

The Economics of Low Carbon Cities

Outcomes of a City-Scale Mini-Stern Review





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The Approach



A review of thousands of energy efficient and low carbon options – only considers energy efficiency and small scale renewables.

A realistic assessment of the costs and the energy (and hence cost and carbon) savings associated with each measure.

A review of the scope for the deployment of these measures in households, commerce, transport and industry at the local level.

Identification of the most cost and carbon effective options for different sectors.

Mapping the capacity of the low carbon goods and services sector to absorb investment and create employment.

All based on conservative assessments and realistic projections.

Headline Outputs from a City-Scale Mini-Stern Review



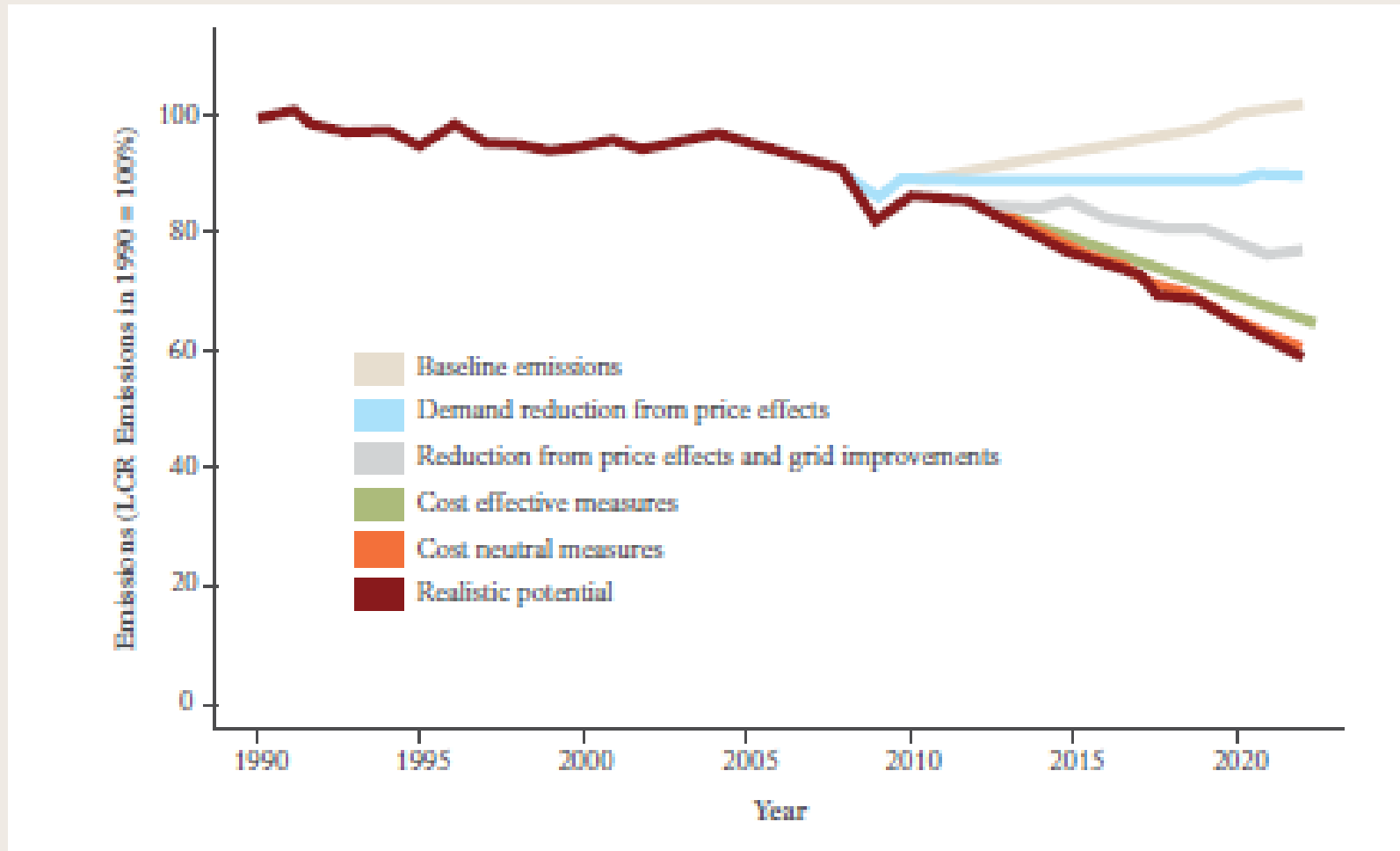
£5.4 billion (c10% of GDP) left the LCR economy in 2010 through payment of the energy bill. This figure is forecast to grow to **£7.24 billion** by 2022.

There is a commercially attractive opportunity to bring **£4.9 billion** of investment into the LCR economy to exploit cost effective low carbon and energy efficient options.

Such investments would pay for themselves in 4 years, cutting LCR energy bills by **£1.2 billion** a year.

They would also create **4,443 jobs** and an extra **£211 million** in wider GDP every year.

The Carbon Impact



Cost Effective Investments - Domestic



- £1.1 billion of investment opportunities
- Exploiting these would generate savings of £400 million a year
- Payback period under 3 years
- Would create 978 jobs
- Would create a further £46 million a year in extra GVA
- Carbon savings equivalent to 3.8% of LCR emissions

Top 10 Measures - Domestic



Cost Effective

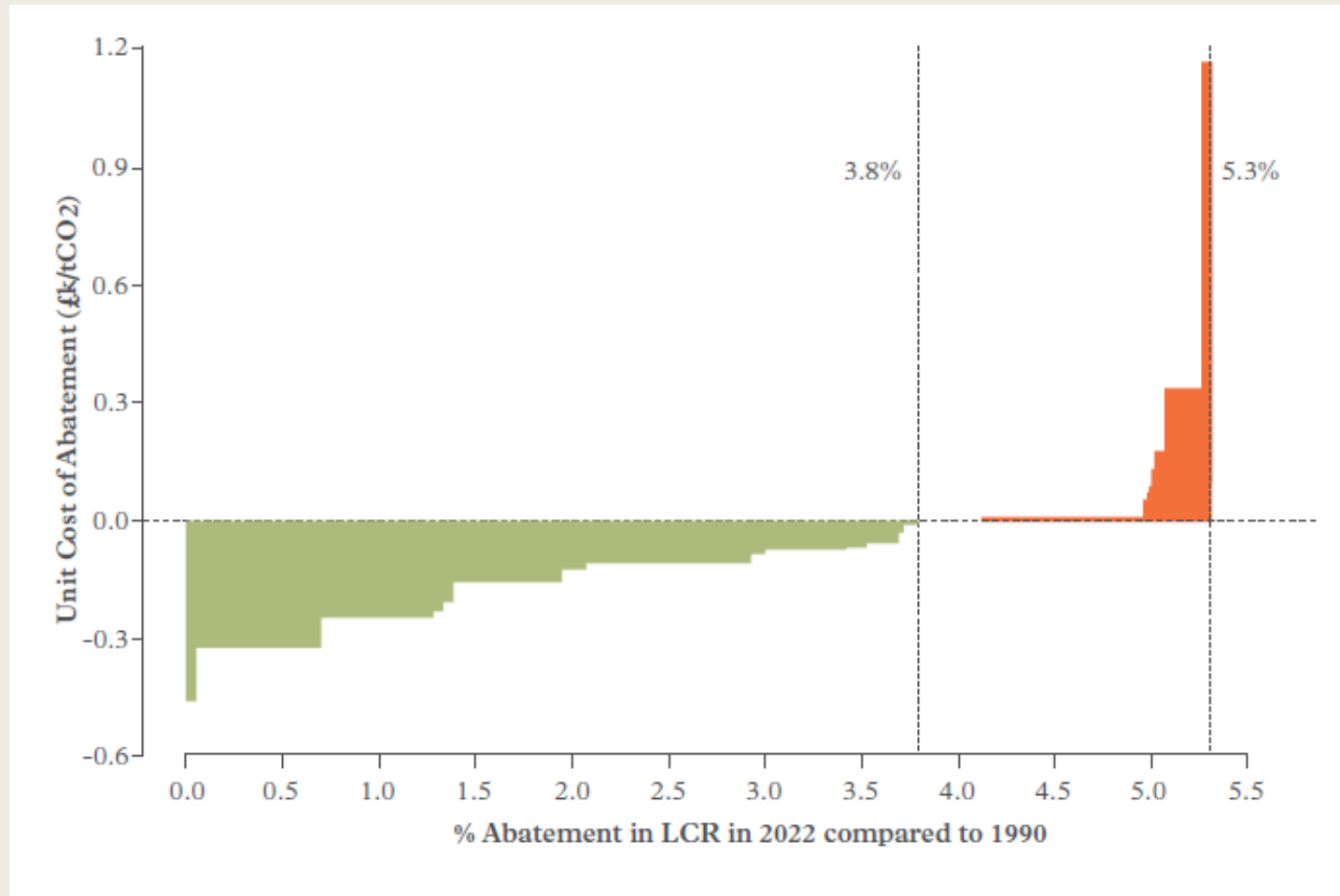
- Mini wind turbines (5kW) with FIT
- Biomass boilers with RHI
- Electronic products
- ICT products
- Integrated digital TVs
- Reduced standby consumption
- Reduce heating for washing machines
- A++ rated cold appliances
- A rated ovens
- Biomass district heating with RHI

Carbon Effective

- Reduce household heating by 1 C
- Solid wall insulation
- Biomass boilers with RHI
- Pre76 cavity wall insulation
- Electronic products
- Biomass district heating with RHI
- Ground Source Heat Pump with RHI
- ICT products
- Efficient lighting
- Air Source Heat Pump with RHI

Cost effective – Cost neutral – Realistic potential

The Domestic Sector MAC Curve



Cost effective – Cost neutral – Realistic potential

Cost Effective Investments – Commercial



- £1.9 billion of investment opportunities
- Exploiting these would generate savings of £335 million a year
- Payback period 5.5 years
- Would create 1,600 jobs
- Would create a further £71 million a year in extra GVA
- Carbon savings equivalent to 3.9% of LCR emissions

Top 10 Measures - Commercial



Cost Effective

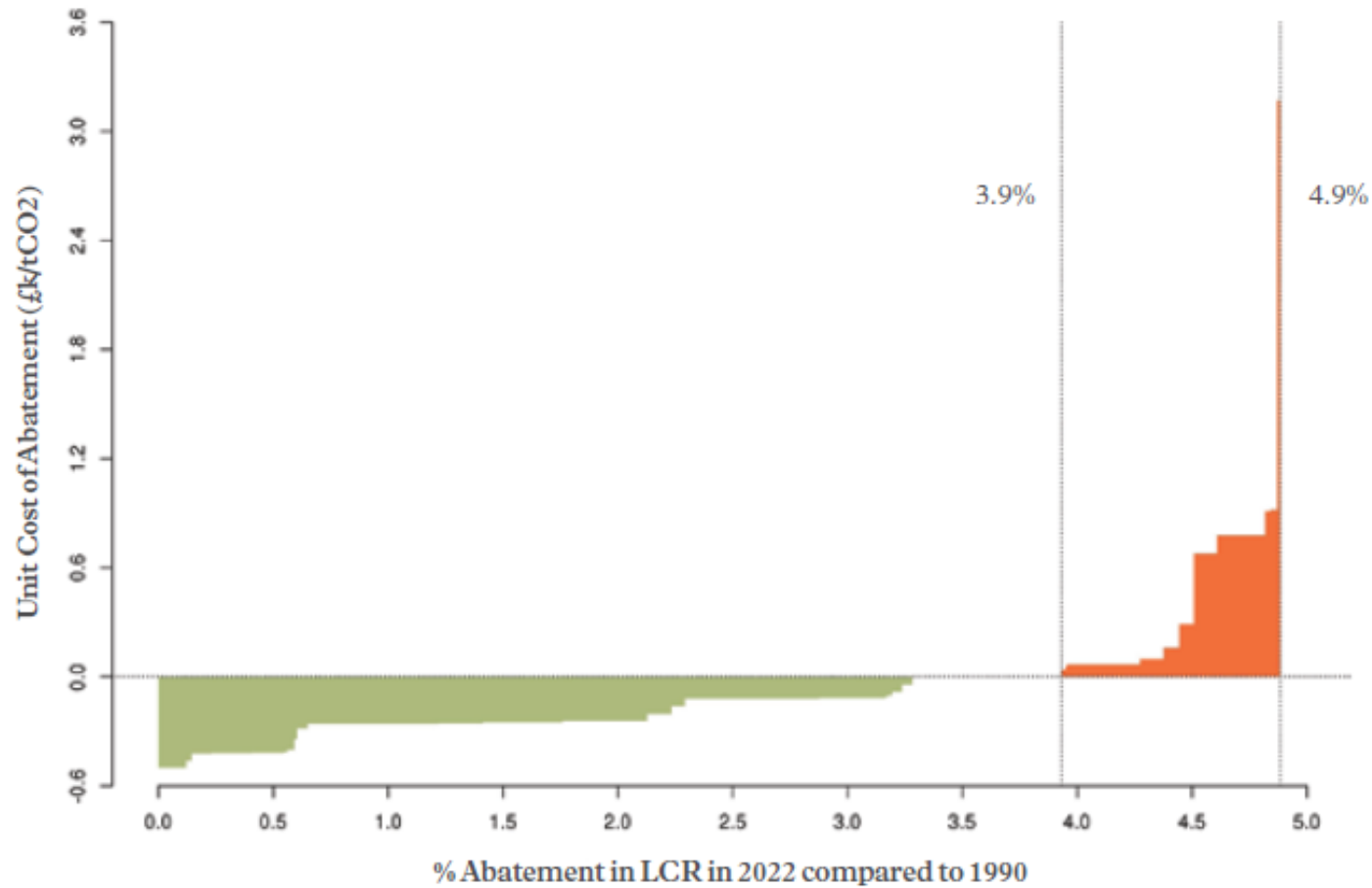
- Fax machine switch off
- Photocopier energy management
- Monitor energy management
- Computers energy management
- Printers energy management
- Vending machines energy management
- Most energy efficient monitors
- Lights - Turn off lights for an extra hour
- Lights - Sunrise-Sunset timers
- Lights - Basic timer

Carbon Effective

- Air Source Heat Pump with RHI
- Most energy efficient boilers
- Programmable thermostats
- Biomass boilers with RHI
- Reducing room temperature
- Ground Source Heat Pumps with RHI
- Biomass District Heating with RHI
- Most energy efficient double glazing
- Heating - Optimising start times
- Lights - Basic timer

Cost effective – Cost neutral – Realistic potential

The Commercial Sector MAC Curve



Cost effective – Cost neutral – Realistic potential

Cost Effective Investments - Industrial



- £1.07 billion of investment opportunities
- Exploiting these would generate savings of £320 million a year
- Payback period 3.3 years
- Would create 116 jobs
- Would create a further £7.5 million a year in extra GVA
- Carbon savings equivalent to 4.3% of LCR emissions

Top 10 Measures - Industrial



Cost Effective

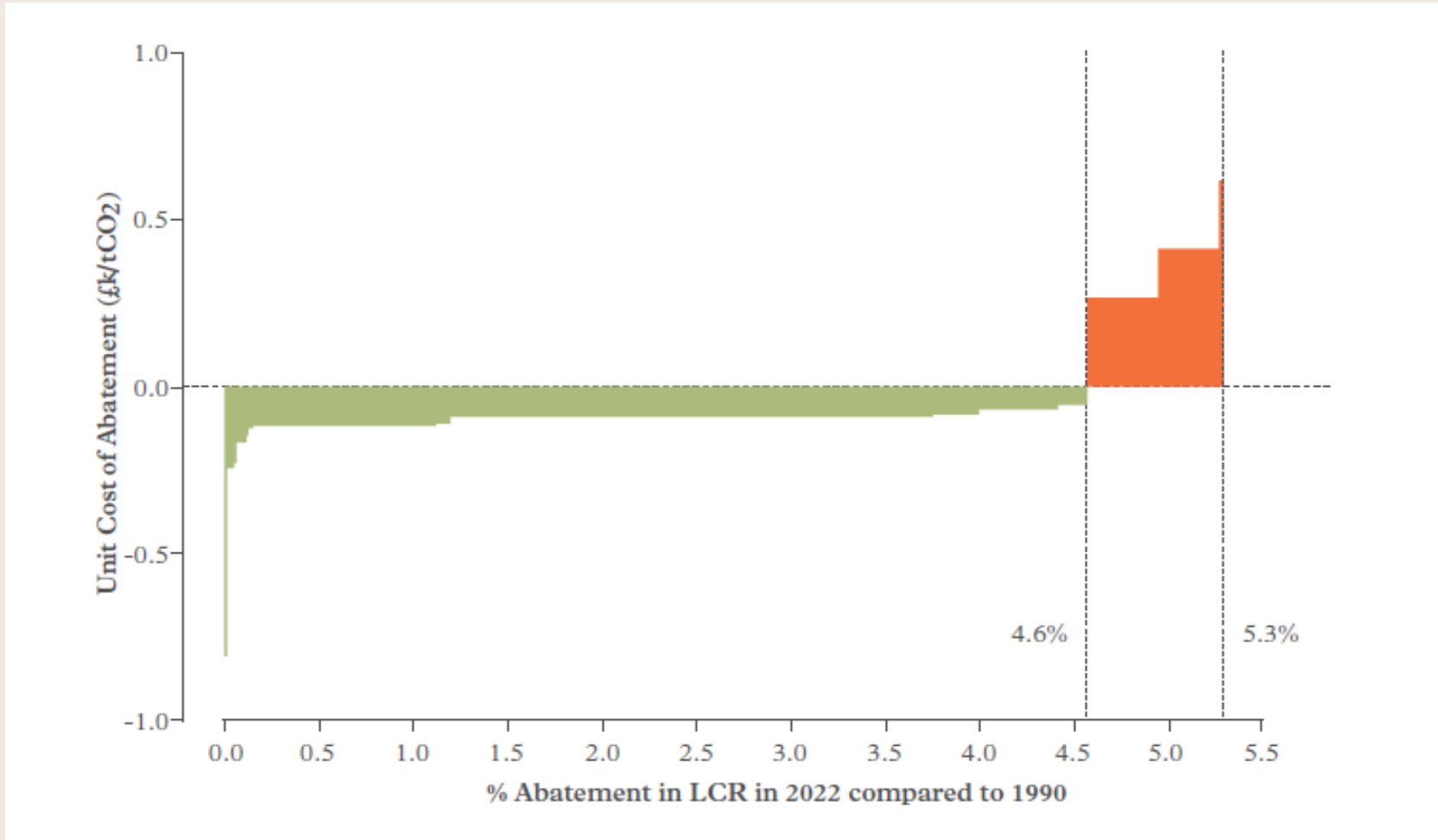
- Burners
- Refrigeration and air-conditioning
- Compressed air
- Lighting
- Fabrication and machining
- Design
- Building energy management
- Operation and maintenance
- Heat recovery
- Drying and separation

Carbon Effective

- Renewable heat
- Process improvement
- Drying and separation
- High temperature heating
- Others
- Motors and drives
- Controls
- Heat recovery
- Low temperature heating
- Operation and maintenance

Cost effective – Cost neutral – Realistic potential

The Industrial Sector MAC Curve



Cost effective – Cost neutral – Realistic potential

Cost Effective Investments - Transport



- £850 million of investment opportunities
- Exploiting these would generate savings of £130 million a year
- Payback period 6.3 years
- Would create 116 jobs
- Would create a further £7.5 million a year in extra GVA
- Carbon savings equivalent to 0.9% of LCR emissions

Top 10 Measures - Transport



Cost Effective

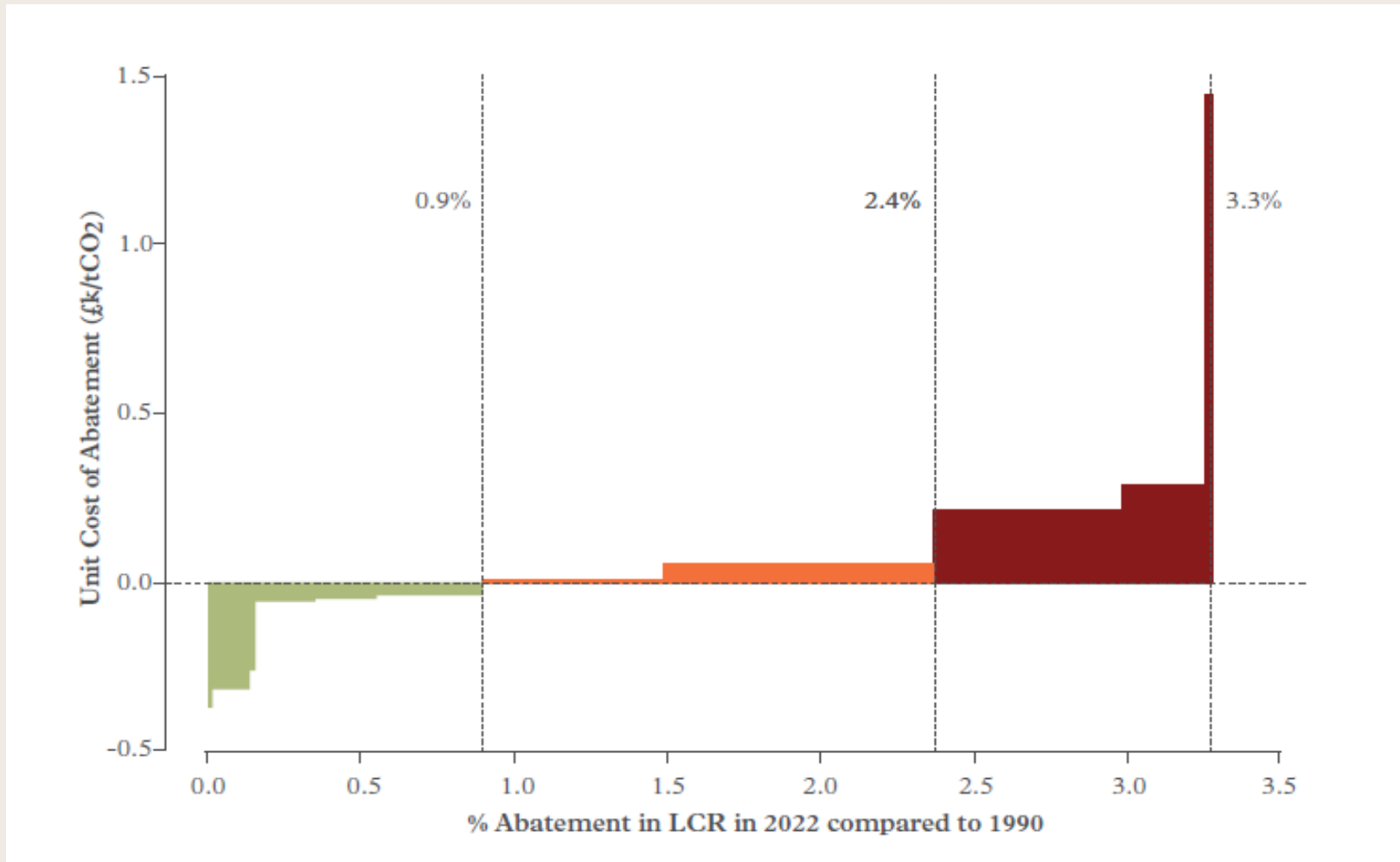
- Park and ride schemes
- Express bus/coach network
- Bus priority and quality enhancements
- Smarter choices
- Cycling
- Mild hybrid vehicles
- Demand management
- Plug-in hybrid vehicles
- Full hybrid vehicles
- Biofuels

Carbon Effective

- Biofuels
- Micro hybrid vehicles
- Full hybrid vehicles
- Plug-in hybrid vehicles
- Electric vehicles
- Demand management
- Mild hybrid vehicles
- Smarter choices
- Bus priority and quality enhancements
- Rail electrification

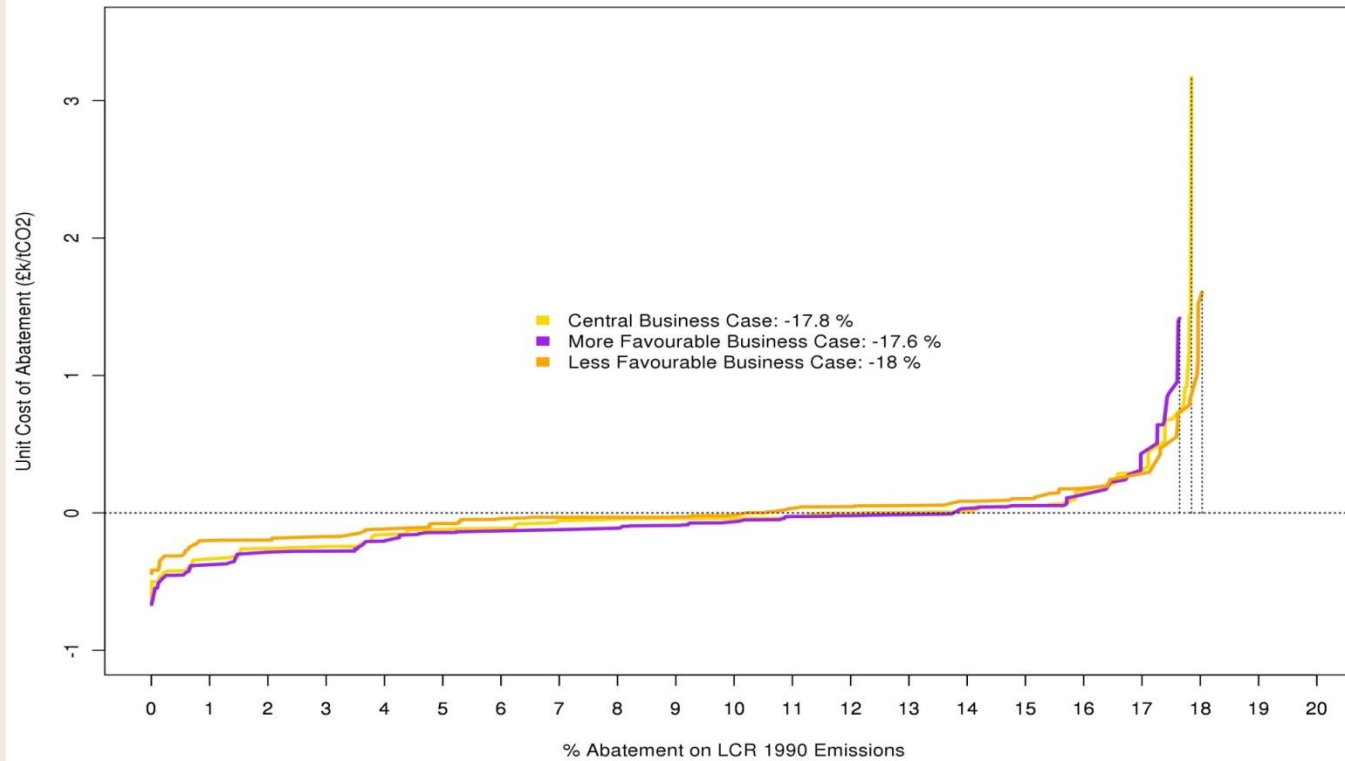
Cost effective – Cost neutral – Realistic potential

The Transport Sector MAC Curve



Cost effective – **Cost neutral** – **Realistic potential**

Sensitivity Analysis



Ten Steps to Deliver Major Change



1. Understand the scale of the opportunity
2. Consolidate the multiple options into an opportunity at scale
3. Increase awareness, reduce risk and uncertainty
4. Develop new business models –
Community Interest Company with blended portfolio?
5. Draw in complementary finance
6. Underwrite early stage investments
7. Design trusted and reliable delivery vehicles
8. Promote take-up
9. Monitor, report, verify and learn
10. Unlock second phase investments



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Thanks to the team who have worked on this

Thanks for listening