

Electricity Market Reform and the UK's liberalised energy market

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Tokyo

3 March 2015

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Structure of talk

Drivers of Electricity Market Reform (EMR)

What problem is EMR intended to resolve?

Historical context

Elements of EMR

Future policy options

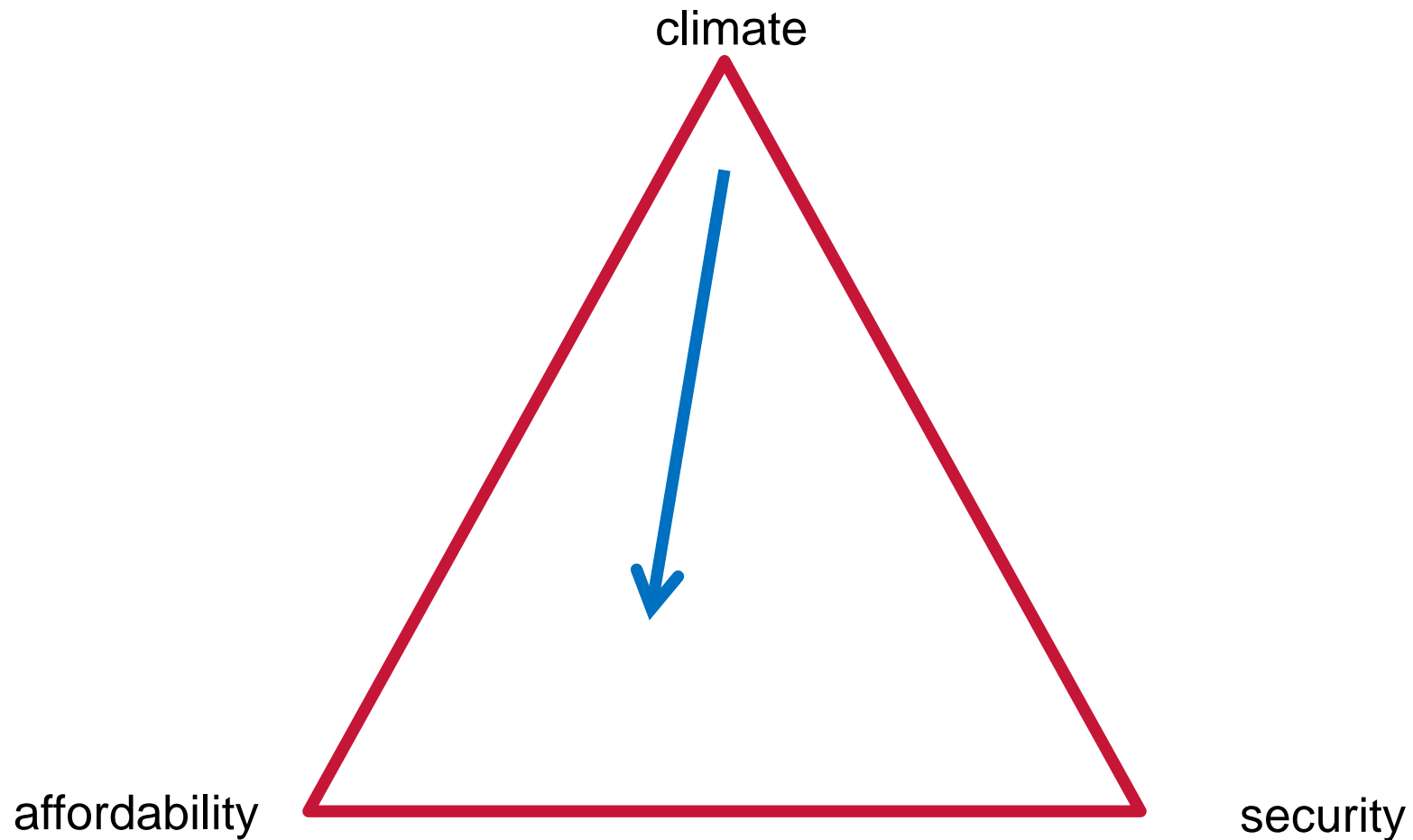
The drivers of electricity market reform (EMR)

1) Climate change policy (Climate Change Act 2008)

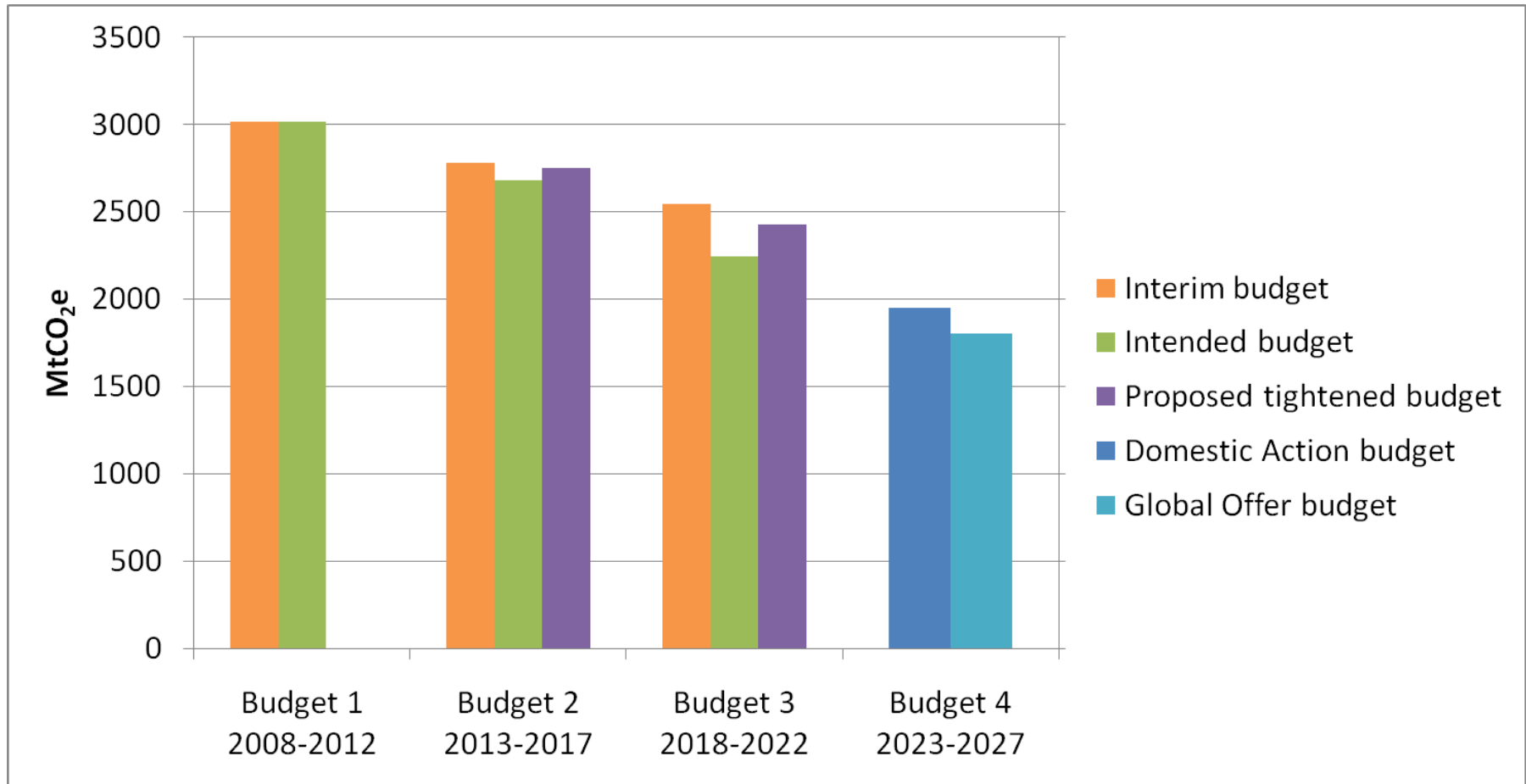
2) EU Renewable Energy Directive 2009

- implies ~30% renewable electricity by 2020
- (15% energy including heat and transport)

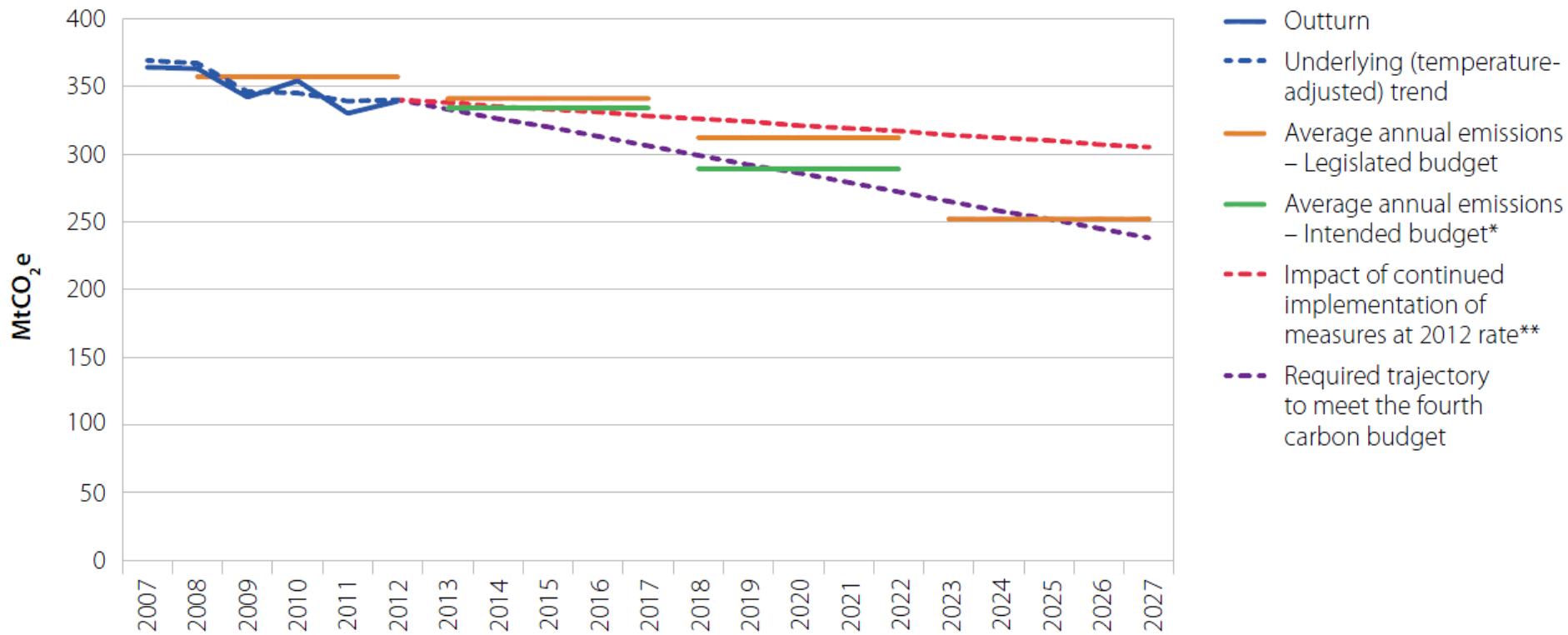
Changing energy policy priorities



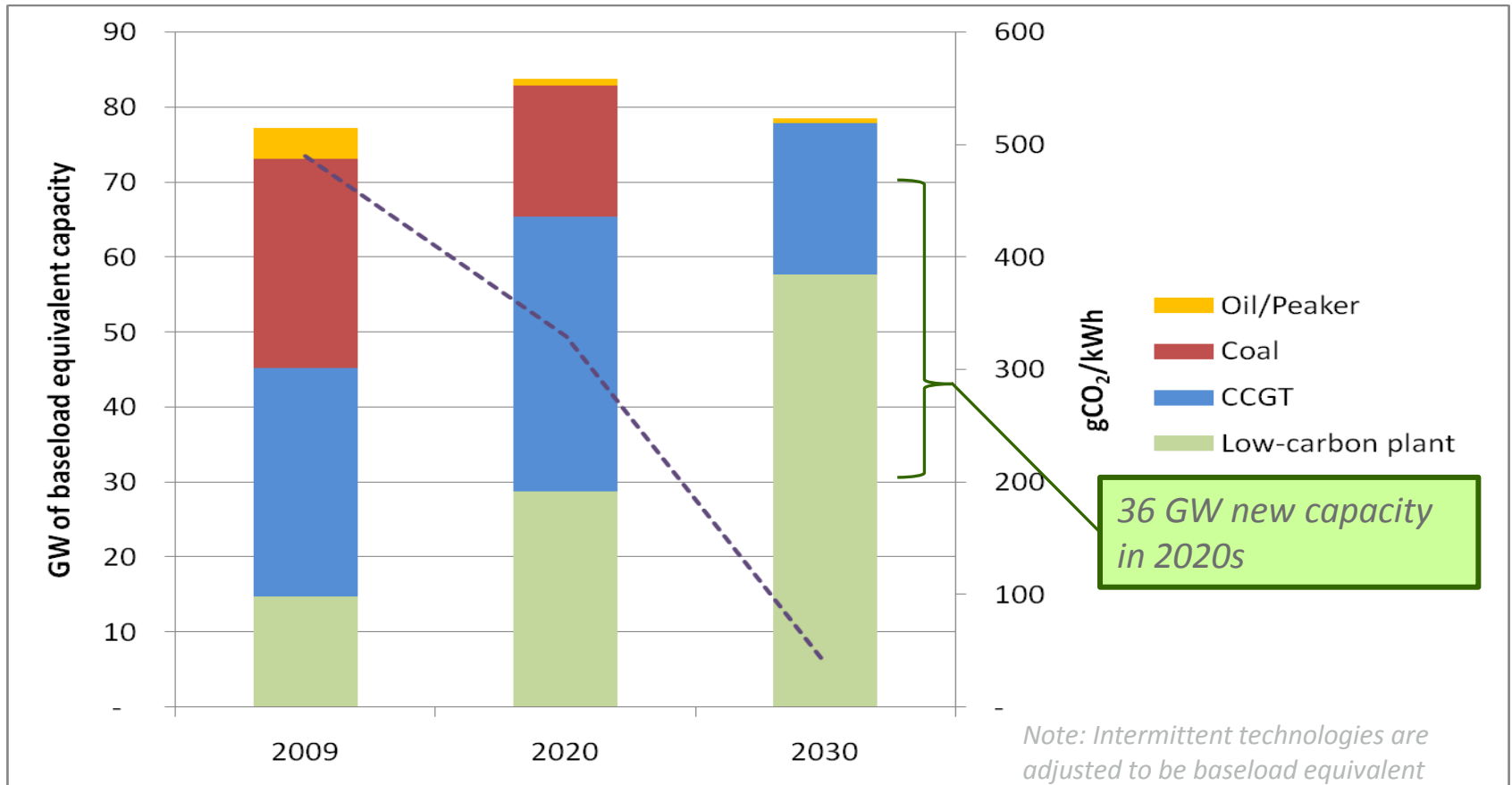
UK carbon budgets



Progress in meeting carbon budgets



Decarbonisation will require 30-40 GW new low-carbon capacity through the 2020s



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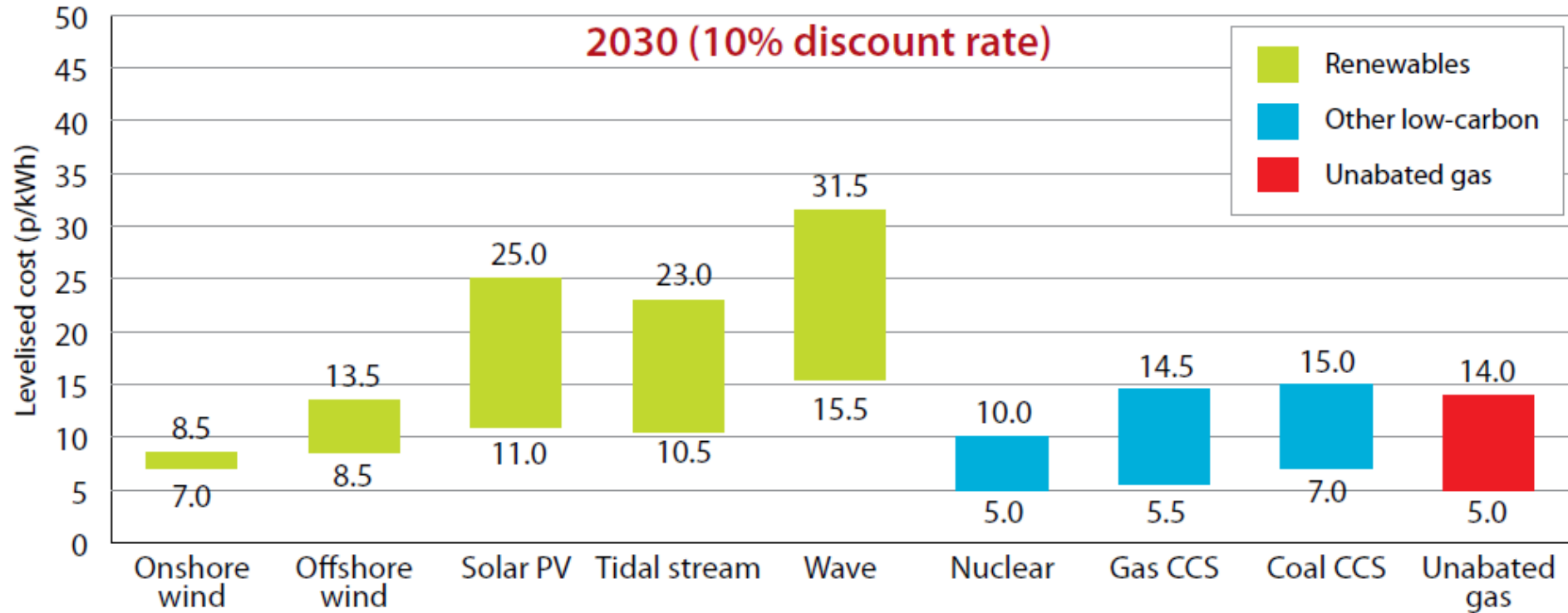
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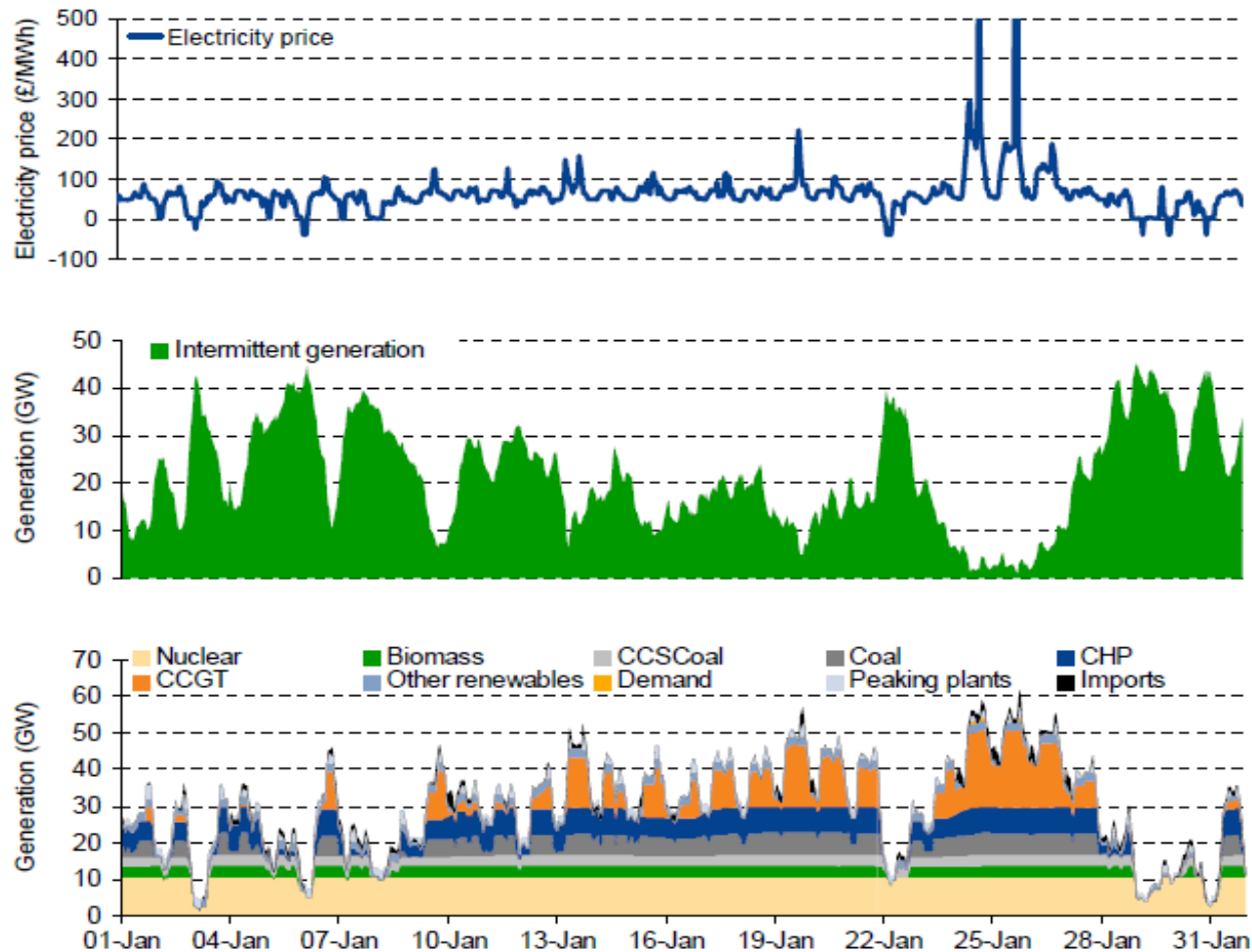
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Low carbon electricity is capital intensive.....

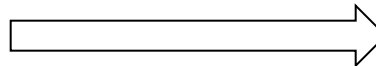


But intermittent generation = volatile prices in an "energy only" market



EMR: What's the problem?

- Low carbon electricity generation tends to be high capital cost/low running cost (fossil plant with CCS excepted)
- Investment in such plant is exposed to additional market risk in a volatile “energy only” market
- Gas plant has a natural hedge because gas prices drive electricity prices and hence has lower risk
- The cost of capital is therefore higher for low carbon generation



- The purpose of Electricity Market Reform is to reduce market risk for low carbon generation by offering stable prices
- This also helps to contain the cost to consumers of low carbon electricity supply

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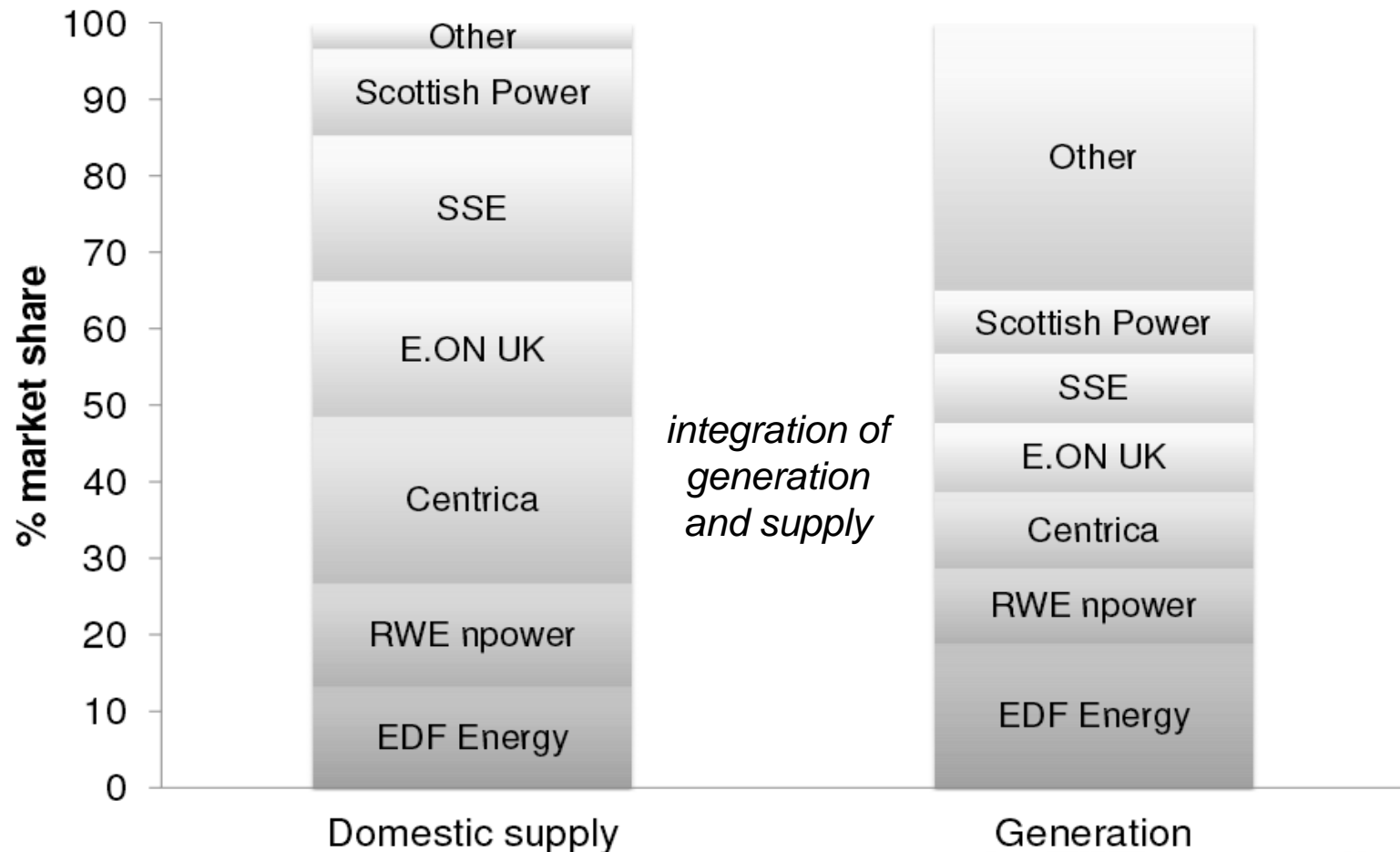
Wholesale electricity

- 1990 Privatisation - Unbundling, generation duopoly, power pool arrangements, but bilateral contracts for differences (CfDs) emerge
- 2001 New Electricity Trading Arrangements (NETA) – bilateral contracts plus spot market for imbalances
- 2005 British Electricity Trading Transmission Arrangements (BETTA) – includes Scotland
- 2013 Electricity Market Reform

Retail electricity

- 1990 Privatisation - 12 regional supply monopolies. Loads over 1 MW can choose their supplier
- 1994. Loads over 100 kW can choose their supplier
- 1999 Full retail competition
- 2014 Competition and Markets Authority (CMA) inquiry

Great Britain today: concentration in supply and generation



Source: Data from Bloomberg New Energy Finance 2012

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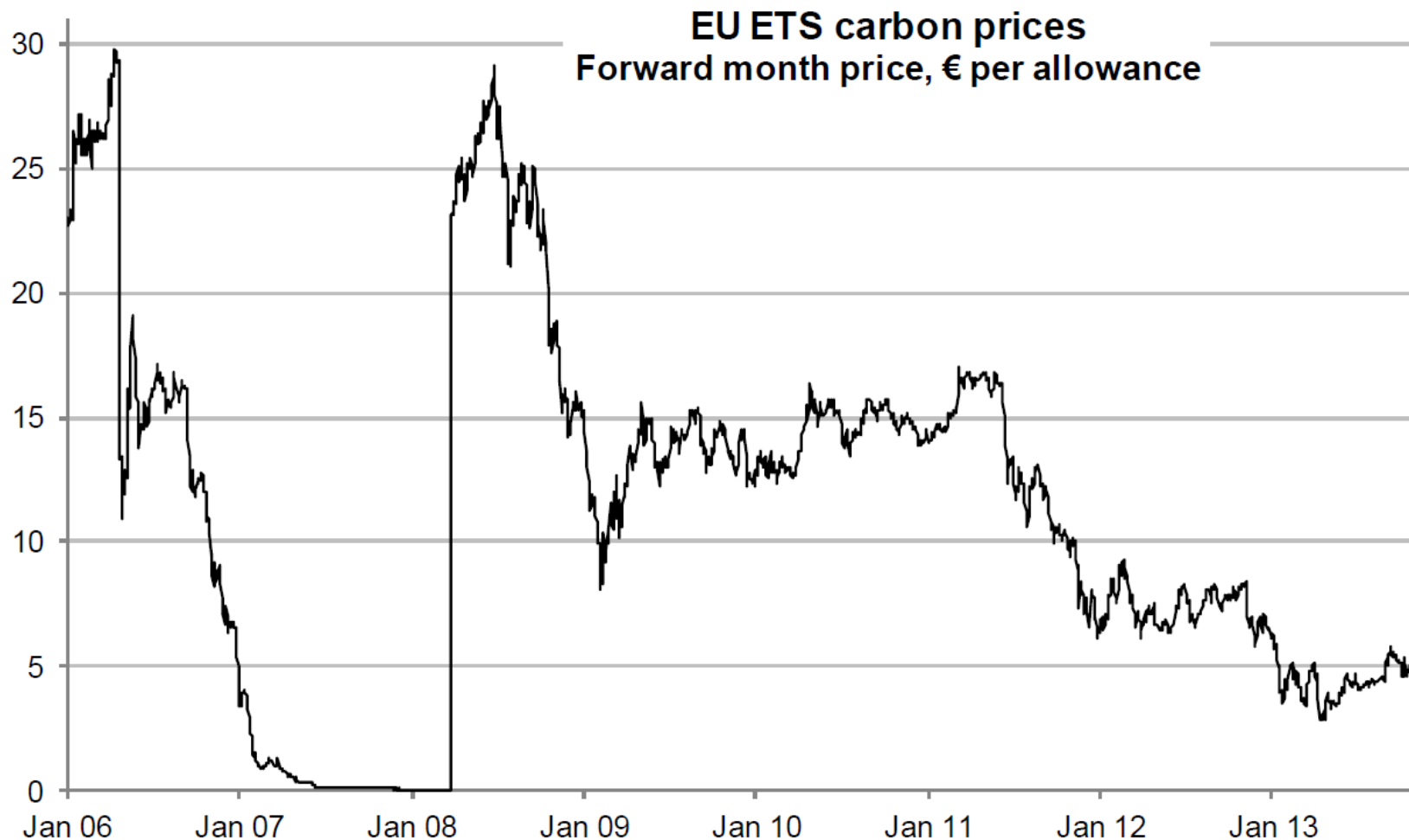
Elements of the Electricity Market Reform

1. Carbon price floor
2. Feed-in-tariffs through contracts for difference (CfDs) for all low carbon generation
3. A capacity mechanism
4. Emissions performance standard

Sits on top of, does not replace, the underlying wholesale market!

Sits on top of the EU Emissions Trading Scheme!

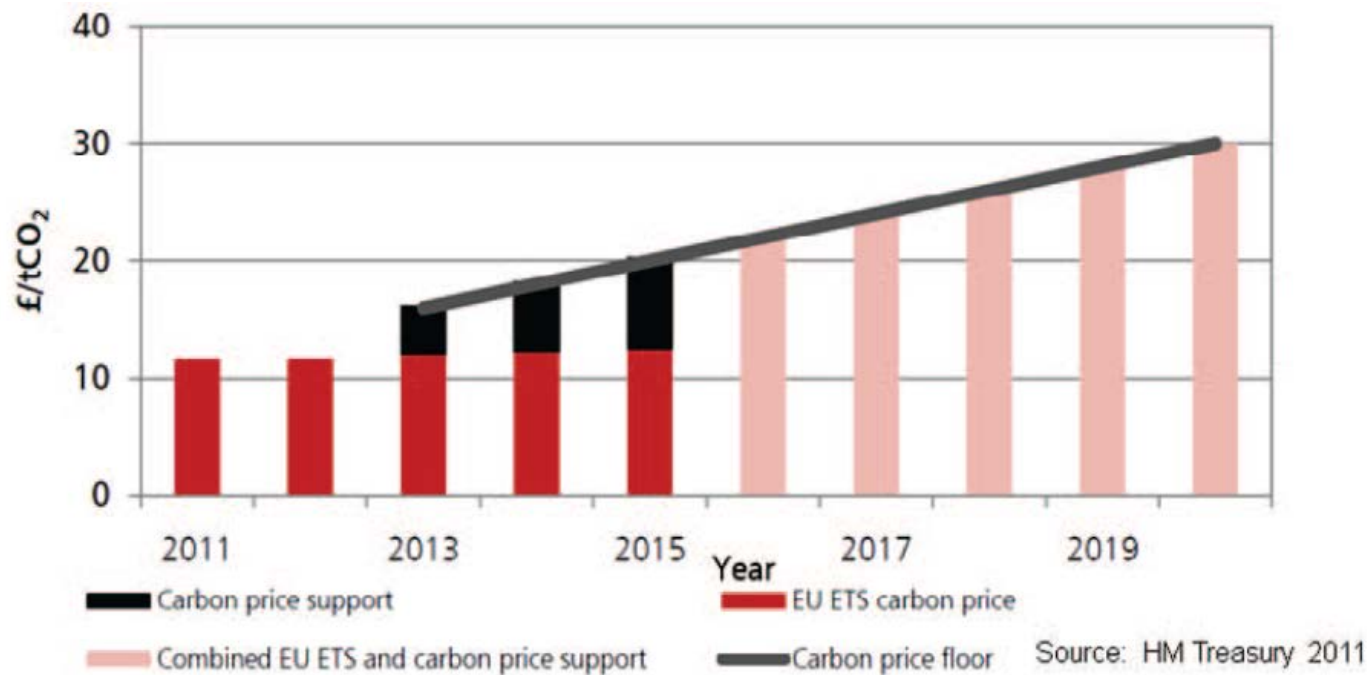
Carbon price floor – the EU ETS context



Source: www.theice.com

Evolving carbon price support

2011

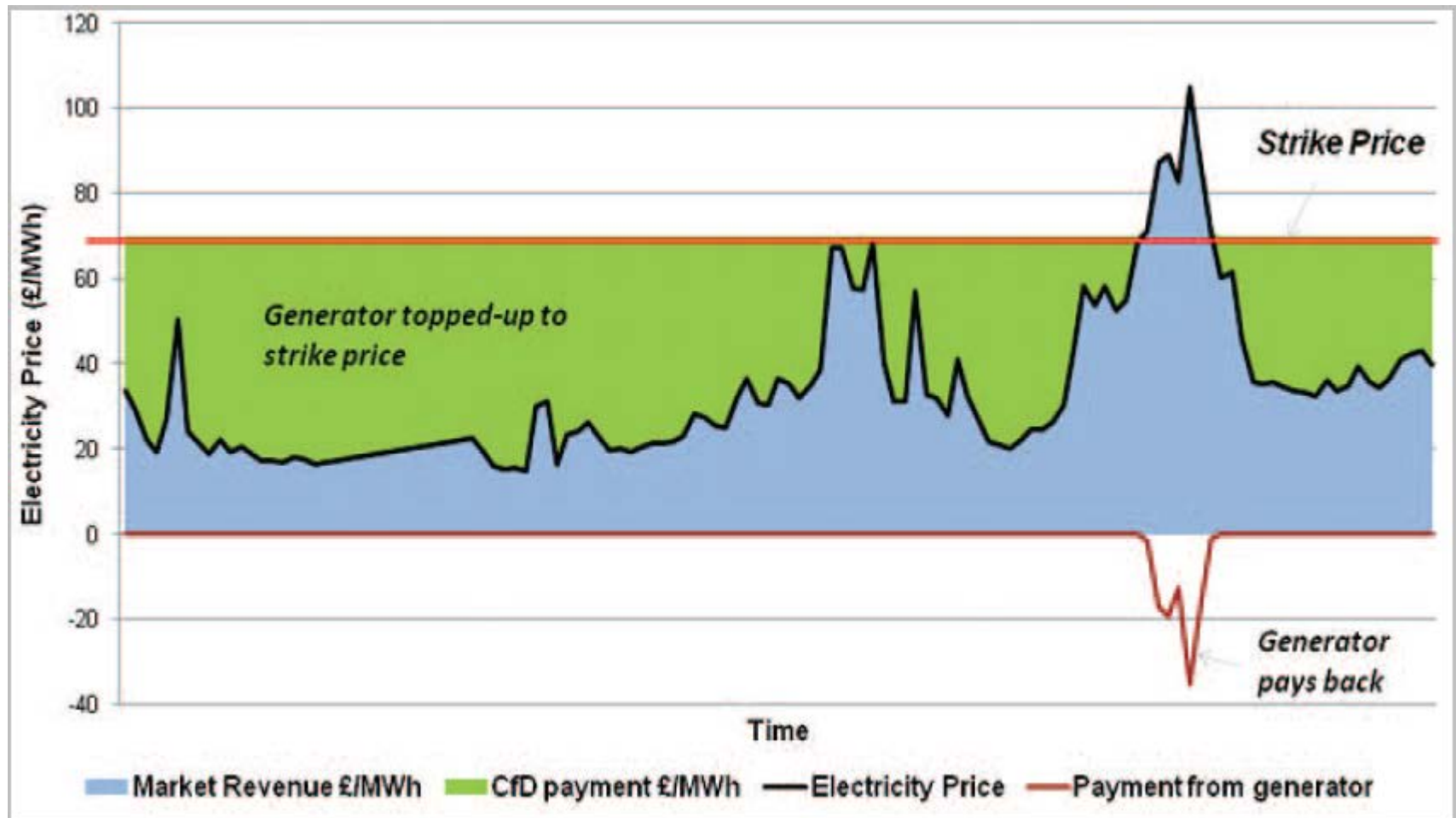


2013

	Confirmed rates			Indicative rates	
	2013-14	2014-15	2015-16	2016-17	2017-18
Carbon price equivalent (£ per tCO ₂)	4.94	9.55	18.08	21.20	24.62

2014 - carbon price support frozen at £18/tCO₂ till 2019-20

Feed-in tariffs through contracts for difference (CfDs)



The four stages of EMR – how strike prices are determined



Nuclear

Stage 1 To 2017	Stage 2 2017 – 2020s	Stage 3 2020s	Stage 4 late 2020s/beyond
Current arrangements alongside new Contracts for Difference with prices set administratively	Technologies mature (but at different rates) and some are able to enter competitive, technology-specific auctions.	Growing maturity of technologies and movement towards technology neutral auctions.	Technologies are mature enough and the carbon price is high and sustainable enough to allow all generators to compete without intervention



Mature renewables

The Levy Control Framework (LCF) – capping costs to consumers

- An annual cap on EMR costs incurred by consumers
- Included: Renewables Obligation, Feed-in Tariffs and Contracts for Difference
- Excluded: capacity payments and energy demand measures
- £5.3bn cap in 2015-16 rising to £7.6bn by 2020-21
- 20% headroom for contingencies
- Believed to be compatible with 30% renewables by 2020
- LCF costs will rise with: a) lower wholesale market price; b) lower carbon price support; c) higher capacity mechanism price

Nuclear progress – Hinkley Point

EDF Energy

- Sites at Hinkley Point and Sizewell up to 6,400 MW
- AREVA EPR Passed Generic Design Assessment and site work started – but no Final Investment Decision (FID) as yet
- Strike price agreed for Hinkley Point - £92.50/MWh, £89.50/MWh if Sizewell developed
- 35 year inflation-linked contract
- Gained EU State Aid approval but Austria may appeal

Nuclear progress – other consortia

NuGen (*Toshiba, GDF SUEZ*)

- Moorside up to 3400 MW
- Westinghouse AP1000
- Passed Generic Design Assessment

Horizon Nuclear Power (Hitachi)

- Sites at Wylfa and Oldbury, 5400 MW
- Advanced Boiling Water Reactors
- Going through Generic Design Assessment

CfD administrative strike prices for renewables

	2014-15	2015-16	2016-17	2017-18	2018-19
Biomass (with CHP)	125	125	125	125	125
Biomass Conversion	105	105	105	105	105
Hydro	100	100	100	100	100
Landfill Gas	55	55	55	55	55
Onshore Wind	95	95	95	90	90
Offshore Wind	155	155	150	140	140
Wave and tidal stream	305	305	305	305	305
Large Solar PV	120	120	115	110	100

15 year contracts....

CfD auctions allocating the funds available

Three 'pots' – no fungibility between them

1. Established' technologies (onshore wind, PV, energy from waste with CHP, hydro (all >5 MW) + landfill gas and sewage gas
 2. Less established' technologies (offshore wind, wave, tidal stream etc)
 3. Biomass conversion
- *If pots are undersubscribed* – all get the administrative strike price
 - *If pots are oversubscribed*, auction is triggered and all are paid the price of the last successful bid
 - Current auction process under way

Anecdotal observations on CfD process

- Cost of capital for completed projects has fallen as planned – projects can be attractive to long-term institutional investors (e.gf pension funds)
- Cost of capital for developers has gone up compared to the Renewables Obligation. The ‘less established’ technologies ‘pot’ could be used up by a single offshore wind project ... therefore risk of over-subscription and wasted preparatory work for developers

Capacity mechanism

- A market-wide mechanism for all generation not supported by Renewables Obligation or CfDs
- Four years ahead - first auctions held December 2014 for 2018-19
- Offers for 1 year, 3 years or 15 years of provision
- 65,000 MW of bids submitted, of which 49,300 MW accepted, of which 9,800 MW new/refurbished plant (174 MW demand side)
- Clearing price - £19.40/kW/year – lower than expected

Emissions Performance Standard

- 450 g/kWh for new or refurbished plant
- Compare to 370 g/kWh for new combined cycle gas turbine CCGT, 900 g/kWh for existing coal
- Effectively kills new coal without carbon capture and storage (CCS)
- Negotiations on two CCS projects still under way (one coal, one gas)

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Certainty beyond 2020

- Carbon intensity target (g/kWh) for electricity in 2030. May be set in 2016 under the Energy Act 2013. Advocated by the Committee on Climate Change to provide certainty beyond 2020.

Continuation of unabated coal

- Falling cost of compliance with the EU Industrial Emission Directive which would otherwise have taken coal off the system in the early 2020s. Could be operating at (low load factor) in 2030
- Beefed up emissions performance standard to take existing coal off the system (application to existing plant, degeneration over time from 450 g/kWh) – suggested by ‘think tanks’

Reform of the EU ETS

- Market stabilisation reserve

More information

<https://www.gov.uk/government/policies/maintaining-uk-energy-security--2/supporting-pages/electricity-market-reform>