Committee on Climate Change

# Energy transformation in a developed economy: the UK


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**International Network for Low Carbon Societies (LCS-RNet)**
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www.theccc.org.uk

# Structure of the presentation

1. The legislative framework: Climate Change Act 2008
2. Carbon targets and budgets
3. Achieving the targets
4. Monitoring progress
5. Future challenges

# UK Climate Change Act

**Climate Change Act 2008**

- Sets a legally binding target for emissions in 2050 (80% below 1990 levels)
- Creates a greenhouse gas budgeting system, capping emissions over 5-year periods starting 2008
- Creates an independent Committee on Climate Change
- Initiates a programme for looking at adaptation

**Department of Energy and Climate Change established in 2008**

**Issues debated in Parliament**

- The ambition of the 2050 target (60% v 80%)
- The length of the budget periods
- The inclusion or otherwise of aviation and shipping
- The powers and make-up of the Committee

The Climate Change Bill passed in the House of Commons by 463 votes to 4.

# The role of the Climate Change Committee

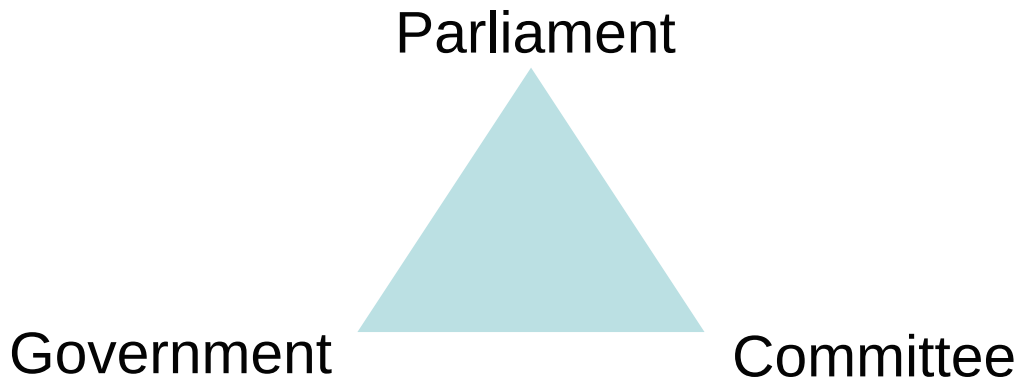
**Tasks:**

- Recommended the long-term target for UK emissions in 2050
- Recommends budget levels for consecutive five-year periods (2008-12, 2013-17, 2018-22, 2023-27)
- Recommends treatment of non-$CO_2$ GHGs and international aviation and shipping.
- Recommends limits on emissions credit purchasing
- On-going monitoring of progress
- Responds to ad-hoc requests for advice

**Taking into account:**

- scientific knowledge
- technology
- economic circumstances and competitiveness
- fiscal circumstances
- social circumstances
- energy policy
- Differences between England, Wales, Scotland and Northern Ireland
- circumstances at European and international level
- the estimated amount of reportable emissions from international aviation and international

# UK Climate Policy Framework: The process in summary




- Independent Committee on Climate Change *recommends* carbon budgets
- Government *proposes* budgets to Parliament
- Parliament decides on budgets
- Government establishes policies and measures to achieve budgets
- Committee on Climate Change monitors Government's progress in meeting budgets and reports annually to Parliament

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# Setting a long-term target: climate goals

Scientific evidence guides discussion on what level of climate change is dangerous, but a decision is ultimately a difficult value judgment

**Damage assessment**

- 2°C above pre-industrial by 2100 will exacerbate current impacts and trigger regional problems
- Beyond 4°C many systems will not be able to adapt

**Emissions assessment**

- Emissions trends and uncertainty in climate projections make it very difficult to rule out a 2°C increase with 100% confidence

**Decision rule**

- Central estimates of temperature increase by 2100 must be close to 2°C above pre-industrial levels
- Keep probability of a 4°C increase very low (e.g. 1%)

# The UK long-term target

Peaking in 2016 and reducing emissions by 3-4% annually implies a 50-60% global reduction by 2050

**Burden share**

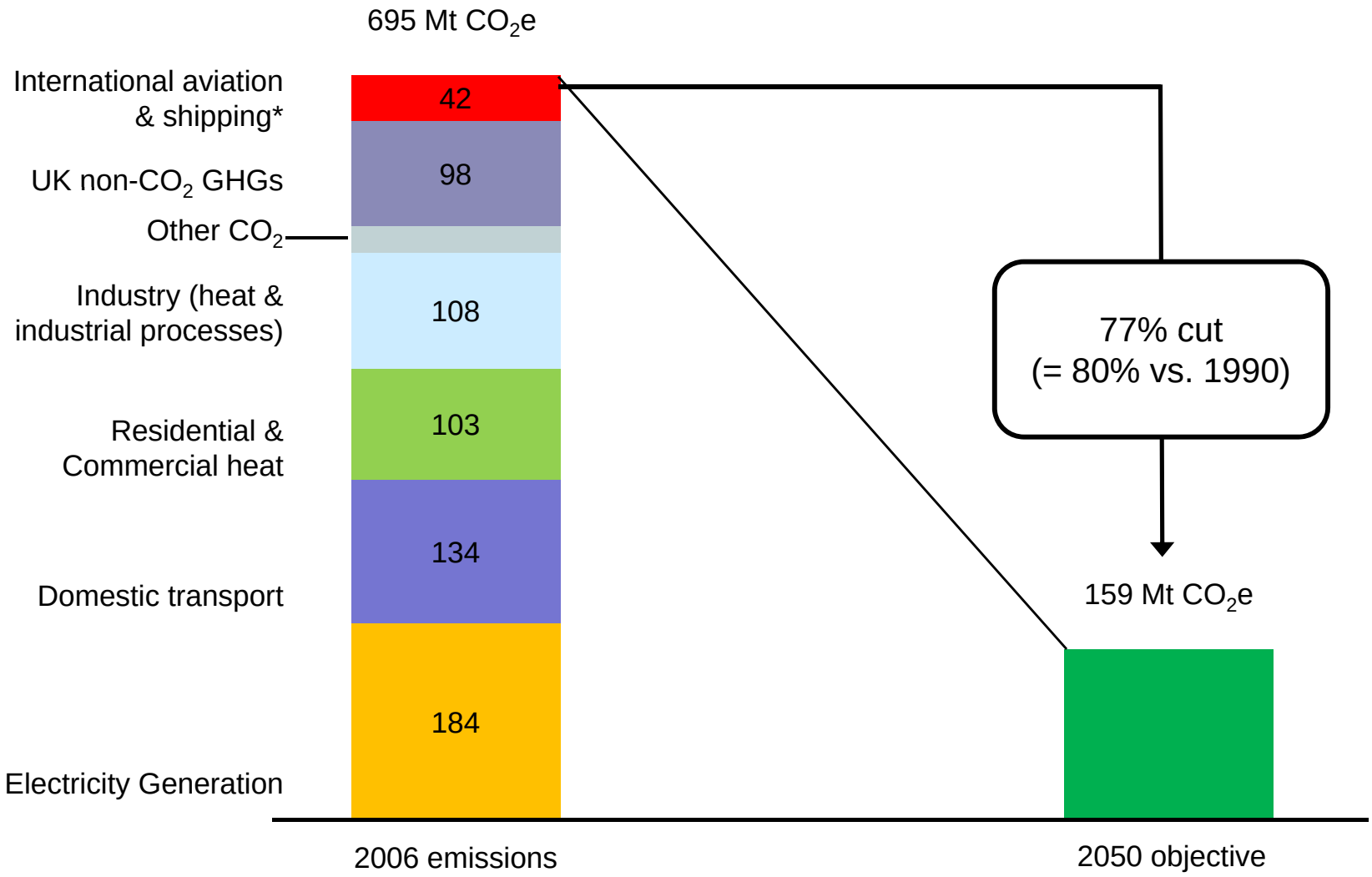
- Various methodologies exist (contract and converge, intensity convergence, triptych etc.)
- But a fair deal will tend towards equal emissions per person in the long term:
  - 20-24 $GtCO_2e$ global total in 2050
  - Implies 2.1-2.6 $tCO_2e$ per capita

**This gives a UK reduction of at least 80% in 2050, relative to 1990 levels**

All Kyoto gases

Aviation and shipping included

# Appropriate UK contribution: the scale of the challenge




* bunker fuels basis

# Level of budgets: factors considered

**The path to 2050**

- 2020 ambition needed to make path to 2050 technically feasible
- Early action needed as contribution to global emission containment

**PROPOSED BUDGETS**

**2008-12**
**2013-17**
**2018-22**

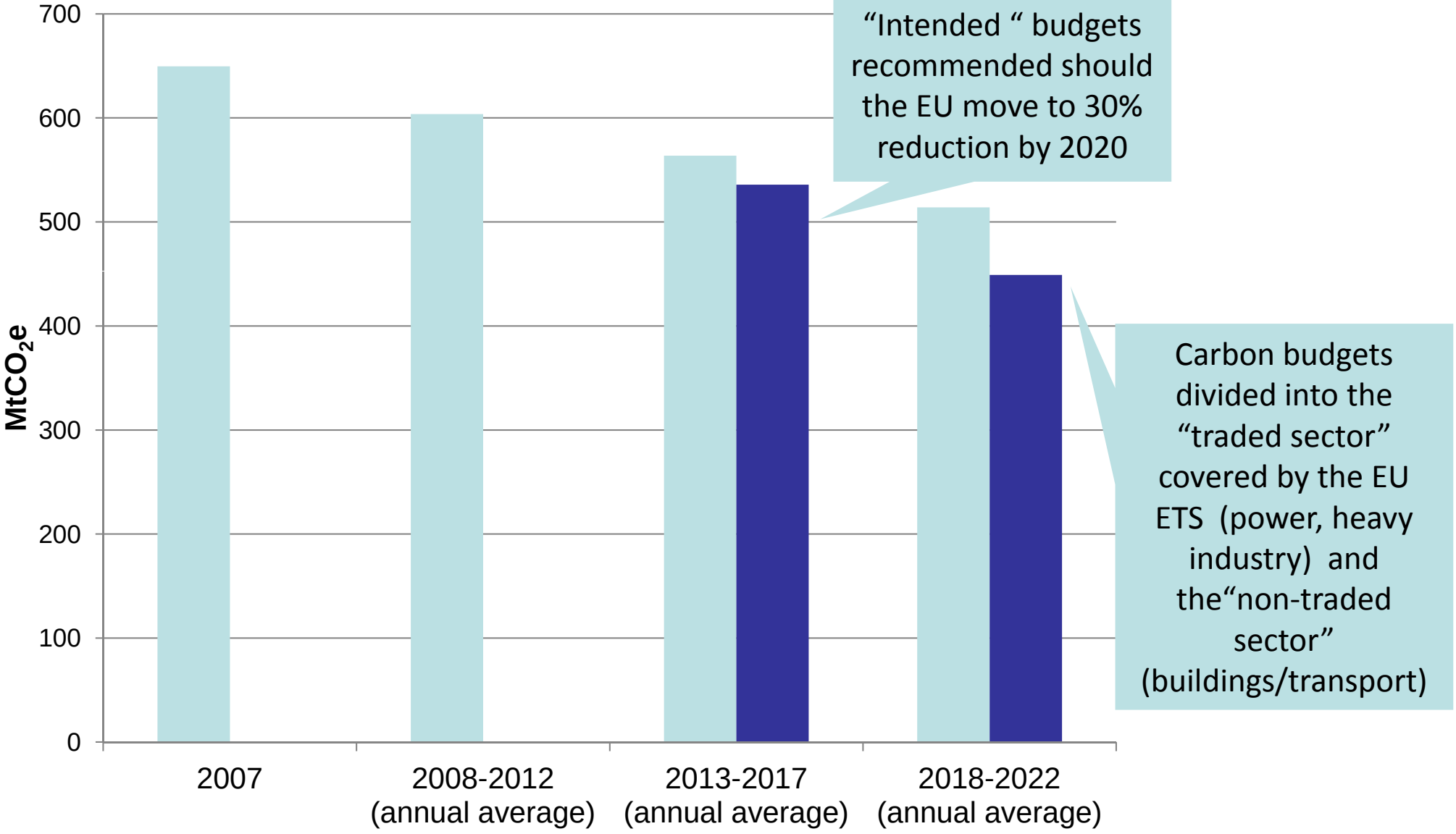
**European Union strategies**

- 30% reduction in GHG by 2020 versus 1990 had there been a global deal at Copenhagen
- 20% unilateral cut

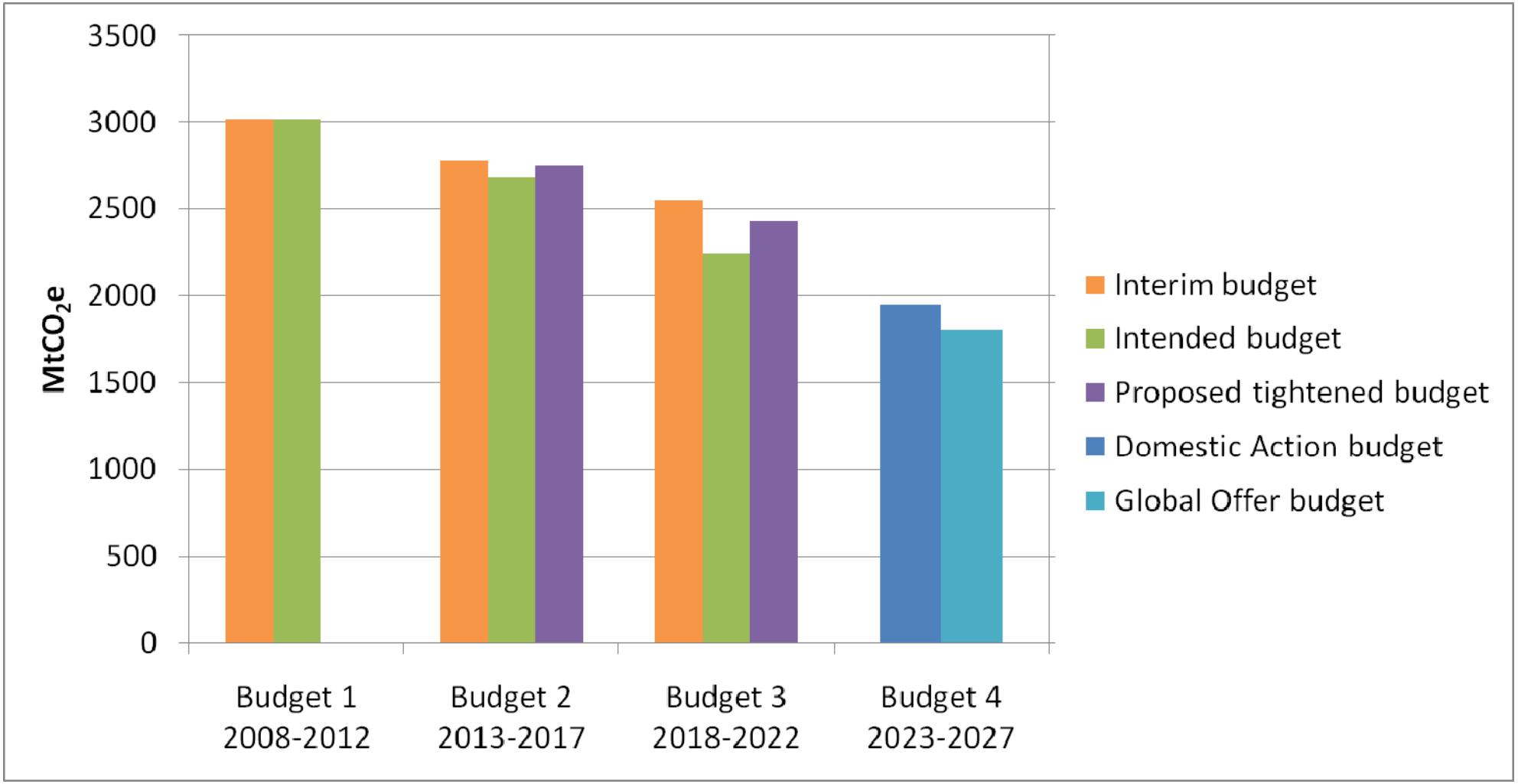
**Bottom up sector by sector analysis**

- Technical feasibility
- Costs of achieving reductions
- Policies in place or needed to drive emissions reductions

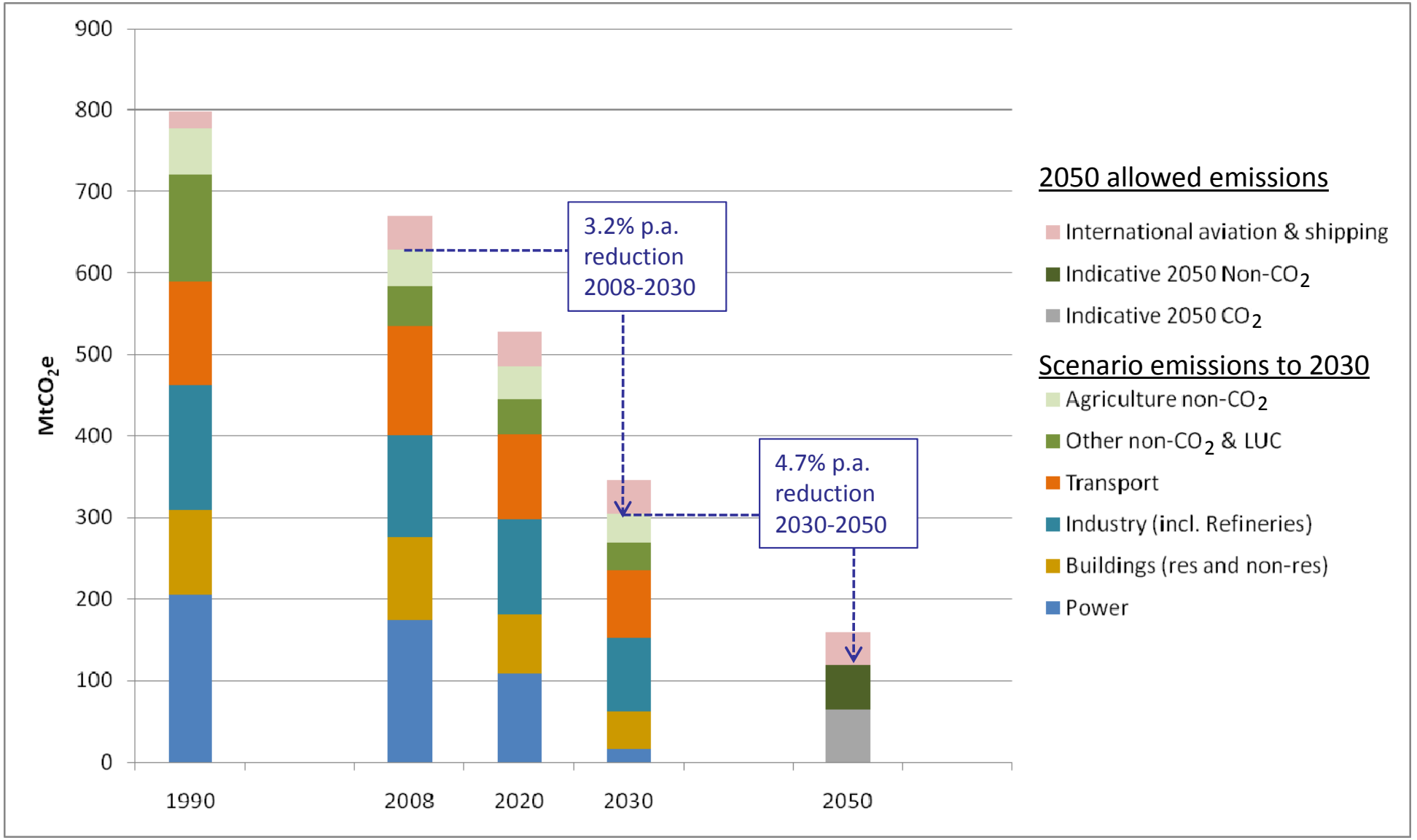
# Level of budget: emissions ceilings



# Budgets now legislated out to 2027



# But, emissions reductions will have to accelerate again from 2030 to 2050



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# Meeting required reductions

**Reducing power sector emissions:**

Renewables (Wind, solar, tidal and marine, biomass), nuclear, CCS

Application of power to transport and heat

**Reducing transport emissions:**

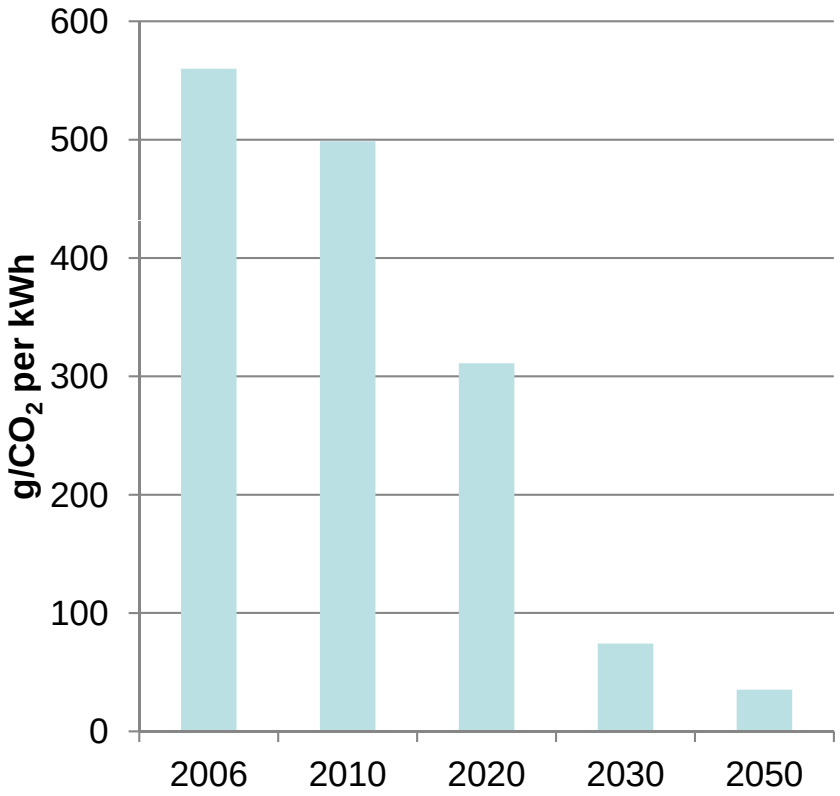
- Fuel efficiency
- Electric/plug-in hybrids
- Sustainable Bio fuels

**Reducing heat emissions:**

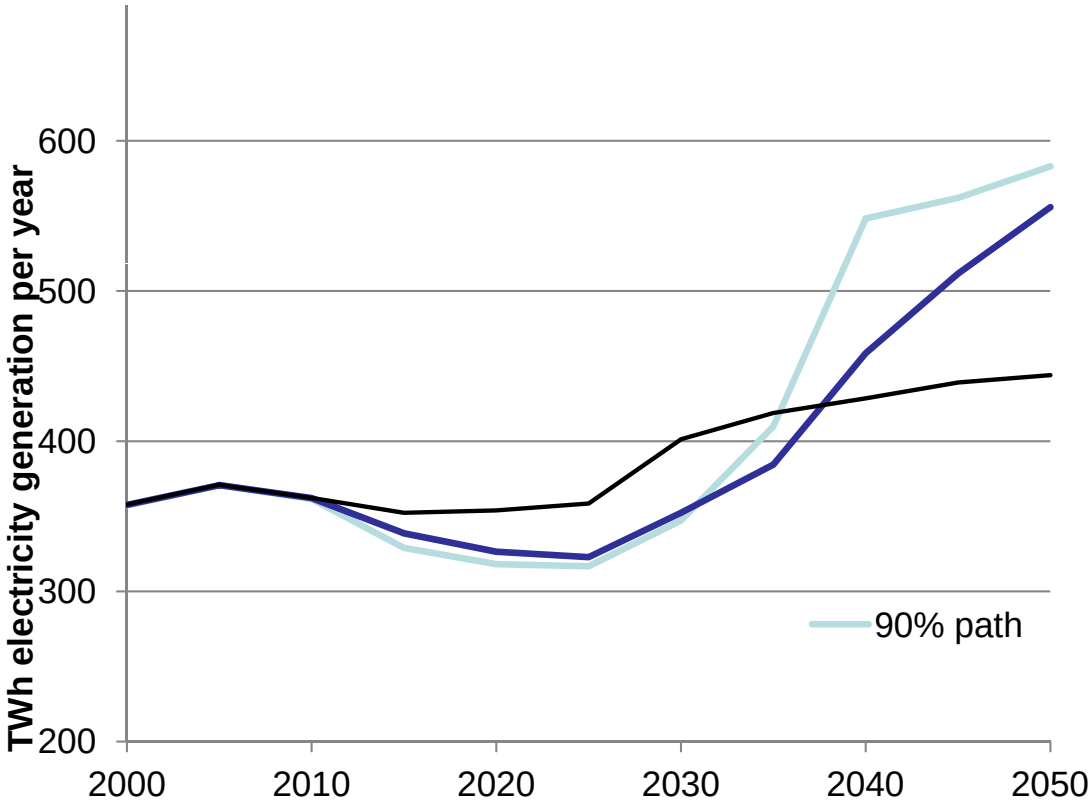
- Energy efficiency
- Behaviour change
- Electric heat (e.g. heat pumps, storage heating)
- Biomass boilers
- CCS in industry

# Meeting required reductions: power sector evolution

## Emissions intensity to 2050




## Power generation to 2050



# Cars: Low-carbon vehicles need to be 60% of new sales in 2030

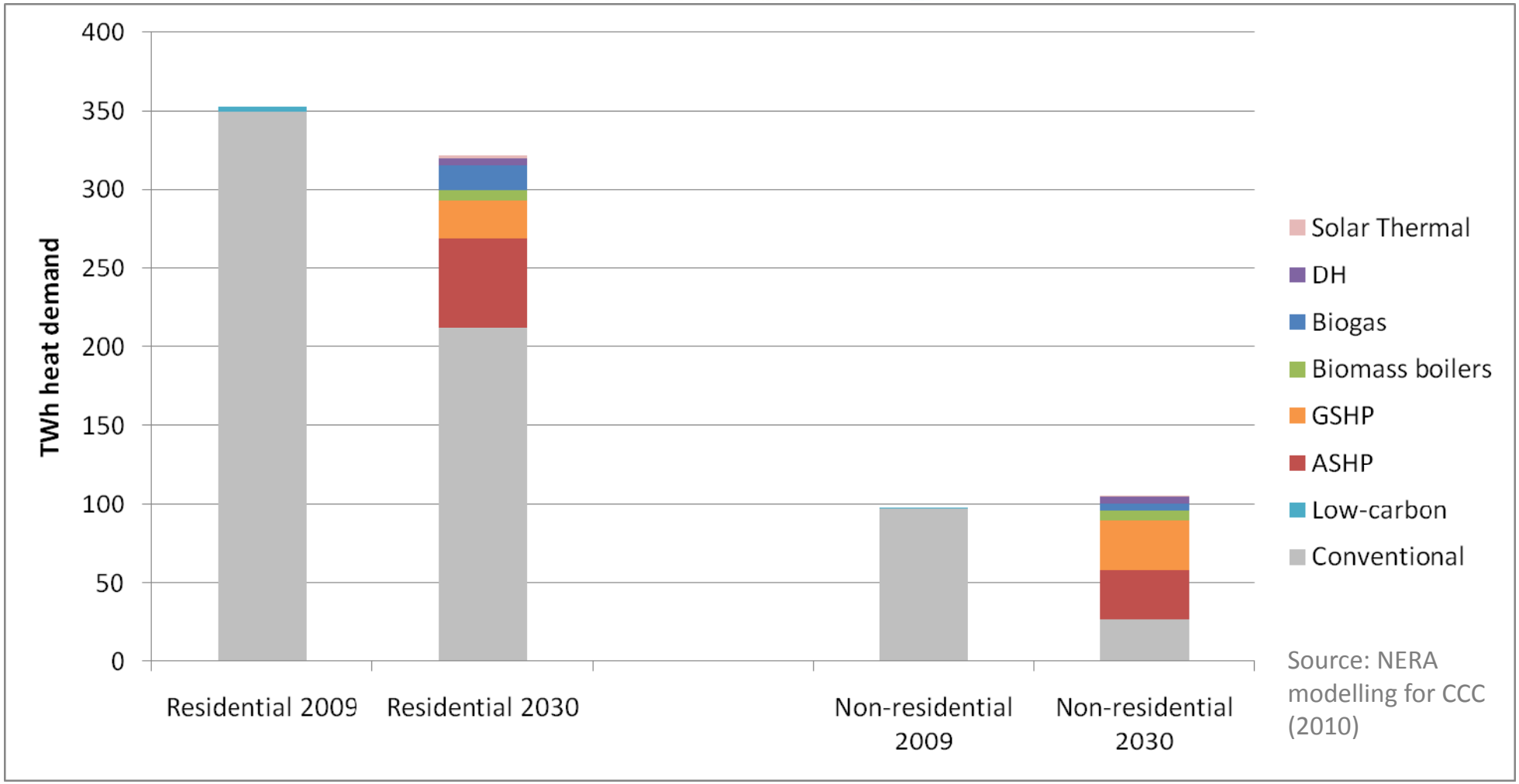
| | 2030 | | |
|---|---|---|---|
| | Share of new car sales | Share of miles | Emissions Intensity |
| Conventional cars | 40% | 70% | 80-125 g/km |
| Plug-in hybrids | 40% | 20% | 50 g/km |
| Pure electric vehicles | 20% | 10% | 0 g/km |

**Average emissions intensity in 2030**

**New cars purchased: 52g/km (versus 150g/km today)**

**All cars on road: 81 g/km (versus 173 g/km today)**

# Buildings/heat. Significant opportunity to reduce emissions to 2030 with a major role for heat pumps




- Demand reductions from efficiency improvements, including 3.5 million solid walls by 2030 in residential buildings
- Low-carbon sources reach 33% of residential heat demand and 74% of non-residential heat demand in 2030

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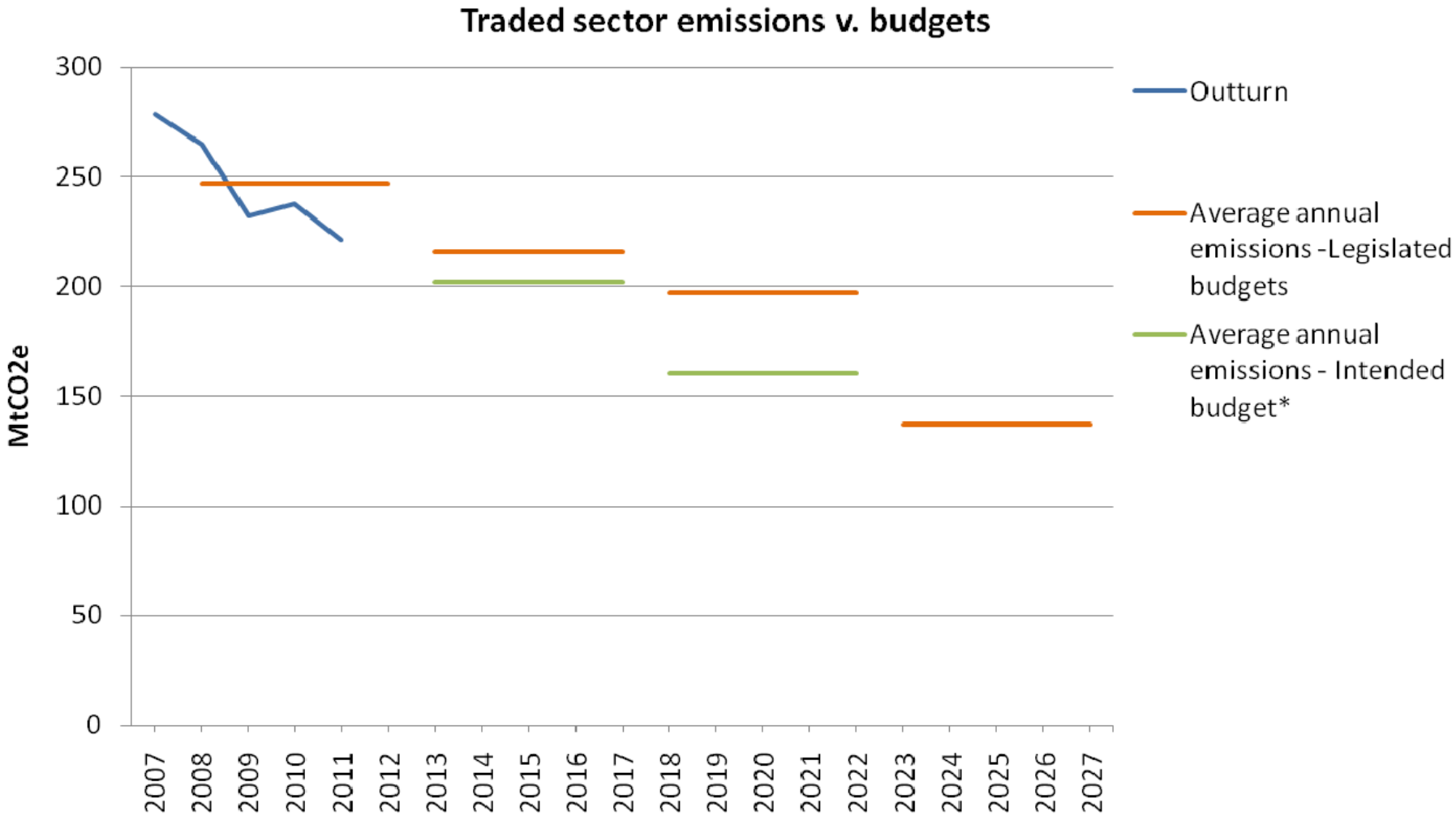
# The progress reports

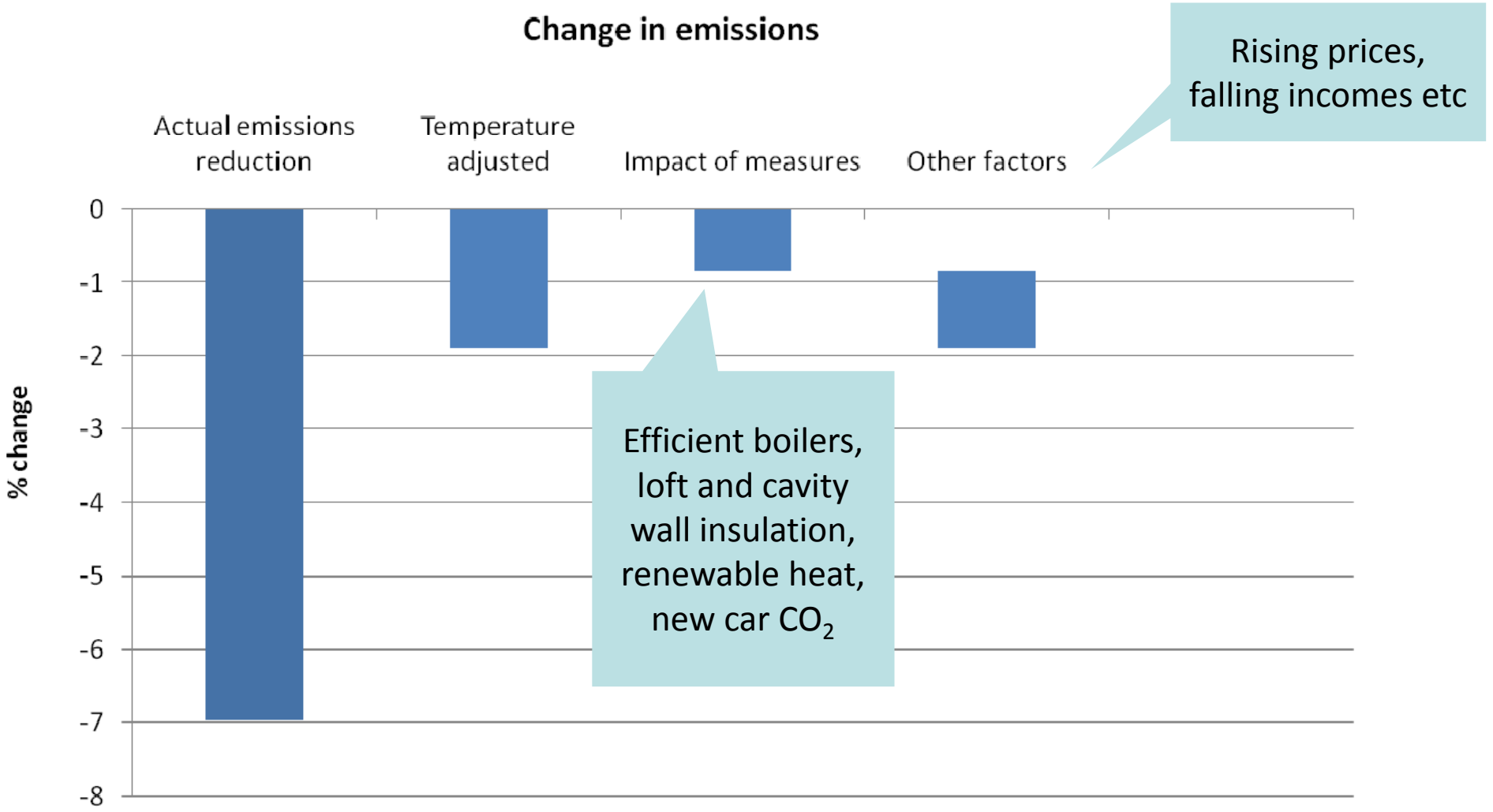
- 1st report
  - Set out indicator framework for measuring progress
- 2nd report
  - Applied the indicators for the first time – mixed messages
  - Emissions decline 10% in 2009 – 90% recession/10% policy
- 3rd report
  - Emissions broadly flat in 2010 and below the first carbon budget
  - Progress against indicators has been mixed.
  - Possible to outperform currently legislated budgets through domestic abatement
- 2012 report
  - Emissions fell by 7% in 2011, 3% due to mild winter weather
  - Progress against indicators, but relative to a low level of ambition for the first budget period.
  - The lead-time of several years for needed step change has now elapsed.

# Traded sector emissions fell, leaving them well below the UK cap



# Non-traded sector emissions below the current budget level, even after adjusting for weather

# Progress implementing measures in the non-traded sector reduced emissions by only around 0.8%



# Progress with insulation and renewable heat

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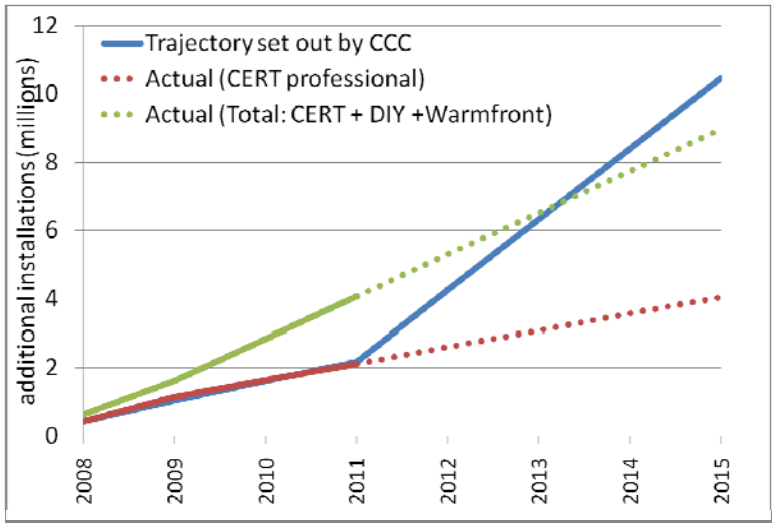
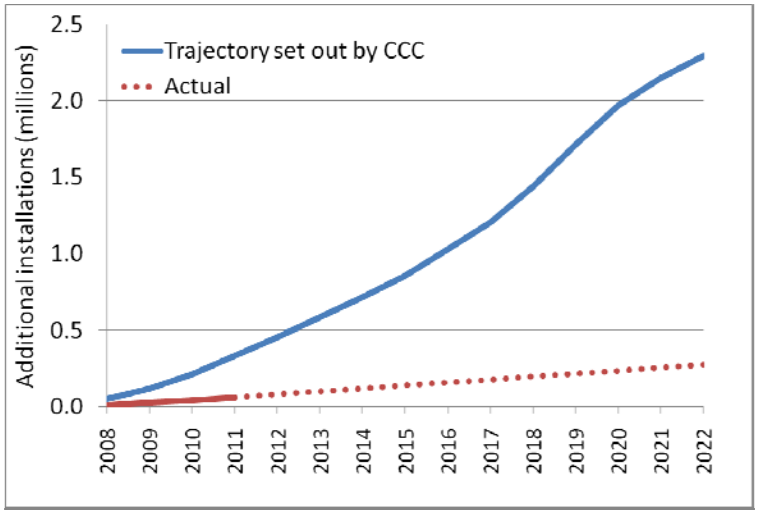
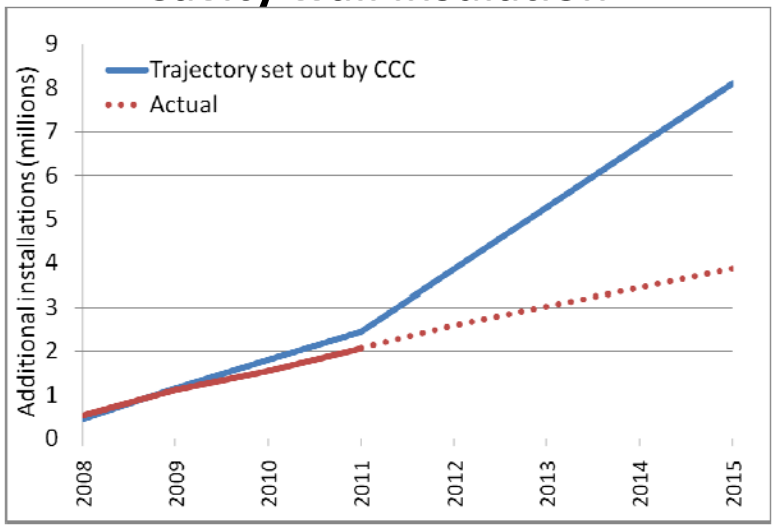
## Loft insulation



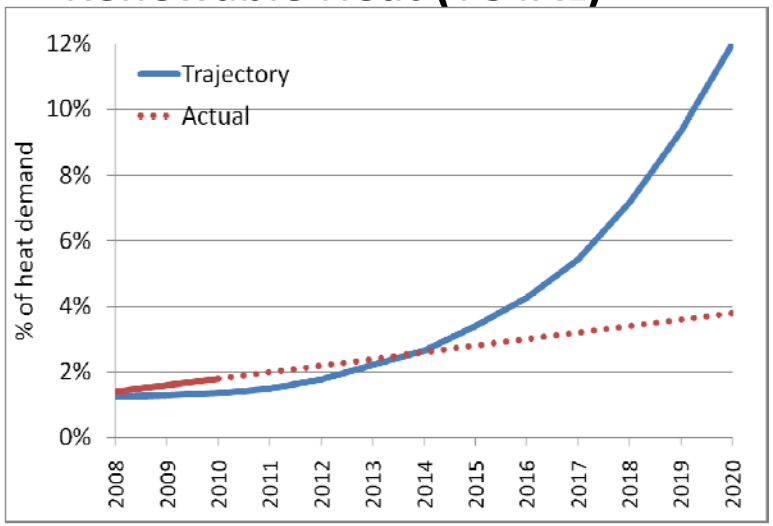

## Solid wall insulation




## Cavity wall insulation




## Renewable Heat (TOTAL)

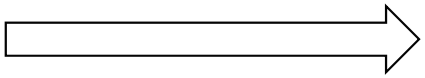


# The flagship policies

- Supply side: Electricity Market Reform
- Demand side: Green Deal for consumers

# EMR: What's the problem?

- Low carbon electricity generation tends to be high capital cost/low running cost (fossil plant with CCS excepted)
- Investment in such plant is exposed to additional market risk in a volatile "energy only" market
- Gas plant has a natural hedge because gas prices drive electricity prices and hence has lower risk
- The cost of capital is therefore higher for low carbon generation



- The purpose of Electricity Market Reform is to reduce market risk for low carbon generation  by offering stable prices
- This also helps to contain the cost to consumers of low carbon electricity supply

# The elements of Electricity Market Reform

- Carbon Price Floor (Treasury led)
- Feed-in Tariff with Contracts for Difference (CfDs) to replace Renewables Obligation
- Capacity Mechanism
- Emissions Performance Standard

# The Green Deal and ECO (Energy company obligation)

- The ***Green Deal*** financial mechanism eliminates the need to pay upfront for energy efficiency measures and instead provides reassurances that the cost of the measures should be covered by savings on the electricity bill (the “Golden Rule”)

- The new ***Energy Company Obligation*** will integrate with the Green Deal, allowing supplier subsidy and Green Deal Finance to come together into one seamless offer to the consumer (“difficult” energy efficiency measures, lower income customers)

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# Challenges

- 2014 review of 4th carbon budget in the light of progress towards EU emissions goals and competitiveness issues
- Awaiting response to CCC recommendation to include international aviation and shipping in budget framework
- Parliamentary criticism of draft Energy Bill (which would enable Electricity Market Reform)
- Stakeholder scepticism about aspects of the Green Deal
- Vocal opposition to wind turbines on landscape/cost grounds
- Nuclear “wobbles” due to weakened business case related to EMR and (indirectly) to Fukushima

# Useful websites

- UK Committee on Climate Change: www.theccc.org.uk
- UK Department of Energy and Climate Change: www.decc.gov.uk
- UK Energy Research Centre: www.ukerc.ac.uk
- Office of Gas and Electricity Market Regulation (Ofgem): www.ofgem.gov.uk