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Priorities in Developing DECC's Evidence Base

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Overview

1 Current policy framework

2 Policy challenges ahead

3 DECC evidence priorities

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1 Current policy framework

a Long-term decarbonisation goal and carbon budgets

b Power sector decarbonisation

c Renewable heat and building efficiency

d Decarbonisation of road transport

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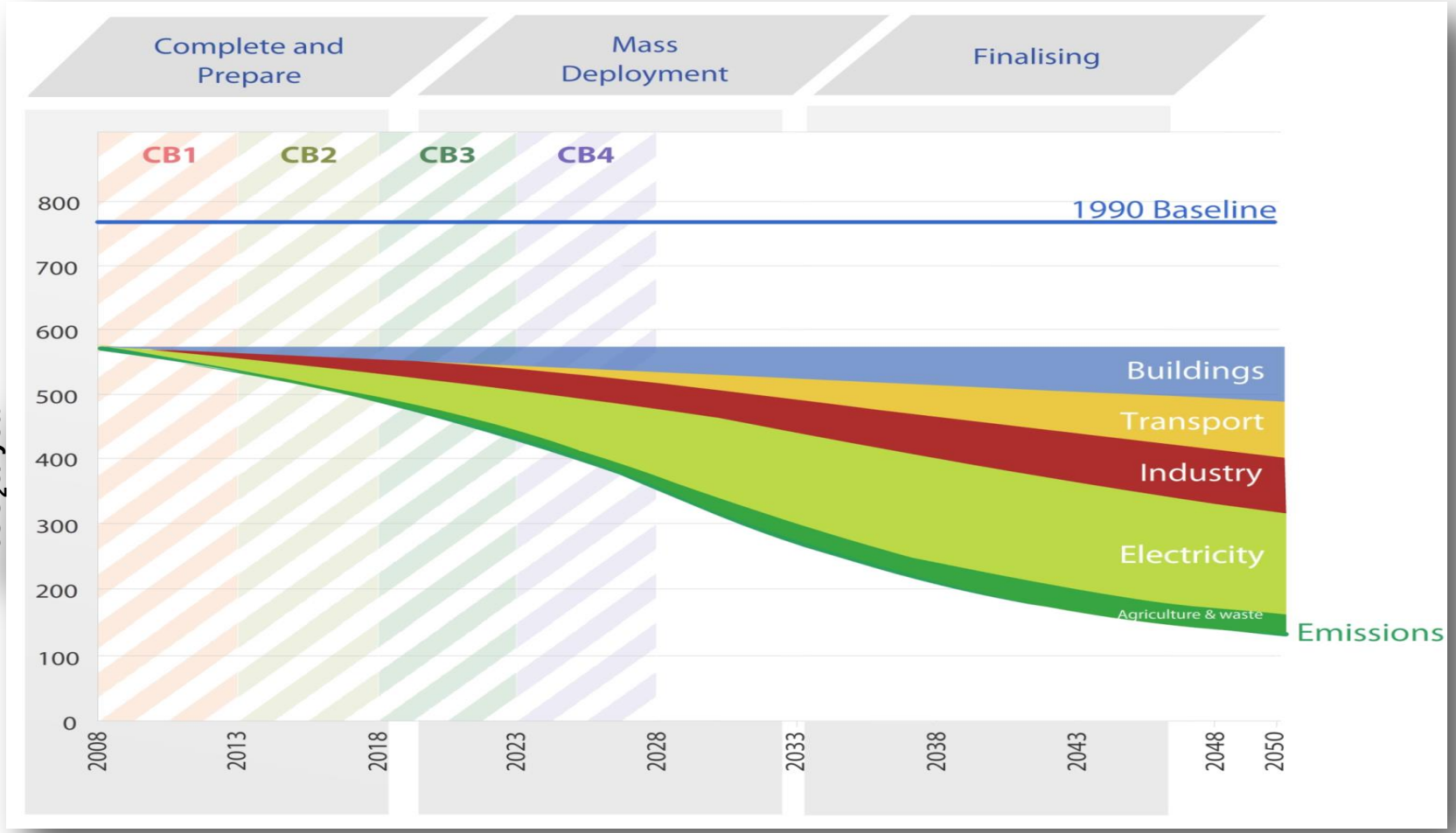
Carbon Budgets shape the pathway to 2050; Carbon Plan sets out the Government's policy strategy



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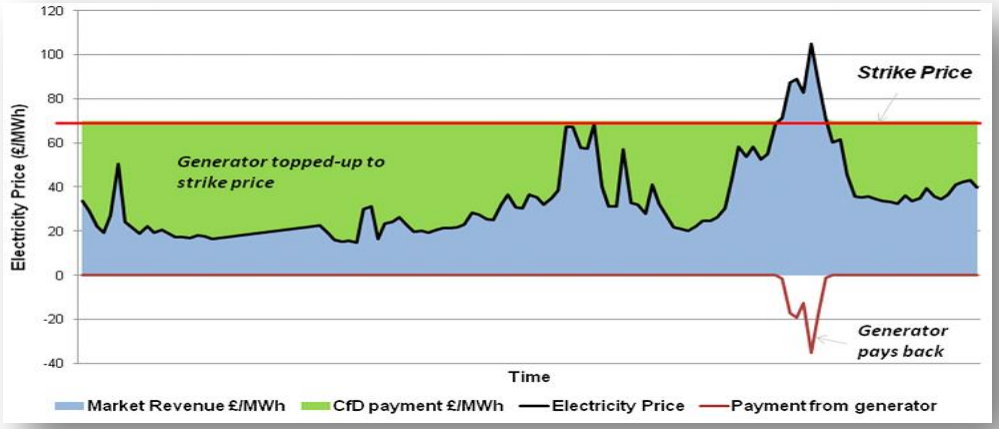
EMR and small-scale feed-in-tariffs aim to drive power sector decarbonisation while maintaining security of supply



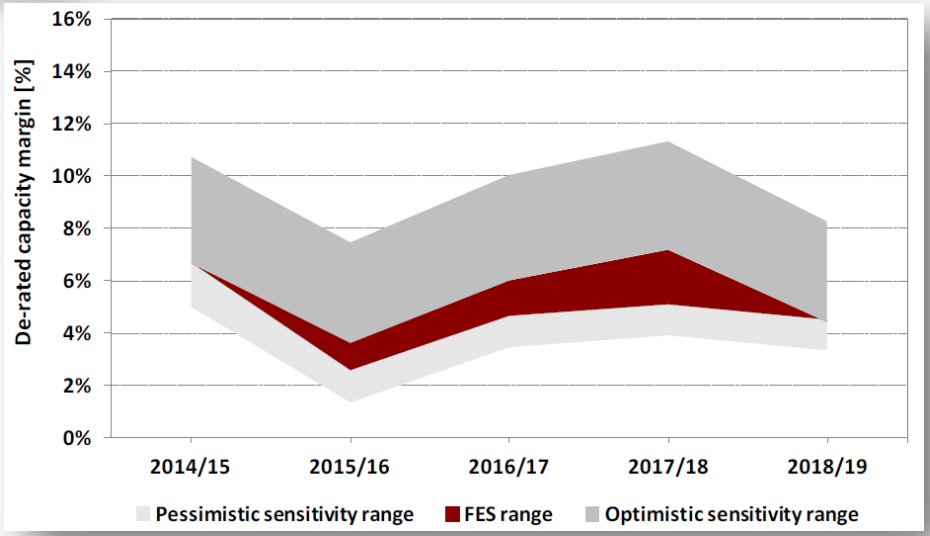
Contracts for Difference:

Illustrative strike price

Ensuring security of supply:

Derated capacity margin

Source: Ofgem, June 30 2014
Based on National Grid's Future Energy Scenarios



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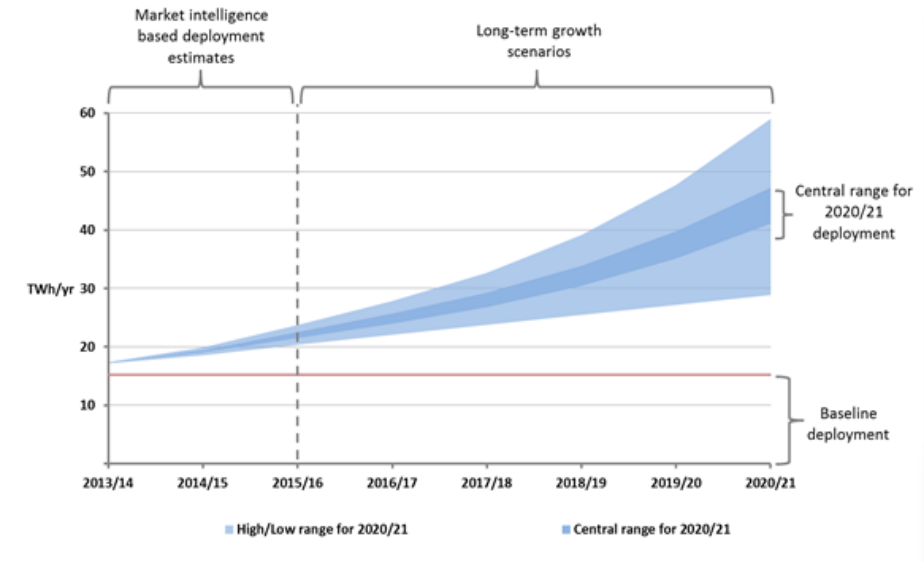
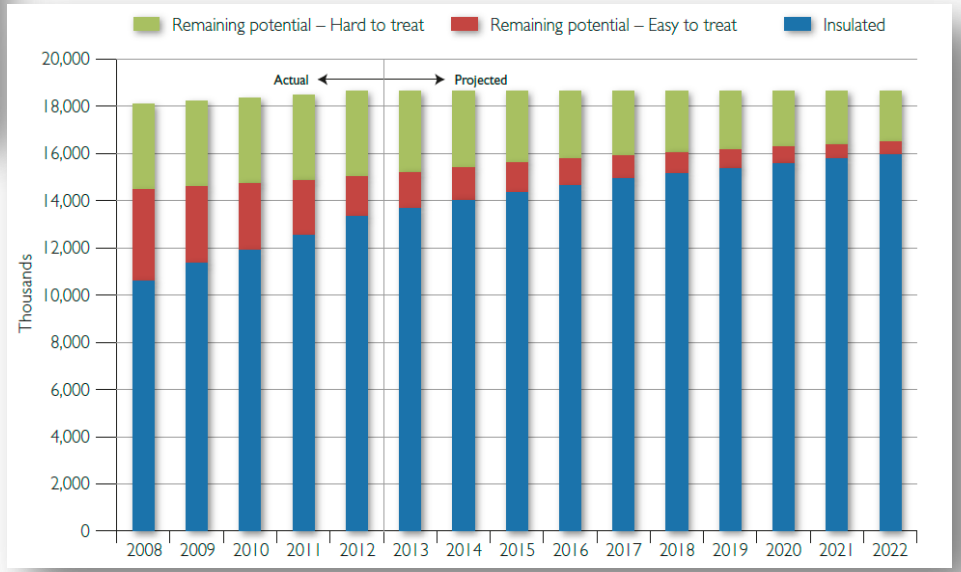
ECO, RHI, Smart Meters, product standards, energy audits and incentive schemes aim to cut building emissions



Deployment of renewable heat

Source: DECC RHI Impact Assessment



Deployment of cavity wall insulation

Source: Government's response to the Fifth Annual Progress Report of the CCC

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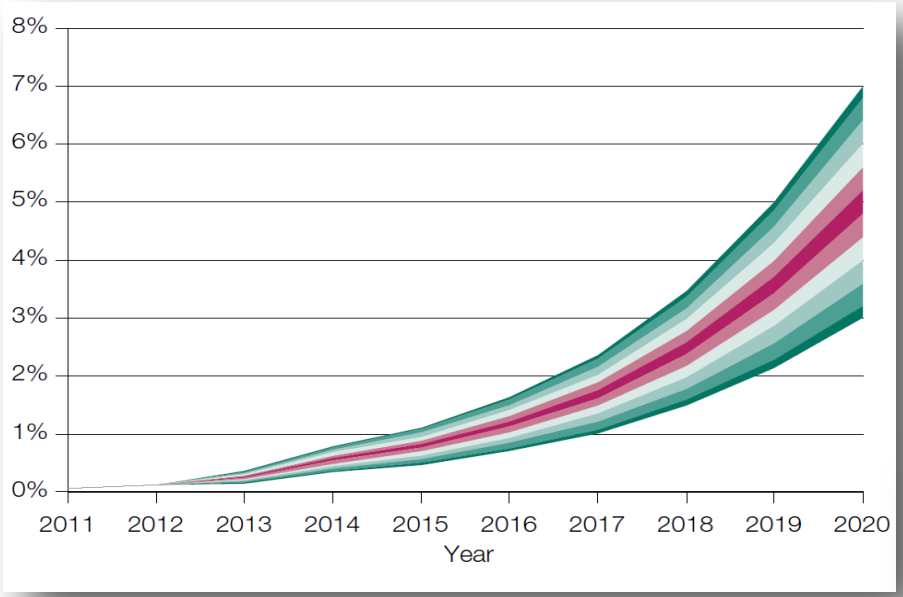
In transport, decarbonising through emission standards, bio-fuels and EV infrastructure support is key

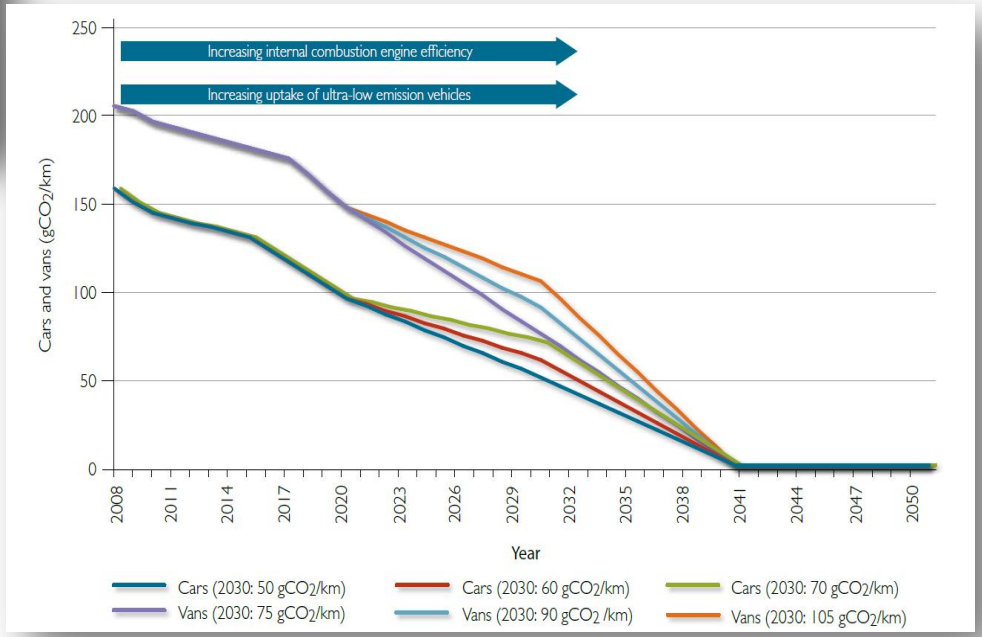


Projected ULEV car sales as a proportion of all car sales

Source: Department for Transport modelling

EU average new car and van emission standards to 2020 and then illustrative ranges

Source: DECC Carbon Plan



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2 Policy Challenges Ahead

a **Policies to deliver the 4th Carbon Budget – building efficiency and low carbon heat**

b **Allocation of LCF budget and next EMR delivery plan**

c **EU 2030 framework and EU ETS reform**

d **Setting the 5th Carbon Budget**

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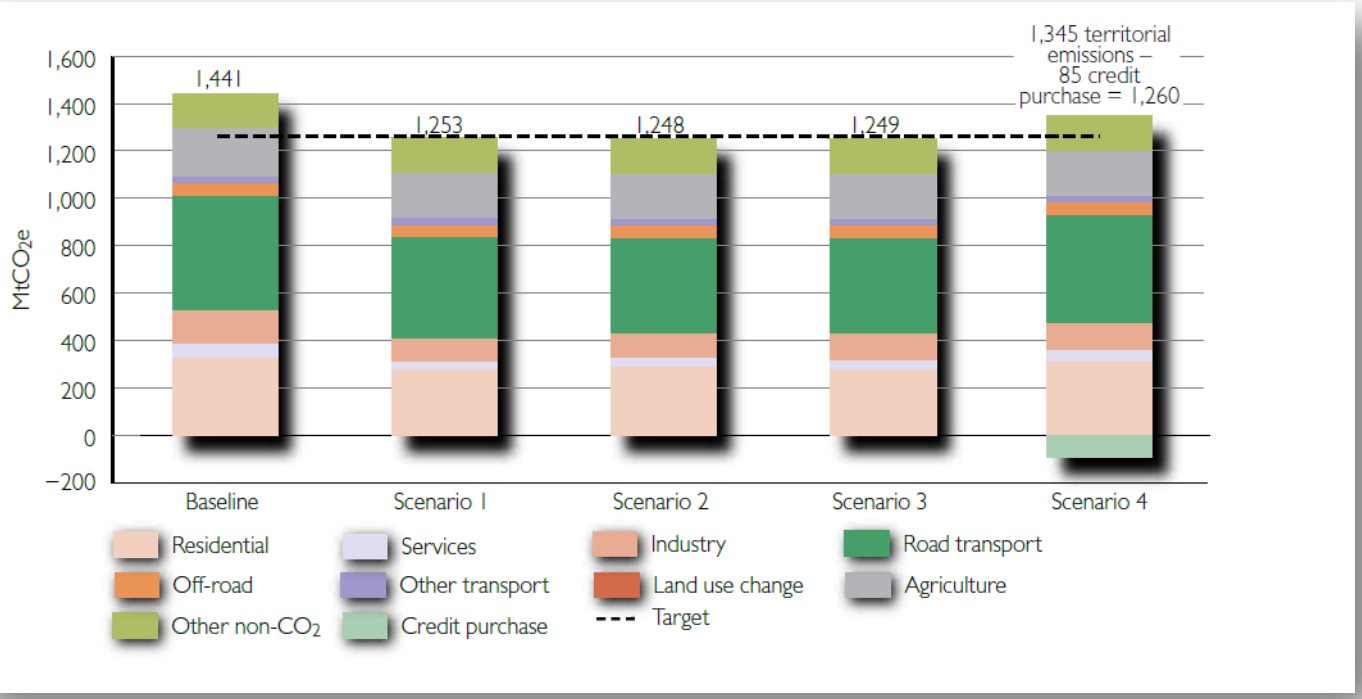
Pathways to meet the 4th Carbon Budget level (1,950 $MtCO_2e$) as set out in the Government's Carbon Plan



Non-traded GHG emissions: scenarios to meet the 4th Carbon Budget, 2023-27

Source: DECC, *Carbon Plan* (2011)

- Four scenarios in the non-traded sector complemented with two in the traded sector
- Bottom-up approach adopted by picking measures in each sector that aim to balance static and dynamic cost effectiveness, feasibility and deliverability, and public acceptance

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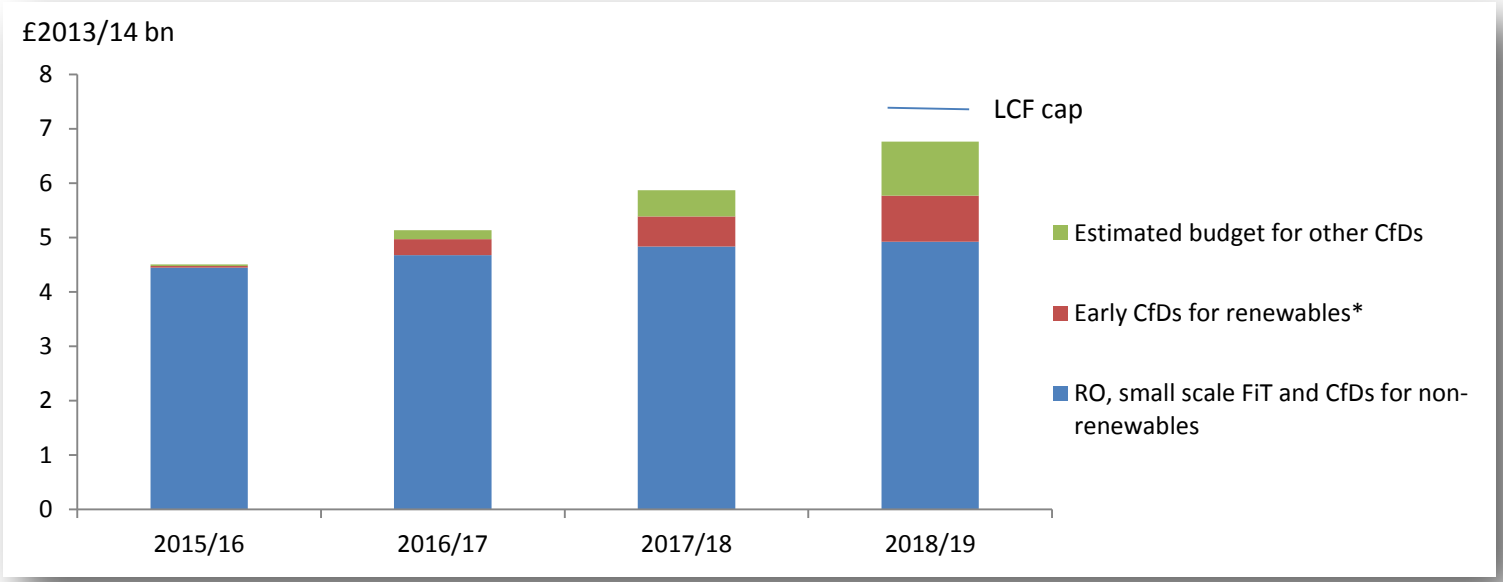
Next EMR delivery plan and LCF Budget must balance static and dynamic efficiency goals

Levy control framework for the first EMR delivery plan period according to NAO



*Based on projects' full capacity estimates and target commissioning date

- Least cost deployment of renewables to meet 2020 target, which means around 30% share of renewables in power generation
- Support for scalable low carbon technologies such as offshore wind, new nuclear and CCS that can make a substantial contribution to long-term decarbonisation of the power sector to reduce costs in future

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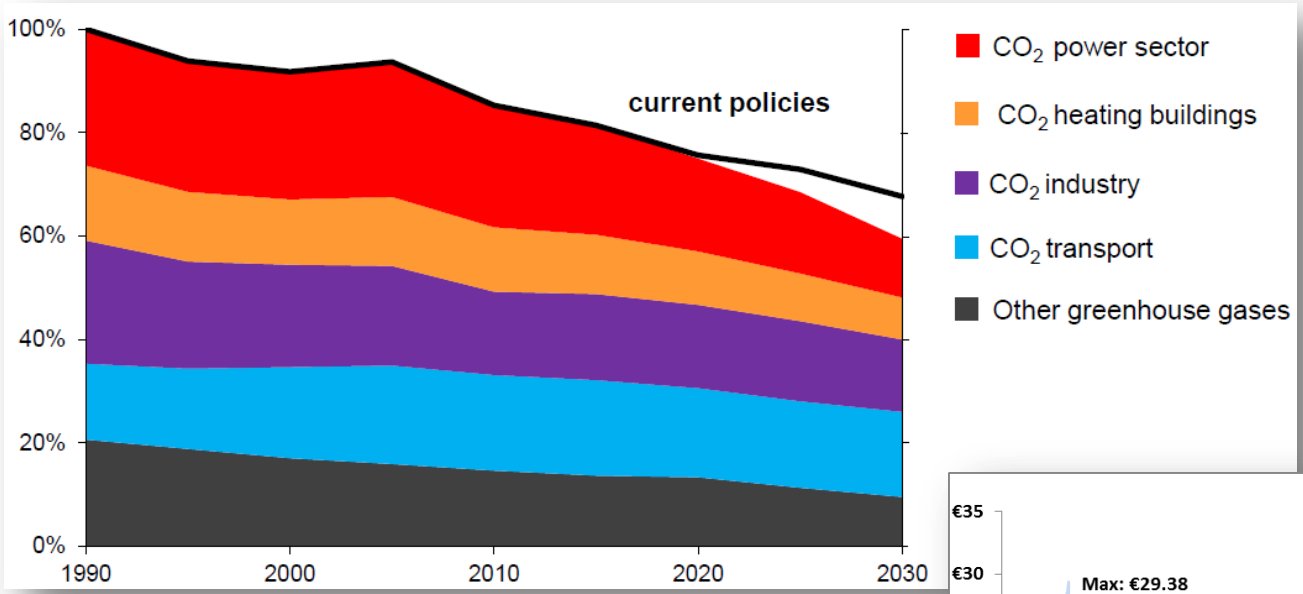
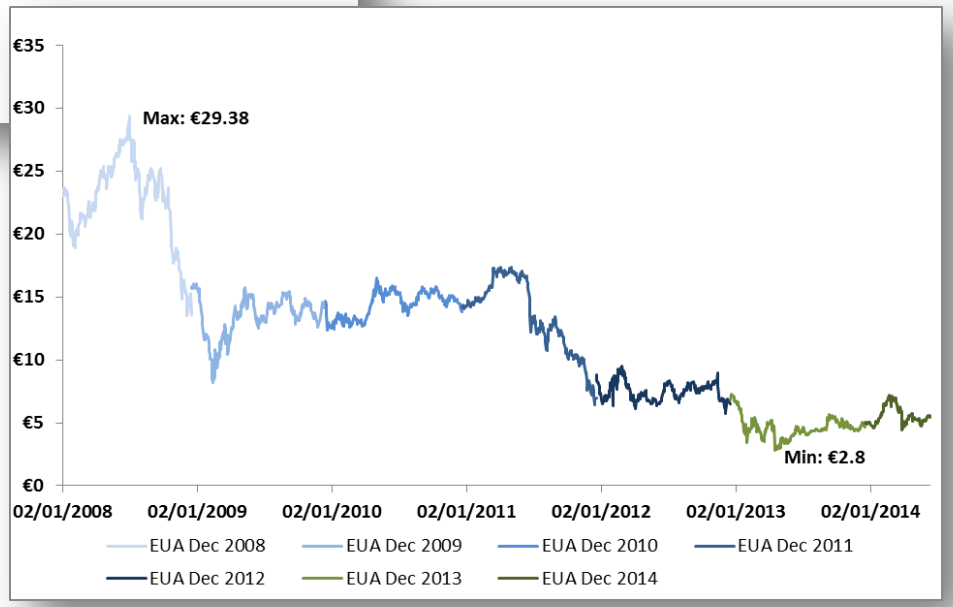
EU 2030 Framework and reform of the EU ETS will have a significant impact on traded sector emissions



EU28 GHG emissions trajectory to 2030

Source: European Commission. *Communication on 2030 framework for climate and energy policies*



Price of EUAs (2008-2014)

Source: Thomson Reuters Point Carbon

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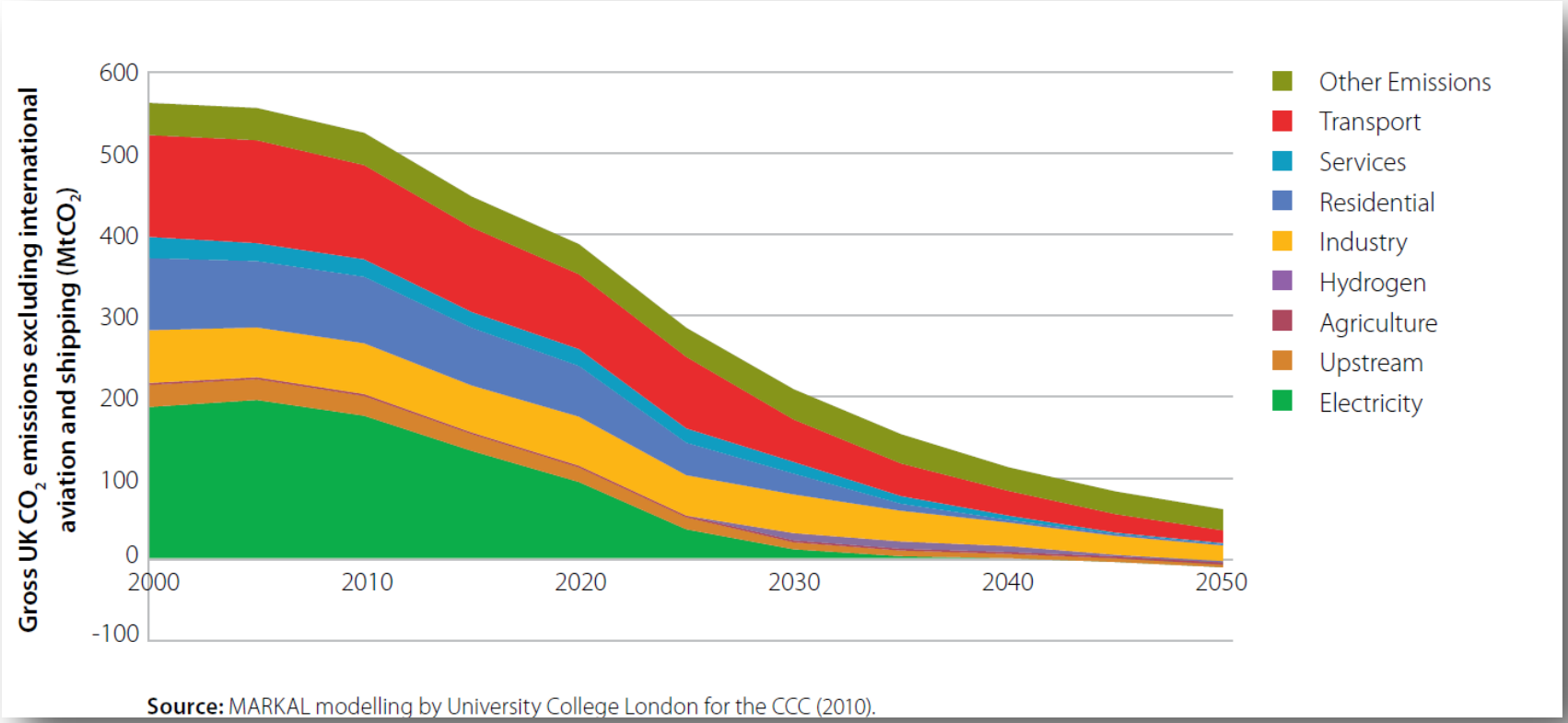
5th Carbon Budget to be set by 2016 on a cost effective pathway to the 2050 emissions target

MARKAL-based emissions trajectory to 2050 for the 4th Carbon Budget



Source: MARKAL modelling by University College London for the CCC (2010).

- Insights into dynamic impacts of abatement though MARKAL modelling.
- Plus bottom-up modelling based on detailed analysis of scope of technology roll-out.

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3 DECC evidence priorities

a **Energy use and efficiency in homes and businesses**

b **Understanding how businesses make investment decisions**

c **Innovation and cost reduction for low carbon technologies and mitigation of long run technology risks**

d **Optimising within and across energy systems**

e **Broader macroeconomic and distributional impacts of change**

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Energy use and efficiency in homes – what policies work and how effective are technologies

Evaluation of key policies

- Energy Company Obligation and Green Deal, Smart Metering, and Domestic Renewable Heat Incentive

Real world evidence on measures, technologies and their impact

- How technologies and measures perform in the real world rather than lab, such as field study of solid wall insulation
- How people use existing heating controls and other tools
- Trails on smart meters, new tariffs and autonomous home control systems
- Supply chain capabilities to install measures and technologies

Improved understanding via energy models

- National household model – open source micro-simulation model
- Building Research Establishment Domestic Energy Models, including the Standard Assessment Procedure used for Energy Performance Certificates

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Business energy use and efficiency – what policies work, how effective are technologies and how to cut emissions in key sectors

Evaluation of key policies

- Non-domestic Renewable Heat Incentive, Carbon Reduction Commitment Energy Efficiency Scheme and Energy Saving Opportunity Scheme (energy audits)
- Electricity Demand Reduction pilot scheme

In situ performance of key low carbon technologies and controls

- Priority technologies are large-scale heat pumps, biomass boilers, heating controls and operation of space heating and cooling in non-domestic buildings

Potential for energy efficiency and low carbon heat

- Major study to update the evidence base on energy use in non-domestic buildings across a ranges of sectors (offices, retail) as well as abatement potential
- Joint BIS-DECC study to develop evidenced-based options to decarbonise the 8 most heat-intensive sectors (iron and steel, oil refining, chemicals, food and drink, paper and pulp, cement, glass and ceramics).

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Understanding how businesses make investment decisions in an uncertain environment

Hurdle Rates under CFDs (pre-tax, real)

%	Offshore wind	Biomass conversion	Onshore wind
NERA illustrative range under CfDs*	9.3% - 11.2%	10.4% - 11.8%	6.6% - 8.0%
EMR delivery plan hurdle rate assumptions	10.1%	10.9%	7.1%

*Includes "EMR novelty risk premium"
Sources: NERA, Changes in Hurdle Rates for Low Carbon Generation Technologies, December 2013, and National Grid, EMR Analytical Report, December 2013

- Evaluation of Electricity Market Reform
- Investor risk appetite and perceptions of risk
- Limited versus perfect foresight regarding fossil fuel prices, future policies and carbon prices, and future technology costs

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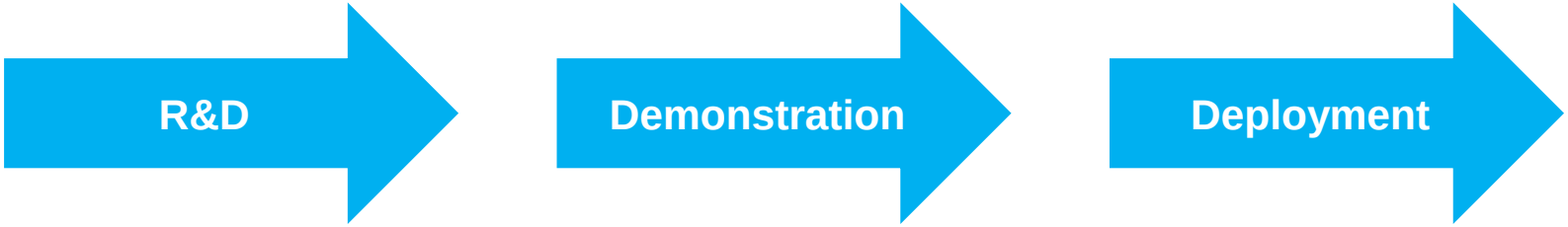
Innovation and cost reduction for low carbon technologies and mitigation of long-run technology risks

- **Technology costs**: which technologies matter and do costs decrease with greater deployment?
  - In power, new nuclear, CCS and offshore wind are potentially scalable
  - Offshore wind costs depend on UK deployment
- **Potentially disruptive technologies**: immature new technologies
  - Battery or other storage technologies
  - Intermittent renewables (wind, solar PV) plus cheap storage
- **Supply chain**: feasible deployment rates without bottlenecks and higher costs
- **Fossil fuel and carbon prices**: high, low or somewhere in between?



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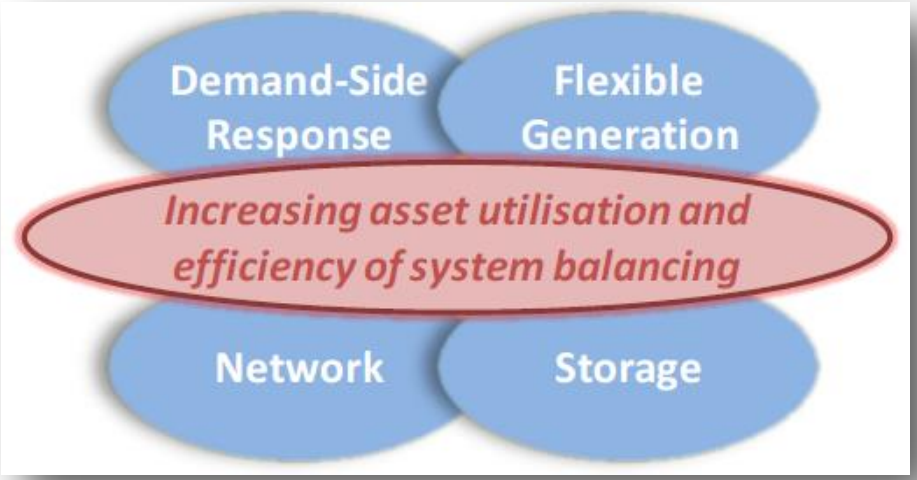
Optimising the power system and across the power and gas systems as heat and power are decarbonised are key

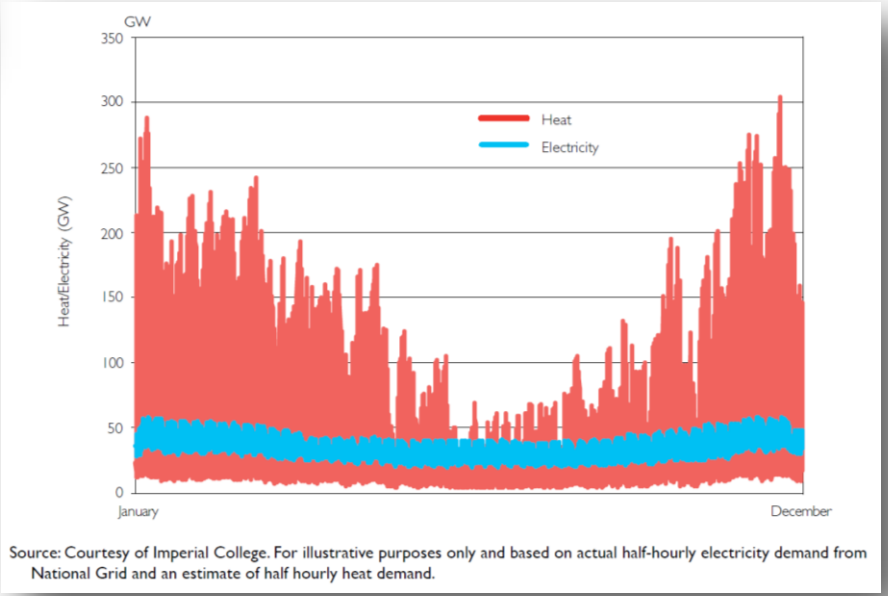


Alternative power system balancing technologies, including interconnection

Source: Imperial College and NERA, Understanding the balancing challenge, August 2012

Comparison of heat and electricity demand variability in 2010, domestic and commercial

Source: Imperial College



Source: Courtesy of Imperial College. For illustrative purposes only and based on actual half-hourly electricity demand from National Grid and an estimate of half hourly heat demand.

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Understanding macroeconomic and distributional impacts of energy and climate change policies

- **Economic growth** – investment and productivity impacts associated with energy infrastructure and energy efficiency
- **Impacts on fiscal and external balances** – green taxes and substitution of capital for imported fossil fuels
- **New supply chains** – offshore wind and new nuclear
- **Adverse competitiveness impacts** – energy intensive industries and leakage
- **Impacts on fuel poverty** – role of energy efficiency in mitigating fuel poverty

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Thank you!
Developing DECC's Evidence Base

https://www.gov.uk/government/publications/developing-deccs-evidence-base