

# Hinkley Point and the Future of Nuclear Power in the UK



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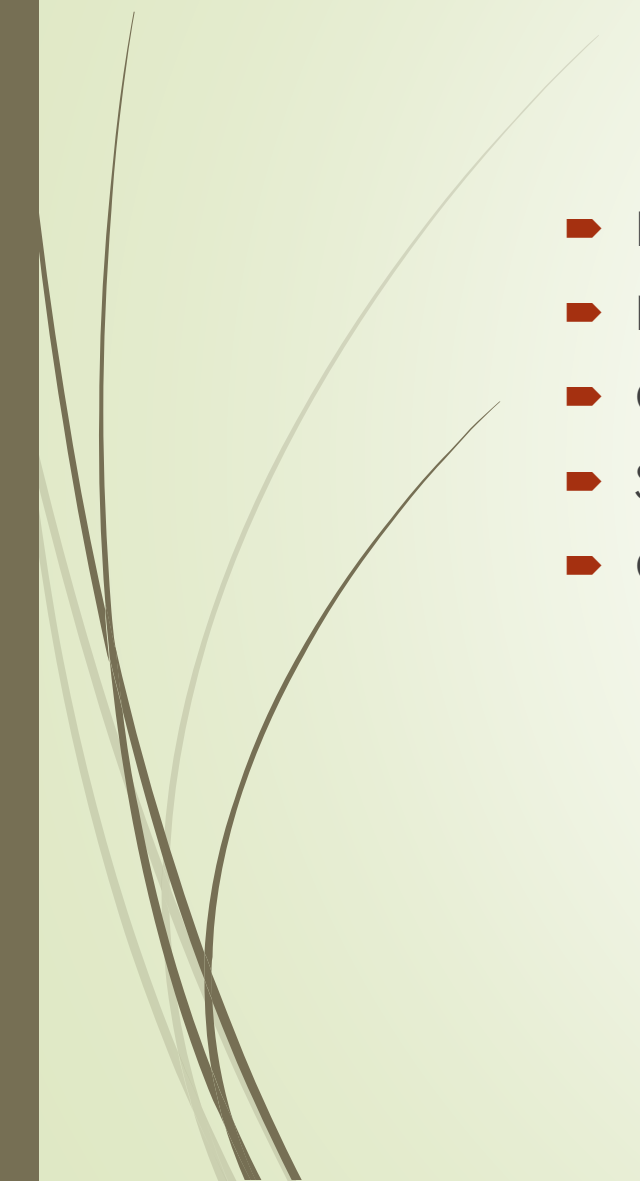
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<http://www.worldnuclearreport.org/>

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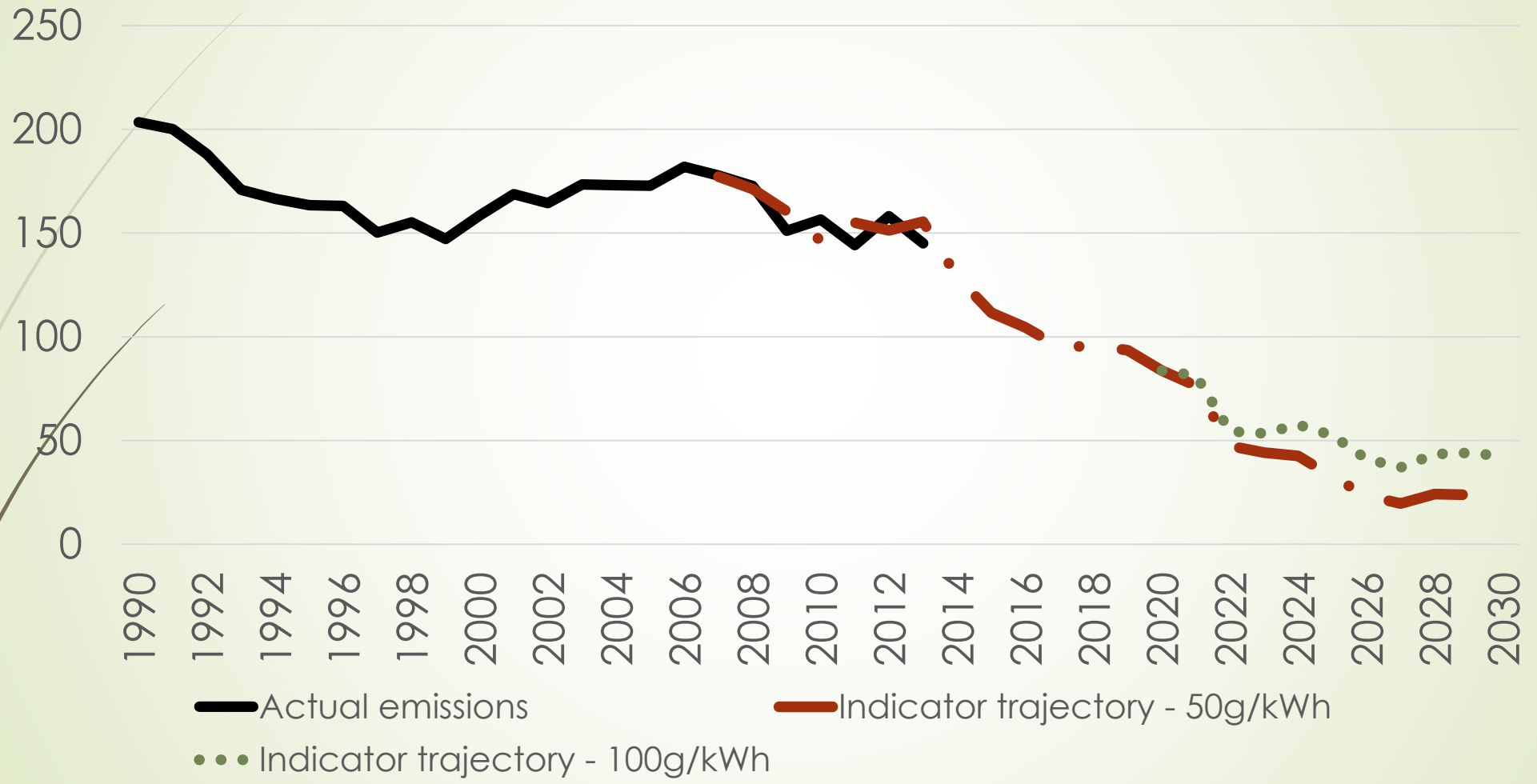
# Presentation Outline

- Recent history of the nuclear sector in the UK
  - Nuclear new build
  - Changing economics of non-fossil fuel power options
  - State aid and nuclear power in the EU
  - Conclusions
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## Status and prospects

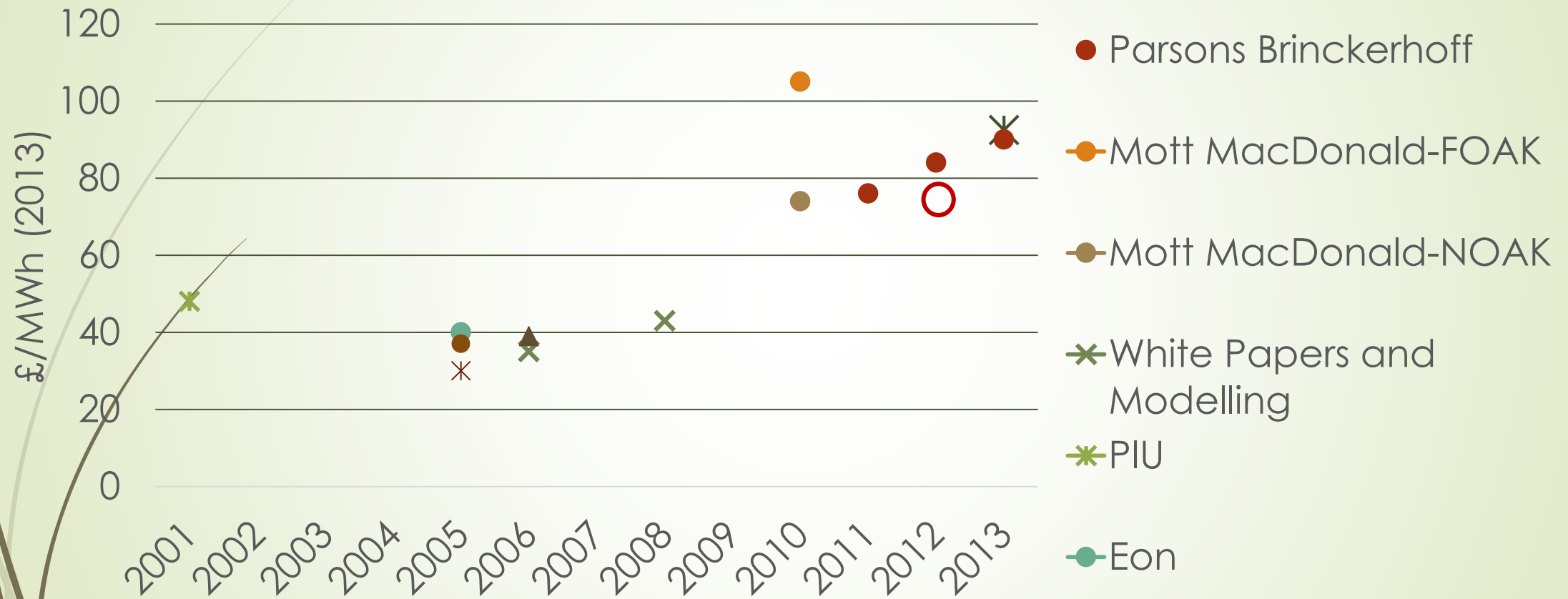
- The last reactor built in the UK was Sizewell B, a PWR, in 1995
- One remaining, Magnox, is in operation; Wylfa is set to close in December 2015
- The remaining 14 AGRs are said to be all closing by 2024, but life extension is occurring.
- In 2006, Tony Blair said nuclear power was 'back on the agenda with vengeance'
- Coalition Agreement, May 2010: In August 2010, "We are on course to make sure that the first new nuclear power station opens on time in 2018" .."To be clear, this means that there will be no levy, direct payment or market support for electricity supplied or capacity provided by a private sector new nuclear operator, unless similar support is also made available more widely to other types of generation".
- May 2015 – New Government – continue to support nuclear -. New legislation to block financial support for onshore wind and only allow with explicit support of local community. Pro-fracking

# Power sector and GHG emissions



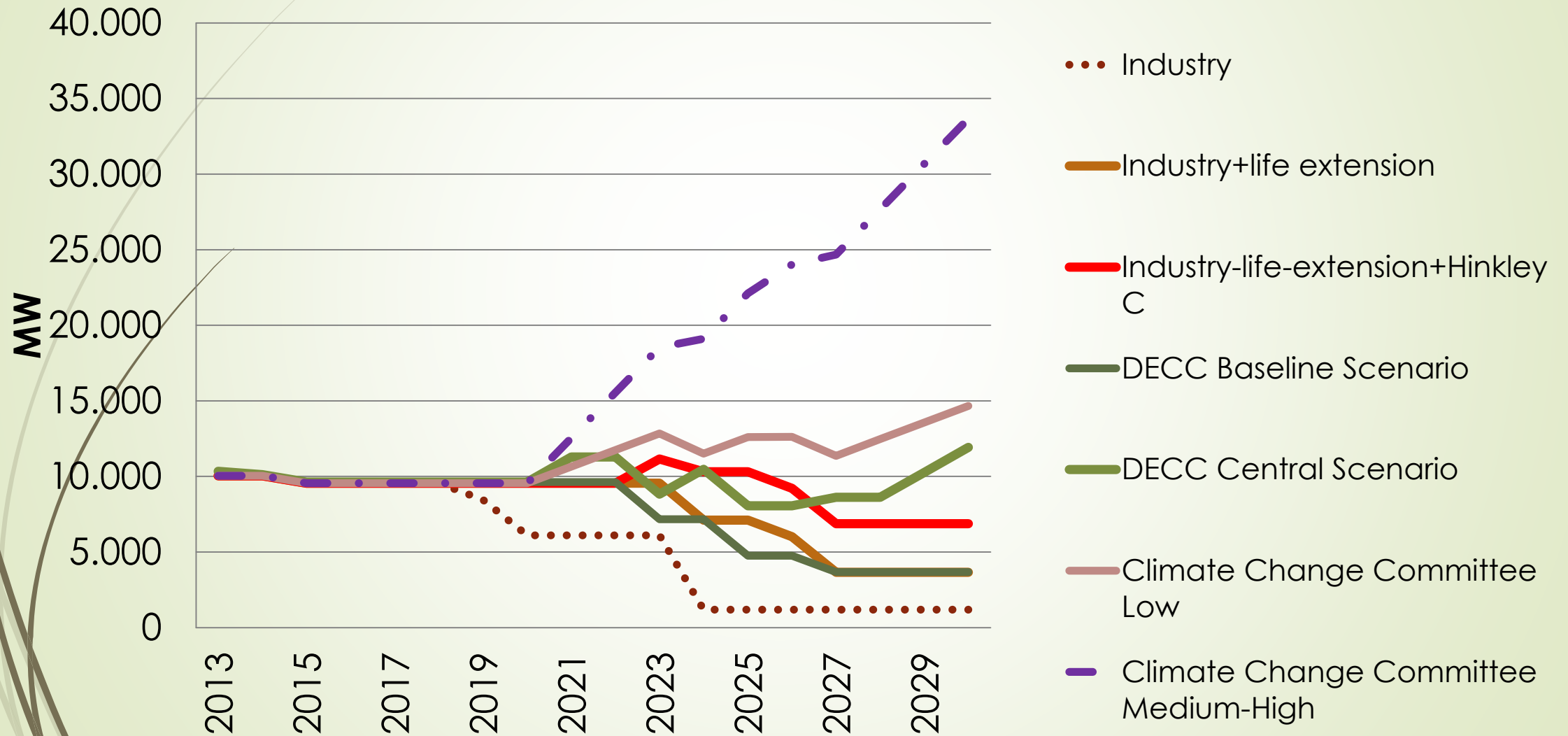
Source: Committee on Climate Change 2015

# UK Forecasted Costs of Nuclear New Build



Source: Individual assessments

# UK Installed Nuclear Capacity 2013-2030





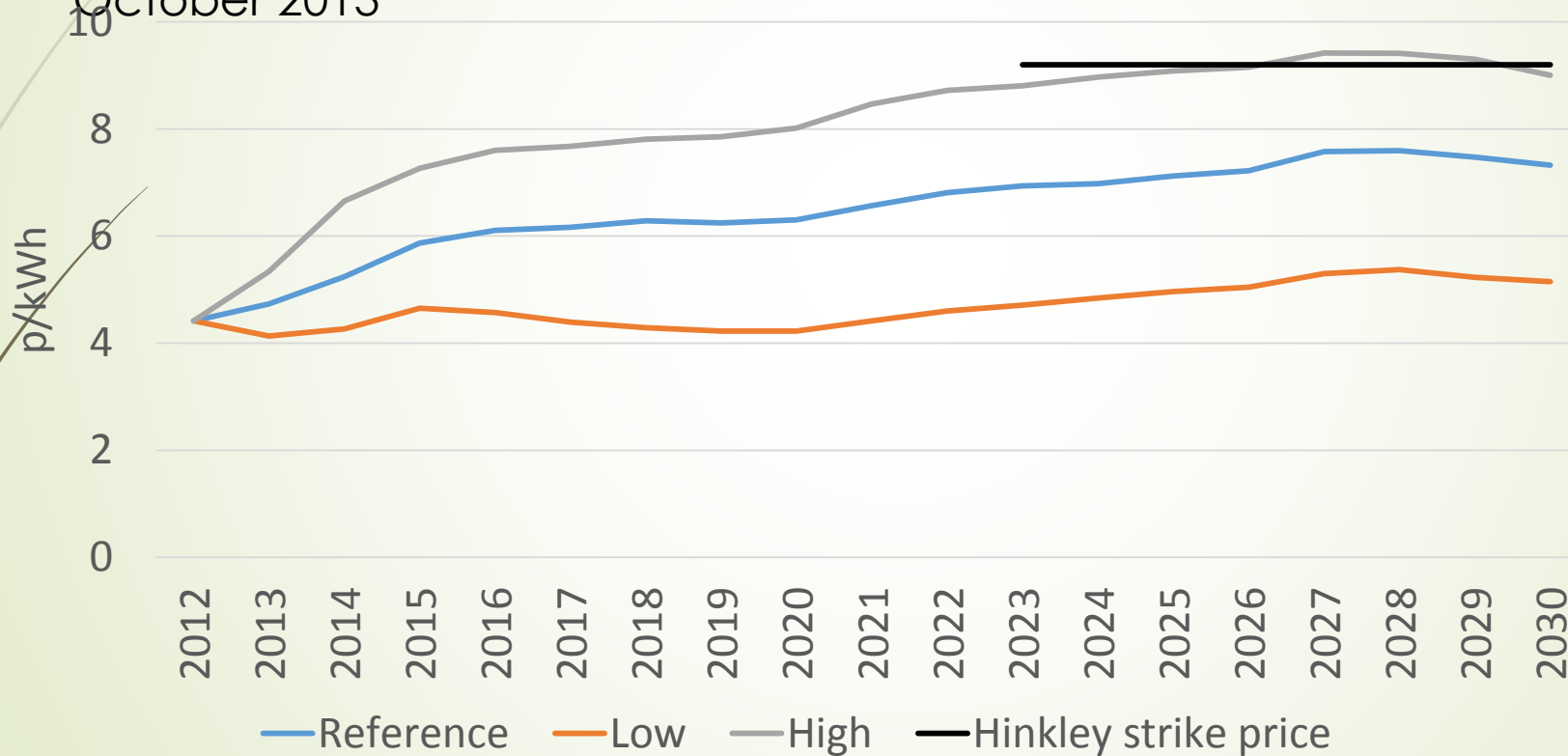


# New Reactors ?

- In 2006 Government launches process to commission new nuclear
- Currently, one firm proposal for GBP 34 billion (around €43 billion) project at Hinkley C, built by Areva for EDF
- Government support, £10 billion debt financing, price guarantee for 35 years, £92.5/MWh (2012,) annual increase index linked - Expected price at start of operation in 2024, £121/MWh
- Funders for Hinkley and possibly at Sizewell
  - ▶ EDF Group: 45-50%
  - ▶ AREVA: 10%
  - ▶ China General Nuclear Corporation (CGN), China National Nuclear Corporation (CNNC): 30-40%
  - ▶ Discussions are also taking place with a shortlist of other interested parties who could take up to 15%
- Horizon (4 reactors at Wylfa and Oldbury)
  - ▶ Hitachi takes over E.on and RWE shares
- NuGen (3 reactors at Moorside – Cumbria)
  - ▶ January 2014, new ownership structure with Toshiba-Westinghouse (60%) and GDF Suez (40%); Iberdrola sold their shares

# Strike Price

“It is estimated that the UK new nuclear programme will save households £74 a year in today's prices by 2026-30” EDF Statement, October 2013



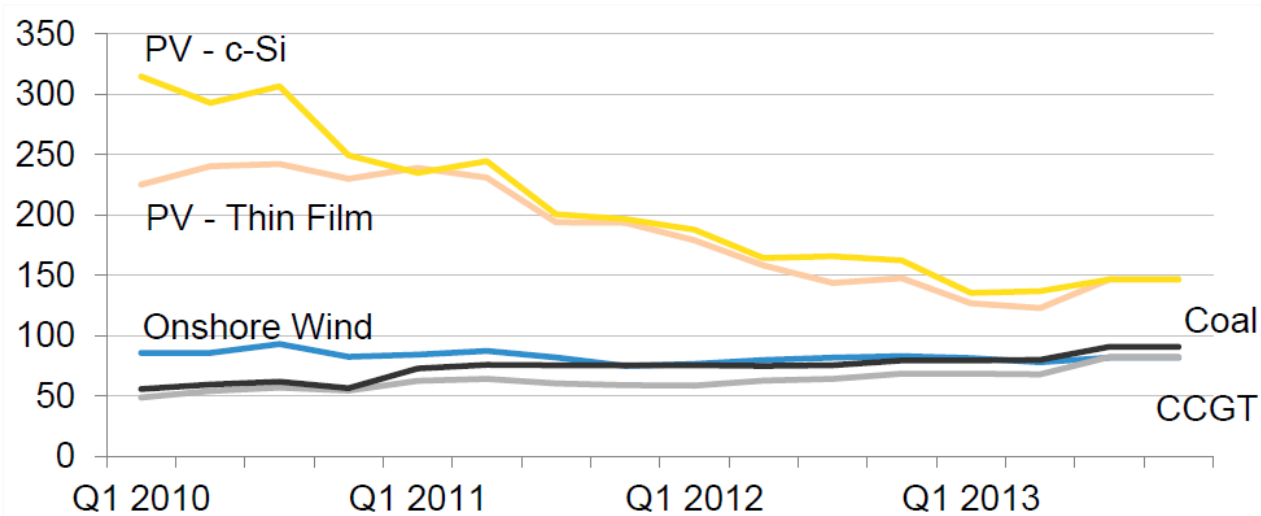
Source: DECC September 2013



# Falling renewable prices

## LEVELISED COST OF ELECTRICITY PRODUCTION

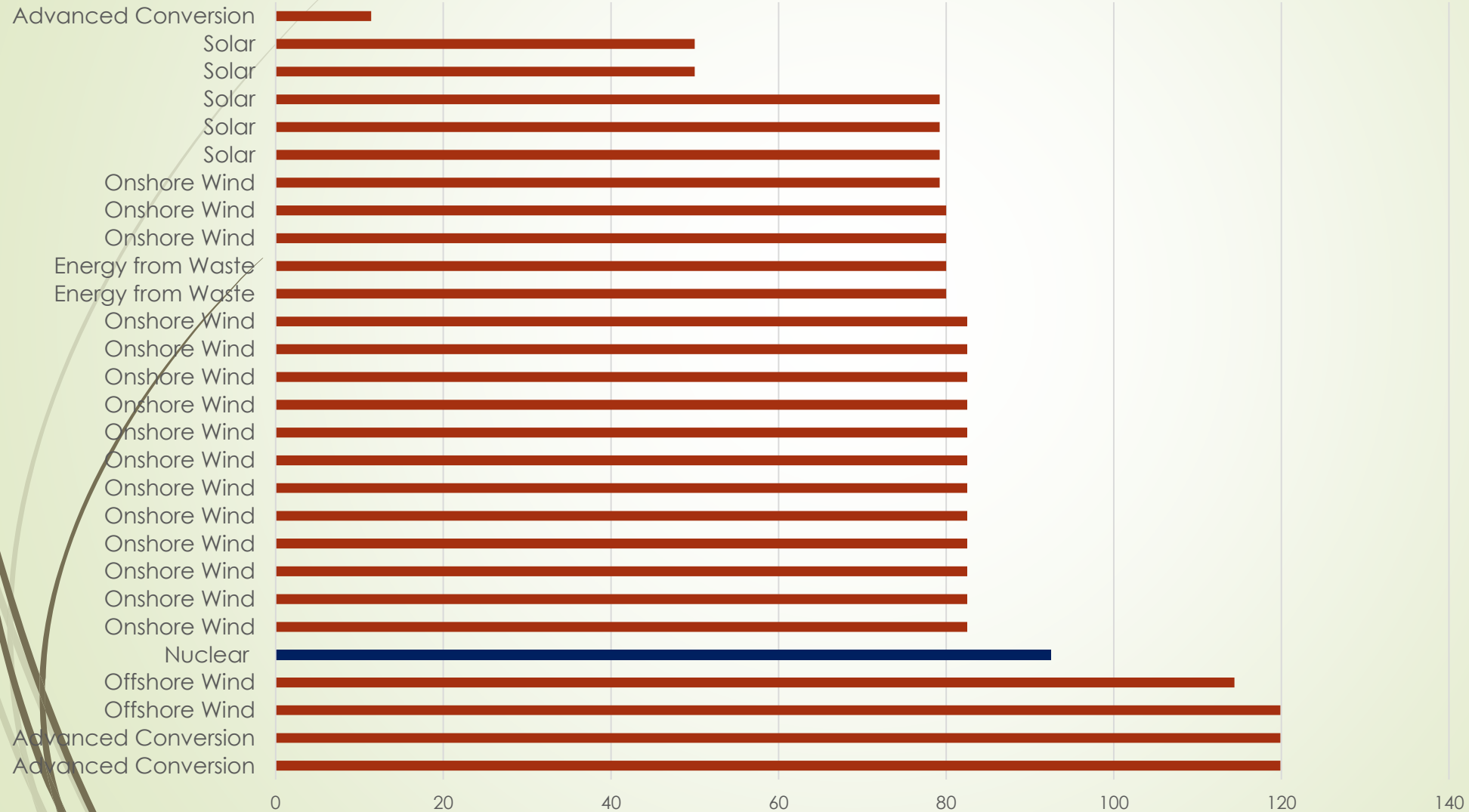
(\$/MWH)



- Recognised that PV is competitive with retail price in increasing number of markets
- Germany – May PV ground mounted bids: Average €97/MWh
- Jan 2015 - Dubai – winning bid on new build solar - US\$5.84c/kWh (€51/MWh) –cheaper than new gas
- Lithium-ion EV Battery experience curve comparable to that of solar pv – Tesla power wall


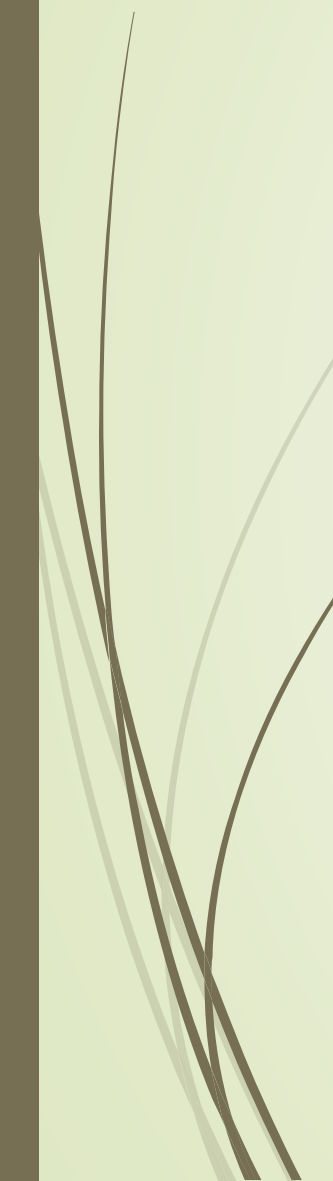
Source: BNEF 2015

# UK Contracts for Difference – 2013-4 (£/MWh)

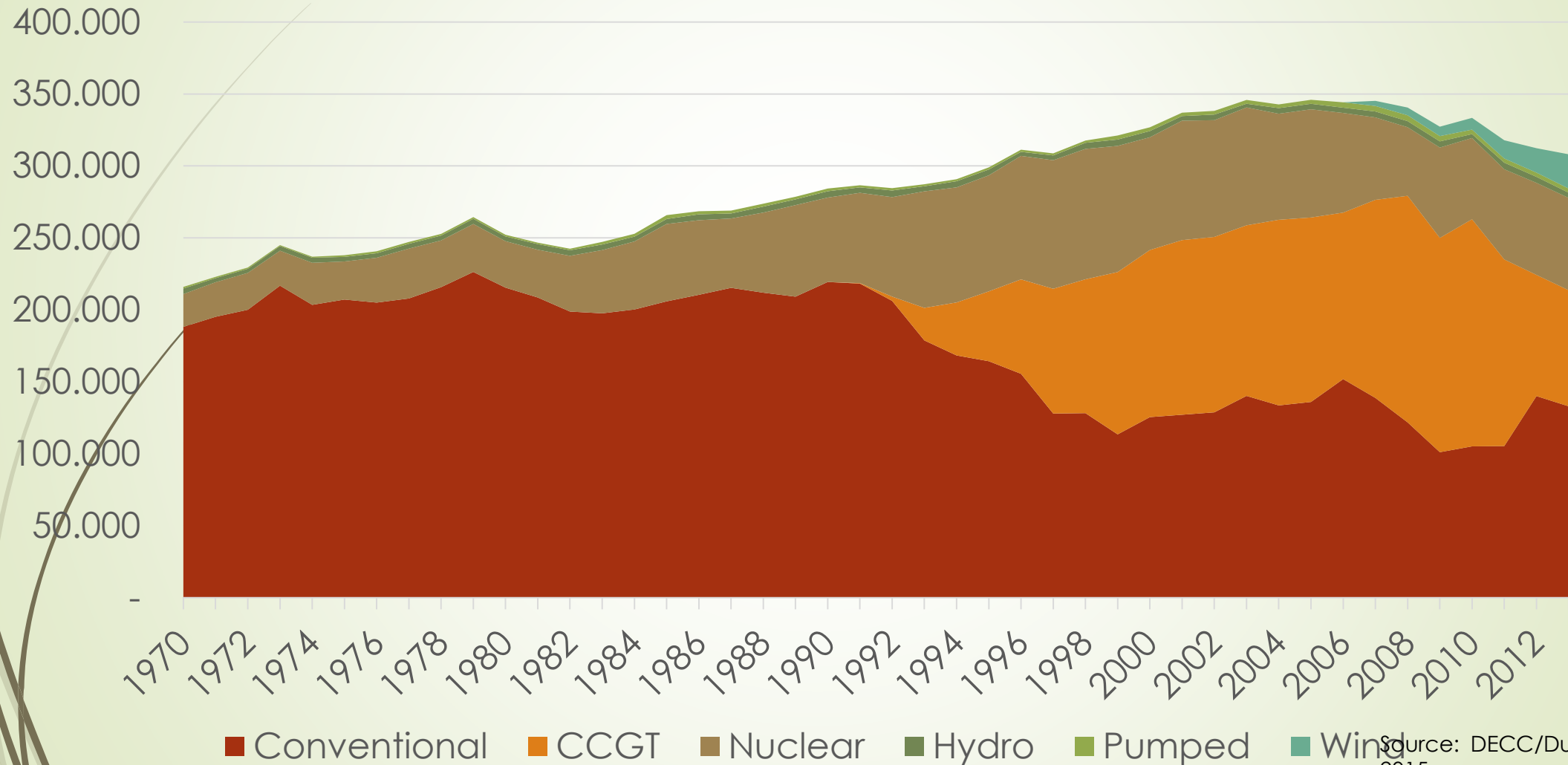


## EU and State Aid Ruling

- October 2013: announcement of agreement of commercial terms between EDF and UK Government, at the time final agreement expected in July 2014
- Formal notification of the proposal was made to the European Commission on 22<sup>nd</sup> October
- 18<sup>th</sup> December 2013: Commission announced it was investigating the deal
- 31<sup>st</sup> January: Commission released a letter raising questions on the deal. This was described as:
  - A damning critic – a searing letter (Daily Telegraph)
  - A scathing initial assessment (Financial Times)

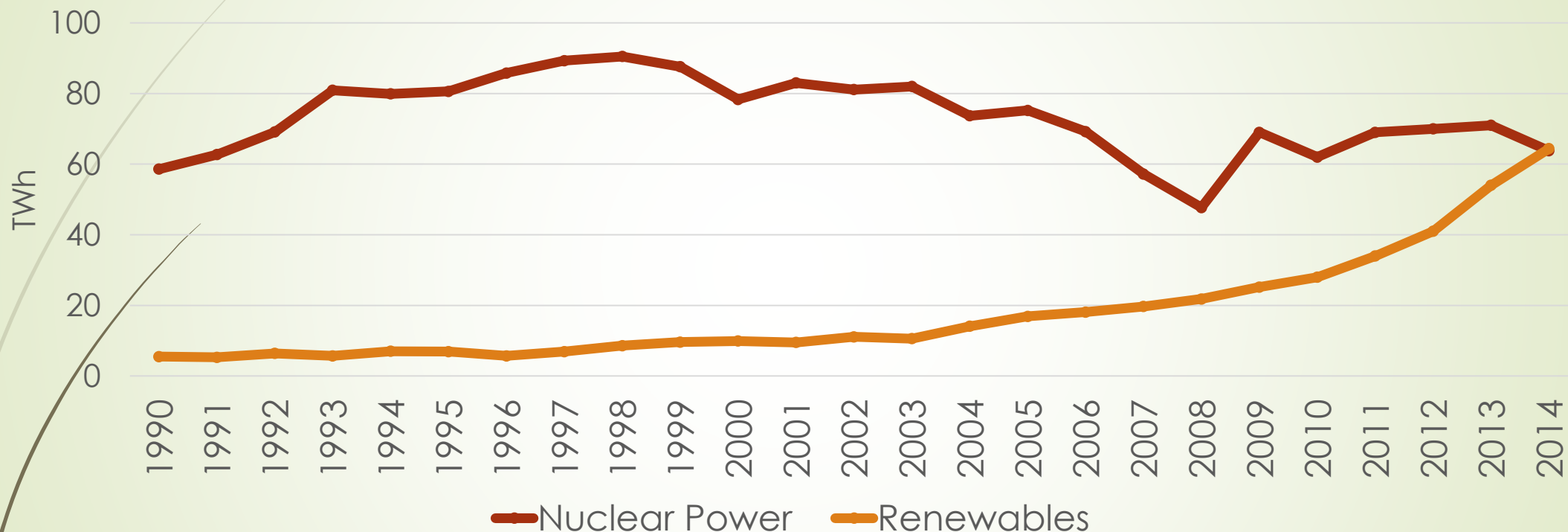
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- Key critiques of Commission's letter:
    - The support is a combination of price guarantees and credit protection
    - The level of support is potentially as much as £17.6 billion more than the cost of building the plant
    - Other nuclear projects have been developed without State aid
  - Others are more critical (Liberium Capital)
    - The project will generate a rate of return between 25-35%
    - EDF and partners will be able to extract £65-80 billion in cash in addition to paying off debts
    - Cost of £16 billion (£5billion/MW) in 9 years' time should have kill off any project – gas costs £0.7 billion/MW and takes 2 years
  - Commission approves the project and publishes rationale 2015
  - Austria and Luxembourg pledge to appeal the decision – plus others from private sector/NGOs
  - ??

# UK centralised electricity production (GWh)



Source: DECC/Dukes data - 2015

## Historic Renewable-Nuclear Cross-over in UK

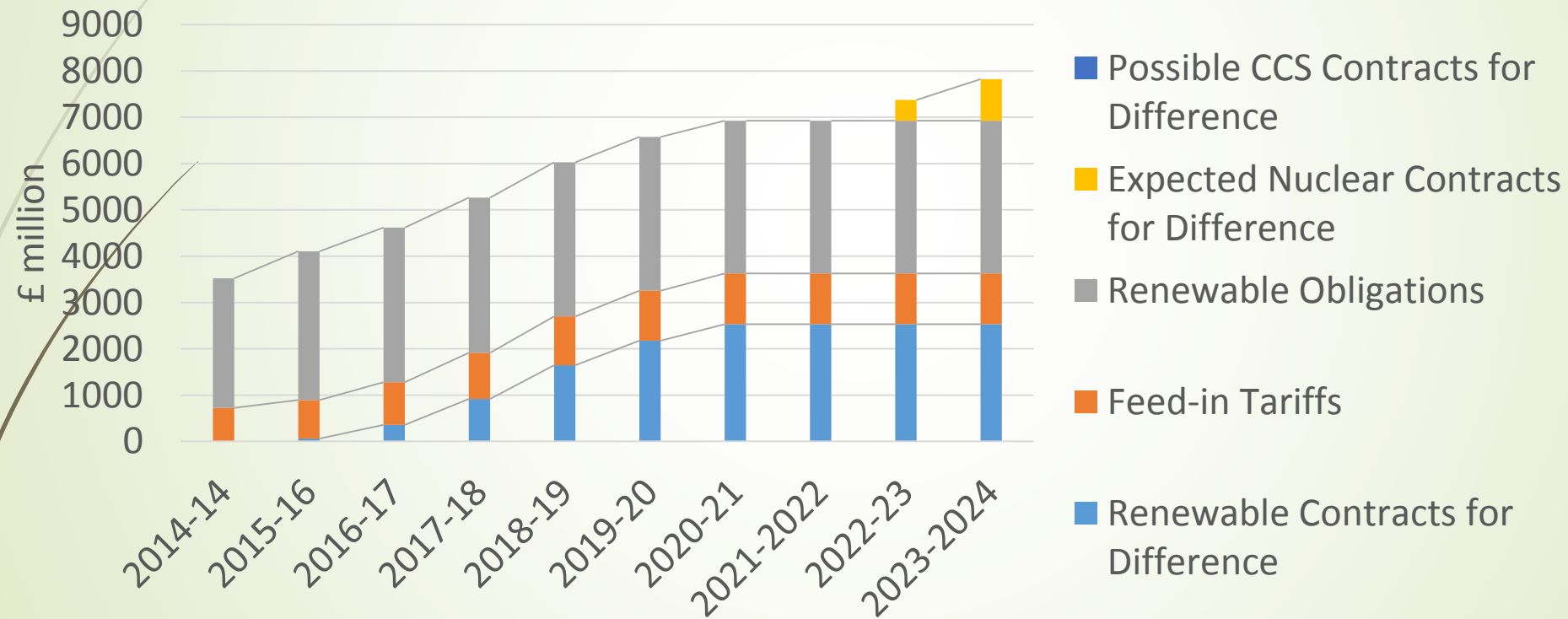


During 2014 electricity production from renewables grew by 20%, to provide a total of 64.4 TWh ( 19.2% of total electricity generation). For the first time renewables provided more electricity than nuclear power, who's share in total generation shrank by 9.7% to 63.8 TWh (19%).



# Nuclear vs Renewables - Levy Control Framework

Annual spending on electricity policies with the Levy Control Framework





# Will Hinkley Proceed ?



Edf/Areva  
Chinese Investors ?  
State Aid not settled  
Technology  
Cost



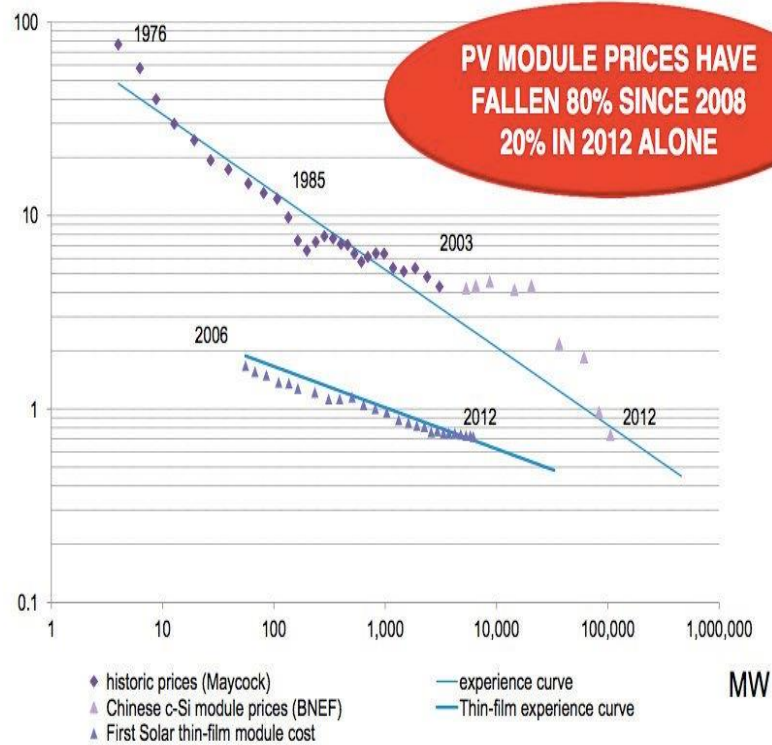
Conservative Government  
Project Inertia/different  
approach  
International importance  
Lack of public scrutiny



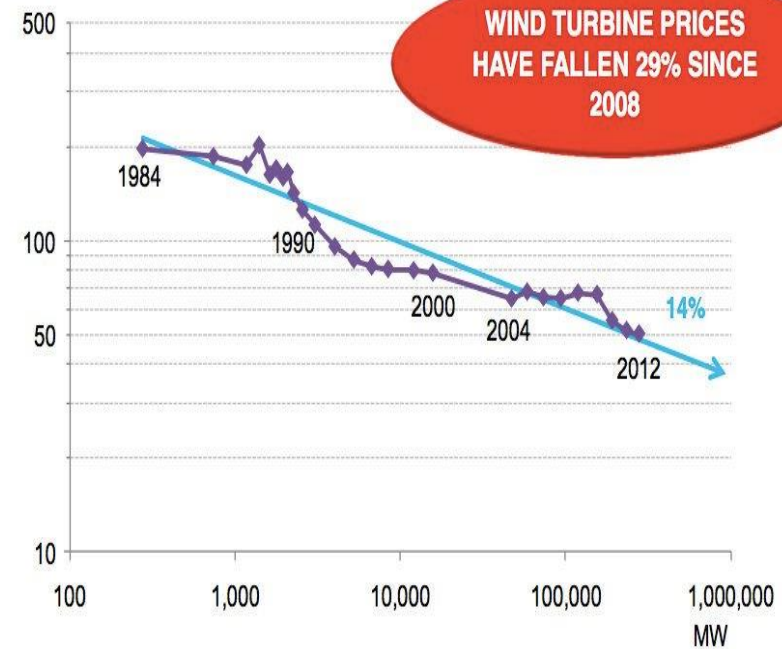
Back-up slides

# Renewable Costs

PV EXPERIENCE CURVE, 1976-2012  
2012 \$/W

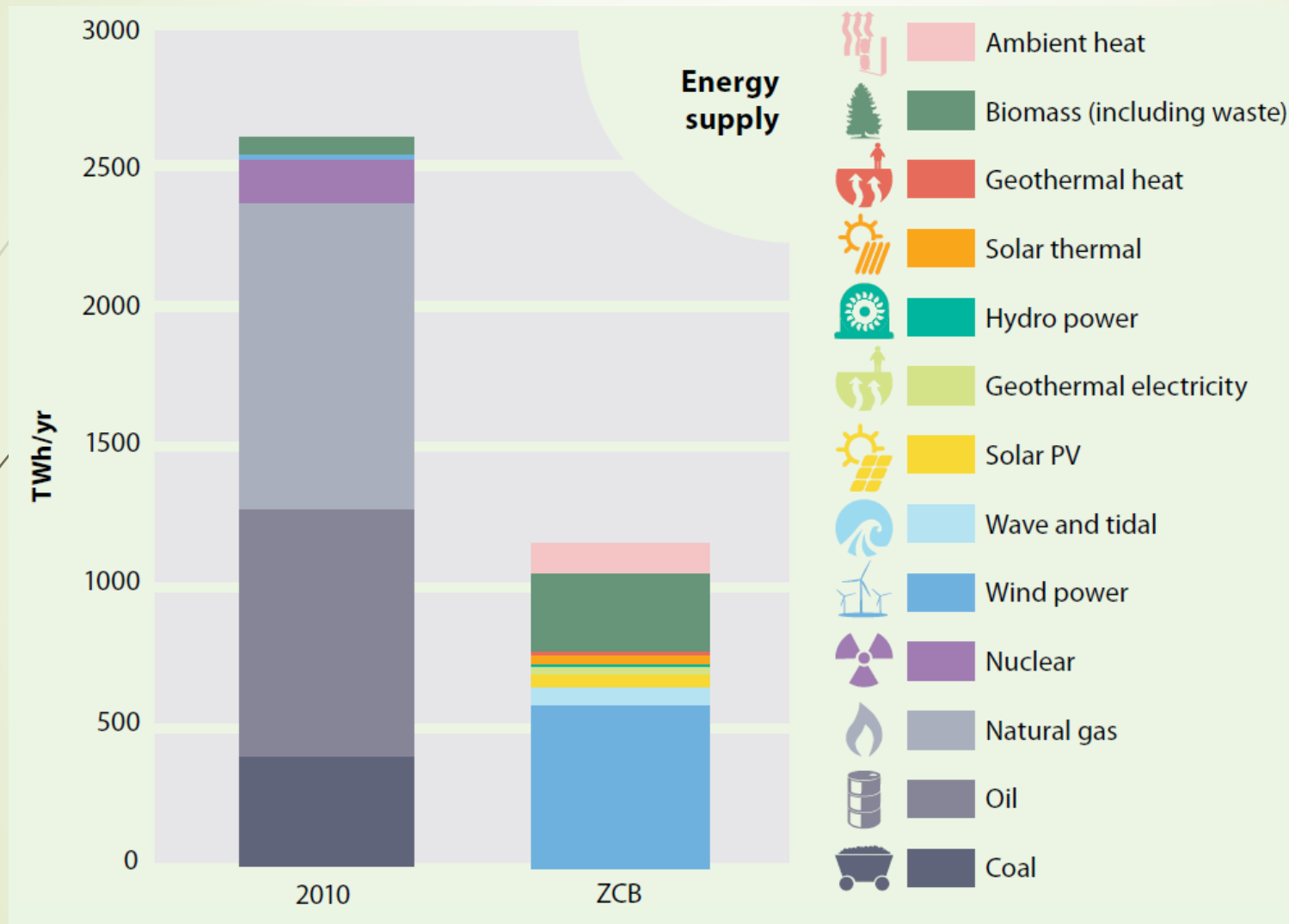


AVERAGE LEVELISED COST OF ONSHORE WIND, 1984-2012 (€/MWH)



Source: BNEF 2013

# 100% Renewables is Possible



# Why nuclear in UK?

## ► Domestic

- Political Capture – All major parties in favour
- Industrial phase out of nuclear makes meeting GHG targets more difficult
- Project momentum - NIMTOF
- Insufficiently vocal public opposition

## ► International

### ► China:

- Hinkley is a major investment opportunity (£ 5 billion +)
- An 'opportunity to gain experience in the UK and will support their long term opportunity of becoming nuclear developers in the UK'.

### ► France:

- A potential show case for AREVA to build reactors in Europe to build to time and budget
- EDF to maintain share of generation mix if and when AGRs close

### ► Japan

- Opportunity to maintain reactor building business while its domestic market is limited

### ► EU

- Test for State Aid rules