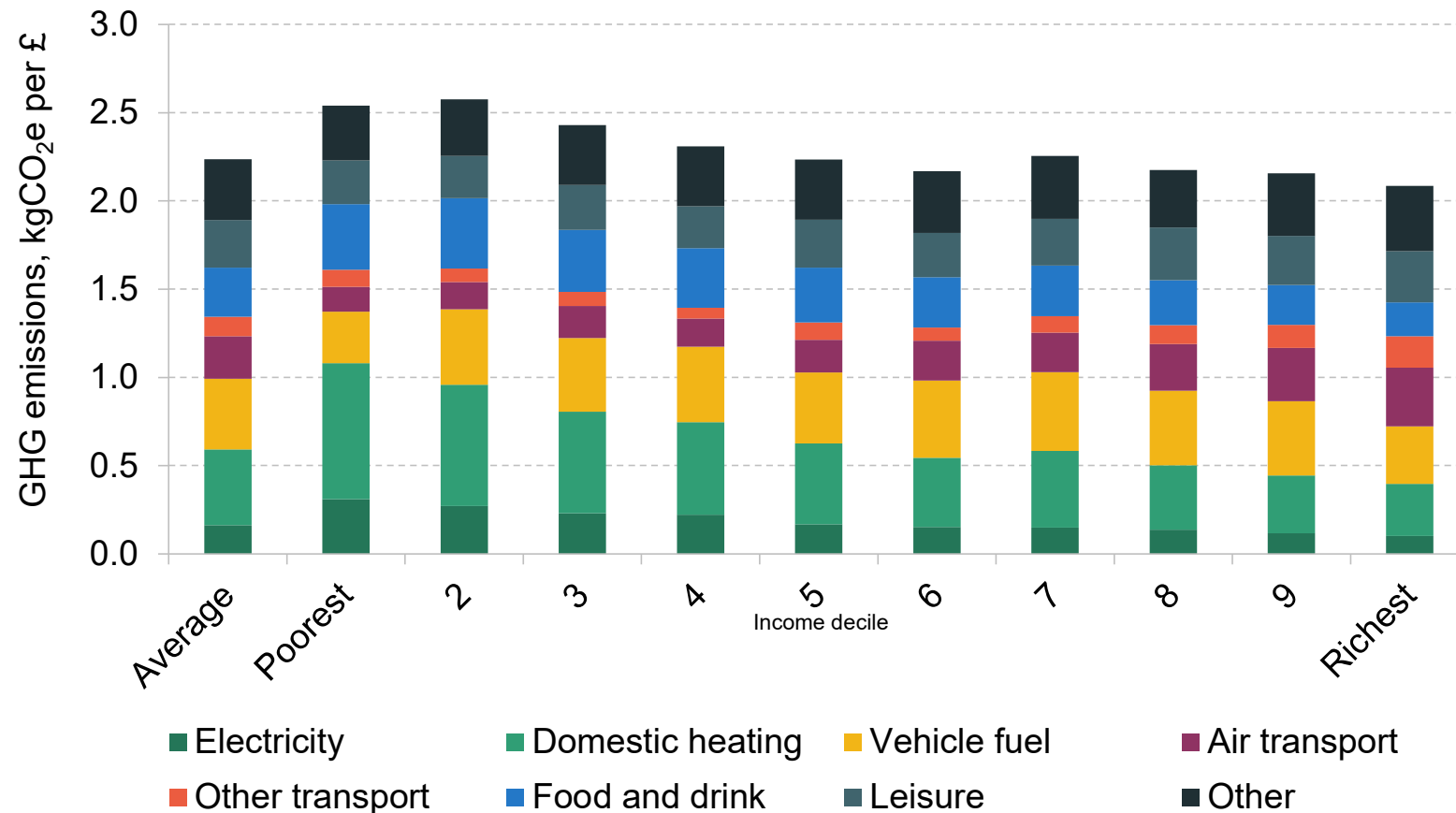


# Distributional considerations



- UK climate policies undoubtedly affected bills
- And budgets of poorer consumers are more carbon intensive in general...

# Average GHG emissions per pound spent



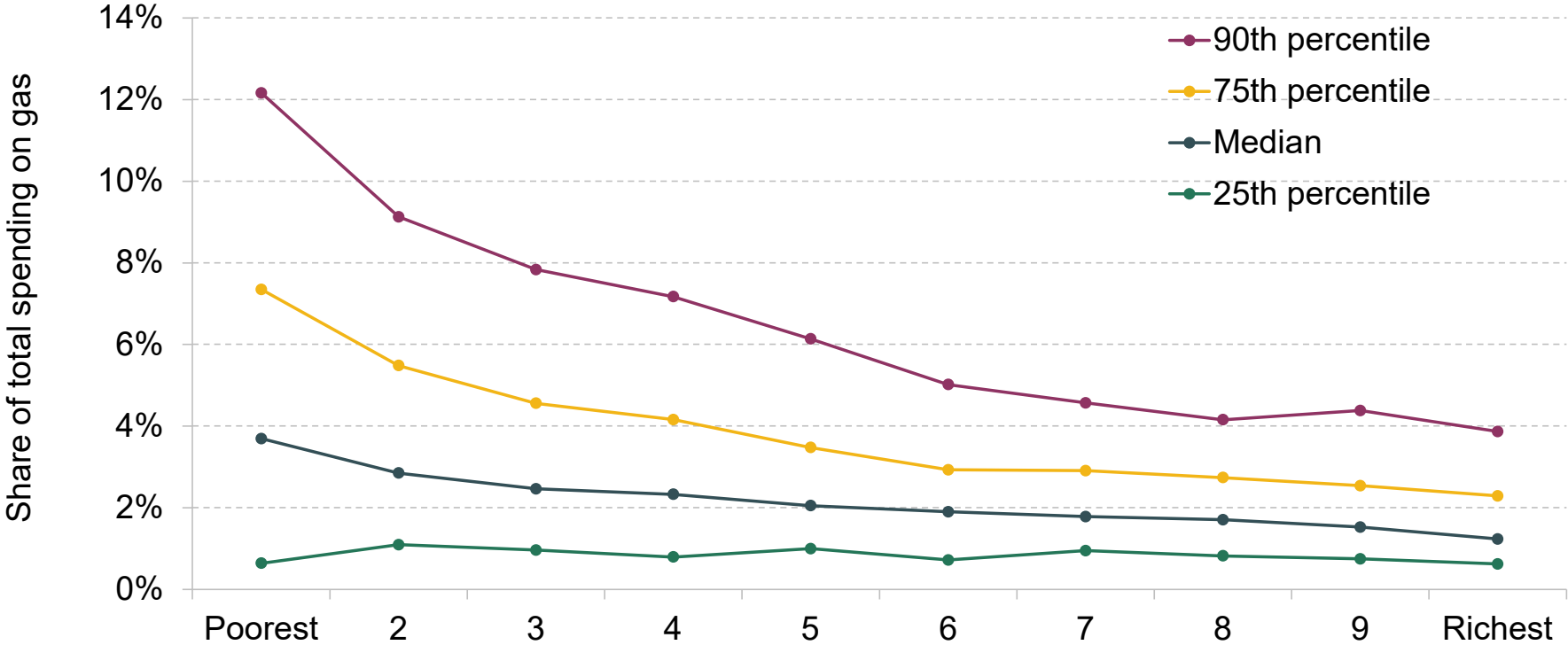
# Distributional considerations



- UK climate policies undoubtedly affected bills
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- And compensation is difficult to target...



# Distribution of gas spending by equivalized income decile



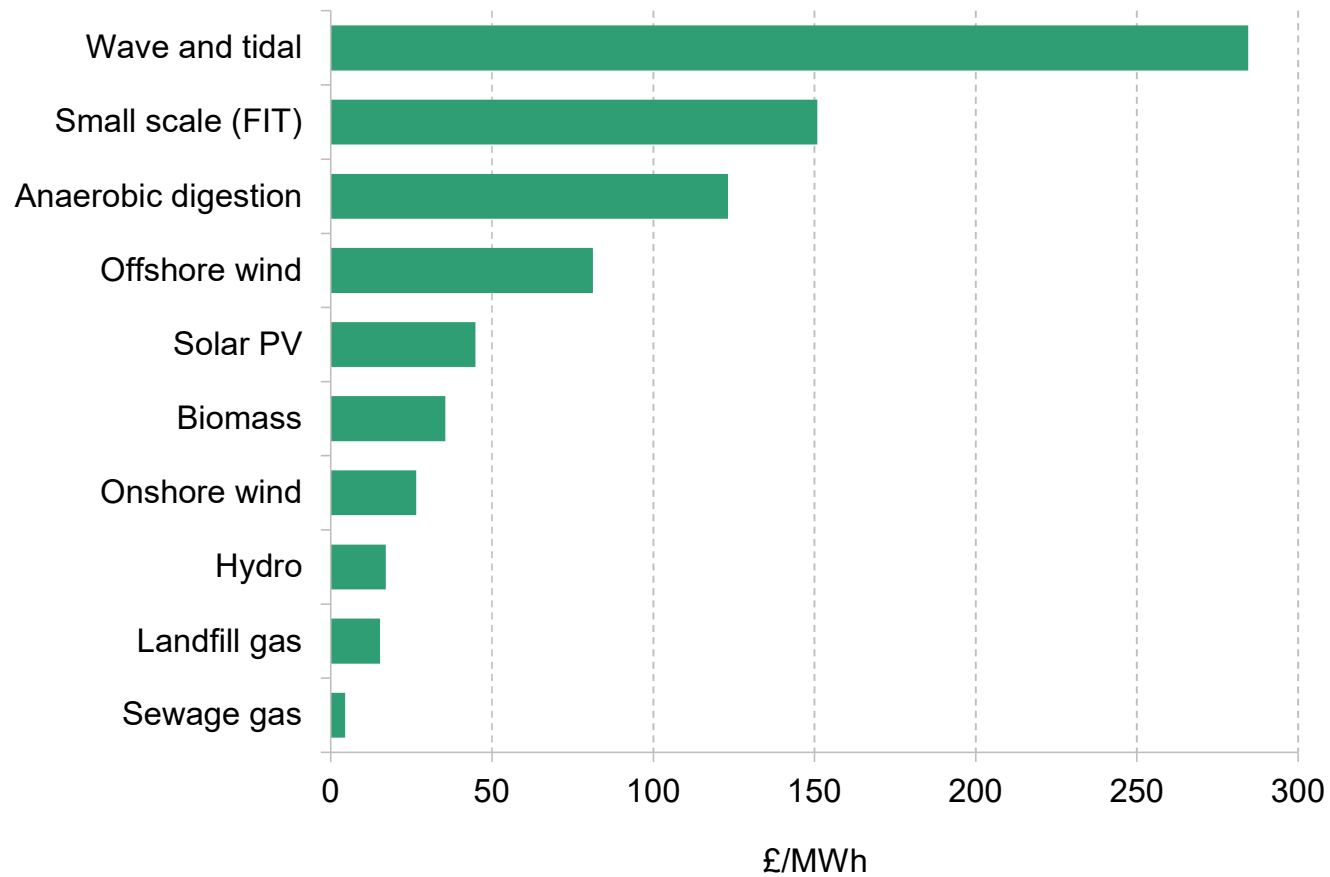
# Distributional considerations

- UK climate policies undoubtedly affected bills
- And budgets of poorer consumers are more carbon intensive in general
- And compensation is difficult to target
  
- Is this why HHs taxed less than businesses?
- But doesn't explain other inconsistencies
  - Elec vs gas
- Various things govts can do to mitigate impacts
  - Preannounce changes, complementary policies

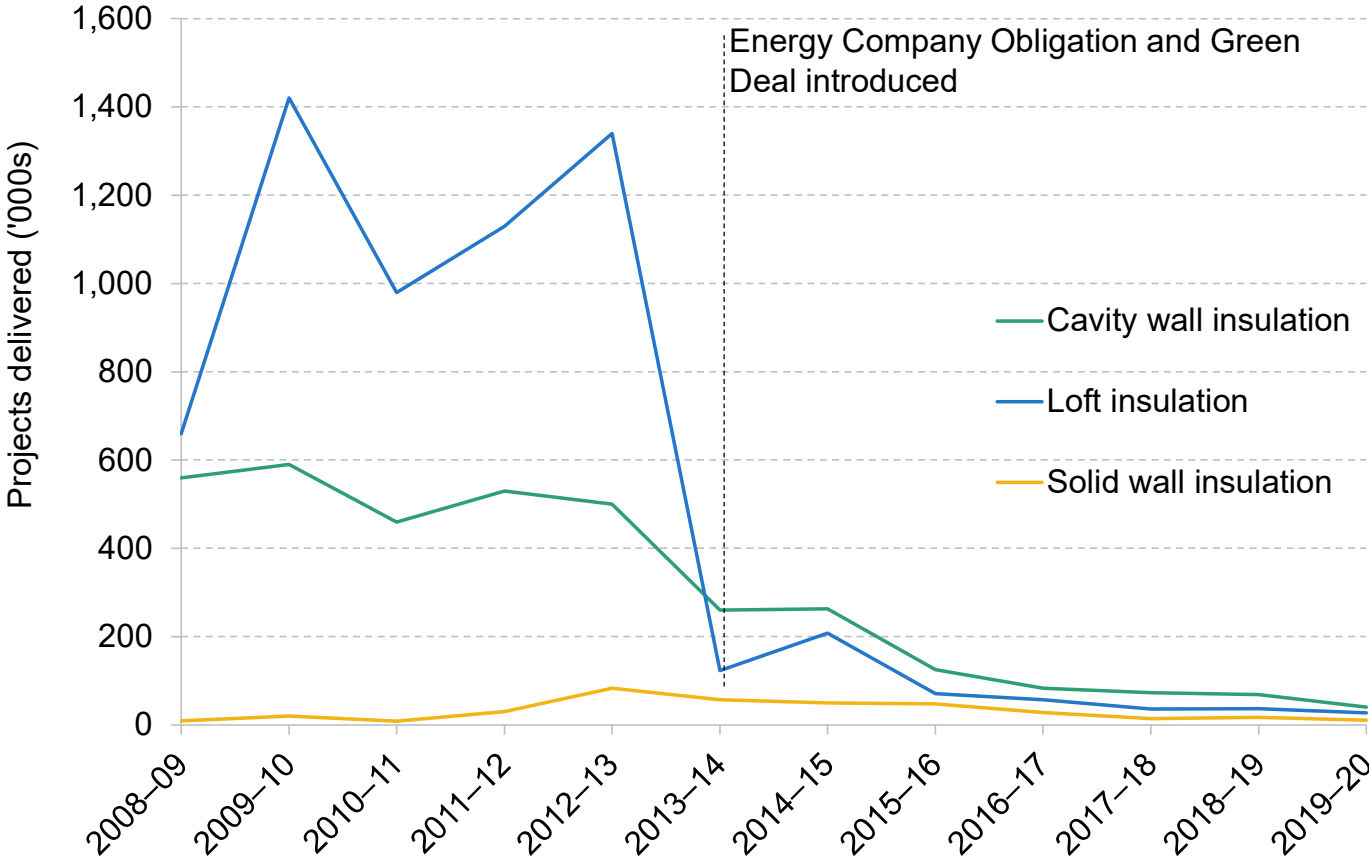
# Other subsidies

- Subsidies also provide incentives to decarbonise, and avoid distributional issues
- But downsides relative to carbon taxes/prices
  - Cost money instead of raising it
  - Must decide what to subsidise (trains? Electric cars?)
  - Rebound effects on energy usage
- Consider two cases (cautionary tales?)
  - Subsidies for renewables
  - Energy efficiency subsidies

# Net average subsidy by renewable type (2020-21)



# Govt insulation projects delivered in GB



# Summary

- Stark inconsistencies in UK carbon prices
  - HHs pay less per g of CO<sub>2</sub>e than businesses
  - Implicit taxes higher on electricity than gas
  - Higher on long haul than short haul flights
  
- Reflected in pattern of UK emissions

# Some specific recommendations

- Scope to make carbon taxes more consistent
  - E.g. extending the ETS above 29% of emissions currently covered
- Some progress so far e.g. in greater alignment of CCL rates on electricity and gas
- ‘Able to pay’ households still lack incentives for insulation or to reduce energy consumption
- Long-term strategy needed for road taxation and switch to electric vehicles

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