Meeting carbon budgets in the UK – the role of demand

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Committee on Climate Change

Demand Seminar, 17 May 2017

Structure of presentation

1. The legislated carbon budgets
2. Our approach to advising on carbon budgets
3. Demand measures in 5CB scenarios
4. Next steps

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The Climate Change Act & the role of the CCC

The Climate Change Act 2008

1	**A goal**	**2050 emissions target**
2	**A pathway**	**Carbon budgets**
3	**A toolkit**	Requirement that Government brings forward **policies**
4	**A monitoring framework**	**Committee on Climate Change** to monitor progress and suggest changes

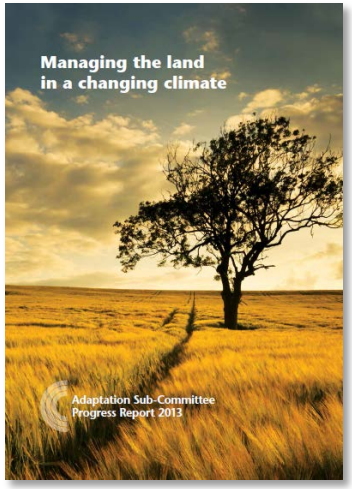
Committee on Climate Change – our role

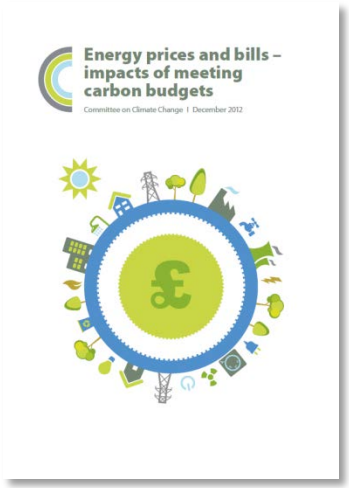
Established by the Climate Change Act 2008 to provide independent advice to Government and Parliament on:

- Emissions limits
- Annual progress
- Adaptation (through ASC)

Lord Deben, Chairman

Baroness Brown, Chair ASC





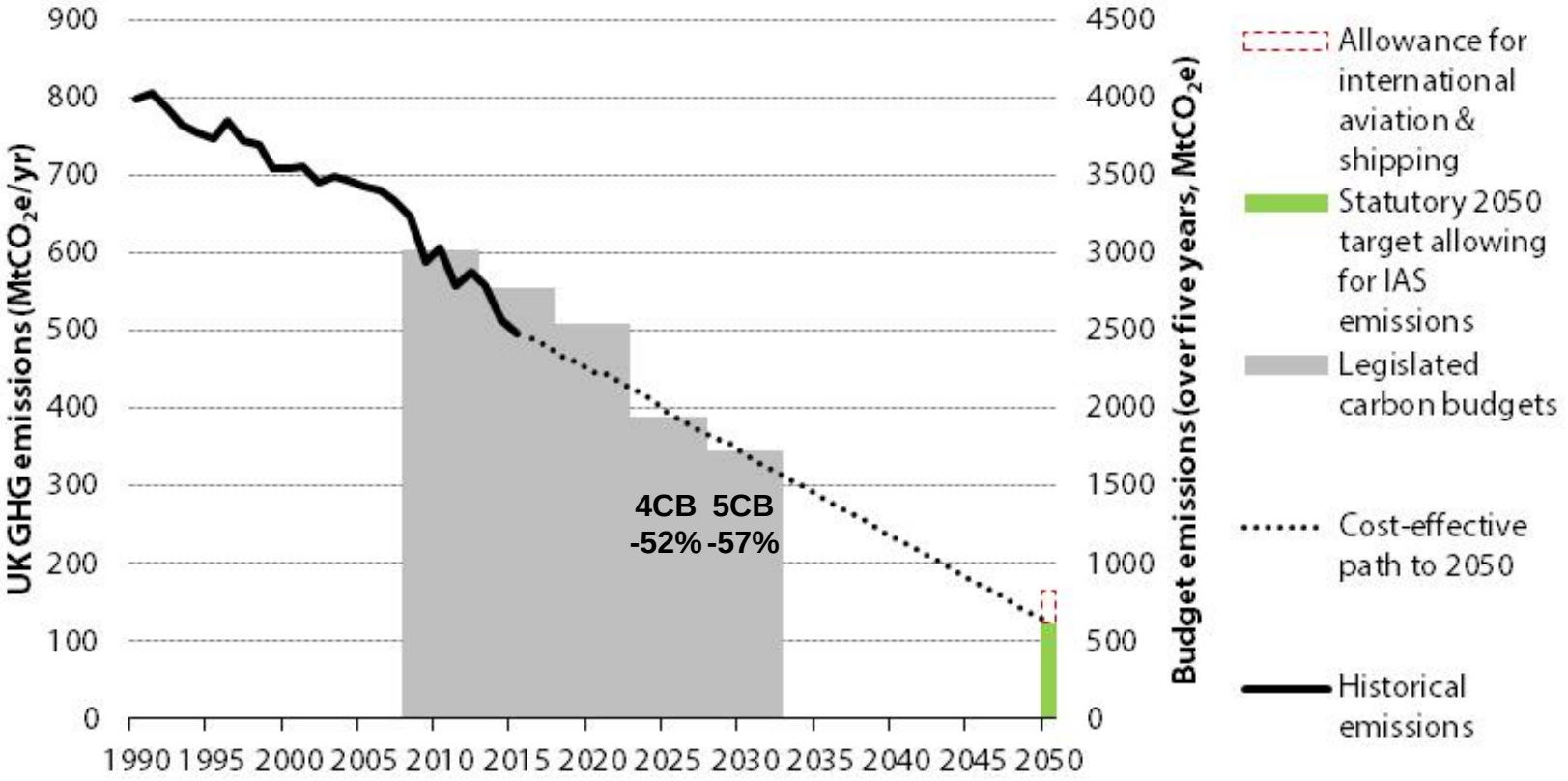
The Committee on Climate Change – How we work

- Non-departmental public body (NDPB), sponsored by BEIS, Defra
- Value our independence
- We have our own research budget
- Secretariat of a little under 30, mainly analysts

<u>Committed to openness and transparency</u>

- Publish supporting research and analysis
- Memorandum of Understanding with Government Departments over research and use of models
- Stakeholder meetings (mix of bilateral and workshops)
- CCC website

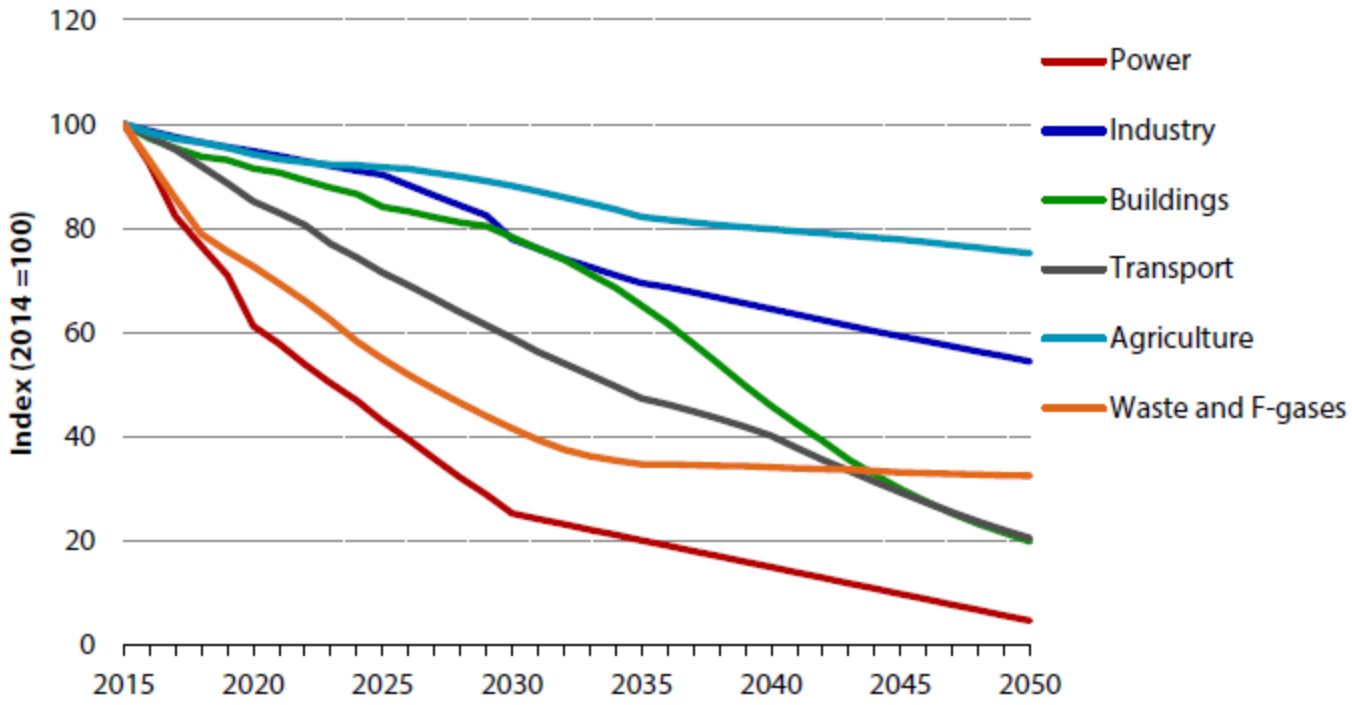
Carbon budgets – legislated out to 2032 - provide stepping stones to the 80% 2050 target



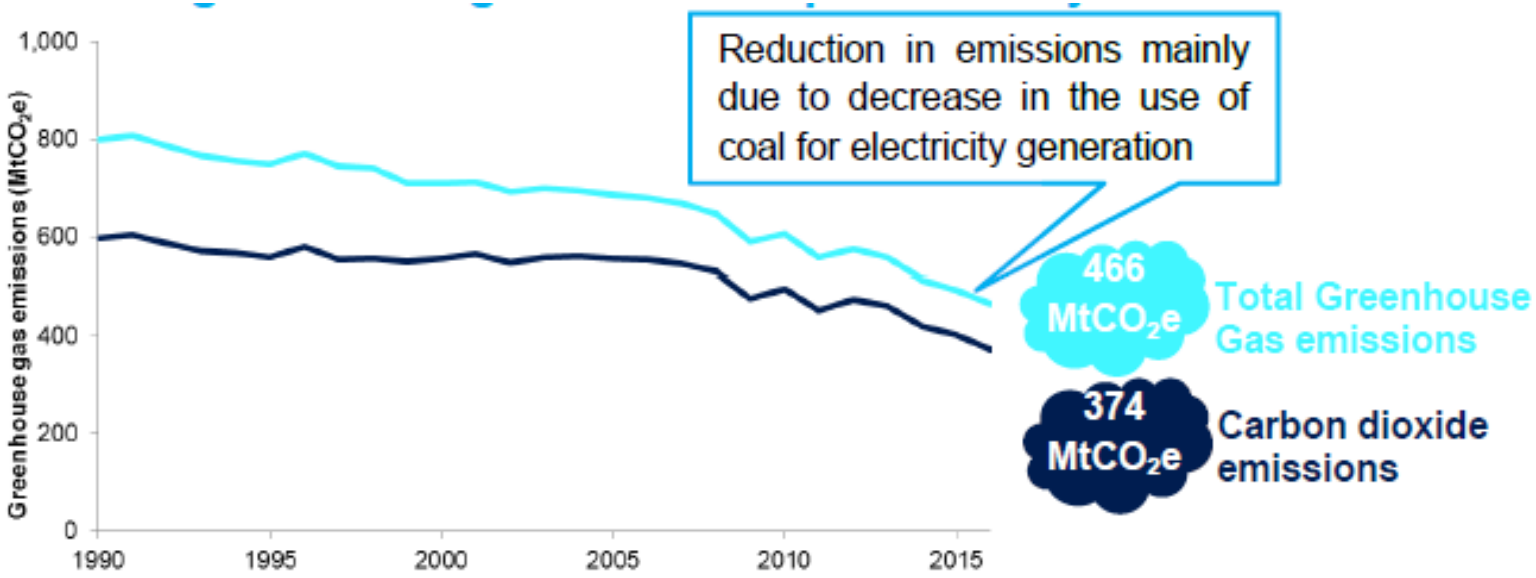
Note: 2050 target allows for emissions from international aviation and shipping, not currently in carbon budgets

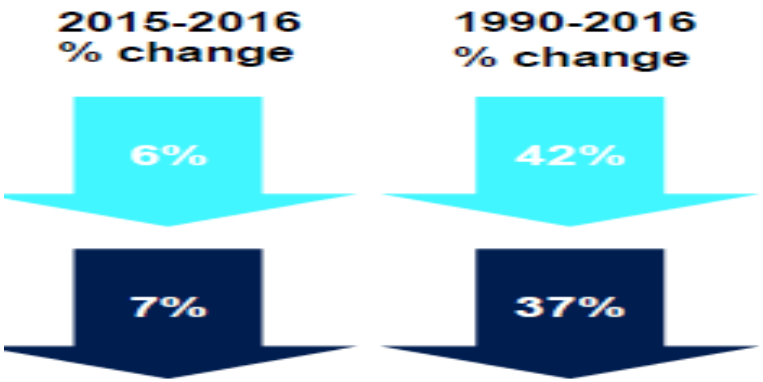
Whilst the overall path looks broadly on a straight-line to 2050, the pace of reduction varies by sector

Figure 1.14: Central scenario emissions paths to 2050



There was a further reduction in UK emissions in 2016

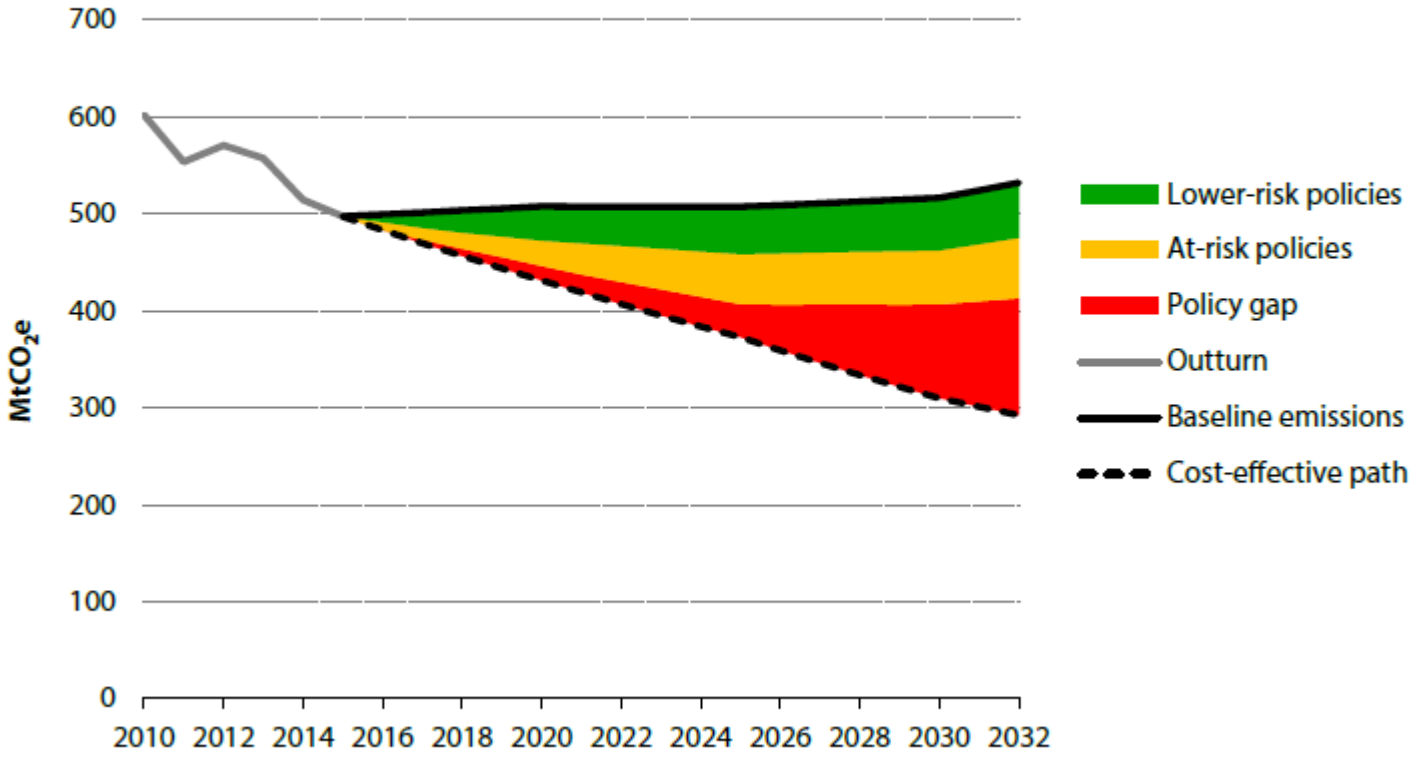




Source: BEIS, provisional data

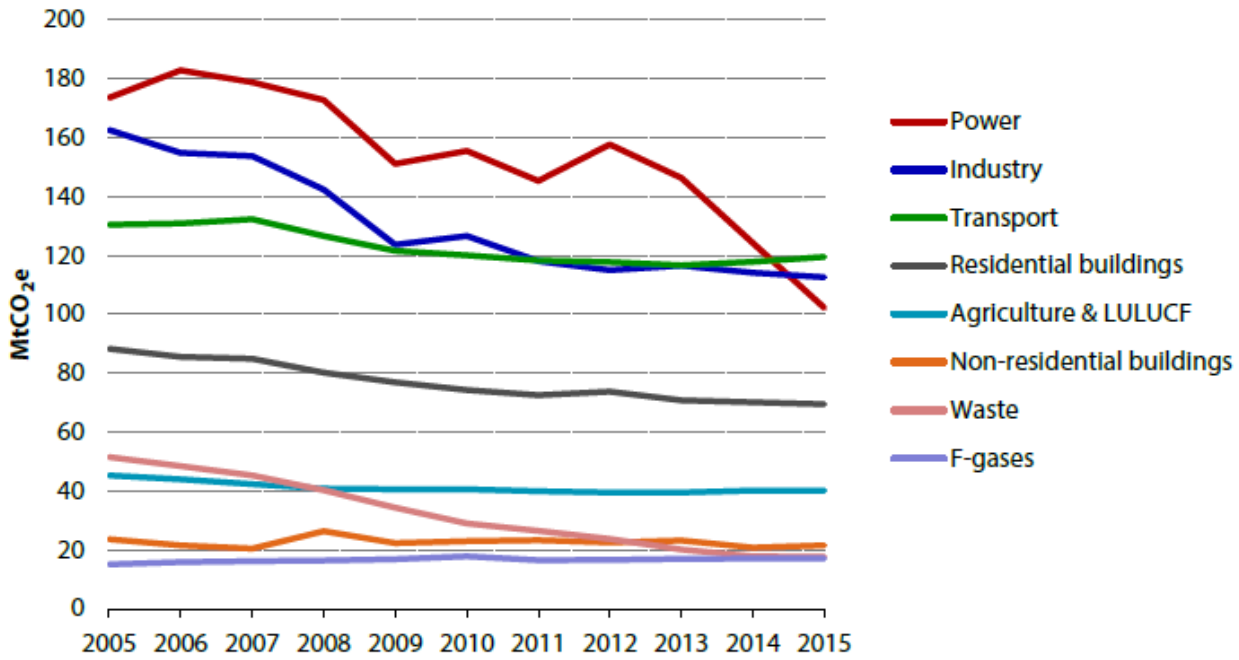
Despite progress, there is a policy gap to meeting the 4th and 5th carbon budgets and preparing for 2050 target

Figure 2. Assessment of current policies against the cost-effective path to meet carbon budgets and the 2050 target



Recent progress in reducing emissions has been almost entirely in power sector

Figure 1. Progress reducing emissions since 2012 has been almost entirely due to the power sector



Change 2015-2016

- Power down 24%
- Transport up 0.9%
- Residential up 4.5%
- Business down 10.0% (closure Redcar steelworks)

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Broad approach: the cost-effective path

The 2050 target – UK's contribution to 2°C

- at least 80% reduction in greenhouse gases

Budgets prepare for 2050

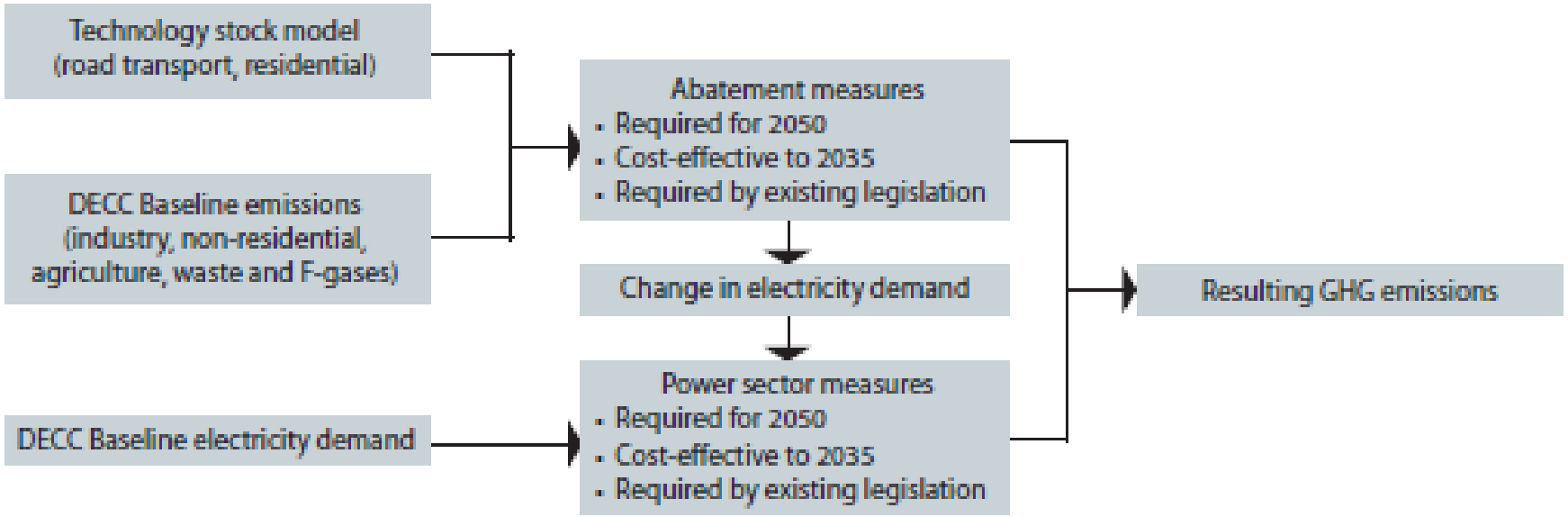
Carbon budgets – the cost-effective path to the 2050 target

- Deploys low-cost measures
- Develops options for the future
- Manageable costs and impacts
- Consistent with international commitments

Budgets are feasible from today

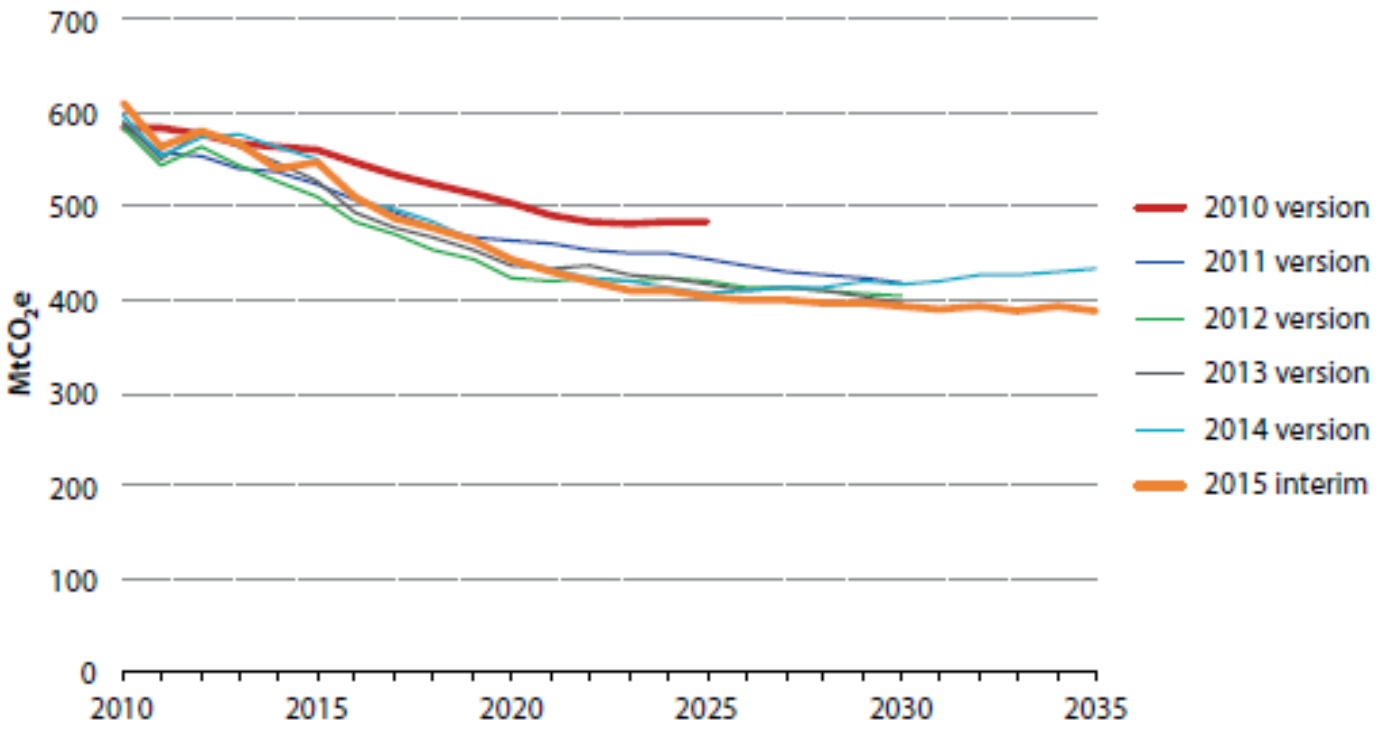
Approach to constructing scenarios

Figure 1.4: Approach to constructing CCC scenarios



Starting point – before measures – is BEIS projections of energy demand and emissions

Figure B3.1: DECC Reference projections, 2010-2015 vintages

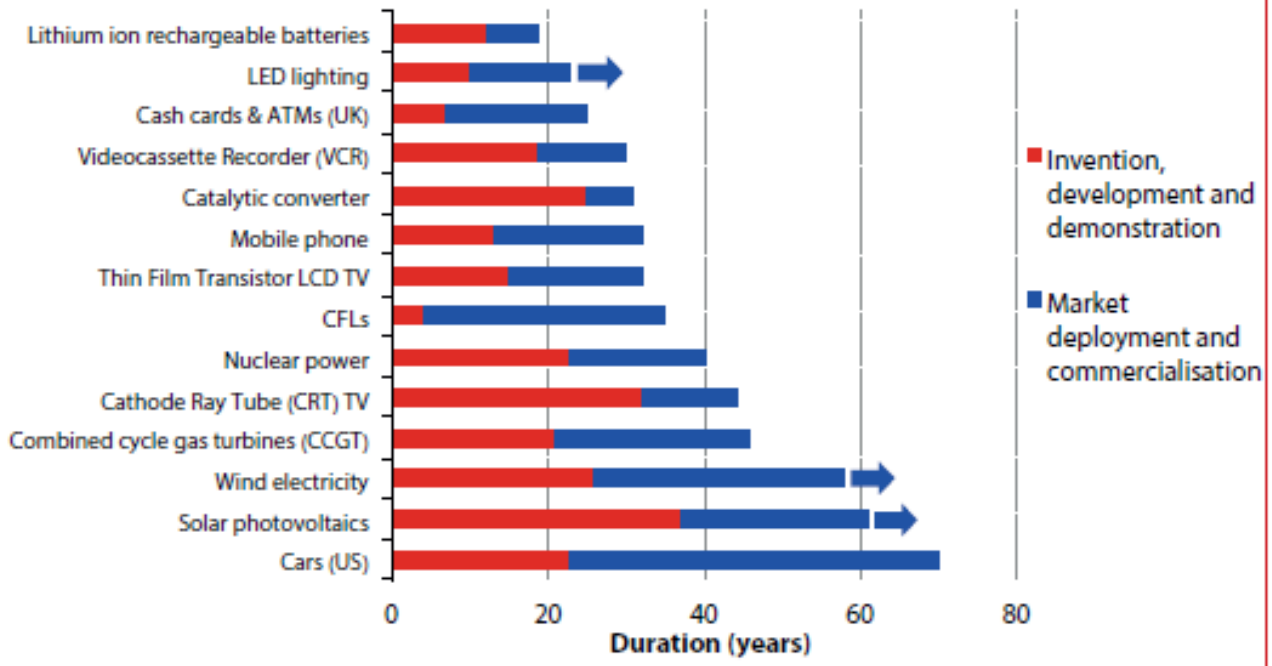


Source: DECC (2010-2015) *Updated energy and emissions projections, DECC interim projections (October 2015).*
Notes: The 2010 version projected emissions up to 2025 only whilst since 2014, projections go out to 2035.

Deployment of currently known technologies will be of critical importance in meeting 2050 target

- Asset lives of 15-30 years requires early deployment
- The development of new technologies , and their deployment at scale, takes time

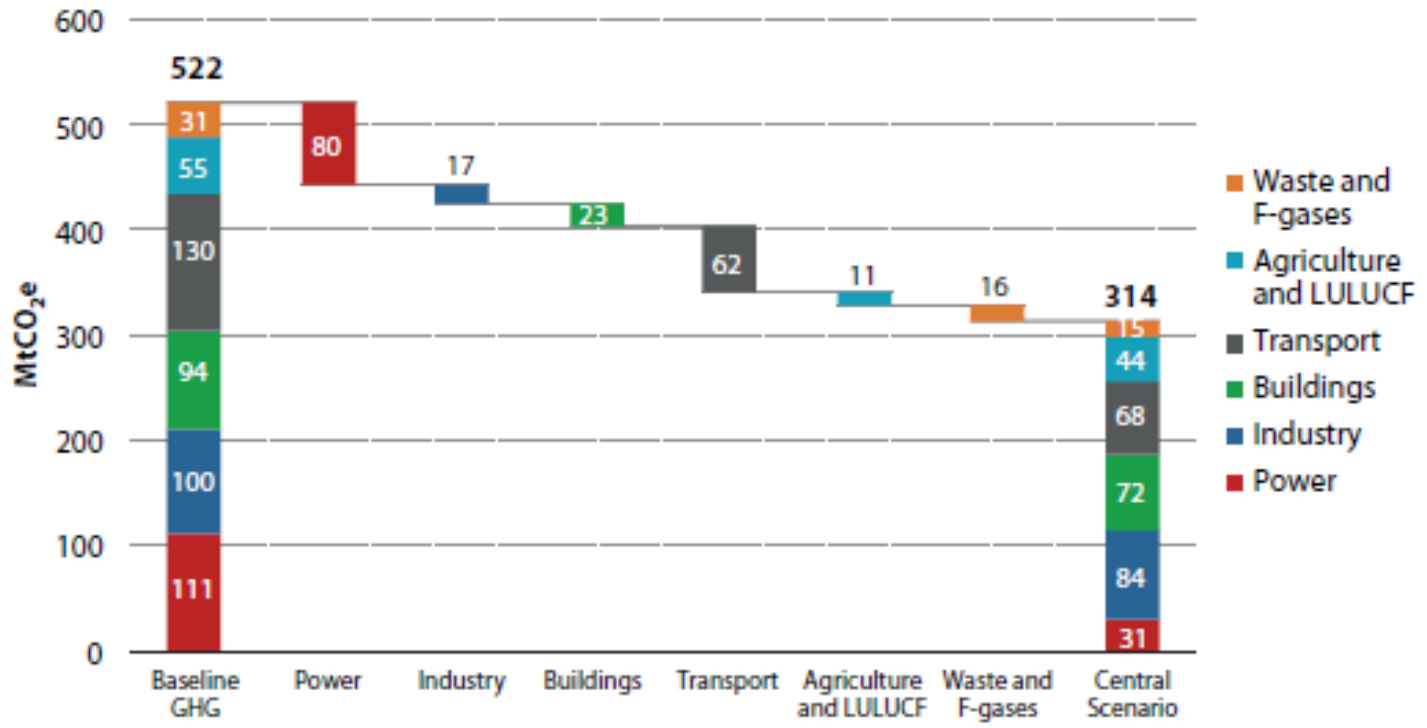
Figure B3.6: Time taken for development and commercialisation of a range of innovations



Source: UKERC (2015) *Innovation timelines from invention to maturity: A review of the evidence on the time taken for new technologies to reach widespread commercialisation.*

We build up a picture, bottom-up, of cost-effective abatement by sector, 2030

Figure 3.6: Abatement in the Central Scenario (total emissions, 2030)



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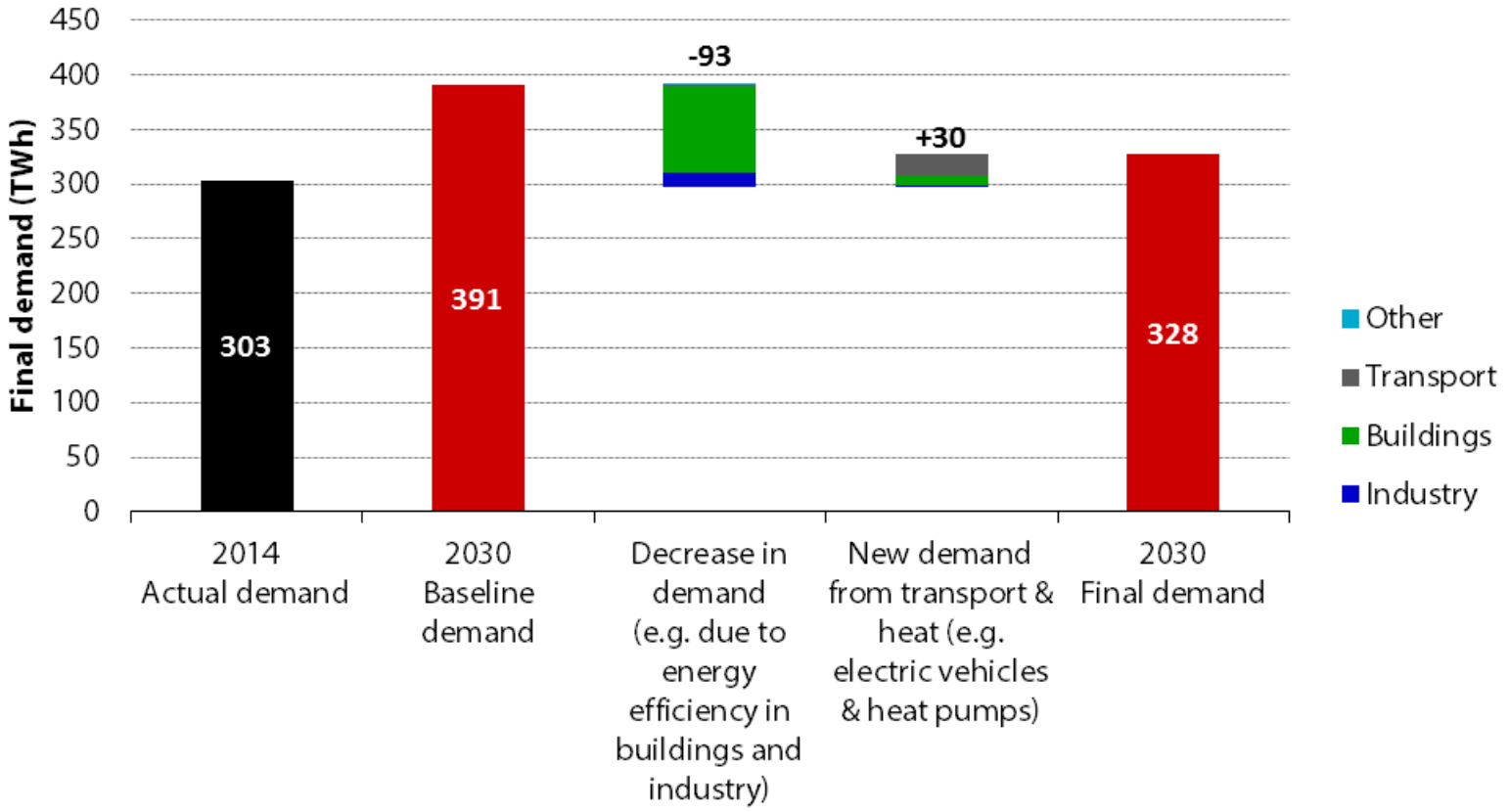
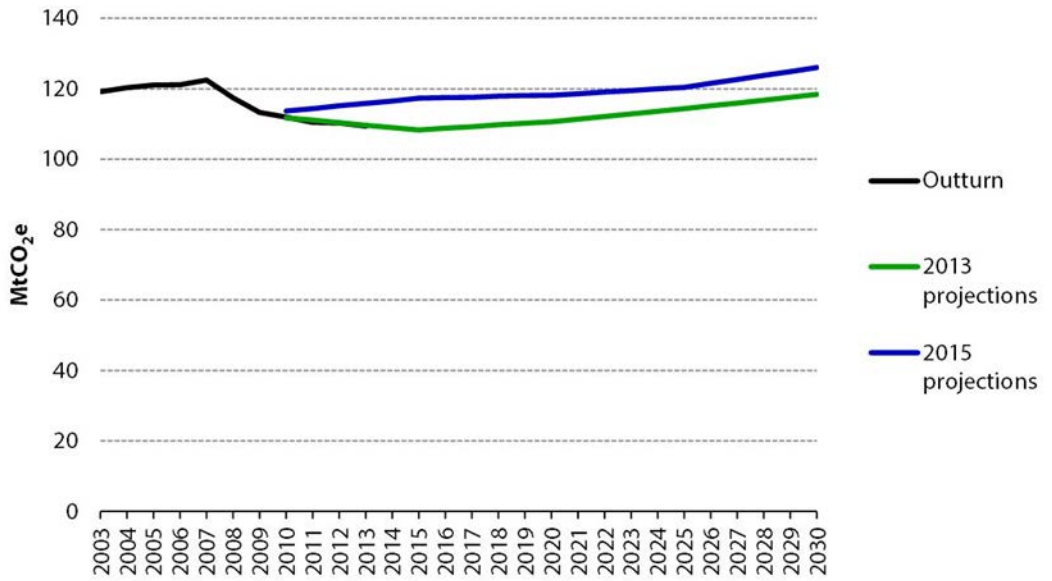
Our projections of final electricity demand take account of energy efficiency measures and new demands from electrification of heat and surface transport



DfT baseline projection of emissions from surface transport rising

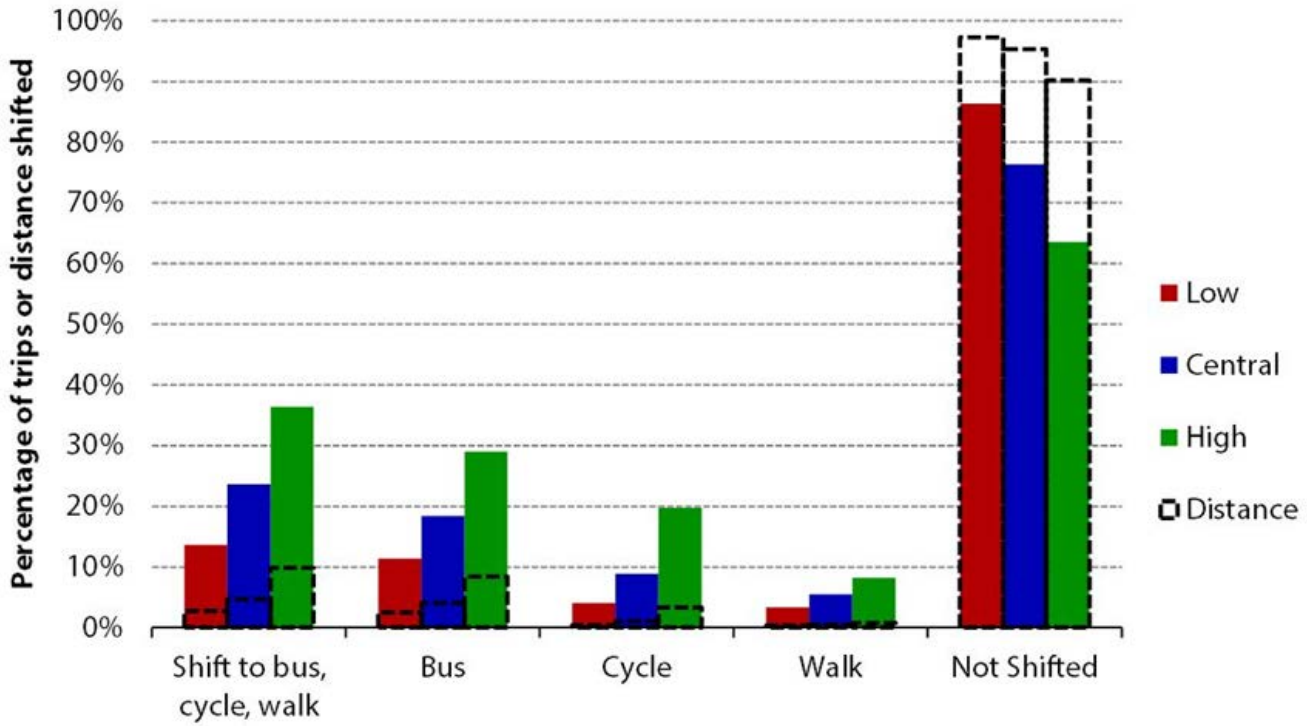
Figure 5.3: UK surface transport CO_2, outturn and baseline projections (2003-2030)



Source: NAEI (2015); DfT projections for CCC (2013, 2015); DECC interim projections (October 2015).
Notes: The baseline emissions trajectory assumes no policies to mitigate climate change after 2010.

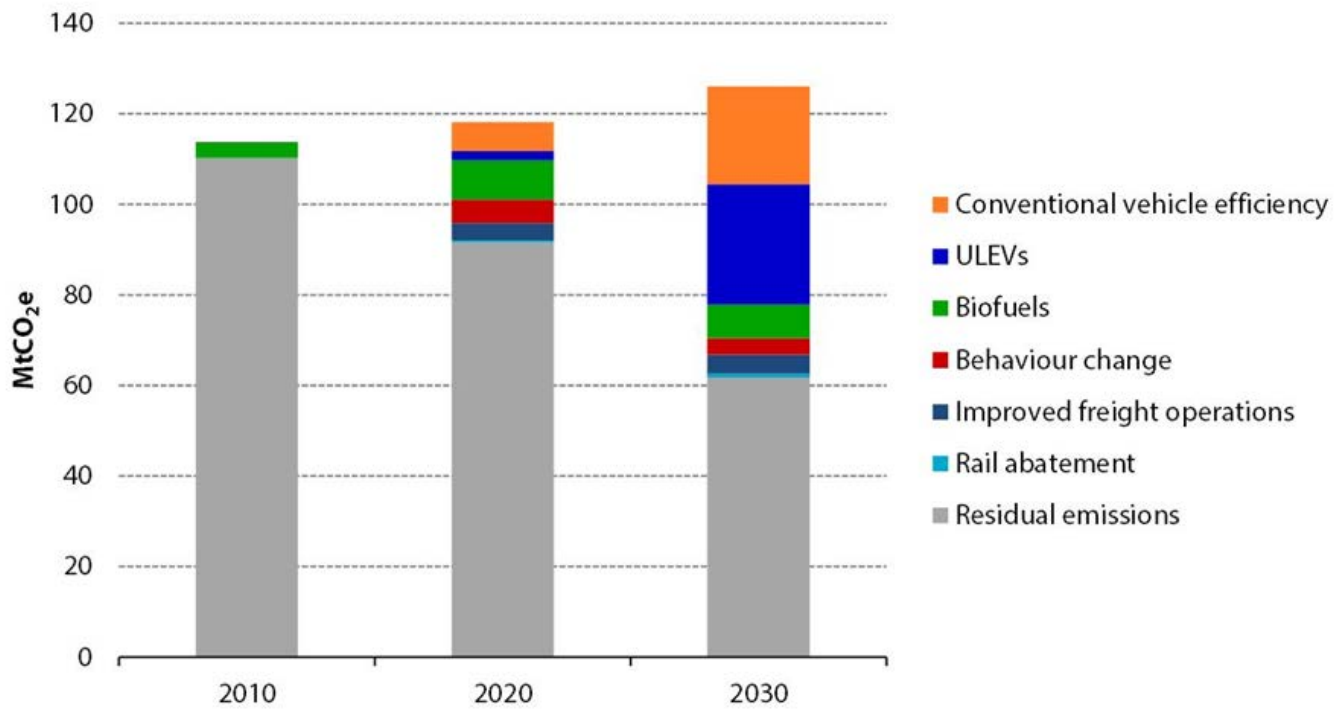
We have looked at potential to shift car journeys to low carbon alternatives

Figure B5.7: Opportunities to shift car journeys to low or no carbon alternatives



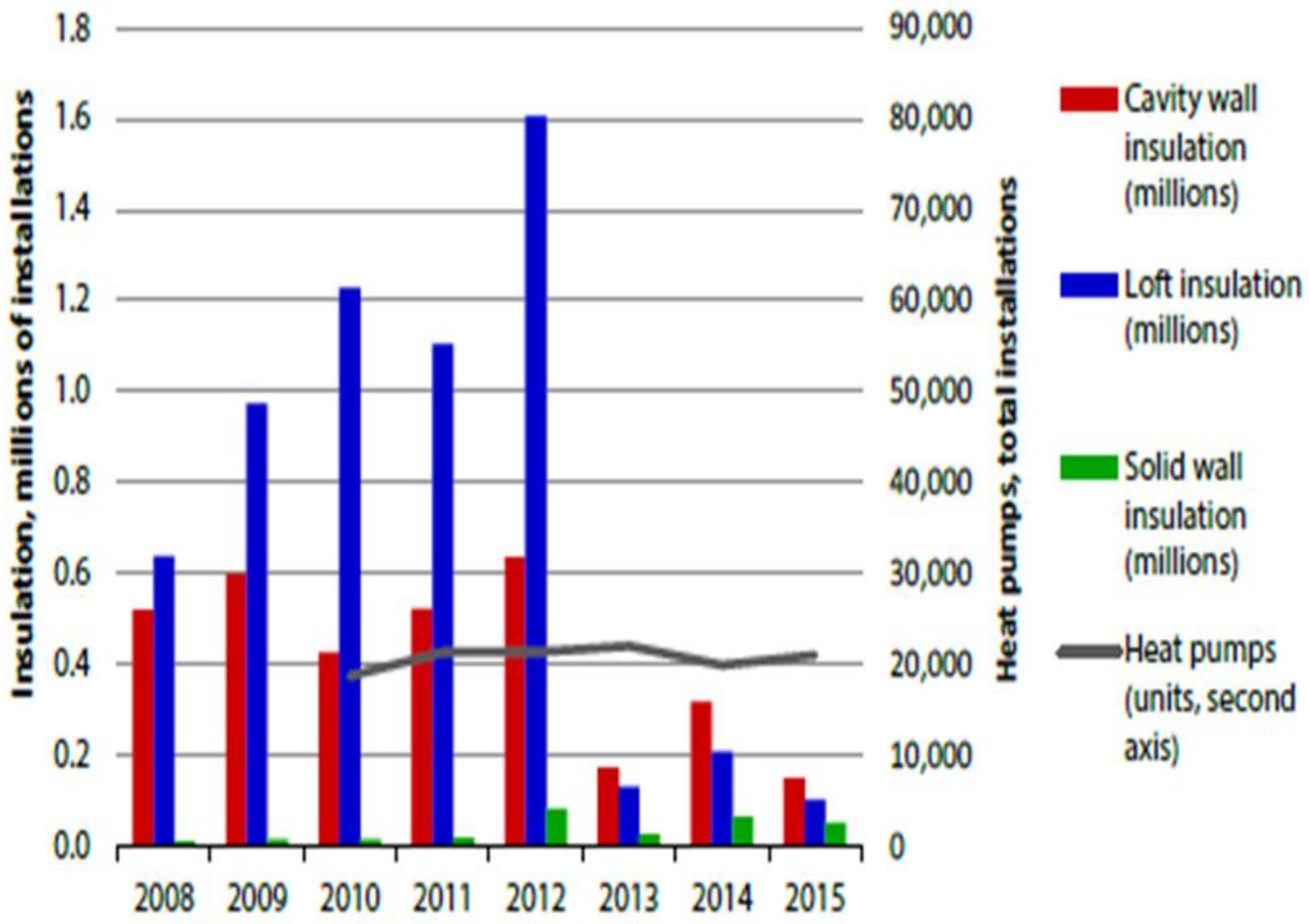
But most abatement in our central scenario for surface transport is from more efficient conventional vehicles and shift to electric vehicles

Figure 5.8: UK surface transport abatement under our Central scenario (2010-2030)

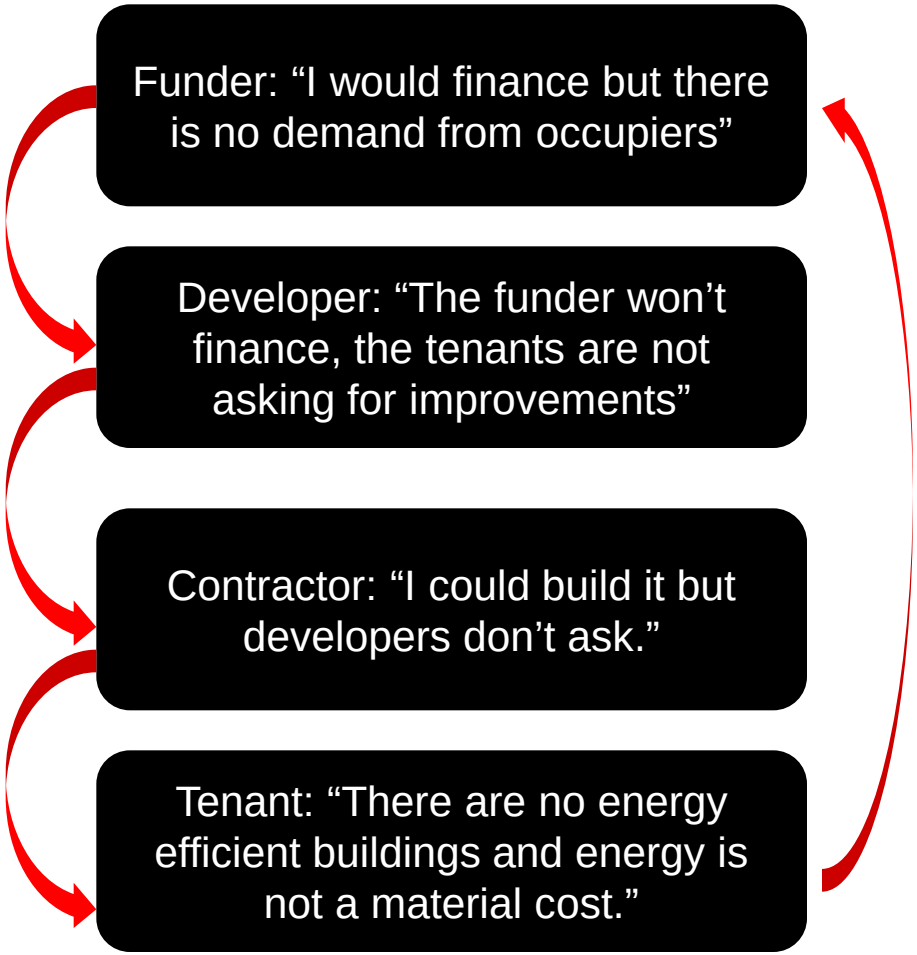


Source: CCC analysis.
Notes: Abatement relative to baseline emissions projection.

Residential buildings - lately action to reduce emissions in homes, and bills, has stalled…



…as has action to improve the energy efficiency of commercial buildings.



"Circle of blame", Carbon Trust 2009

- Information and reporting has little impact:
  - Energy Performance Certificates (EPCs)
  - Display energy certificates (public buildings)
  - energy audits (Energy Savings Opportunity Scheme for large business)
- Need to focus on:
  - Actual not modelled performance
  - Board-level reporting, "salience"
  - Identification of low cost options
  - Comparisons with peers

We include range of measures to reduce emissions from the residential building stock

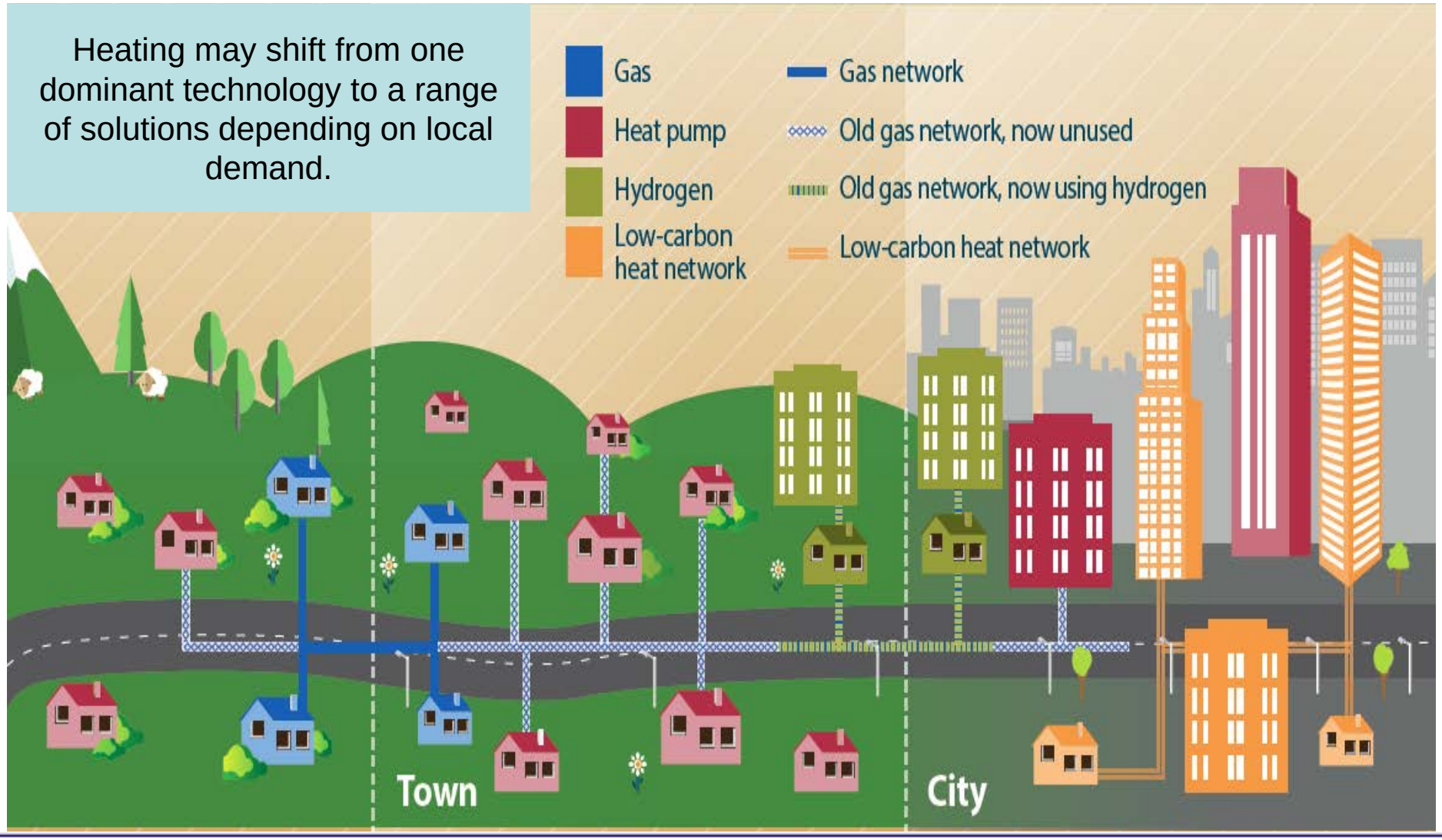
Committee on Climate Change

Table 3.1: Residential sector Central scenario to 2030

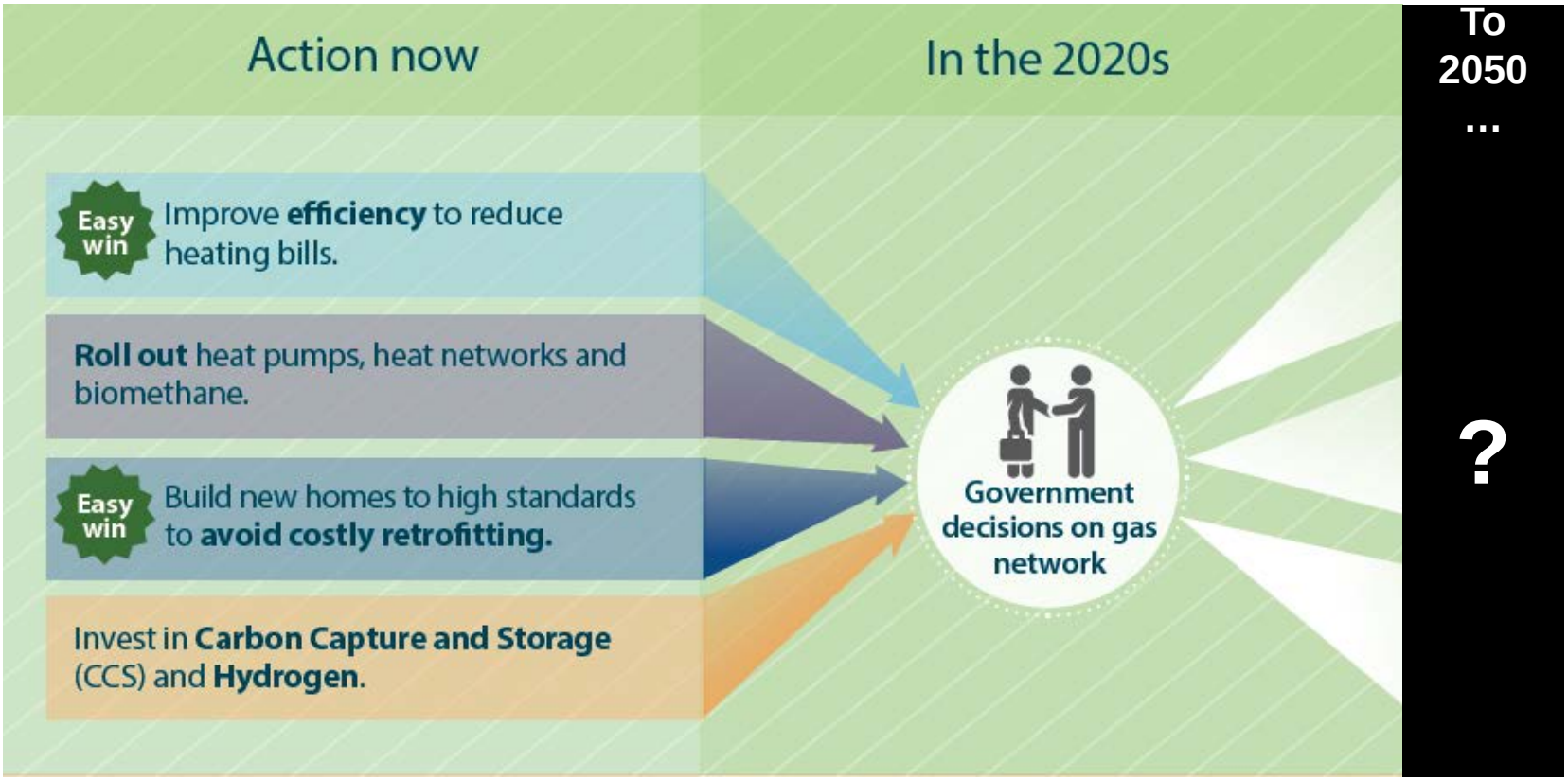
Measure	Cumulative uptake from 2008	Direct abatement ($MtCO_2$)	Electricity savings (TWh)
Retrofit heat pumps	1.2 m homes *	2	1
Heat pumps, new-build	1.1 m homes	1.5	-2.5
Heat networks	14 TWh / 1.5 m homes*	2	-1
Biomass boilers	0.3 m homes	1	3.5
Solid wall insulation	2 m homes	1	1.5
Cavity wall and loft insulation top-up	6 + 9 m homes	3	1
Other fabric measures	-	0.5	0.0
Lighting and appliances	-	-3	25.5
Heating controls	-	0.5	0
Hot water efficiency measures	-	1.5	0.5
Behavioural measures	-	1.5	0.5
Glazing	-	0.5	0.5
Total abatement		**13**	
Residual emissions by 2030		**60**	

But the longer-term story of how we decarbonise heat is to be resolved. We can say broadly where we need to be in 30-40 years.

Heating may shift from one dominant technology to a range of solutions depending on local demand.



Getting there requires effective roll-out of each option now – and associated investment in training, certification and supply chains.



"…no consensus on the best mix of these technologies… We need a clearer shared understanding of the potential, the costs and the benefits … Our ambition is to be able to agree in the next few years, together, on the right long-term direction for heat policy" (Baroness Neville-Rolfe, then BEIS Minister, December 2016)

Full infographic: see https://www.theccc.org.uk/wp-content/uploads/2016/10/Infographic-The-future-of-heating-in-UK-buildings-Committee-on-Climate-Change.pdf

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Having legislated the 5th budget, the Government has to prepare a report on how it will be met "as soon as is reasonably practicable"

- The Clean Growth Plan is awaited. It has now been delayed by the Election
- When the plan appears it will be a priority for the Committee to provide an assessment

We will continue to build the evidence base. This will feed into annual progress reports to Parliament and the our advice on the 6th carbon budget which will be due by end 2020

We are currently taking forward research on:

- Flexibility indicators for the power sector
- Requirements for electric vehicle battery re-charging network

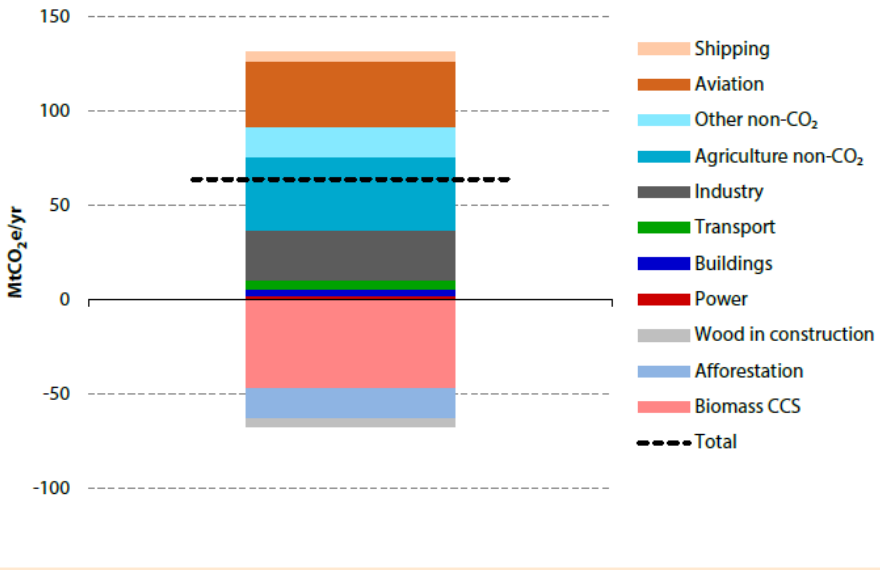
We intend to look further at:

- Potential scale of contribution from bioenergy and hydrogen
- Aviation strategy
- Agriculture abatement

To meet Paris Agreement aims may need to go further than currently legislated 5th carbon budget

- The UK 2050 target (at least 80% reduction in emissions) was derived as a contribution to a global emissions path keeping global average temperature rise to around 2°C above preindustrial levels
- Paris Agreement aims for "well below" 2°C; to "pursue efforts" for 1.5°C; and sets target of net zero global emissions in 2nd half this century
- CCC advice not to set a new UK emissions target now, but to vigorously pursue measures to deliver the existing commitments, and maintain flexibility to go further.

Figure 3.1. Residual UK greenhouse gas emissions in 2050 under Max deployment across all sectors



Source: CCC calculations.

We currently have no scenarios for how the UK can achieve net zero domestic emissions

In providing our advice on the 5th carbon budget we considered "barriers" and "max" scenarios as well as a central scenario … and our analysis of the powers sector also considered a "low demand" scenario to 2030

Sector	Barriers Scenario	Max Scenario
Power	Further delays or failure to roll out nuclear or CCS	Greater deployment of low-carbon generation as costs fall more quickly than anticipated
Industry	Lower uptake of energy efficiency and failure to deploy CCS	Greater electrification in industry and wider adoption of CCS
Buildings	Lower levels of deployment of heat pumps and fewer energy efficiency measures	Greater deployment of low-carbon heat and energy efficiency options
Transport	Reduced uptake of low emissions vehicles	Greater change in travel behaviour, and better alignment of real-world emissions with test cycle
Agriculture	Slow introduction of measures to manage soils and crops, failure to reduce emissions from vehicles	Greater uptake of alternative diets for animals, new crops and more efficient vehicles
Waste and F-gases	More limited diversion of biodegradable waste streams from landfill with less of UK participating in such programmes	No further abatement beyond the Central Scenario due to limited evidence

How can we build on this – possibly to consider a wider range of scenarios?

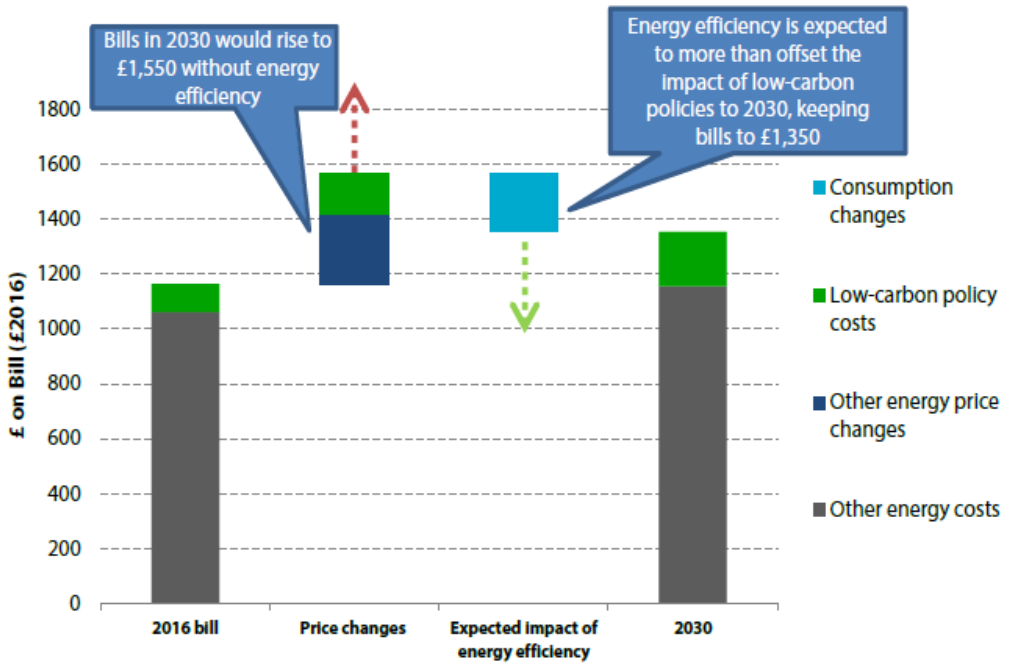
Thank you

For more information, see our website

https://www.theccc.org.uk/

Energy prices and bills – for households, energy efficiency improvements can more than offset impact of low-carbon policies to 2030

Figure 2. Central estimates for changes in annual household energy bill from 2016 to 2030



Source: CCC analysis. Estimates are for the average dual-fuel household with gas heating.

For energy-intensive industries cost compensation and exemptions should remain so long as there are differences in low-carbon policy costs between the UK and international competitors