

# Transforming the UK energy system

Are the right policies and institutions in place?

**Jim Watson**

**Director, UK Energy Research Centre**

**LCSR-net conference, Paris, 13-14 June 2015**

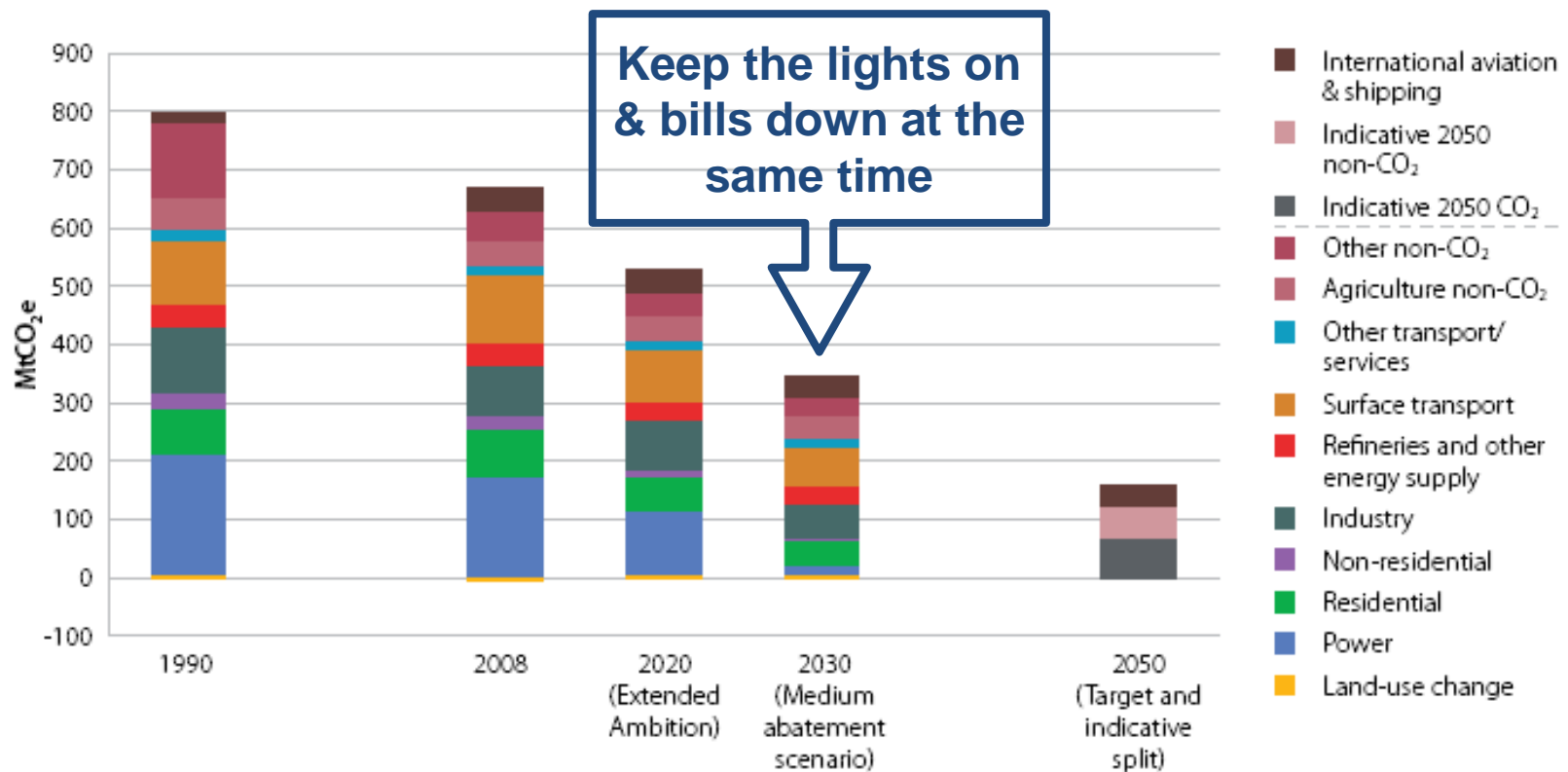


# Overview

1. The UK's low carbon transition: progress so far
2. Policy framework and political context
3. Investment and innovation challenges
4. Conclusions and implications

# The UK's low carbon transition

Figure 3.13: UK greenhouse gas emissions (1990-2050)



Source: NAEI 2010, CCC calculations.

Note(s): Other transport/services includes CO<sub>2</sub> emissions from domestic aviation and shipping and agricultural energy use. Other non-CO<sub>2</sub> includes non-CO<sub>2</sub> emissions from waste, buildings, industry, energy supply and transport.

Source: Committee on Climate

# Progress to date (non traded sectors)

Figure 1.8: Non-traded sector emissions vs. carbon budgets (2007-2027)

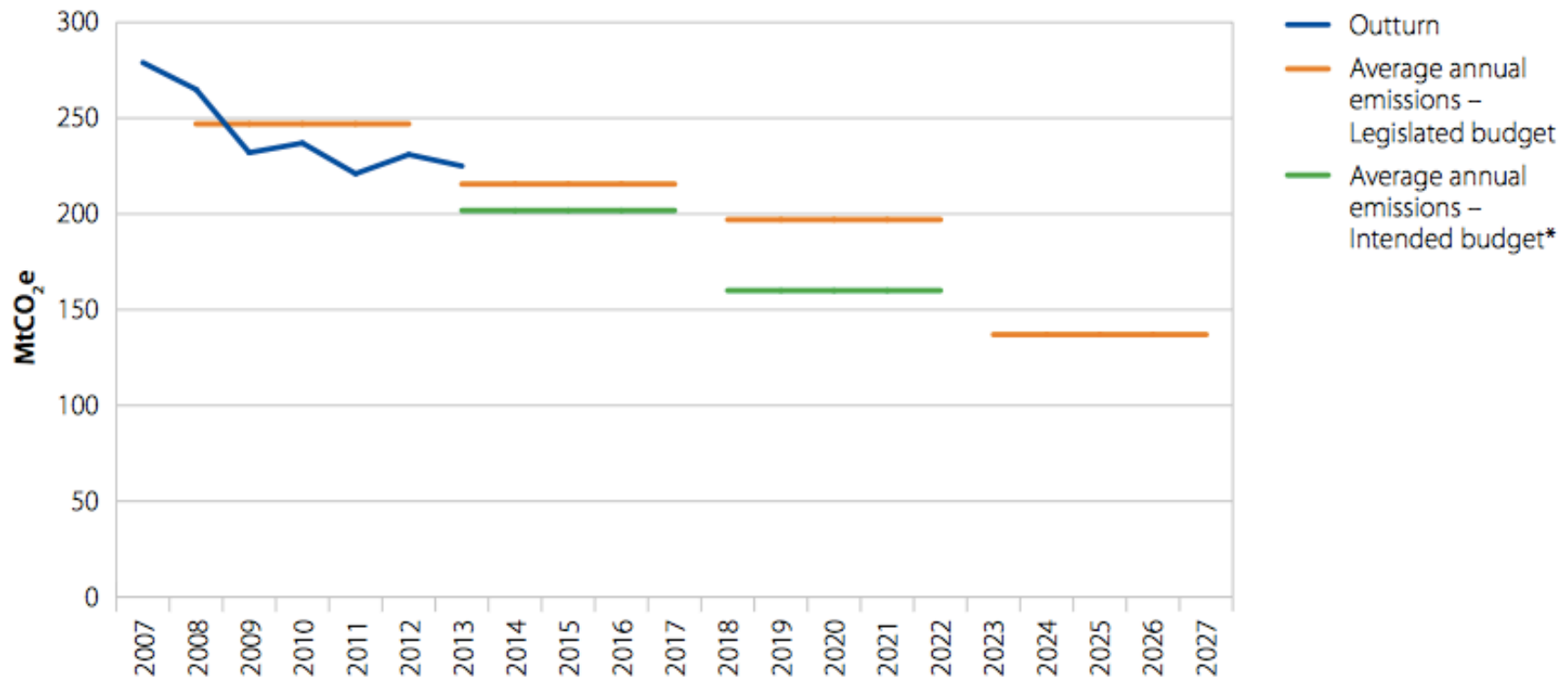


**Source:** DECC (2014) 2013 UK Greenhouse gas emissions, provisional estimates; DECC (2014) Energy Trends; CCC calculations.

**Notes:** \*As proposed in our 2008 report, the Intended budget (2008-2022) corresponds to the UK share of an EU 30% 2020 target. We recommended it should be enacted in the context of a global deal to reduce emissions.

# Progress to date (traded sectors)

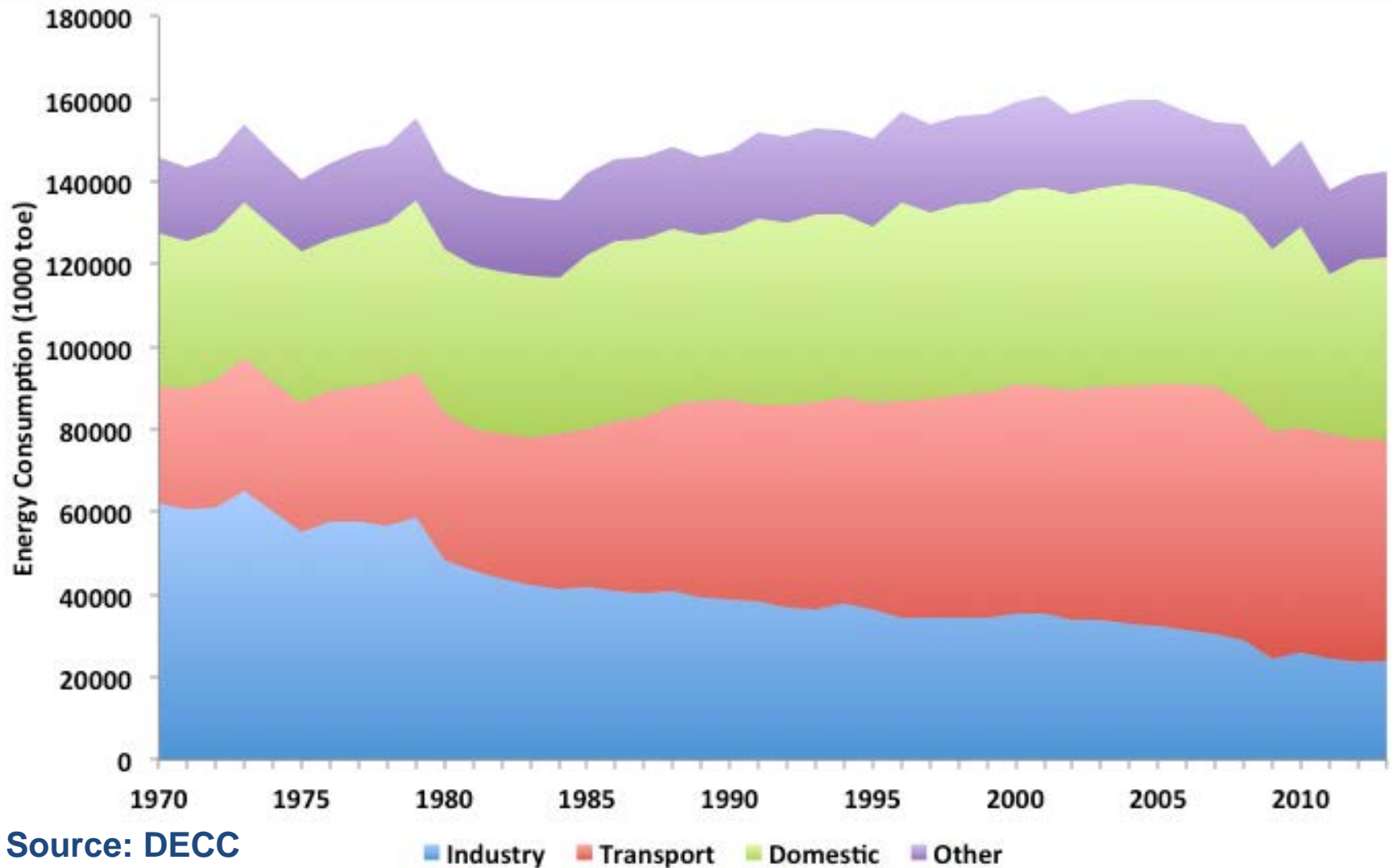
Figure 1.9: Traded sector emissions vs. carbon budgets (2007-2027)



Source: European Commission (2014) Verified emissions data; CCC analysis.

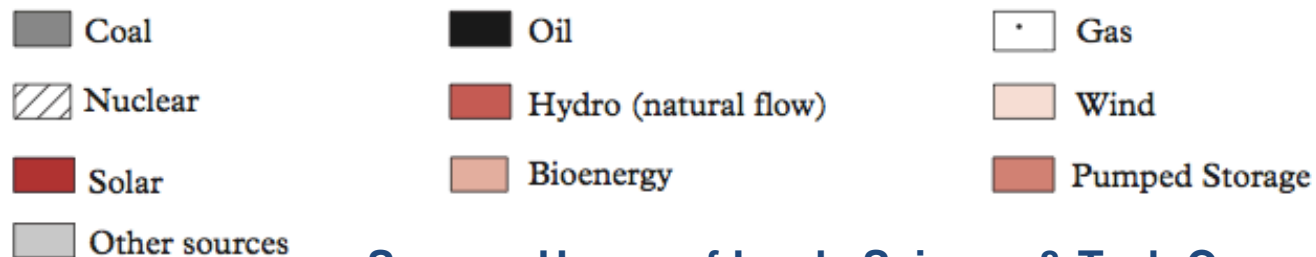
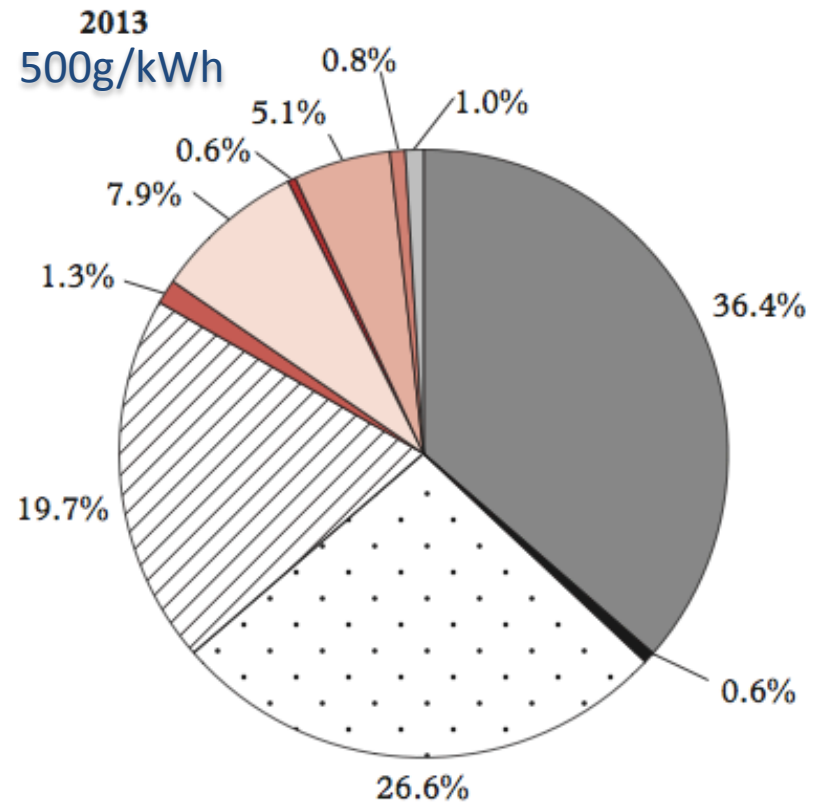
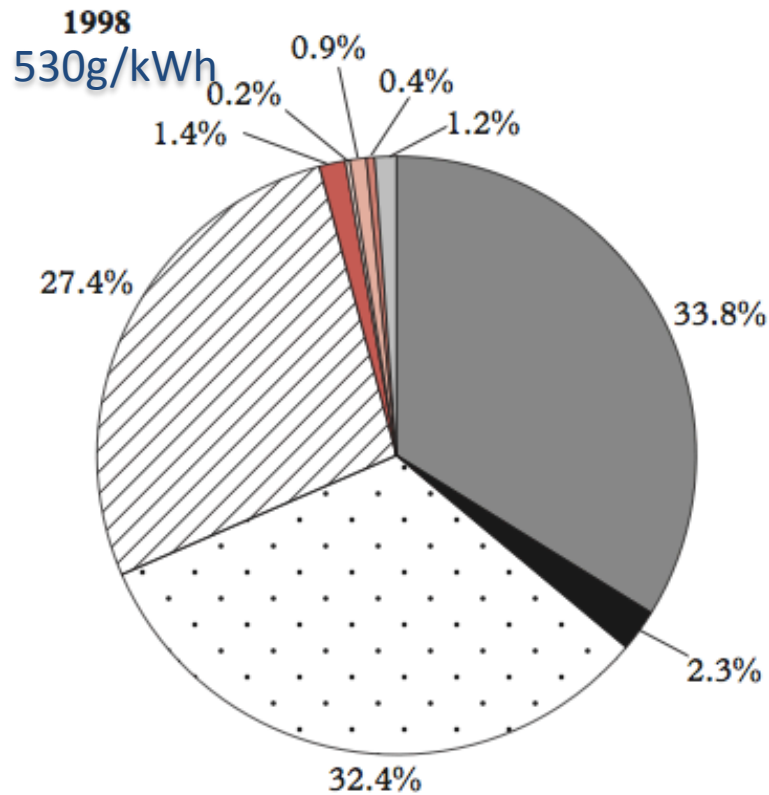
Notes: \*As proposed in our 2008 report, the Intended budget (2008-2022) corresponds to the UK share of an EU 30% 2020 target. We recommended it should be enacted in the context of a global deal to reduce emissions.

# Energy demand is falling



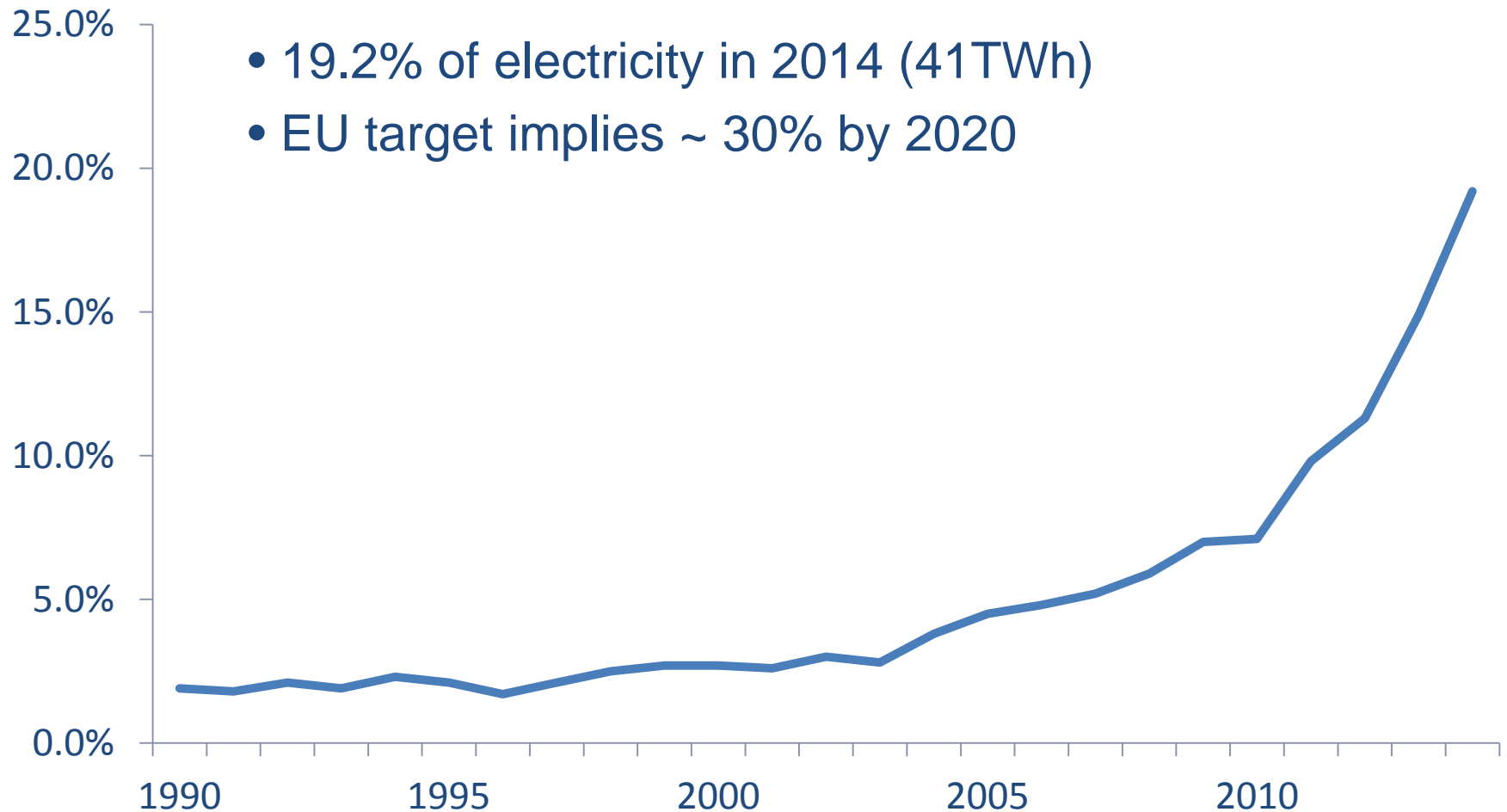
Source: DECC

# Power generation mix shifting



Source: House of Lords Science & Tech Committee / DECC

# Rapid growth of renewable electricity





# Policy framework: some key points

- Climate Change Act (2008):
  - 80% reduction in emissions by 2050 (from 1990)
  - 5-year Carbon Budgets
  - Committee on Climate Change
- Electricity Market Reform:
  - Long term contracts for low carbon generation
  - Capacity market
  - Carbon price floor plus Emissions performance standard
- Energy efficiency through energy supplier obligations, standards, market-based financing scheme (Green Deal)
- Support for R,D&D including networks / heat / transport

# Political context

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## Ed Miliband: Labour would freeze energy prices

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Labour would freeze gas and electricity bills for every home and business in the UK for 20 months if it wins the 2015 election, Ed Miliband has said.

Ed Miliband: "Britain can do better than this"

The big energy firms would be split up and governed by a new tougher regulator to give people "a fairer deal".

Labour says the move will save average households £120 and businesses £1,800 - but cost the energy giants £4.5bn.

But energy companies said the policy could lead to power shortages, and jeopardise investment and jobs.

Labour conference 2013

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## Energy boss warns of blackouts as competition probe 'stops investment in power plants'

Centrica chief executive says energy giant is unlikely to invest in power plants needed to keep the lights on while under investigation by the top competition watchdog



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## Conservatives plan new attack on windfarms



Cameron considering manifesto commitment to curb onshore turbines, senior party source says

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Get the data: where are the UK's windfarms?

## Lawyers speak out Why legal aid cuts are a disaster

Why have lawyers taken to the streets or because they care about the havoc?

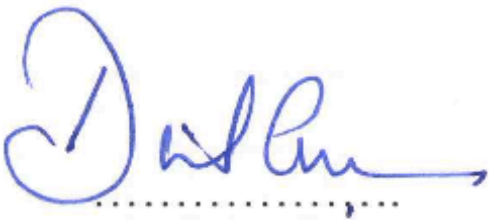


# UKERC

# Political context

That is why we pledge:

- To seek a fair, strong, legally binding, global climate deal which limits temperature rises to below 2°C.
- To work together, across party lines, to agree carbon budgets in accordance with the Climate Change Act.
- To accelerate the transition to a competitive, energy efficient low carbon economy and to end the use of unabated coal for power generation.



The Rt Hon David Cameron MP  
**Prime Minister**



The Rt Hon Nick Clegg MP  
**Deputy Prime Minister**



The Rt Hon Ed Miliband MP  
**Leader of the Opposition**

# Political context

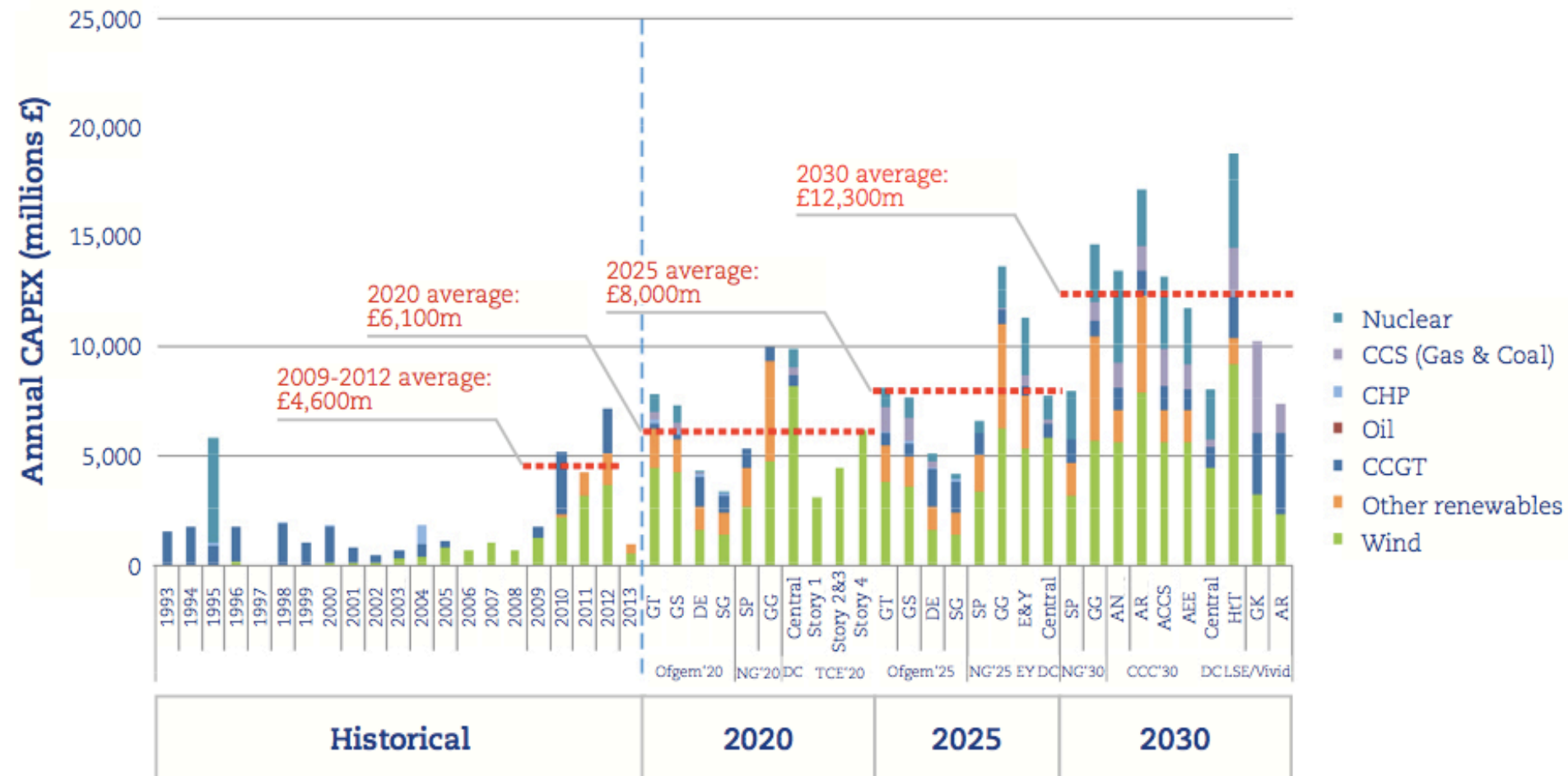
The Government are committed to taking robust, effective action to tackle climate change here at home and on the international stage. Climate change ... is not exclusively left-wing or right-wing, if we can use those terms anymore. Climate change brings together all the parties in this House, and indeed countries across the globe. The G7 on Monday demonstrated just how far the major developed economies are aligned.

Amber Rudd MP

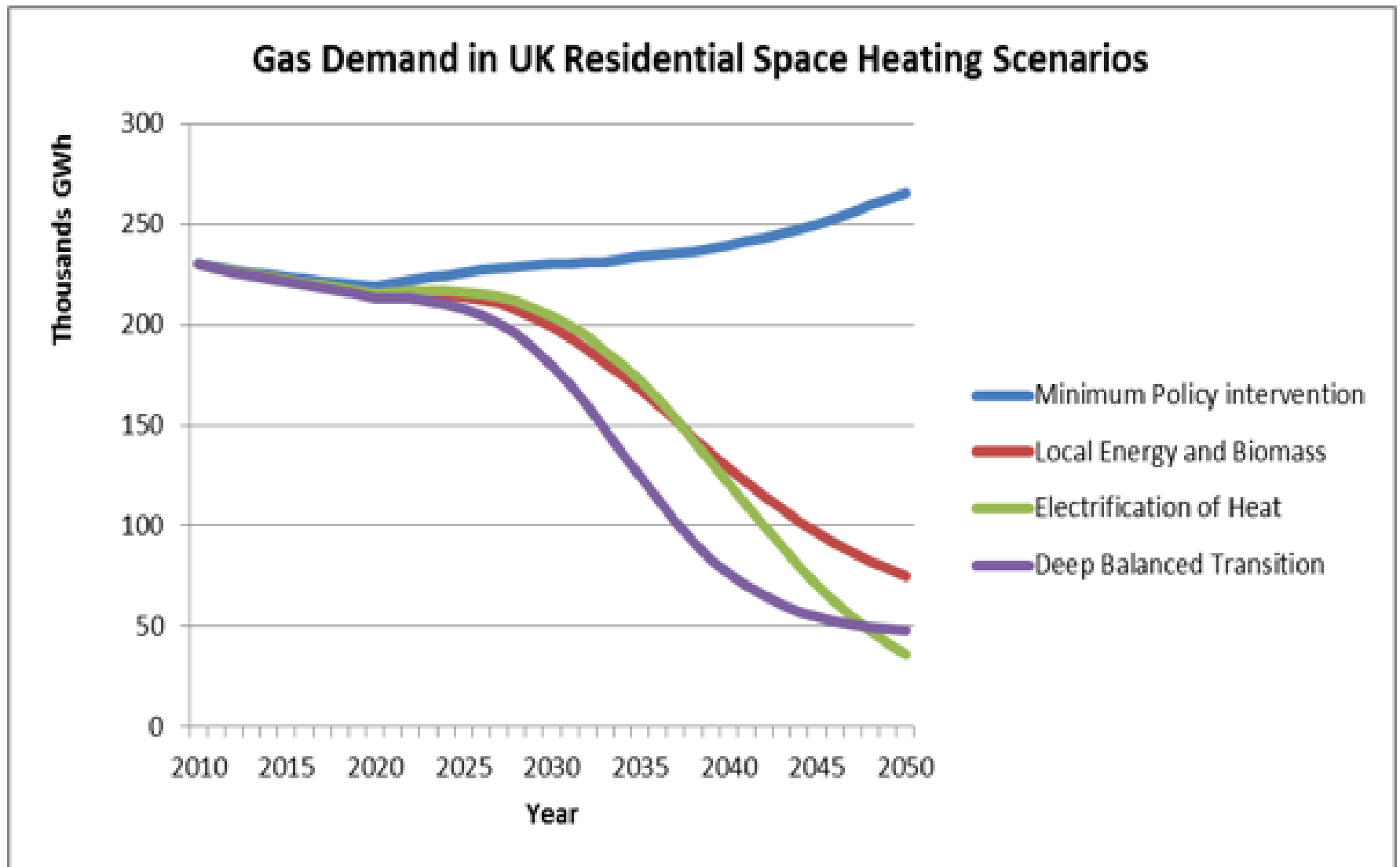
UK Energy & Climate Change Secretary, 10<sup>th</sup> June 2015

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# Investment challenge: Case of the power sector

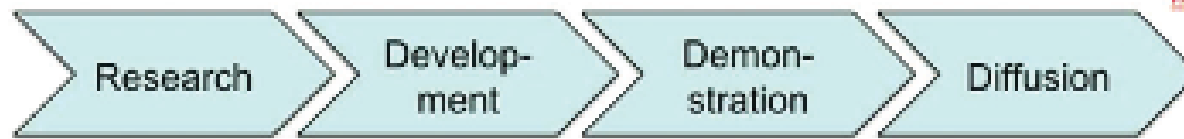


# Investment (& innovation) challenge: Case of residential heating



# Innovation challenge

## Linear model of Innovation process

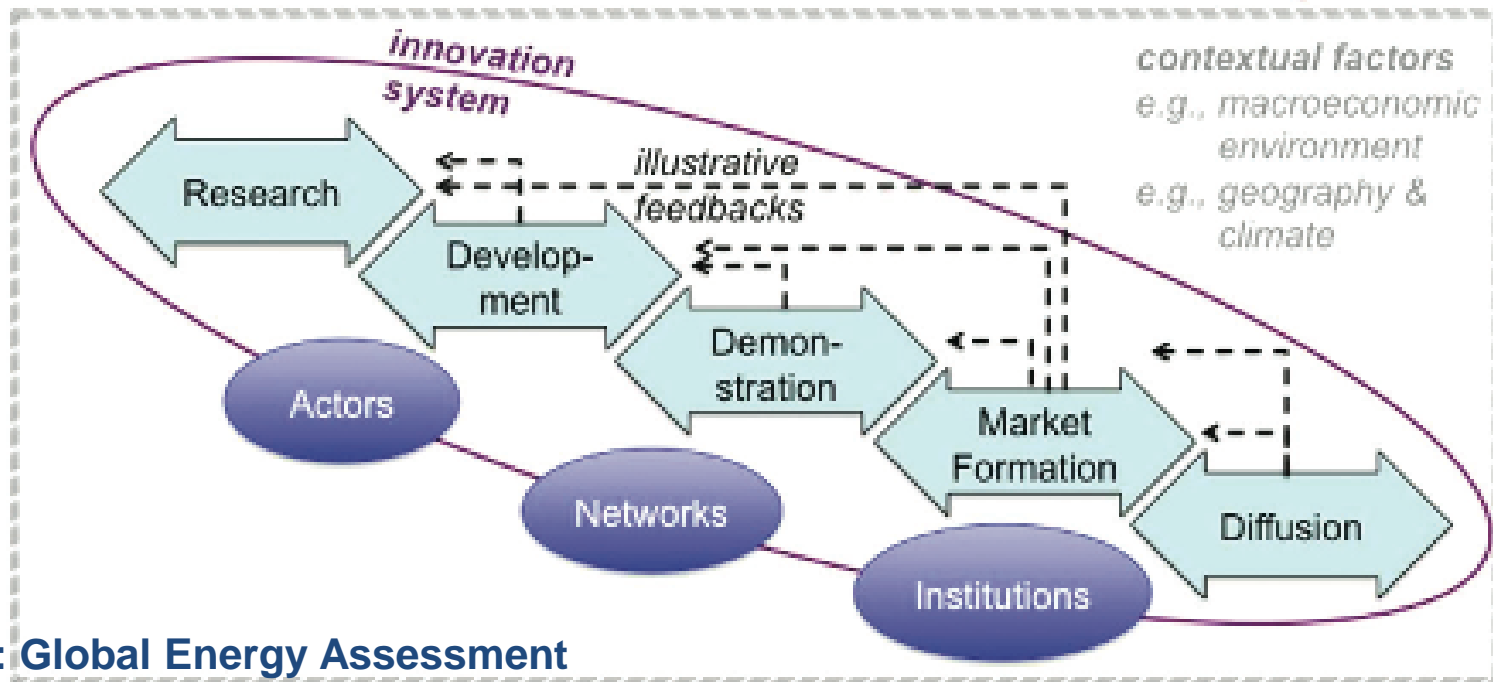


*Understanding innovation;*

*from this*

*to this*

## Systematic representation of innovation with chain-linked model of innovation process

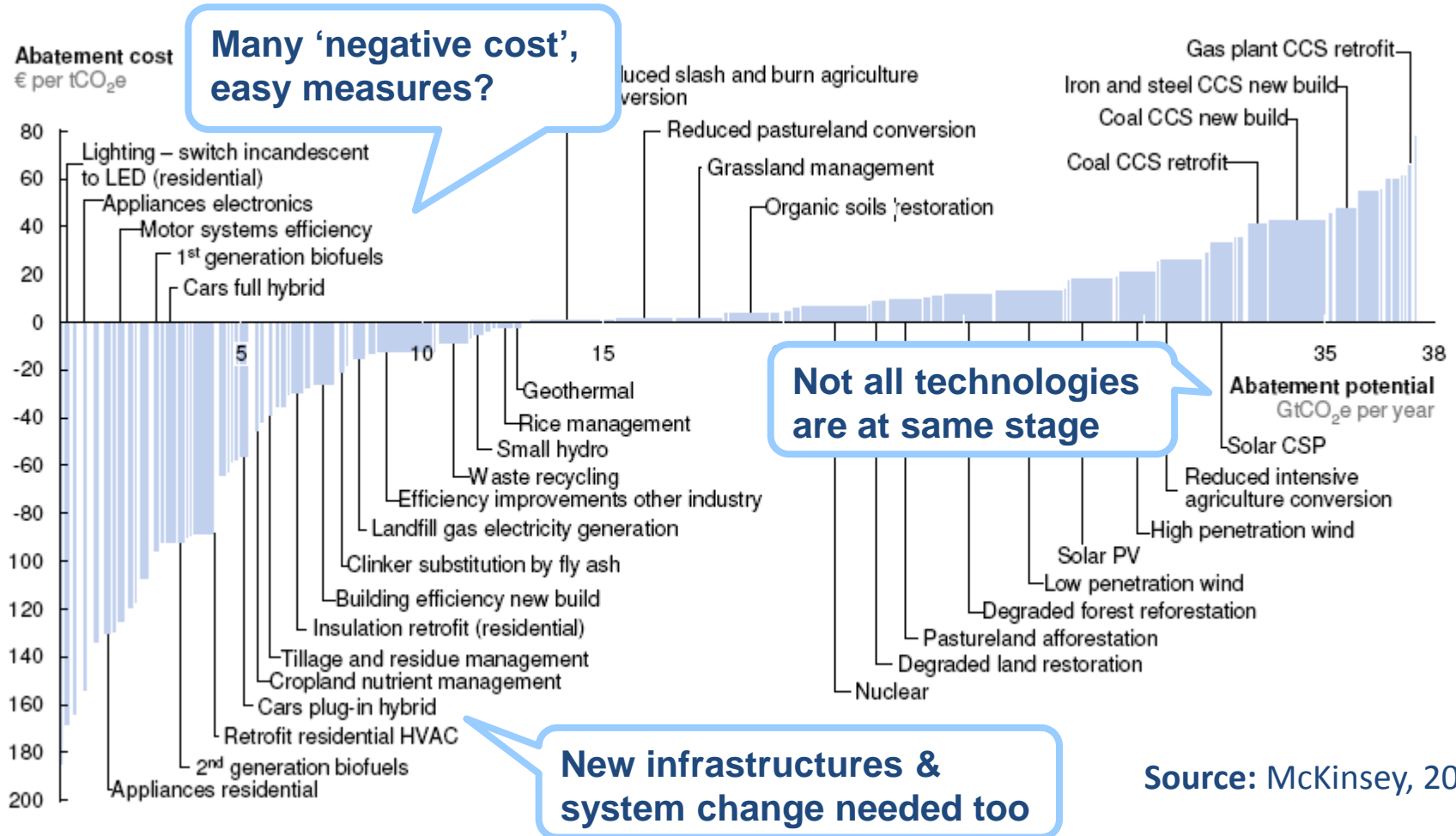


# Innovation challenge

- Innovation covers spectrum from R&D to early deployment
- Innovation is not a linear process – it is networked and involves firms, government and other organisations
- Increasing recognition that innovation policy has a role to play at many of these stages of development
- Innovation includes the development of new technologies and their embodiment in products; but also associated social, institutional and organisational developments
- Energy innovation is increasingly globalised, with a prominent role for multinational firms



# Investment & innovation challenge



Source: McKinsey, 2010

# Conclusions and implications

- **UK emissions have fallen significantly since 1990**
- **But many of ‘easy gains’ have already been made, e.g.**
  - Switch from coal to gas in power sector
  - Reduction in energy demand: restructuring & recession
- **Investment and innovation challenges closely linked:**
  - Deployment of low carbon technologies across the energy system - some still at the demonstration stage
  - Limited number of large-scale options for power sector: tensions between innovation support and competition
  - Stronger energy efficiency policies could help buy time
  - Heat and transport more uncertain: demonstrate, evaluate and scale up most promising options

# Conclusions and implications

**It is no surprise that the first budget (2008-12) was met relatively comfortably ... this reflects the impact of the economic downturn, which significantly dampened energy demand ...**

**Looking back there is encouragement in some areas – the scale-up in deployment of wind generation ... and the major improvements in the efficiency of new cars.**

**However, in some areas we have done little more than find our way to the starting line ... That requires technology and market development now.**

**Committee on Climate Change (2014)**

**UKERC**

# Conclusions and implications

## Tensions with other energy policy goals

- **Some synergies (e.g. through energy efficiency)**
- **But trade-offs also important due to:**
  - High consumer energy prices / bills since late 2000s
  - Energy security concerns, e.g. due to shift back to net importer of energy and tight electricity capacity margins
- **Pressure to trade-off climate change policies for short-term reductions in consumer bills**
- **Cuts to energy efficiency programmes, reinforced by new round of cuts to public sector budget**
- **Some big unknowns: impact of EU referendum and increasing policy variations within UK**

# Thanks

<http://www.ukerc.ac.uk>

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