



Committee on  
Climate Change

**Independent** advice to government  
on building a low-carbon economy  
and preparing for climate change

**Thursday, 19 October 2017**

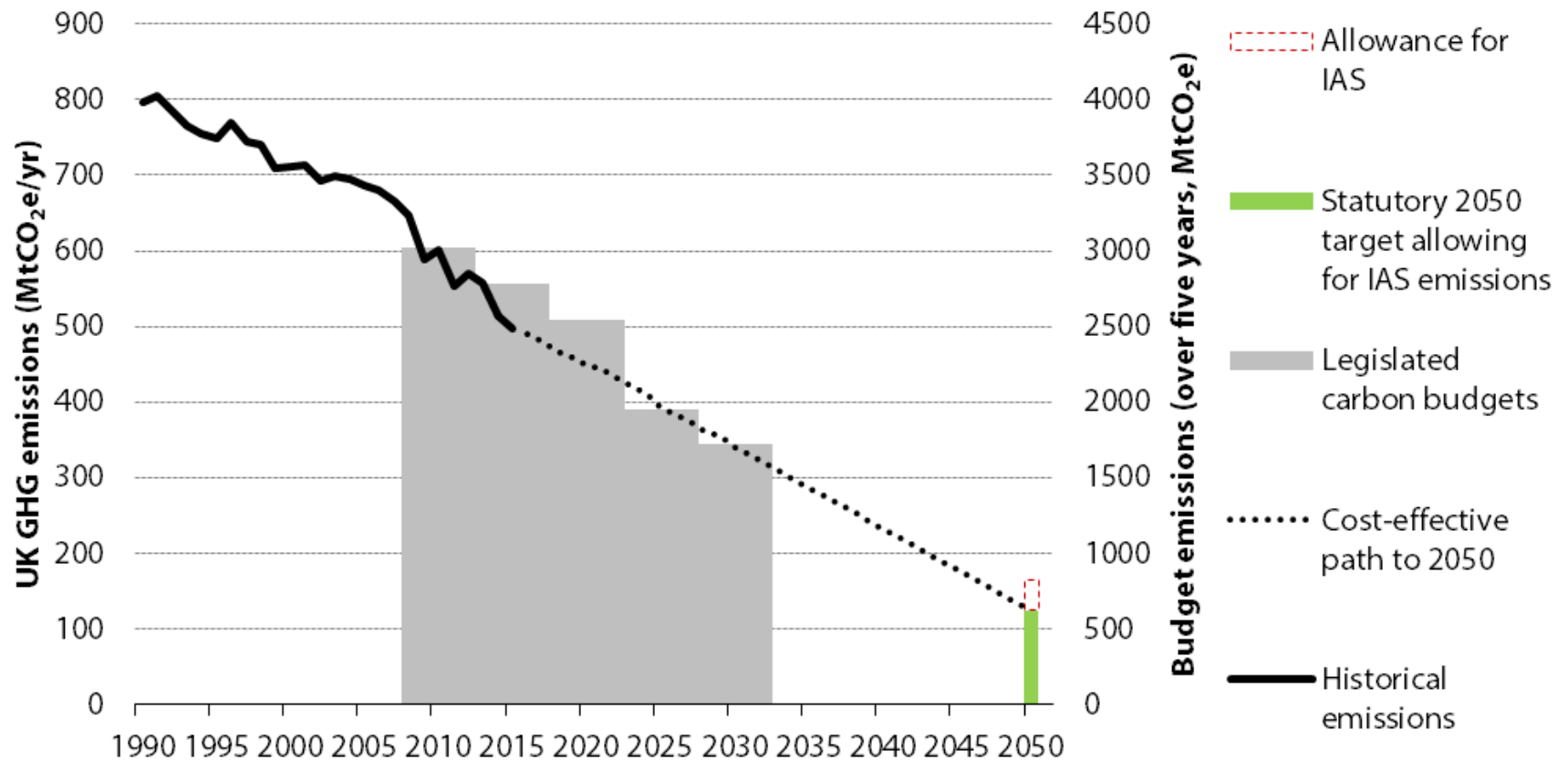
# What could UK climate targets mean for gas consumption?

Dr. David Joffe

# Contents

- The role of the CCC and legislated targets
- The role of gas in a decarbonising energy system – sector-by-sector
- Overall implications for gas consumption

# UK carbon budgets and the 2050 target



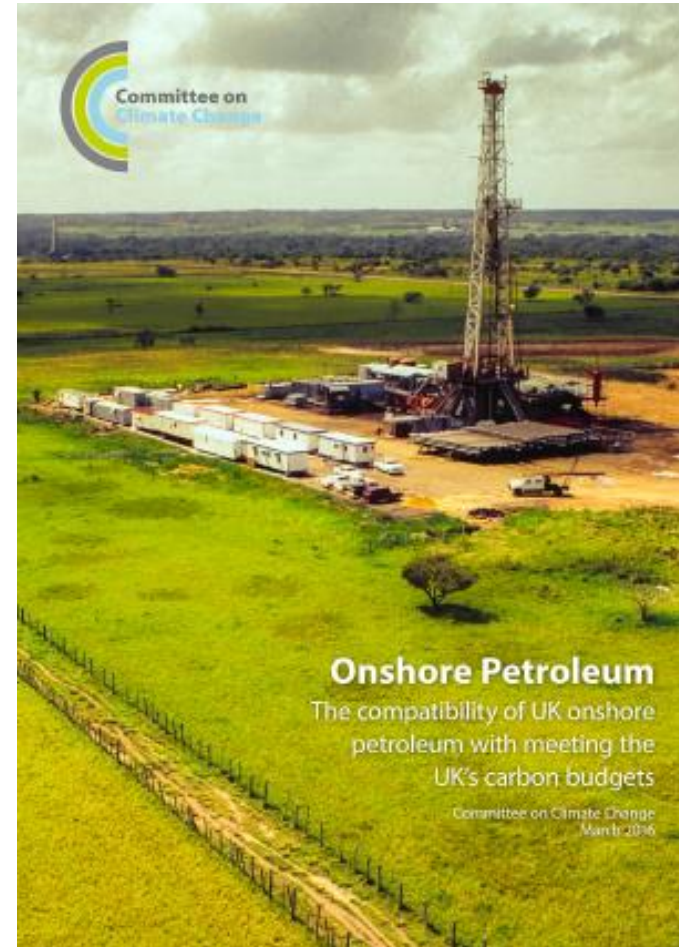
# The Committee on Climate Change scenarios

- The Committee is the statutory advisor to the UK Government on climate change
- We recommend carbon budgets, which are enshrined in law under the Climate Change Act
- We produce scenarios as the basis of the recommended carbon budgets and to show how they could be met
- However, these are not intended to be prescriptive

# The Committee's duty relating to shale gas

The Committee also has a duty under the Infrastructure Act (2015) to advise the Government on the compatibility of shale ('onshore petroleum') with UK carbon targets

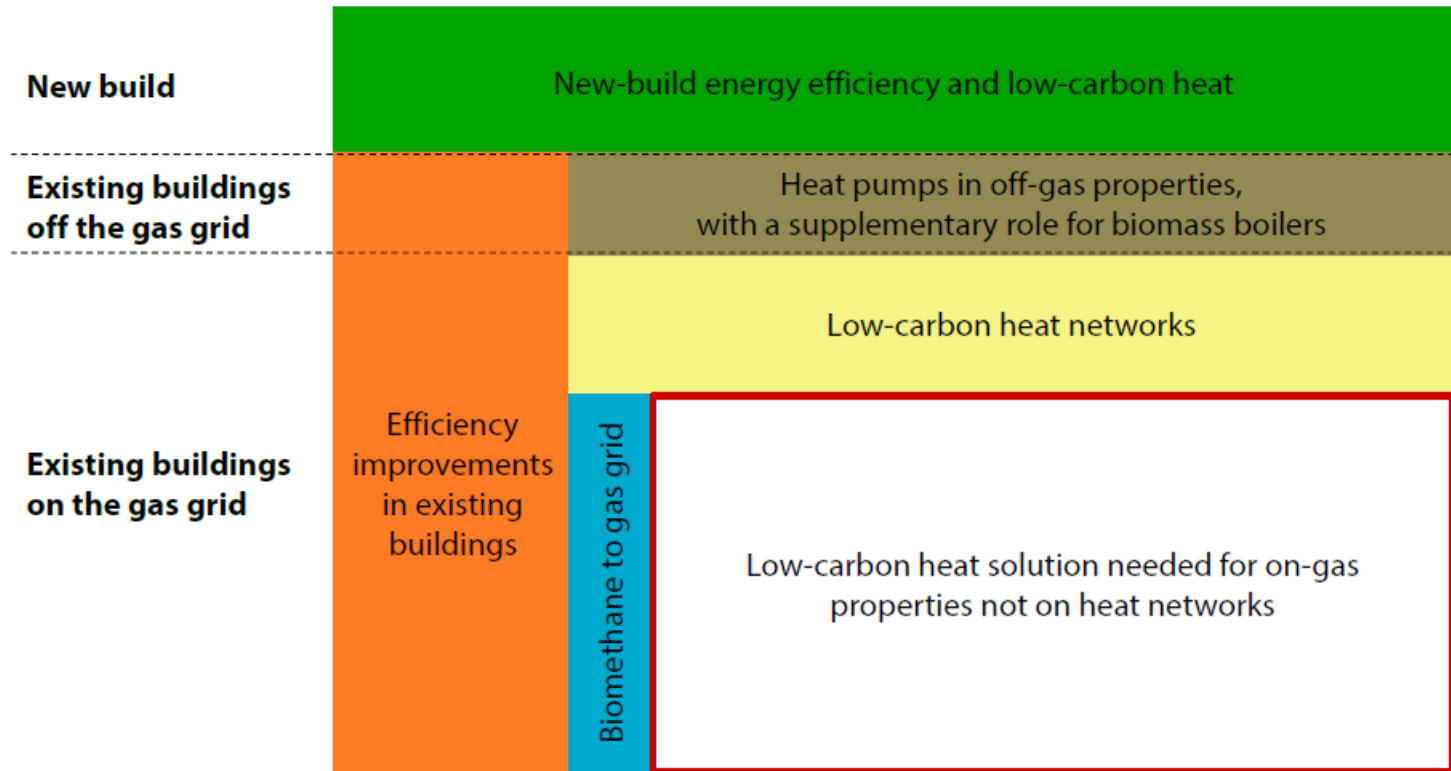
- This was the first report provided under the Act
- Not part of our remit to investigate other issues raised in relation to shale gas
- Considerable uncertainties, including over the potential scale of the industry in UK and associated emissions



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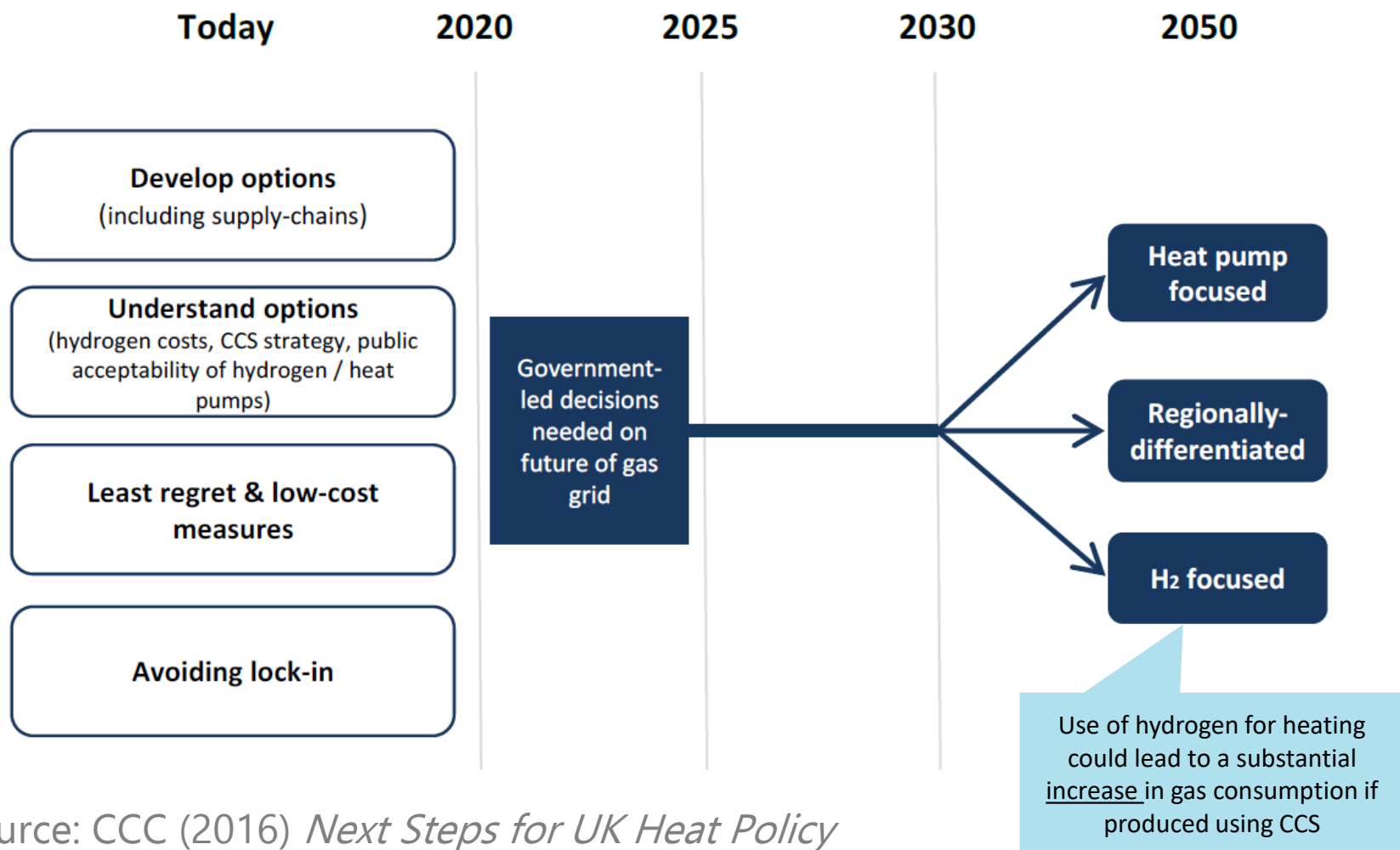
# On heat for buildings, there's quite a bit that we can be getting on with now to reduce heating emissions...



Source: CCC (2016) *Next Steps for UK Heat Policy*

Note: The sizes of the blocks broadly reflect the scale of emissions reduction, but do not do so precisely.

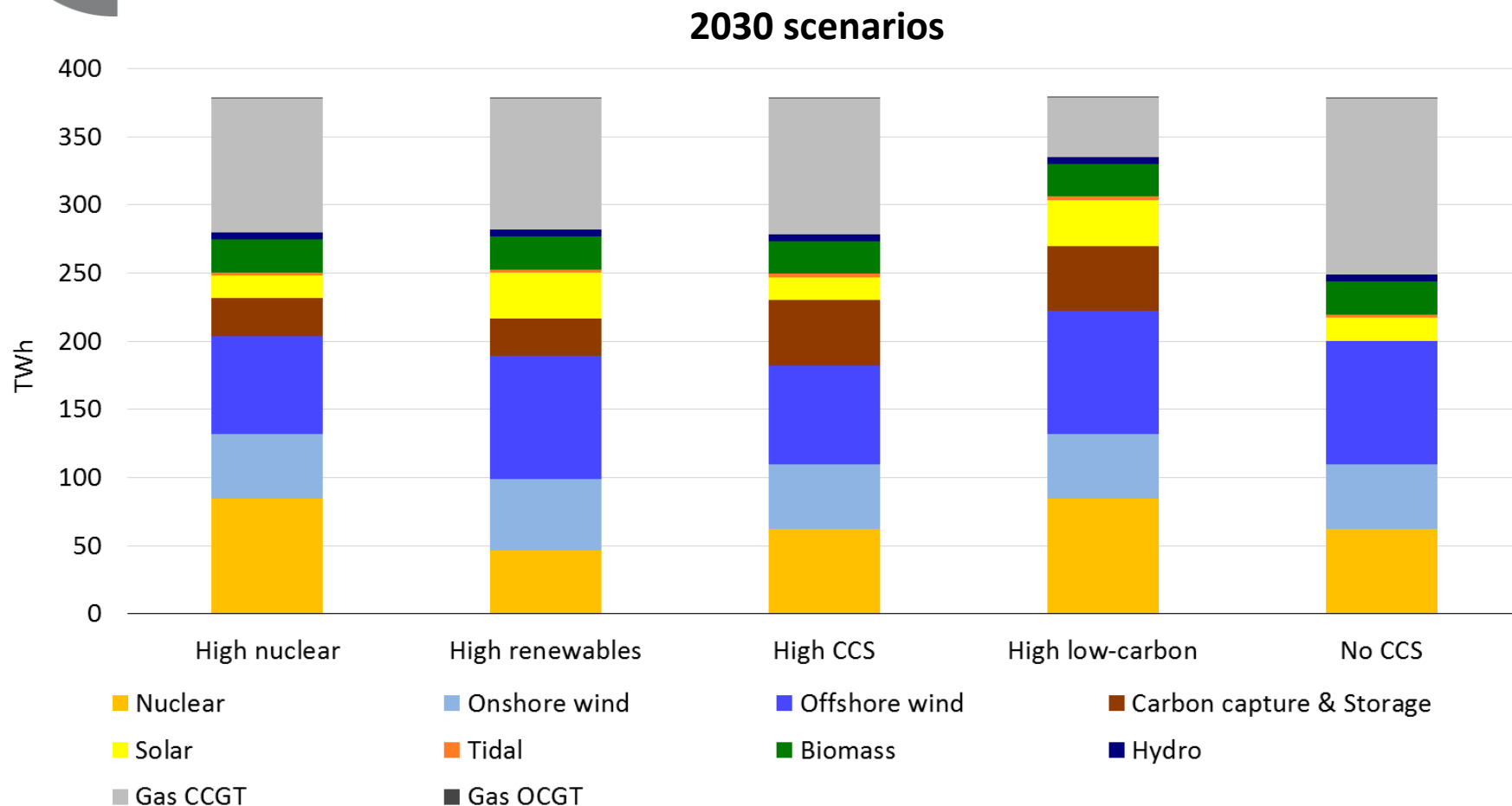
... but there remain big strategic decisions to be made by 2025 over the respective long-term roles of electrification and hydrogen for heat



Source: CCC (2016) *Next Steps for UK Heat Policy*



In power, by 2030 unabated gas generation will need to be no higher than in 2015; there is a question over the role of CCS in power



# Replacing the role of gas in seasonal energy storage

- Gas currently meets much of the seasonal swing in UK energy demand
- If we move towards electrification of heating, how will we be able to meet the seasonal swing in electricity demand (most storage options are not seasonal)
- We are about to explore such questions as part of our hydrogen review
- Offshore wind cost breakthroughs provide an interesting new context for this analysis

# The roles for gas in other sectors

**Transport.** There may be an interim role for methane as a transport fuel

- This would primarily provide an air quality benefit
- But by 2050, it will probably need to be phased out
- However, there could be an important role for hydrogen (potentially produced from gas with CCS)

**Industry.** The long-term path for industry decarbonisation is unclear.

- There is likely to be an important role for CCS...
- ... but in part this could be CCS used to produce low-carbon hydrogen for use in industry
- Further work and better evidence is required

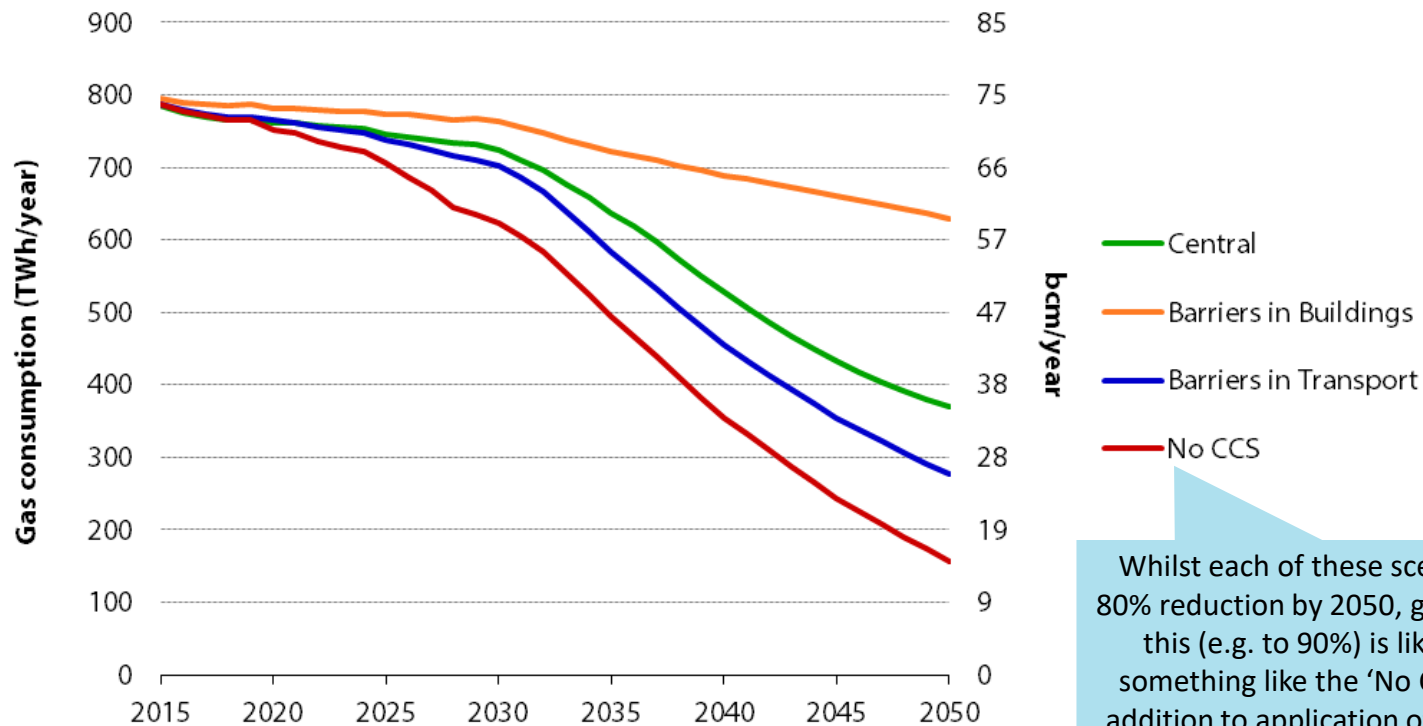
# Implications of the net-zero challenge for gas

- The Paris Agreement sets an ambition to “balance sources and sinks” (i.e. achieve net-zero emissions) in the second half of the century
- Given important ‘hard-to-reduce’ emissions sources, this looks extremely challenging, and wherever possible is likely to require end-uses moving away from combustion of hydrocarbons without CCS, to non-carbon energy vectors (i.e. electricity, H<sub>2</sub>, hot water)
- The potency of methane as a greenhouse gas means that its continued use as an energy carrier would be particularly problematic (assuming leaks cannot be eliminated entirely)

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# The balance of decarbonisation effort across sectors has a large impact on gas consumption

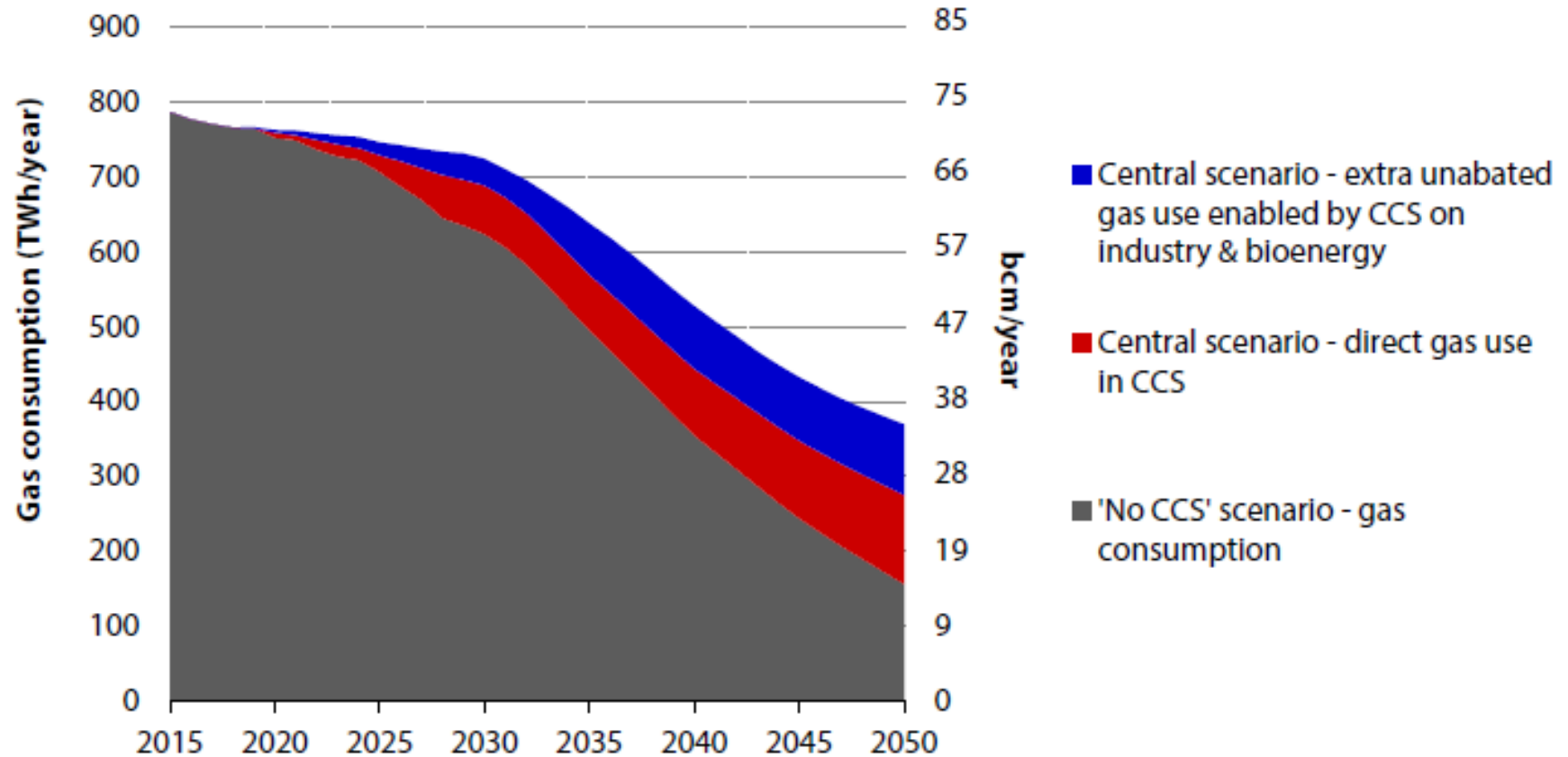


Whilst each of these scenarios is for an 80% reduction by 2050, going well beyond this (e.g. to 90%) is likely to require something like the 'No CCS' scenario in addition to application of CCS to industry and bioenergy

Source: CCC (2016) *The compatibility of UK onshore petroleum with meeting the UK's carbon budgets*, based on analysis for the 5<sup>th</sup> carbon budget

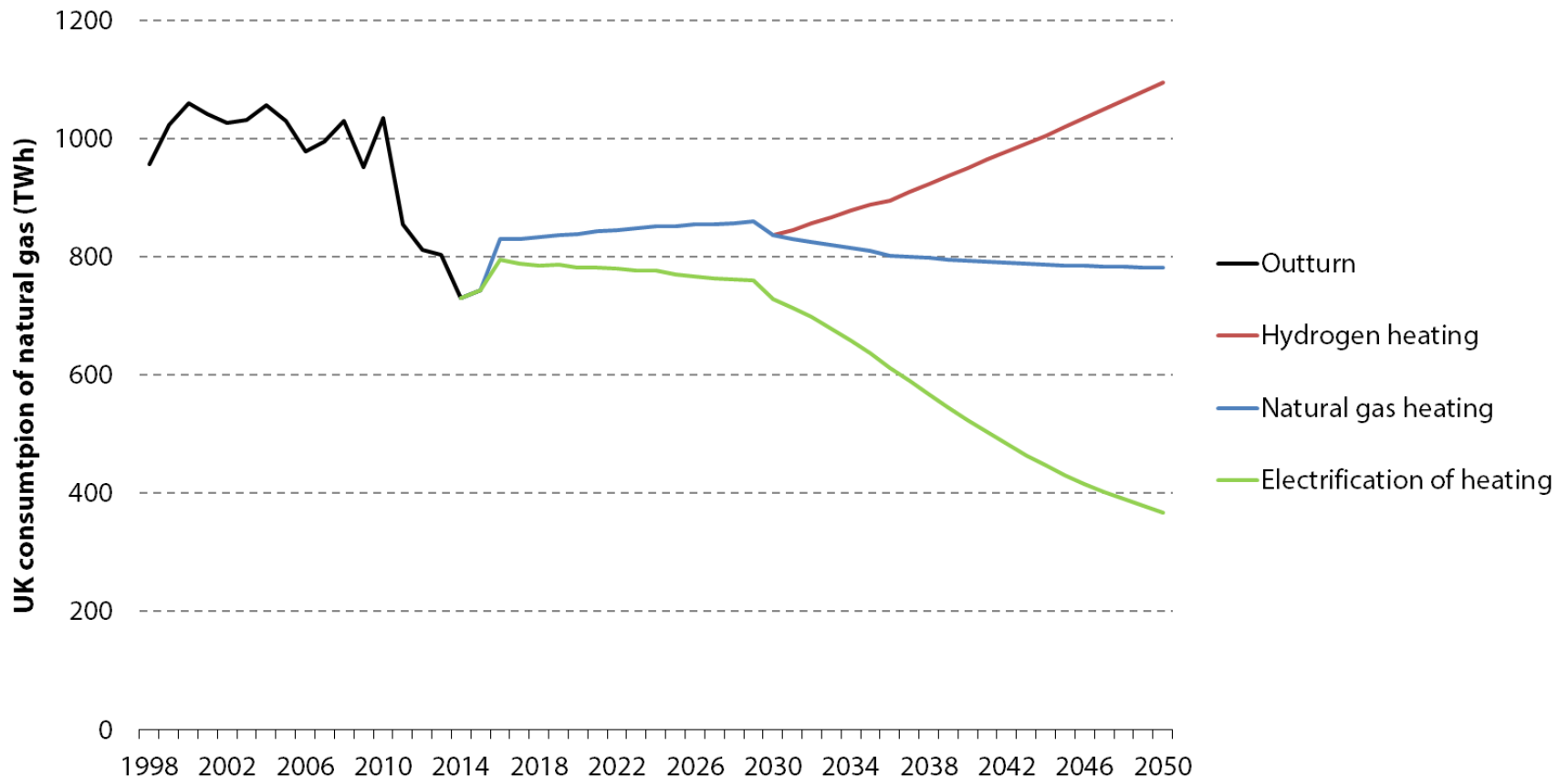
Note: the Central scenario does not include a significant amount of hydrogen

# Overall gas consumption depends strongly on overall use of CCS (not just its application to gas)



Note: the Central scenario does not include a significant amount of hydrogen 15

# Use of hydrogen in place of direct use of natural gas could increase gas consumption



Source: CCC internal analysis, based largely on CCC 5<sup>th</sup> carbon budget scenarios. Assumes gas is replaced with hydrogen produced from natural gas with CCS



# Areas for further CCC work

- Report in autumn 2018 on the potential role for hydrogen in decarbonisation
- Review of methane leakage from the whole gas system (not just shale production)
- Better evidence needed on industry decarbonisation pathways
- How recent dramatic cost reductions (e.g. offshore wind) affect long-term decarbonisation

# Contact us

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