

Reducing the UK's carbon footprint and managing competitiveness risks

Committee on Climate Change, 24 April 2013

www.theccc.org.uk

Key messages

- ④ The UK's carbon footprint has increased over the past two decades but could fall by 70% by 2050, provided a global deal to achieve climate objectives is agreed.
- ④ Competitiveness risks exist for energy-intensive industries but are manageable within policies and funding already announced by the Government.
- ④ Key low-carbon technologies offer significant saving over fossil-fuel technologies on a lifecycle emissions.

Structure of presentation

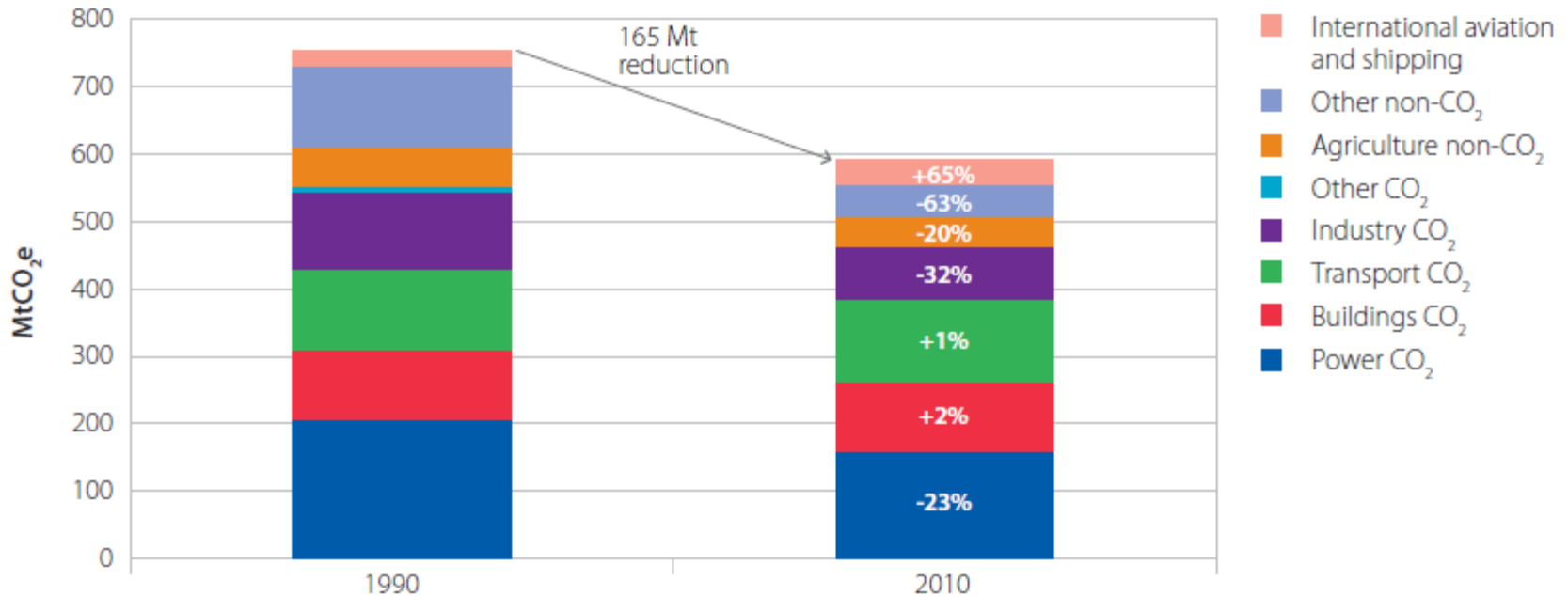


- Reducing the UK's carbon footprint
- Managing competitiveness risks
- Lifecycle emissions of low-carbon technologies
- Key messages
- Implications for the 4th carbon budget review



Reducing the UK's carbon footprint

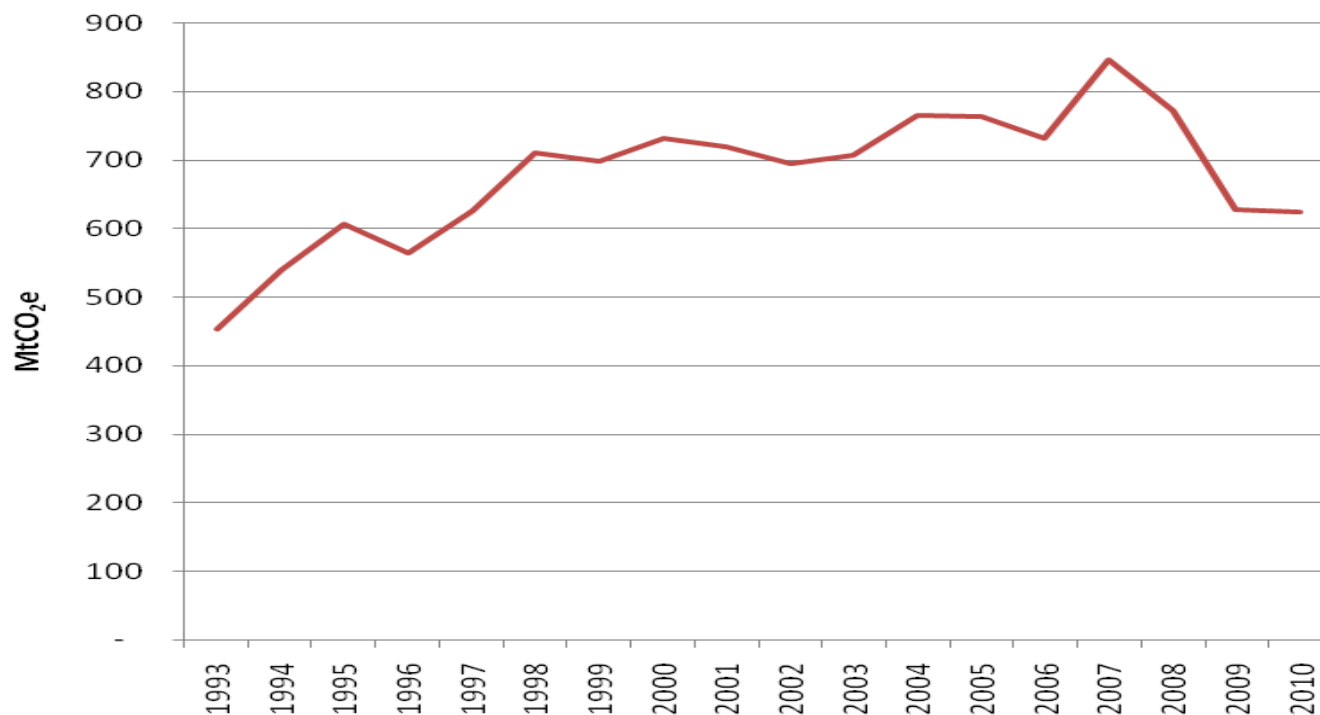
UK GHG production emissions over time



Source: NAEI (2012)

- Production emissions fell 21% between 1990 and 2010 due to switching from coal to gas in power generation and reductions in non-CO₂ gases such as waste methane emissions
- Industry reductions have been due to fuel switching, energy efficiency, industrial restructuring related to broader processes of globalisation and more recently the recession

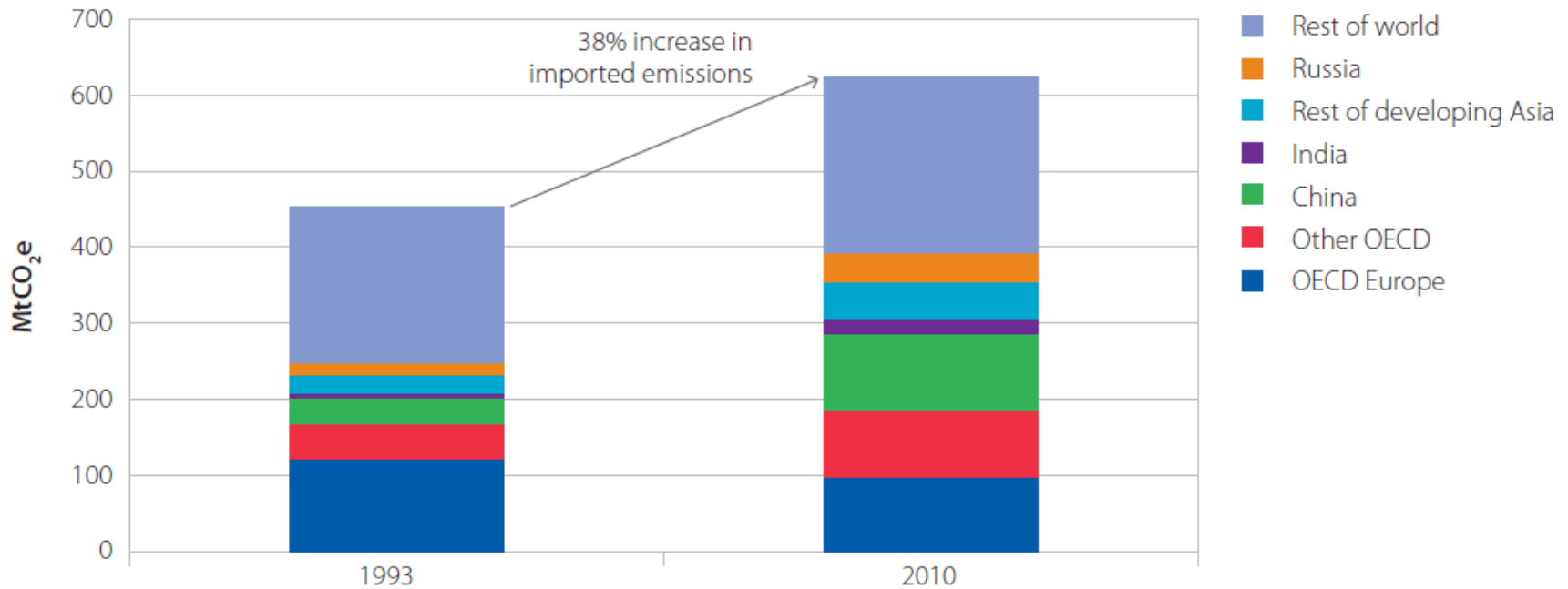
Imported GHG emissions over time



Source: University of Leeds (2013)

While production emissions (and domestic consumption emissions) have decreased, emissions embedded in UK imports of goods and services are estimated to have increased (by an estimated 40% between 1993 and 2010)

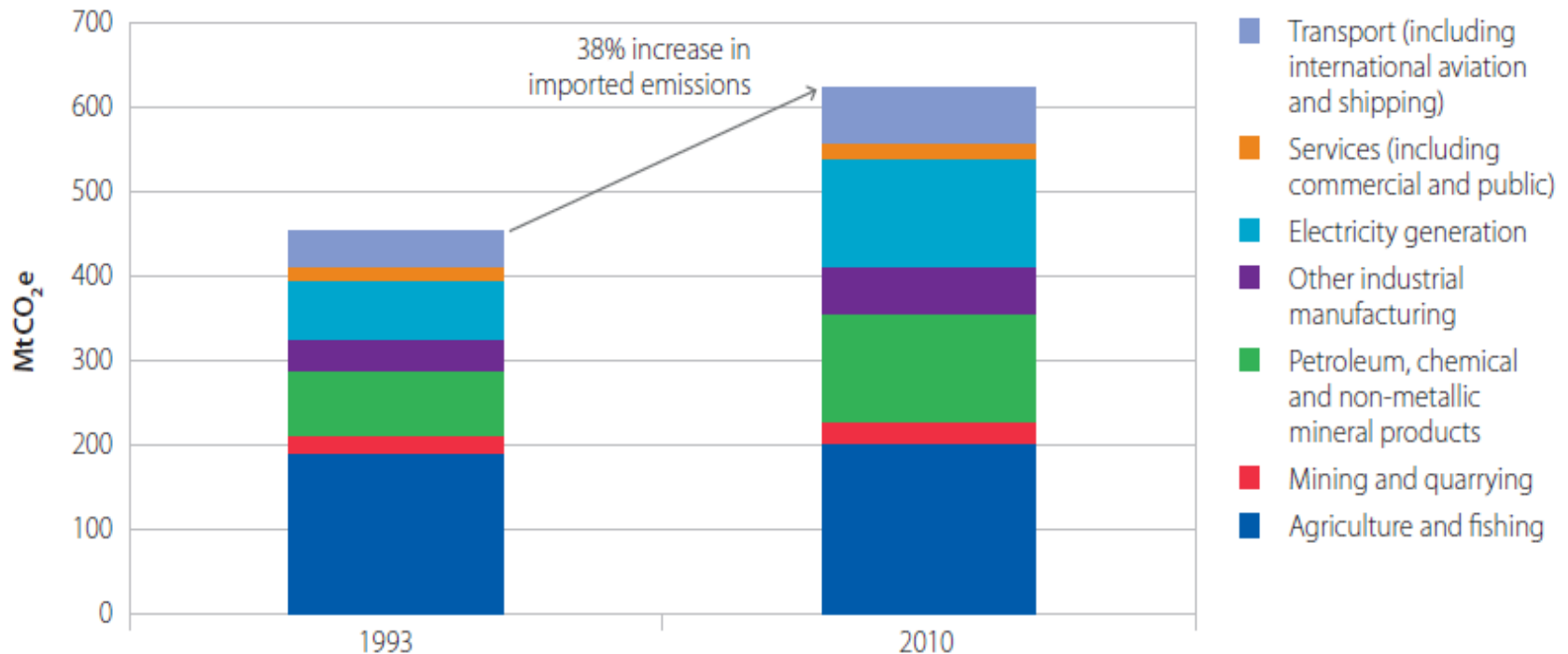
UK imported GHG emissions by region



Source: University of Leeds (2013)

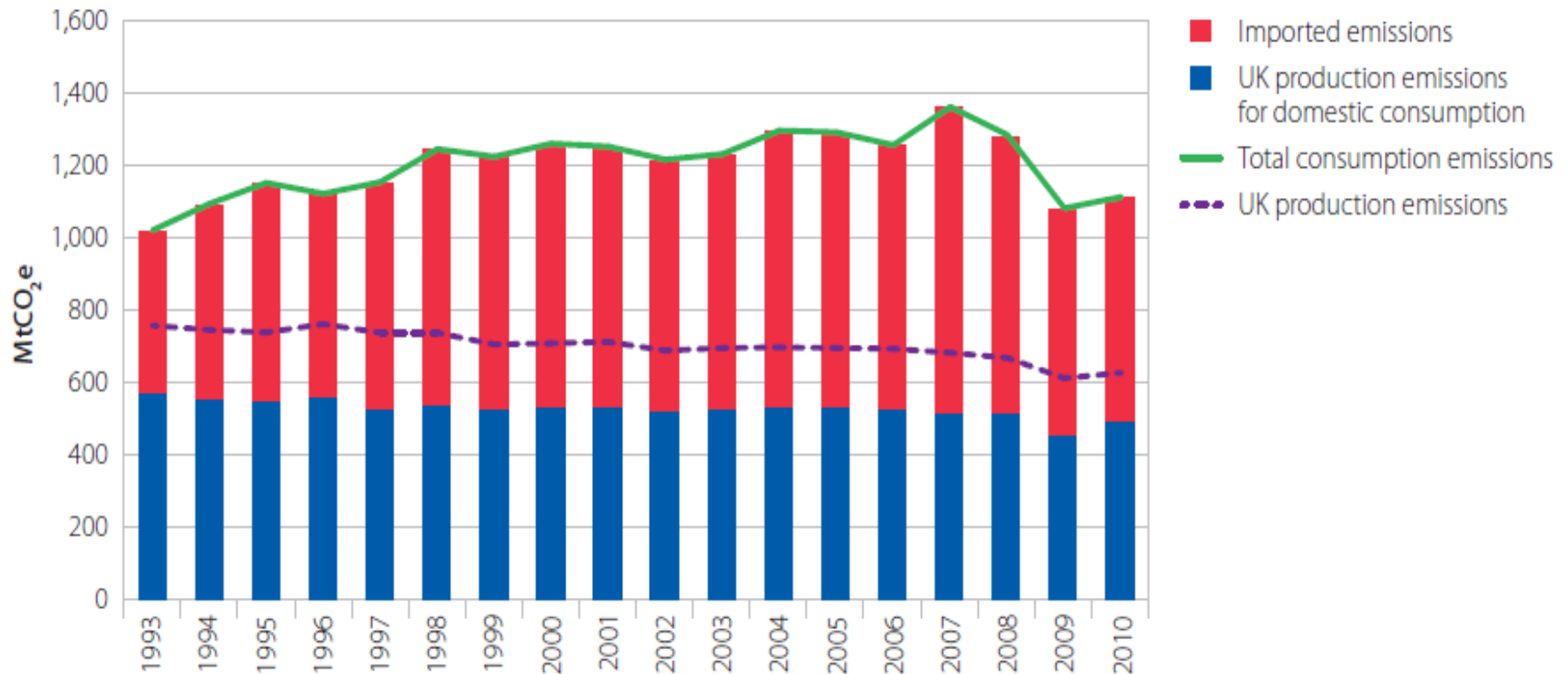
- 15% of imported emissions originate in rest of OECD Europe, an additional 15% from other OECD countries
- Developing Asian economies account for one-third of UK's imported footprint (half of which are from China) and for majority of growth in imported emissions

UK imported GHG emissions by sector



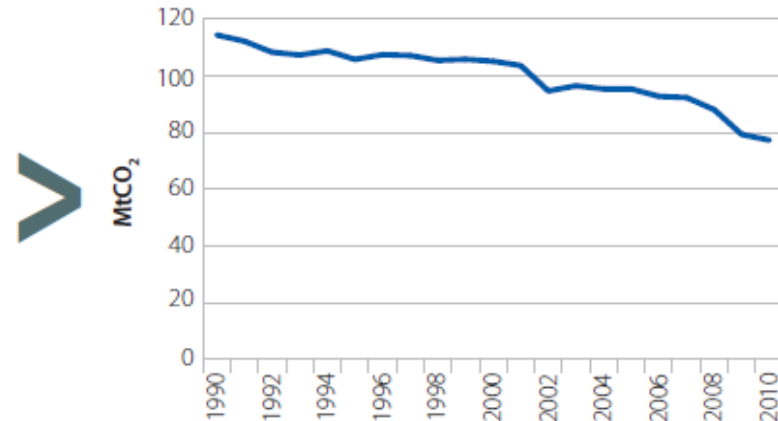
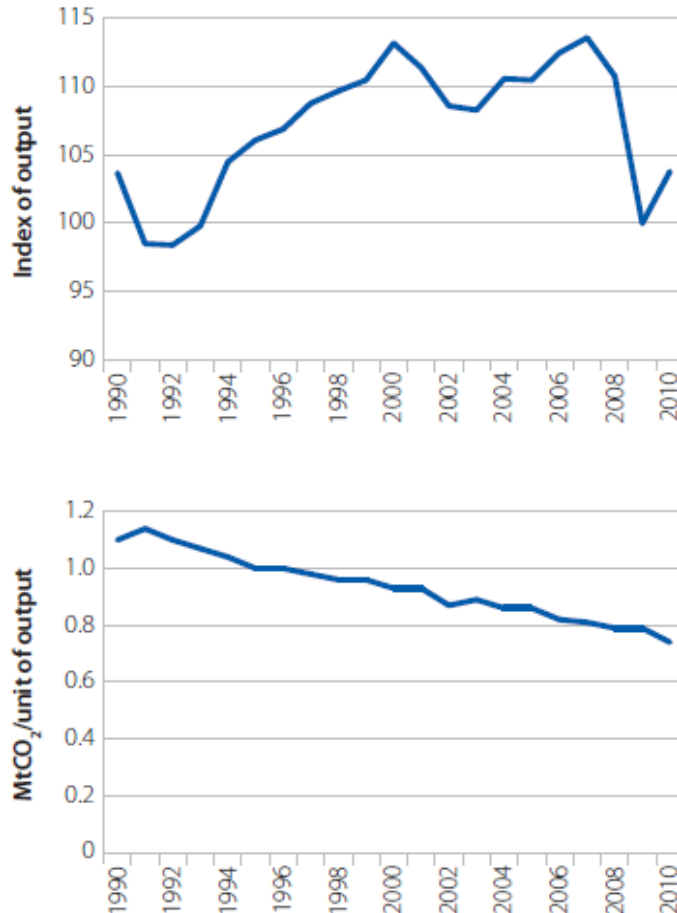
- UK demand for goods and services result in significant production emissions overseas, particularly in agriculture (1/3 of imported emissions), power generation, and direct emissions in production of petroleum, chemicals, non-metallic mineral products
- Together, with overseas transport emissions (e.g. freight), these account for over 80% of the UK's imported footprint, and majority of growth in imported emissions

Trends in the UK's carbon footprint (all GHGs)



The UK's carbon footprint has increased over the past two decades, as growth in imported emissions has more than offset reductions in production emissions.

Emissions intensity of UK industry has decreased over time while output has increased



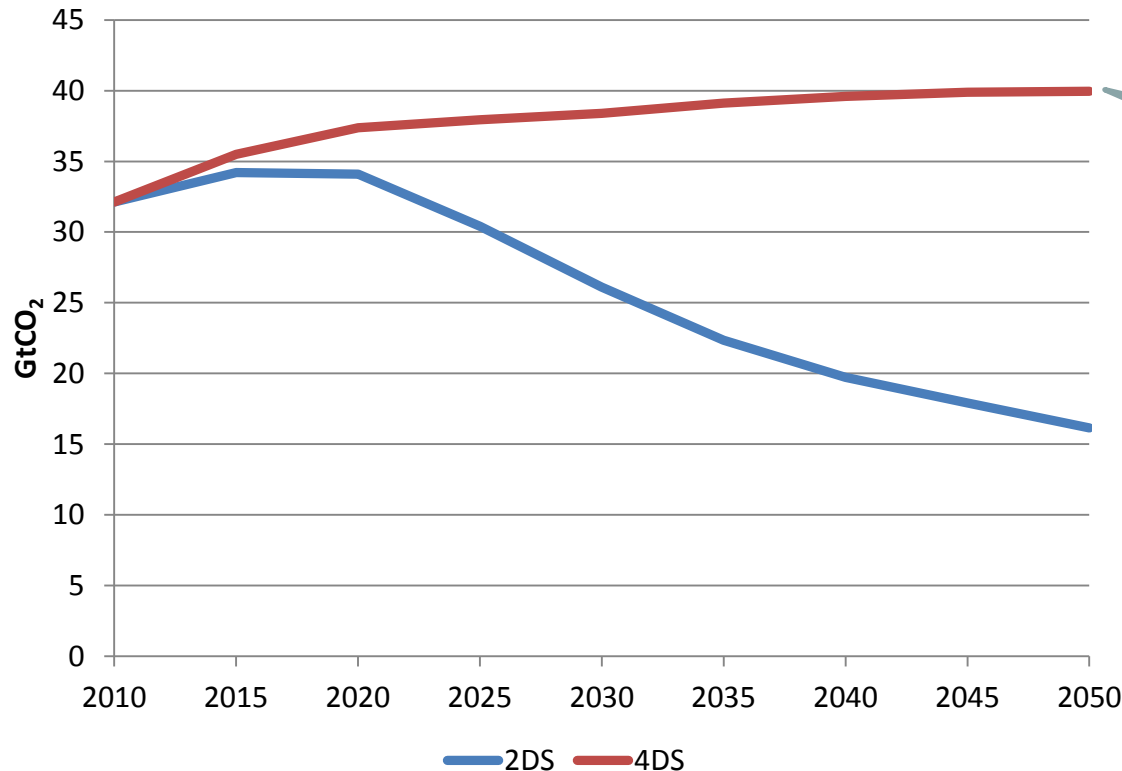
Source: ONS (2013) Index of manufacturing production; NAEI (2012); CCC calculations.

- Suggests offshoring of industry in response to low-carbon policies has had (at most) a minor impact in reducing production emissions, with much of reductions due to fuel switching/ energy efficiency, and more recently the recession
- UK carbon footprint would have increased more had production emissions not been reduced

Global emissions reductions compatible with climate objective

Global climate objective:

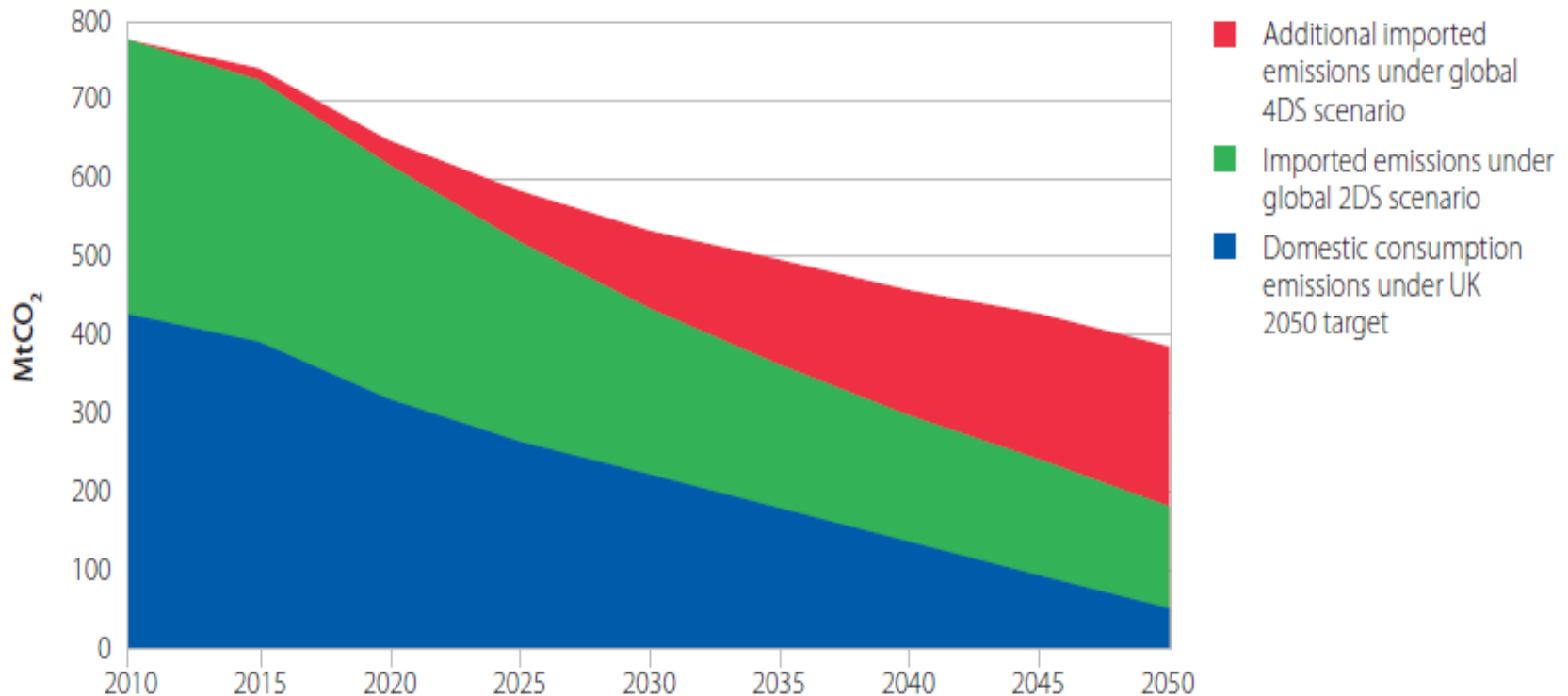
To keep central estimates of global temperature rise by 2100 close to 2°C above pre-industrial levels, and limit the likelihood of a 4°C rise to very low levels (e.g. 1%).



As a sensitivity, we analysed UK consumption emissions in a world where international actions do not go beyond Copenhagen (projected to lead to a long-term temperature rise of 4°C (4DS scenario)).

Source: IEA (2012)

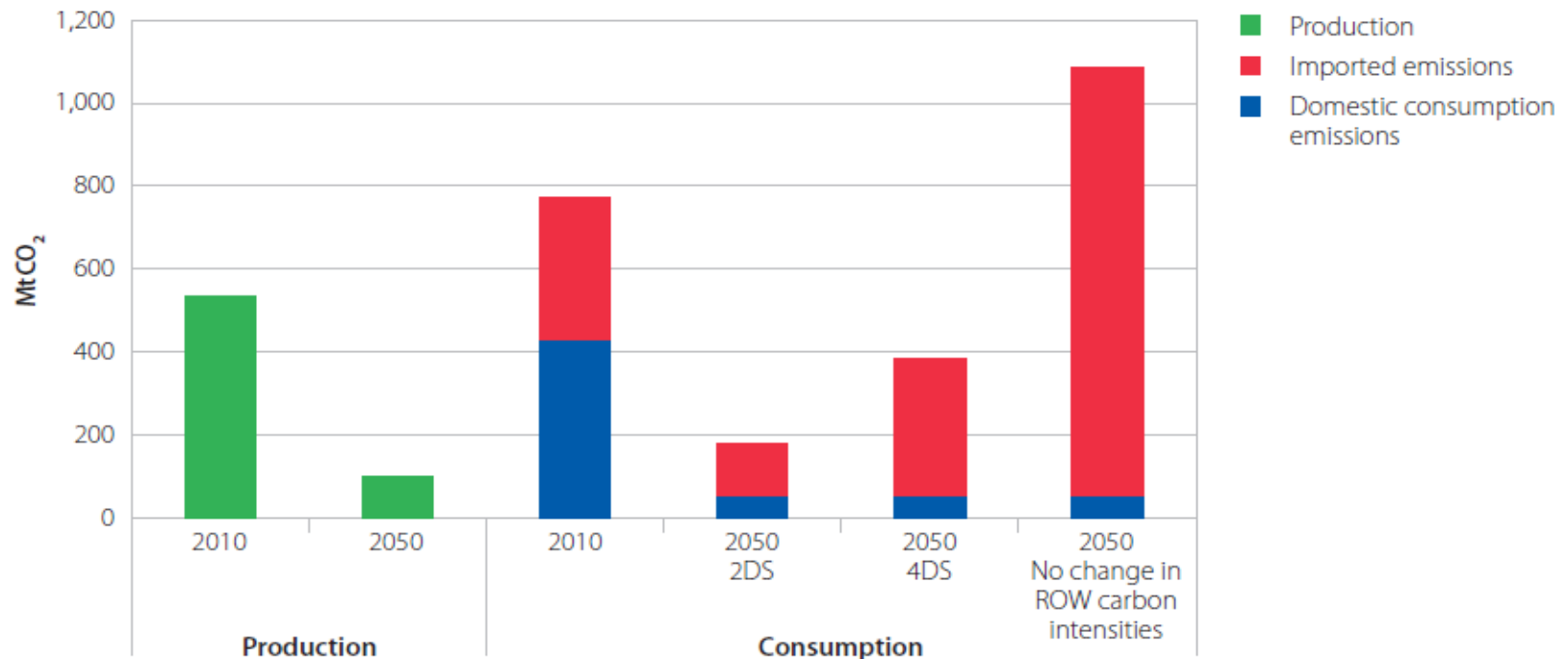
Taking IEA emissions scenarios, we developed scenarios for the UK's carbon footprint to 2050



Source: CCC modelling (2012); University of Leeds (2013); IEA (2012) *Energy Technology Perspectives*.

- Under a scenario where the UK meets its 2050 target and global emissions fall in line with the climate objective, the UK's carbon footprint (CO₂ only) could fall up to 80% below current levels
- Under a scenario where the UK meets its 2050 target but the rest of the world does not go beyond current pledges, the UK's carbon footprint (CO₂ only) could be reduced by only 50% from current levels

Scenarios for the UK's CO₂ carbon footprint under various global emissions scenarios

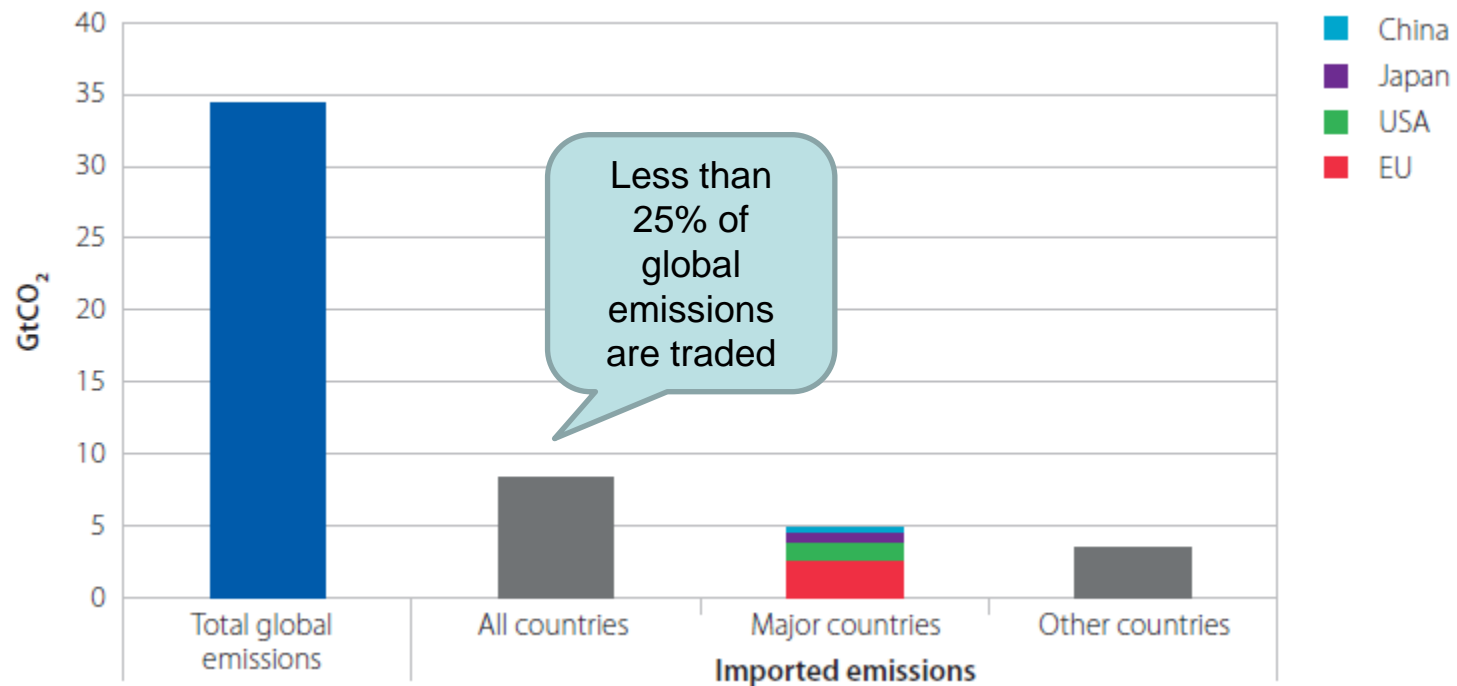


Source: CCC modelling (2012); University of Leeds and Centre for Sustainable Accounting (2013); IEA (2012) *Energy Technology Perspectives*.

UK likely to continue to be a net importer of carbon under all scenarios (even under 2DS scenario)

There is no real alternative to a global deal

Traded emissions compared to global emissions (2010)

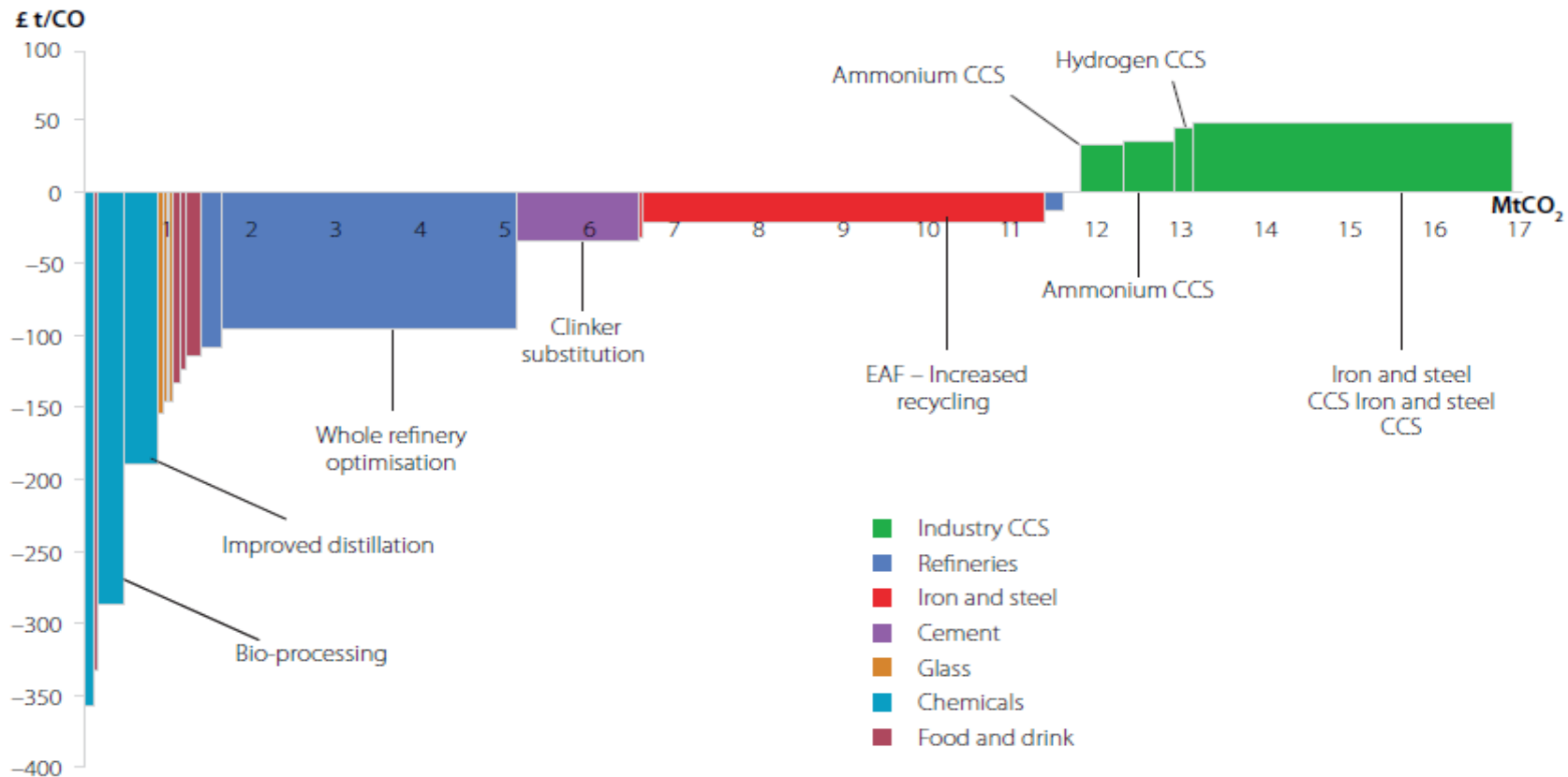


Border carbon adjustments could not substitute for a global deal given limited potential coverage and the need for other policies in addition to a carbon price.

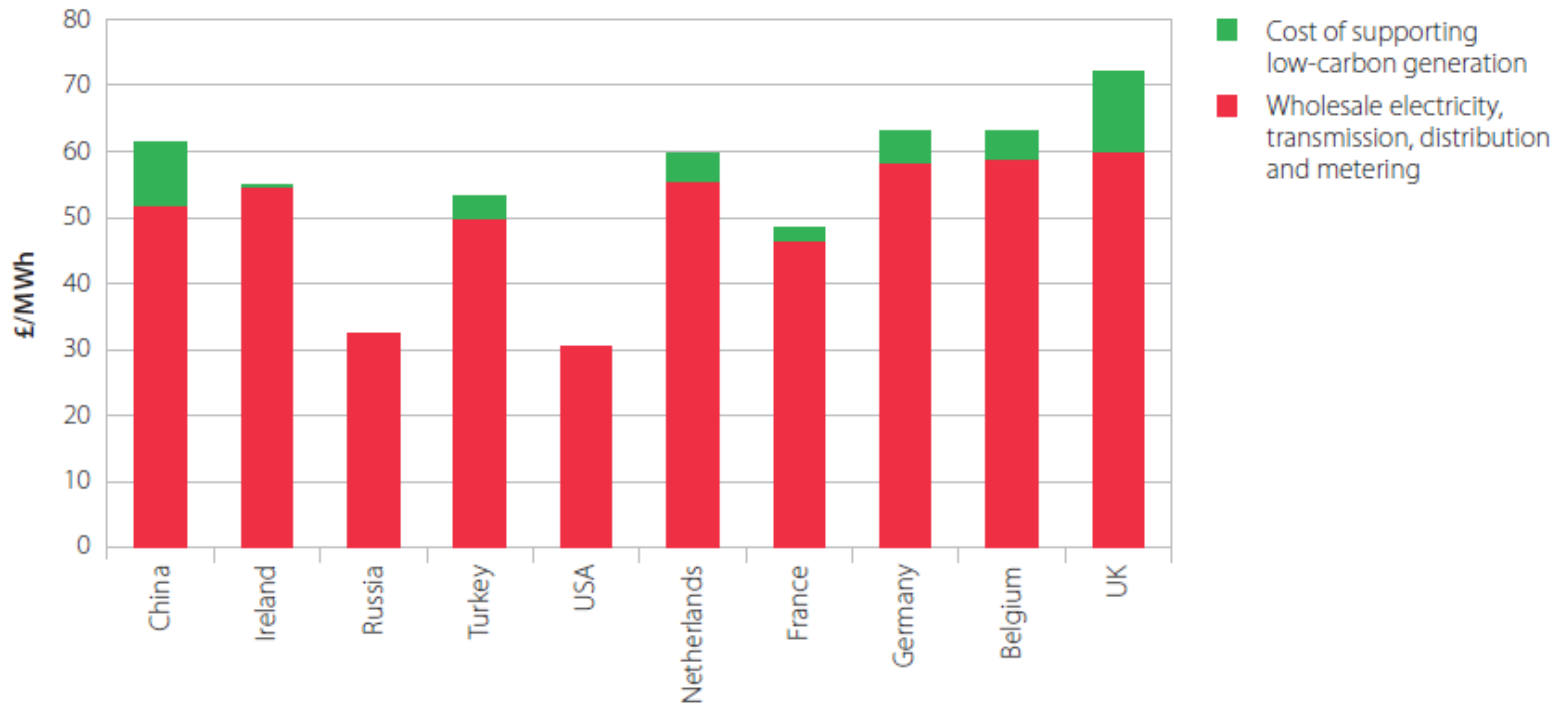


Managing competitiveness risks

Measures to reduce emissions in energy-intensive industry in 4th carbon budget post-2020

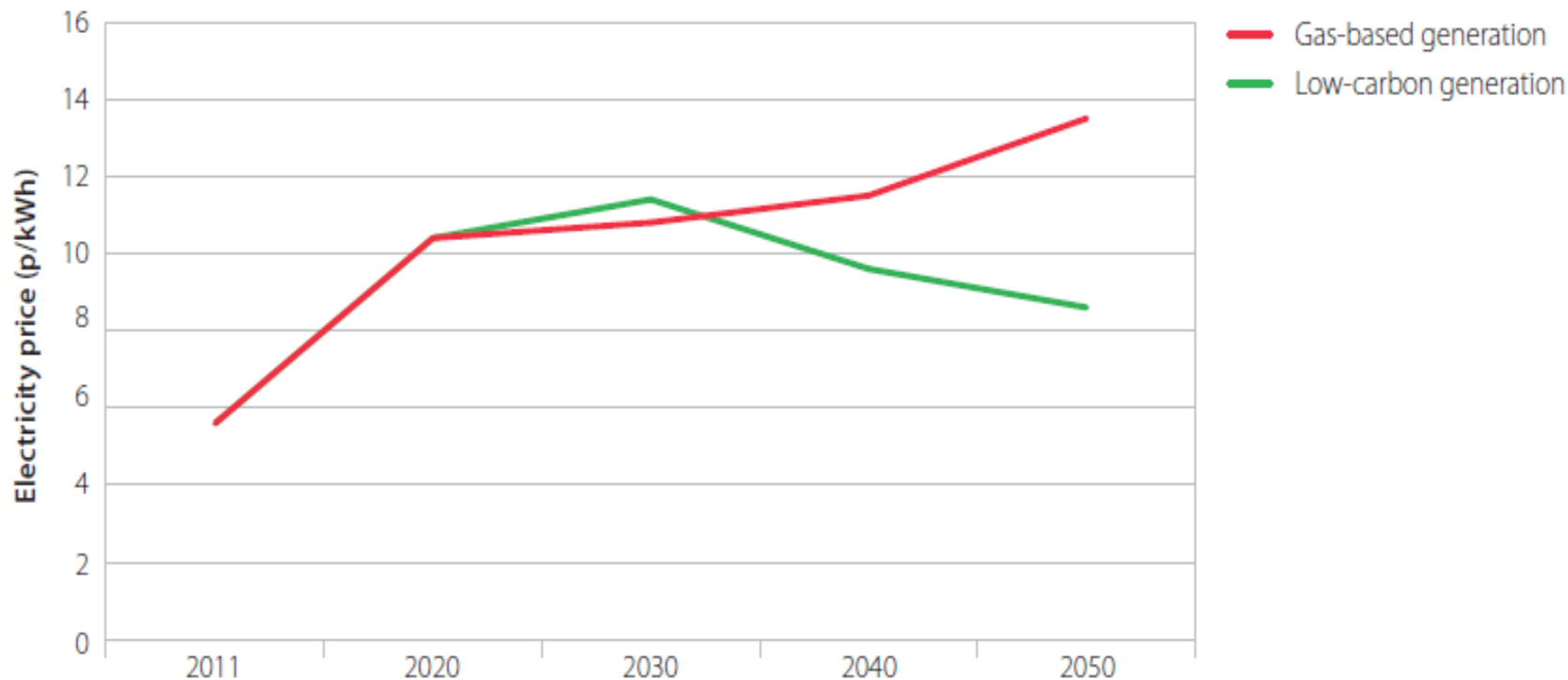


Snapshot of industrial electricity prices (2011)



Notes: German costs of supporting low-carbon generation includes exemptions for energy-intensive industries

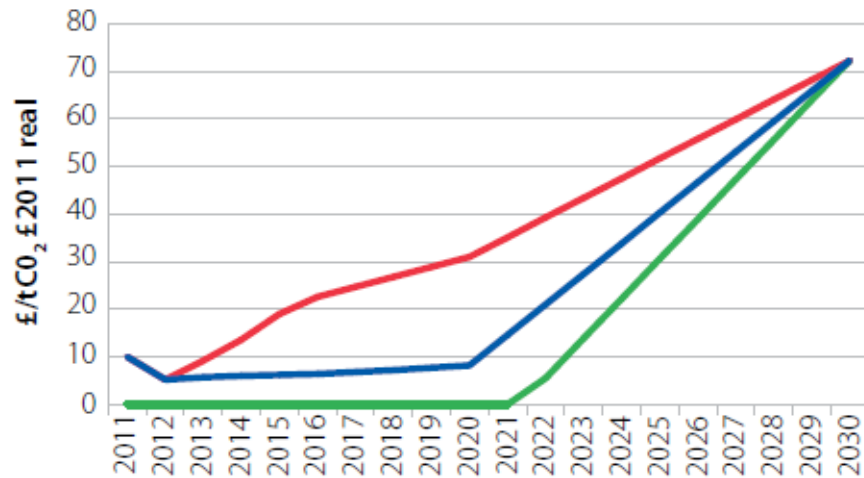
UK wholesale electricity prices: low-carbon versus 'dash for gas'



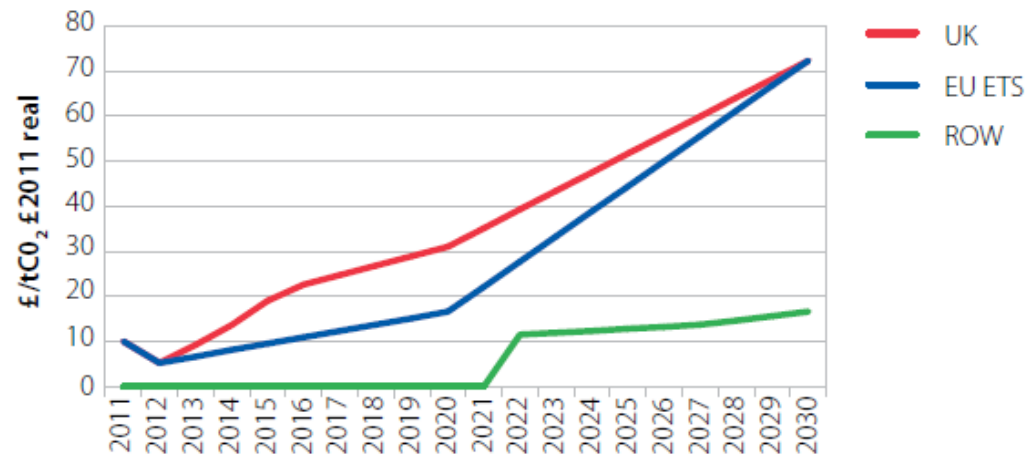
Notes: Chart shows wholesale electricity price, including transfer payments to fund low-carbon generation via the Renewables Obligation and Contracts for Difference, and wider systems costs associated with intermittent renewables (where relevant). The retail price faced by industrial users will depend on ability to negotiate contracts with suppliers.

Carbon price scenarios

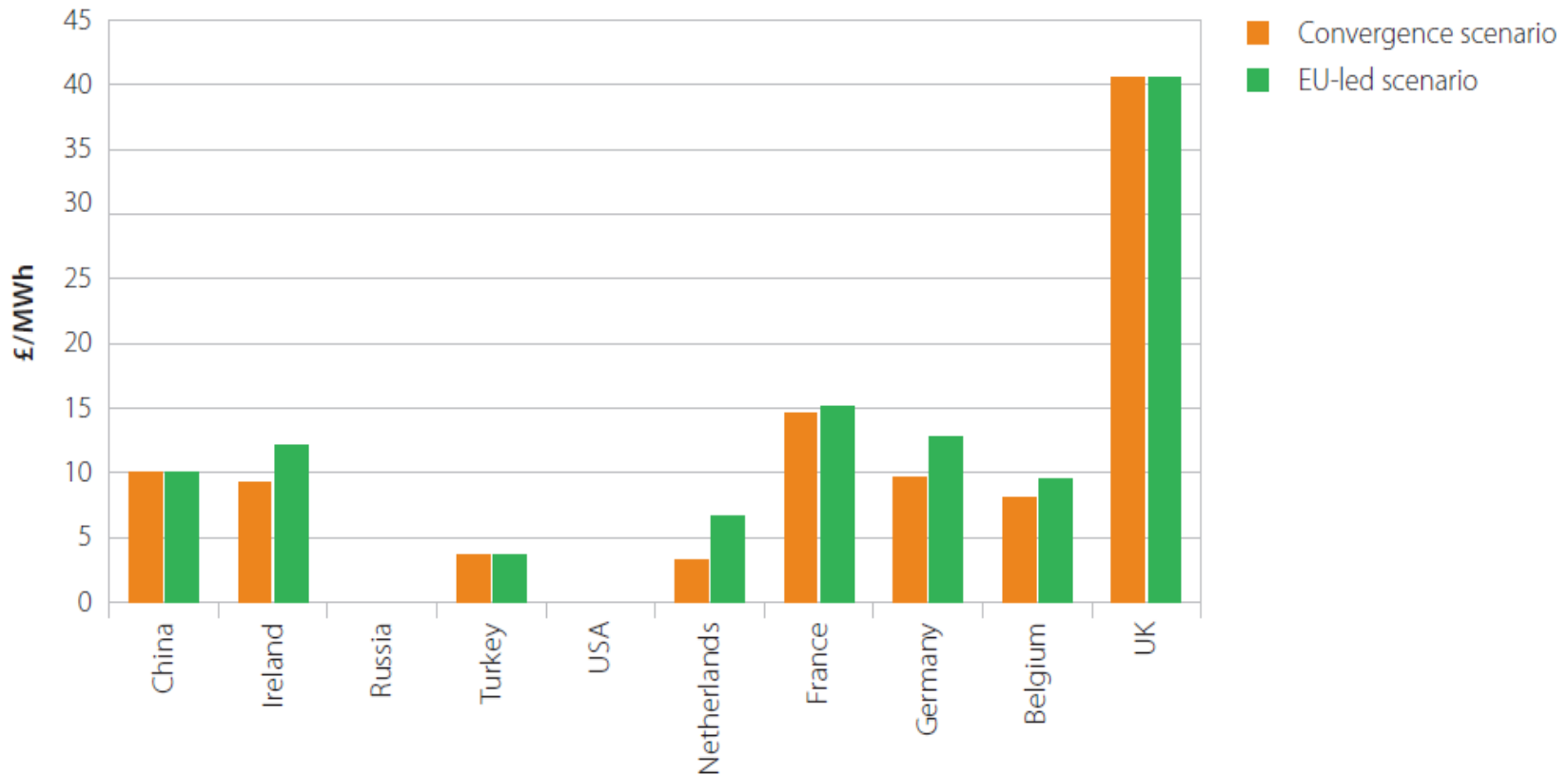
Scenario 1: Convergence



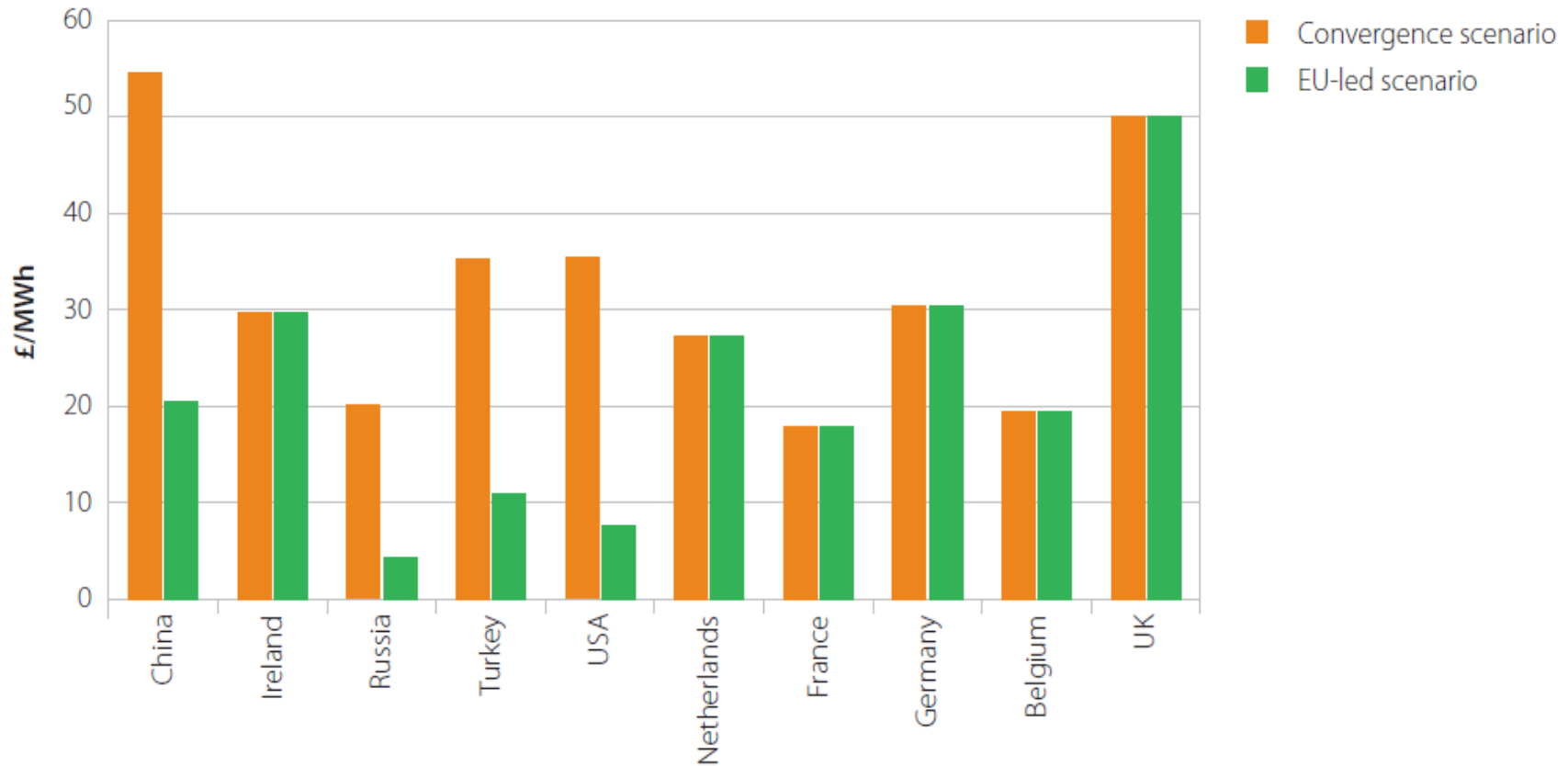
Scenario 2: EU-led



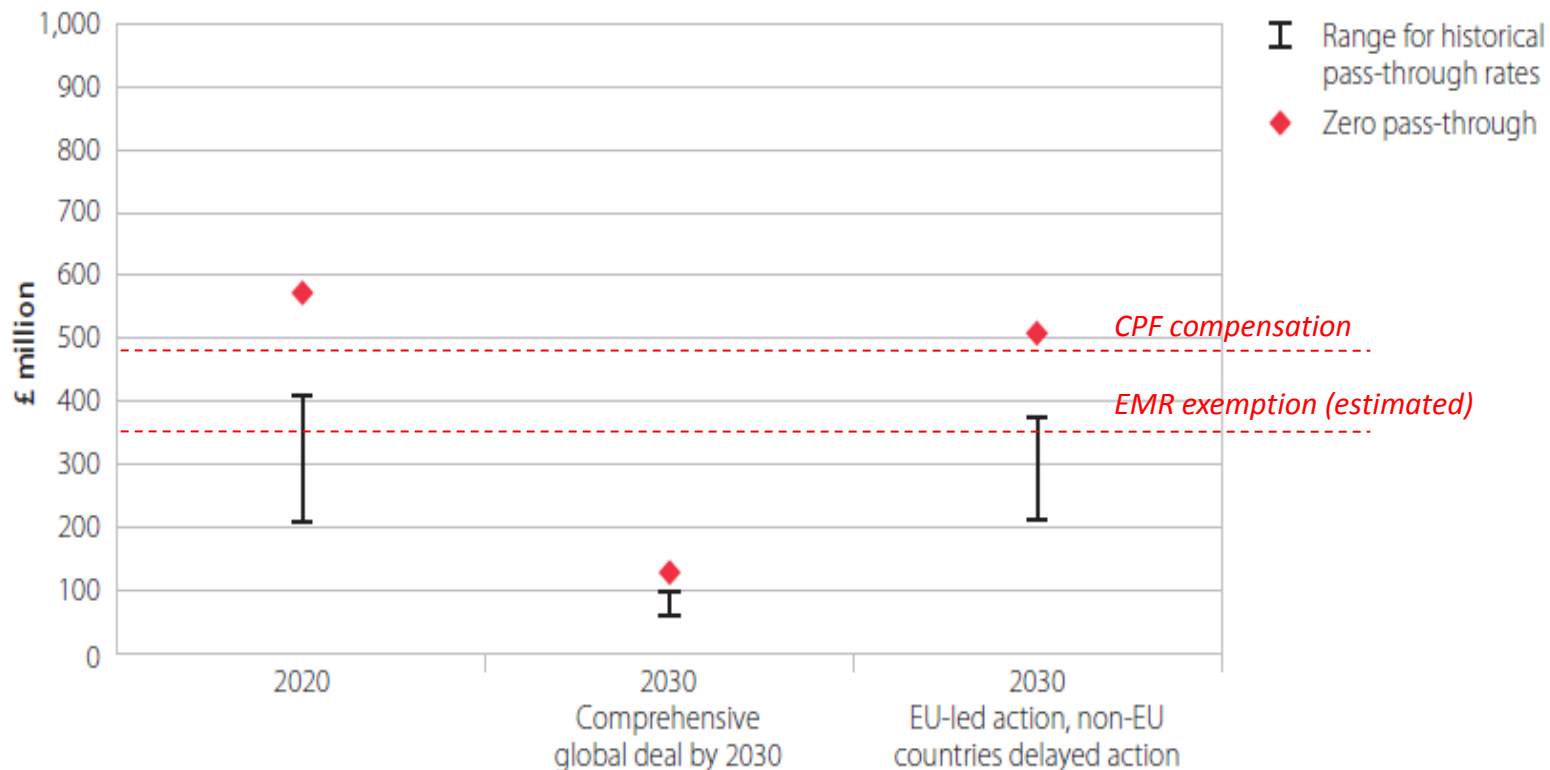
Electricity price projections (2020)



Electricity price projections (2030)



Profit impacts of low-carbon policy on electro-intensive industry

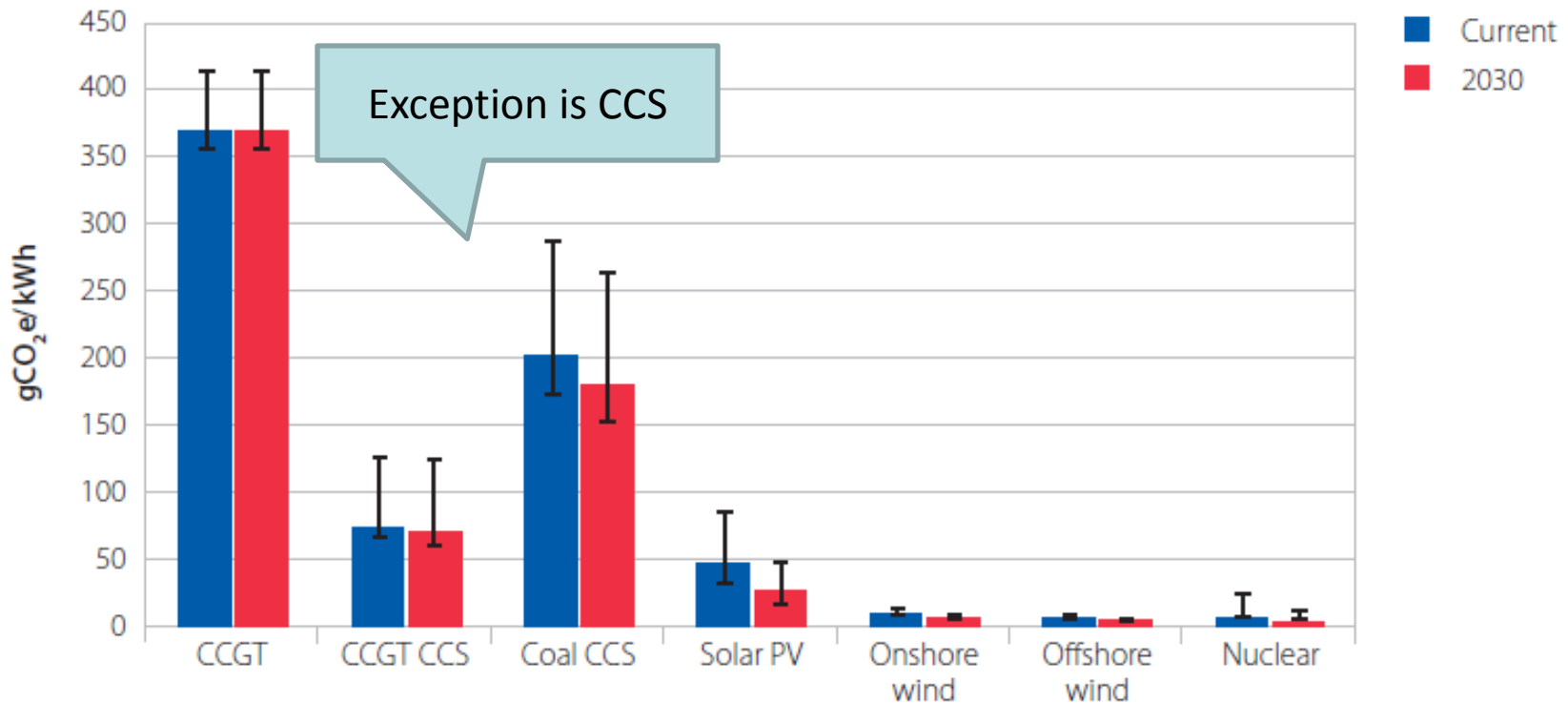


Note: Chart uses consumption estimates derived from DECC data. ONS data brings lower end of range to around £150 million in 2020.



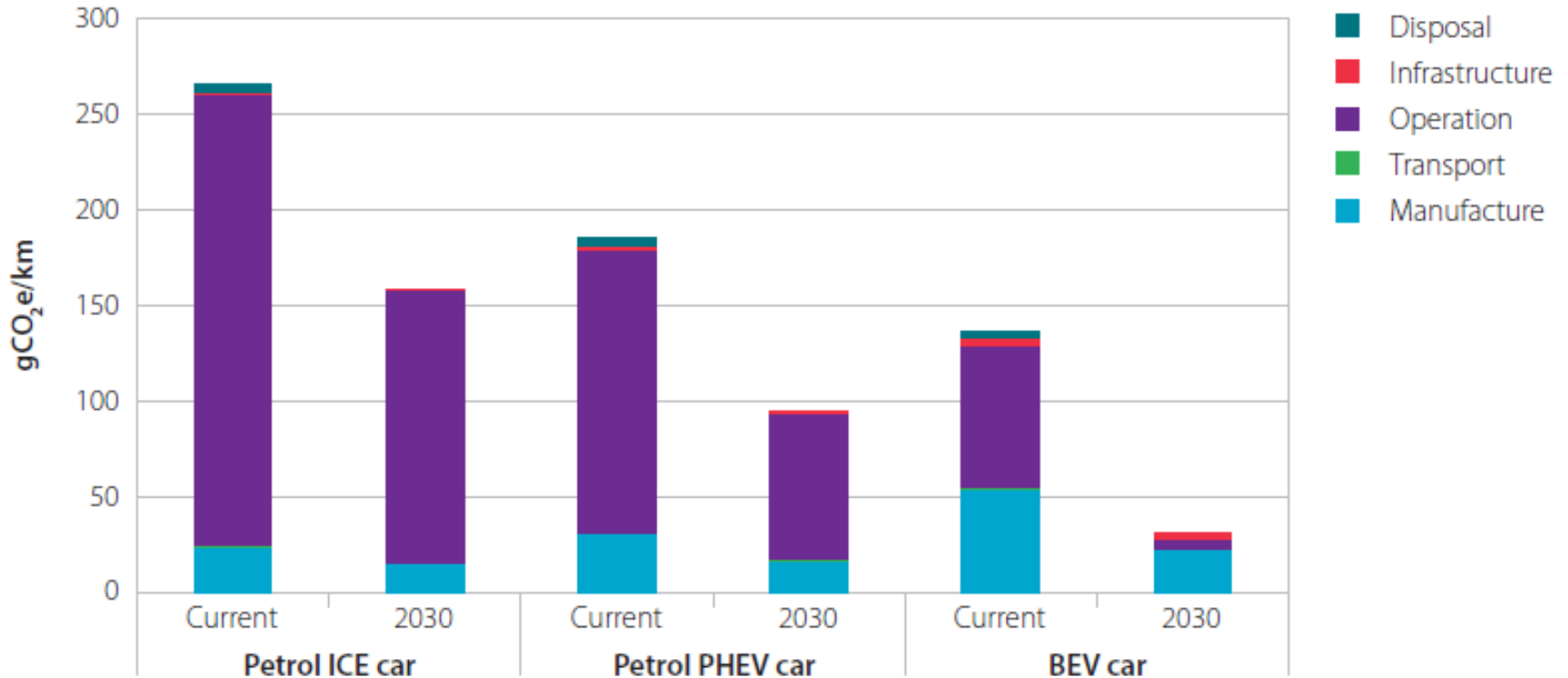
Lifecycle emissions of low-carbon technologies

Lifecycle emissions of most low-carbon power technologies are small, and expected to fall further



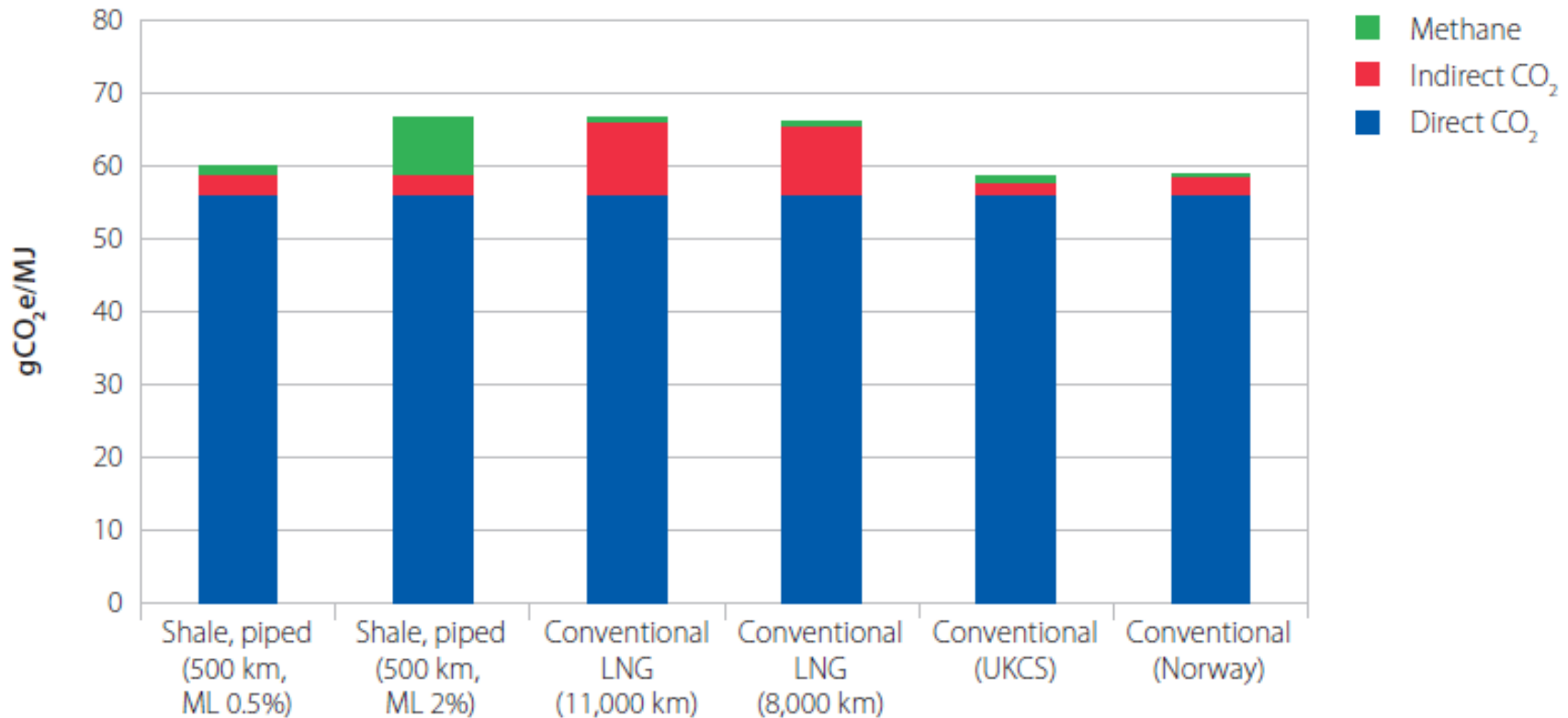
> CCS should be used only as part of a portfolio of low-carbon power generation technologies

Electric cars used with low-carbon power offer significant emissions savings even on a lifecycle basis



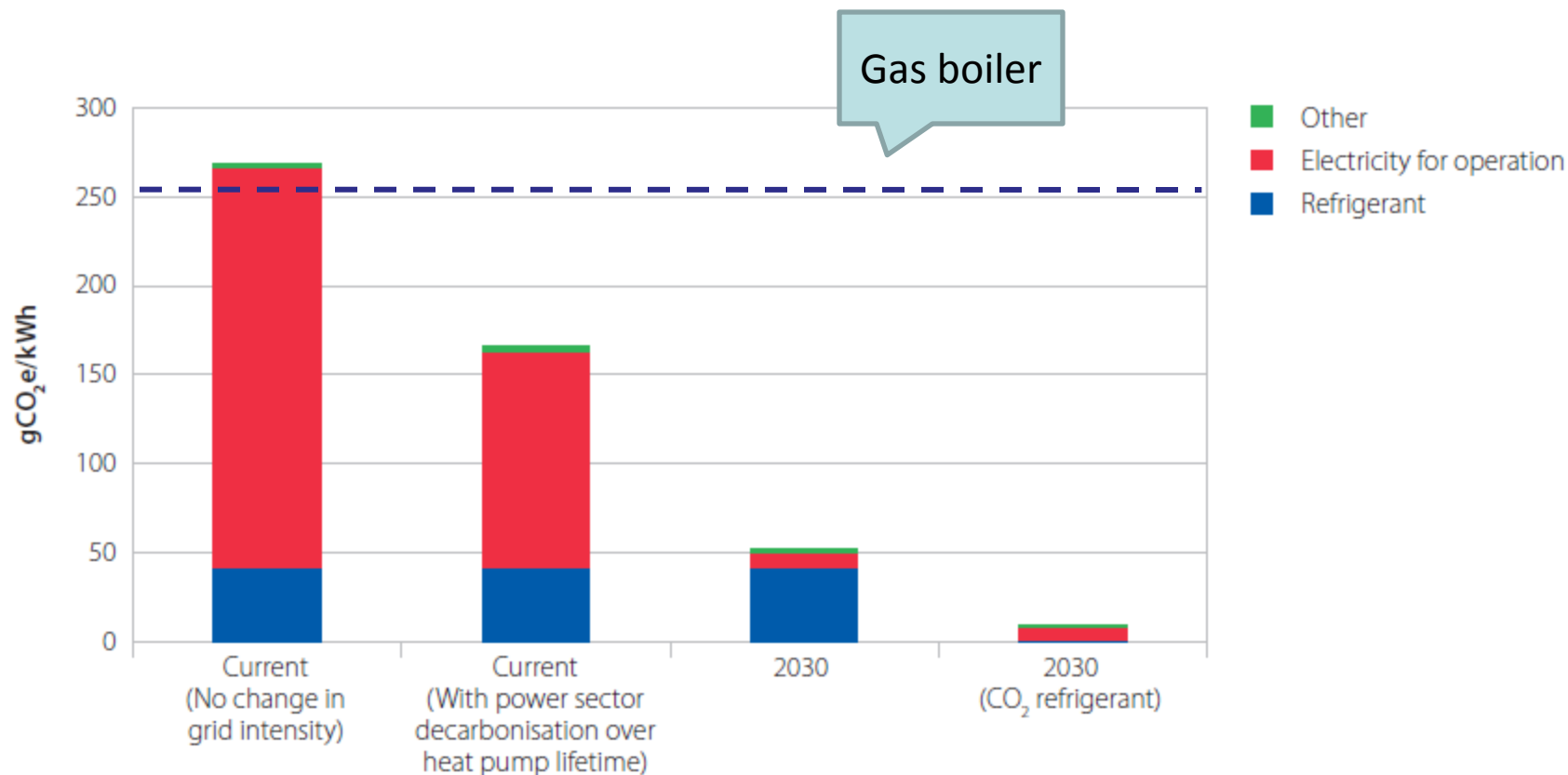
> Improved battery recycling efficiency could help further reduce EV lifecycle emissions

Emissions from well-regulated shale gas could be comparable to conventional gas, and better than LNG



> Government should put the necessary regulatory measures in place to control methane emissions from shale gas production

By 2030, emissions from heat pumps could mainly be due to HFC refrigerants – but alternatives exist



> Government should support a move away from HFCs towards low-GWP refrigerants where cost-effective

Key messages

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- ④ Competitiveness risks exist for energy-intensive industries but are manageable within policies and funding already announced by the Government.
- ④ Key low-carbon technologies offer significant saving over fossil-fuel technologies on a lifecycle emissions.

- Production emissions remain the most appropriate basis for UK carbon budgets
- UK targets should be met through domestic emissions reduction and not through the purchase of expensive credits
- Competitiveness impacts associated with the 4th carbon budget are manageable and provide no basis for changing 4th carbon budget ambition.
- Lifecycle emissions associated with 4th budget technologies are likely to be limited