

# CCS

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# Key messages

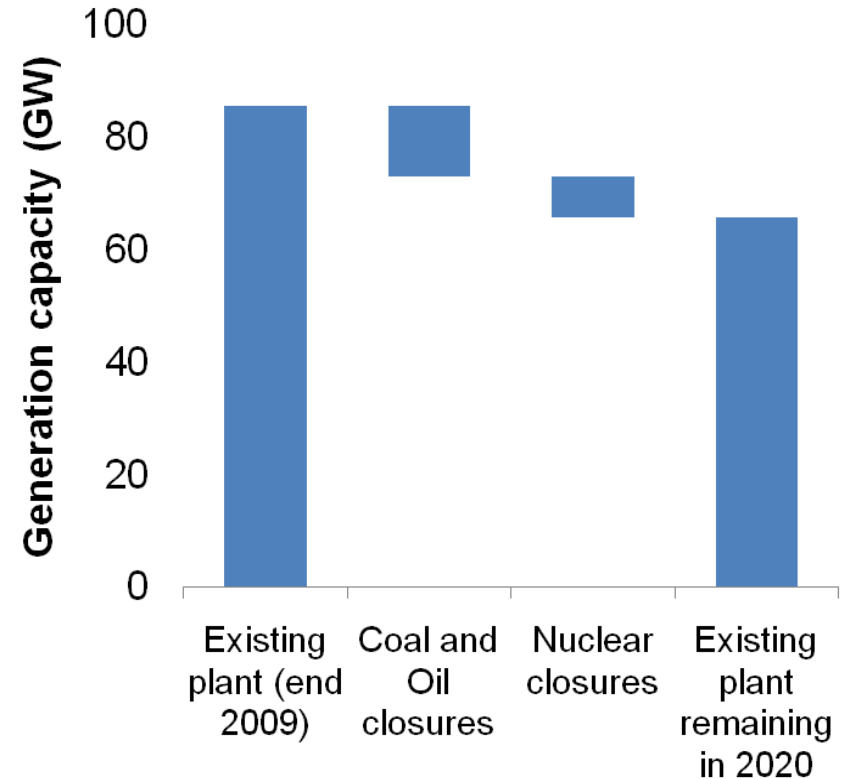
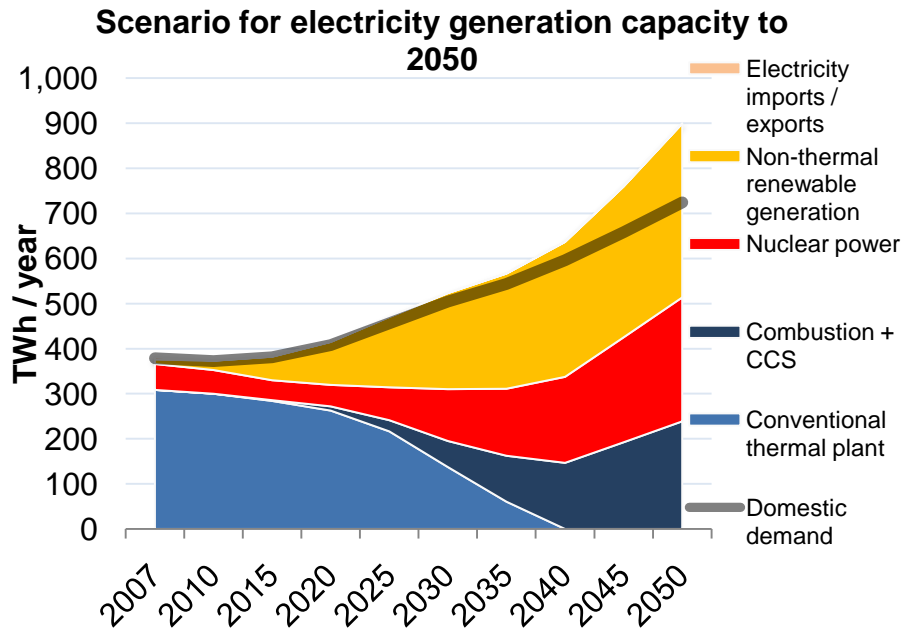
- Government still committed to CCS... and need to focus on cost reduction to ensure it is cost-competitive by the 2020s
- DECC / Carbon Trust draft analysis shows CCS innovation through learning by research could reduce costs by £10bn-45bn by 2050
- 2011-2015, Government and partners are investing £125m in a coordinated CCS R&D programme

# UK Energy challenges

**Electricity demand could double by 2050**

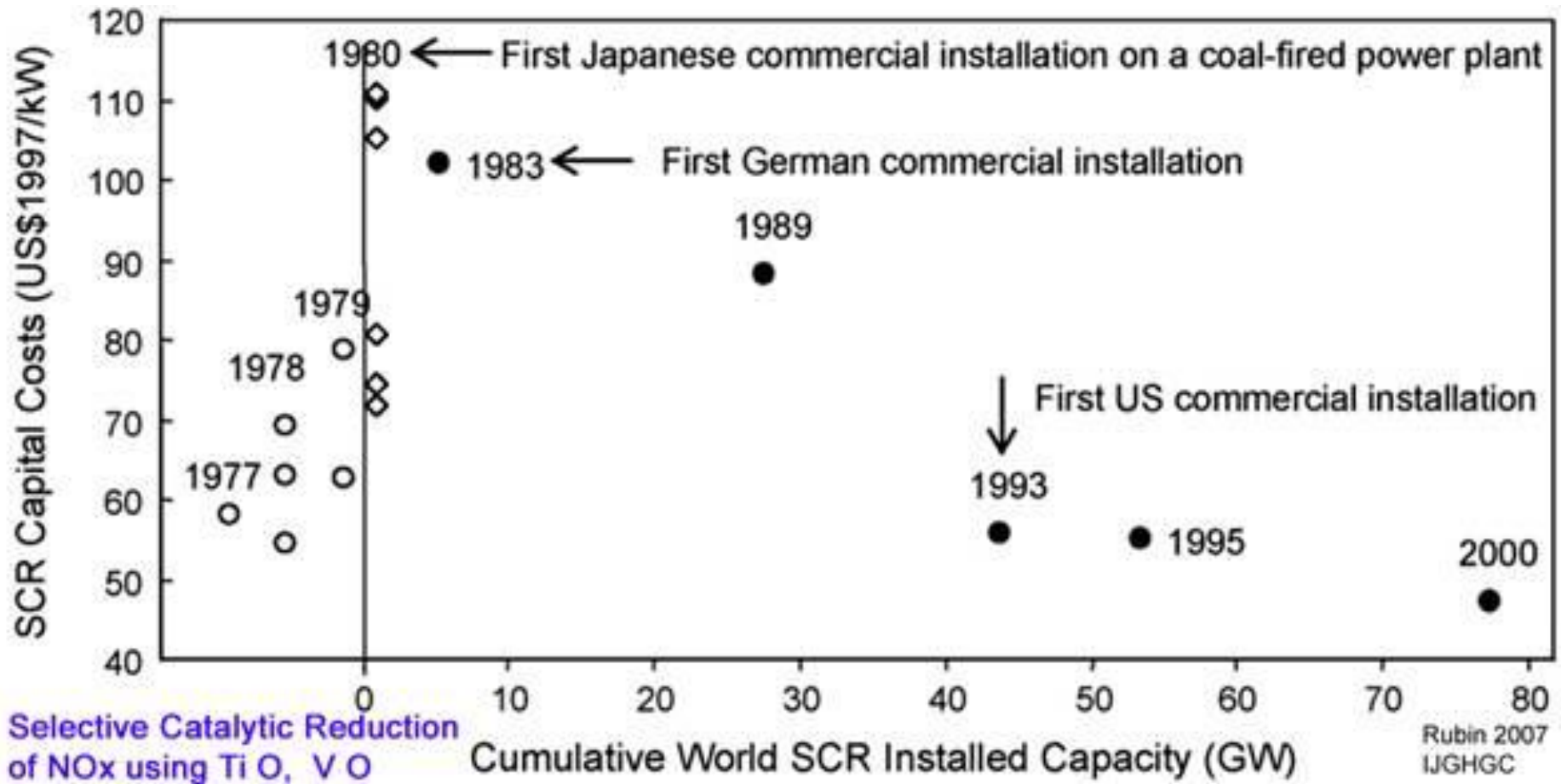
**Need to decarbonise – 80% reduction by 2050**

**Around a quarter of our plant will close by 2020**



**Up to £110bn investment in new generation and transmission to 2020 likely to be required – over double the investment that has come forward in the last decade.**

# Essential to reduce technology costs quickly – SCR example



# CCS – current Government activity

## Commercialisation Programme

- 2 FEED studies (Eon Kingsnorth & Scottish Power Longannet plants)
- £1bn commitment to portfolio of projects

## £125m R&D Programme

- Includes £20m announcement yesterday

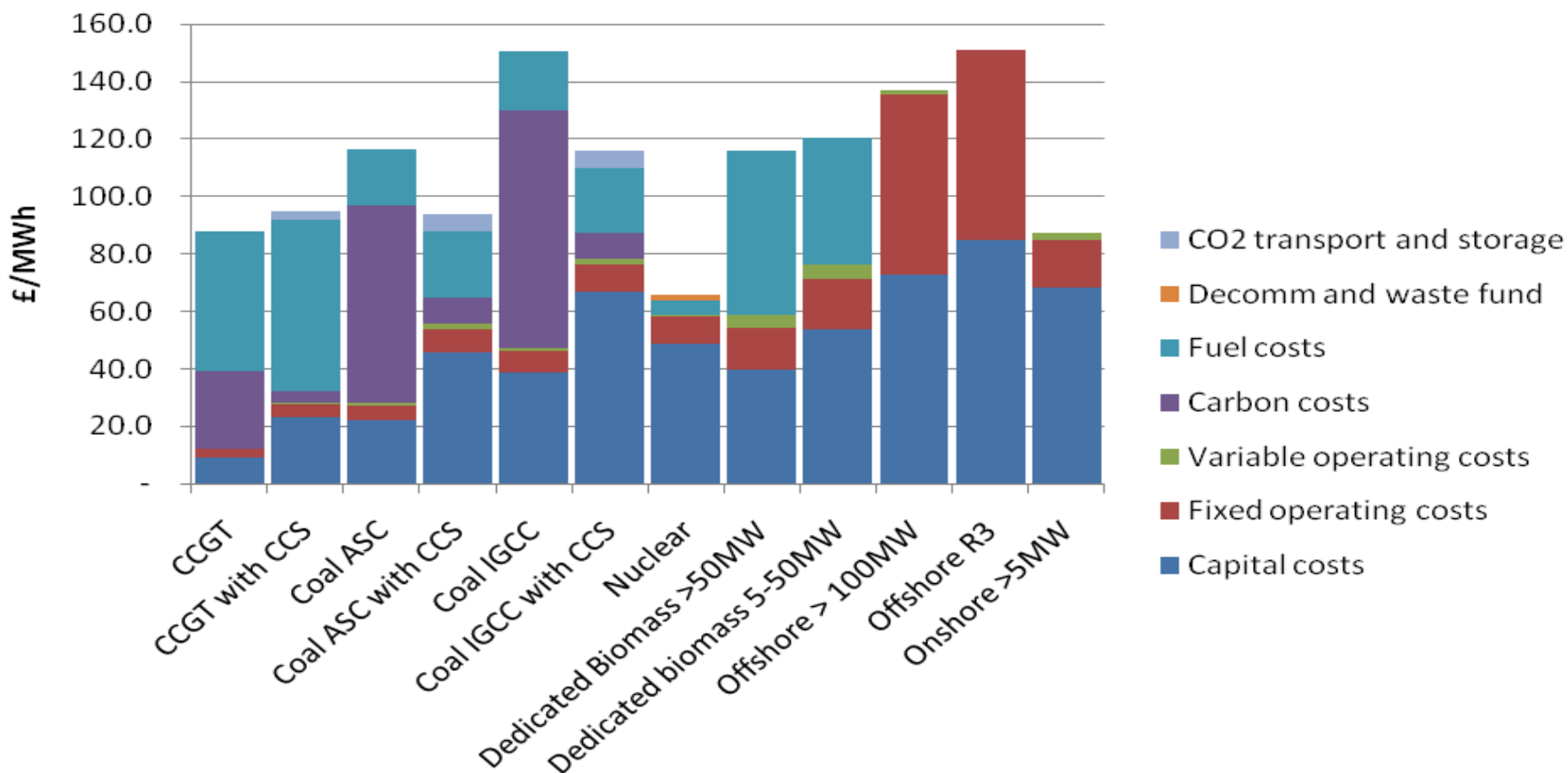
## Financing & a long term market

- Electricity Market Reform proposals

## Regulation and infrastructure

- 3<sup>rd</sup> party access to CO<sub>2</sub> pipelines and storage sites
- Removed barriers to reusing existing (gas etc) pipelines

# CCS is expected to be cost competitive with other low carbon generating technologies...

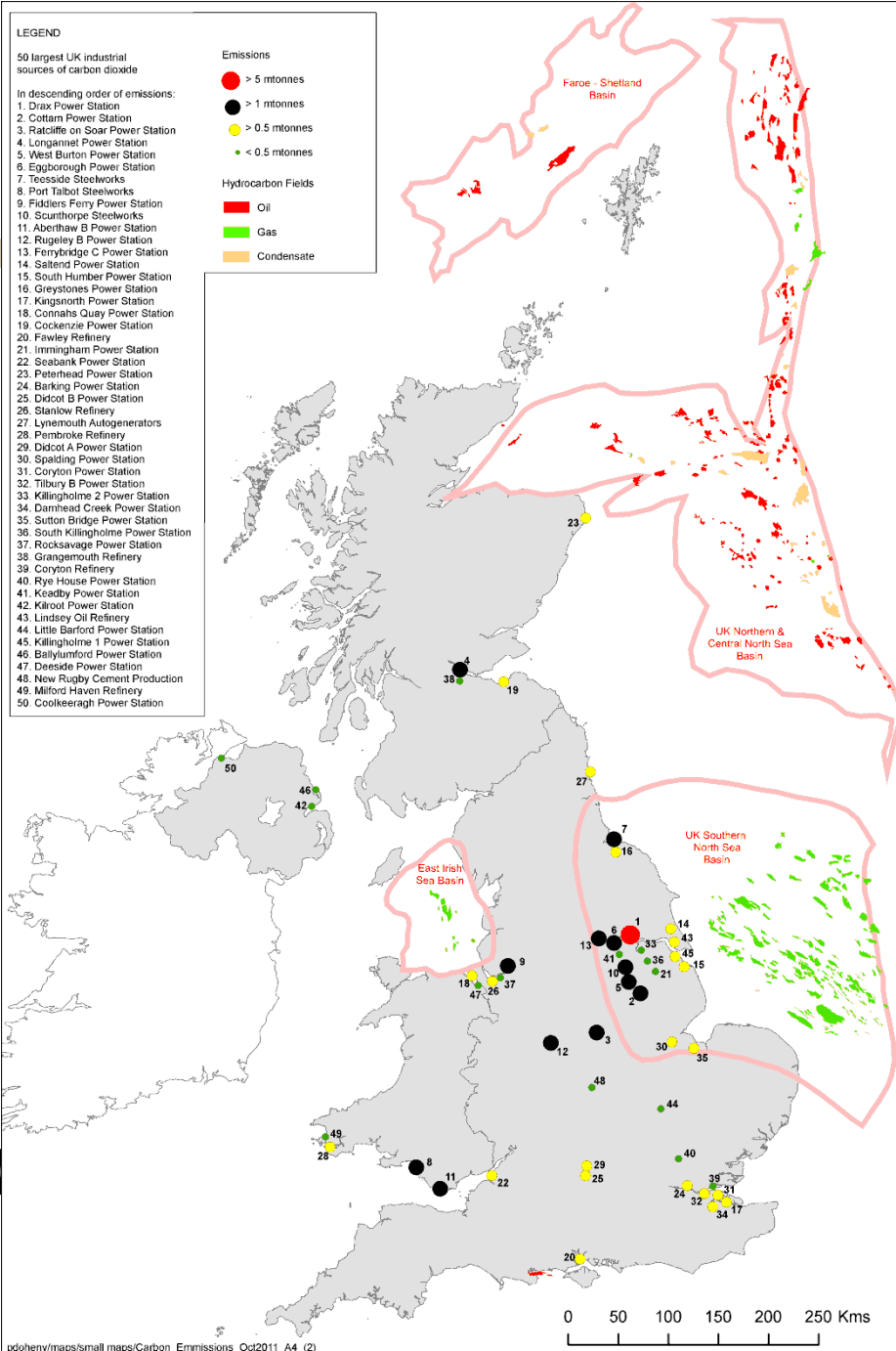


## NOAK levelised cost estimates of generation technologies for projects starting 2017

Central estimates of construction, operation, fuel and carbon costs. Levelised costs calculated using 10% discount rate. Data from PB Power (2011) and Arup (2011)

# Sources and sinks

- Clusters of CO2 emitters
- Clusters of CO2 sinks (e.g. Oil fields in N N Sea Gas fields in S Aquifers throughout)



- 30GW CCS in 2030 implies 150Mt CO2/yr storage
- Maximum UK oil production 130Mt/yr
- UK N. Sea storage potential up to 70,000 Mt?
- EOR potential??

# ...but right now costs are higher than FOAK or NOAK

- Expected levelised costs of CCS reasonably well understood, plenty of work done on these (e.g. Mott McDonald and PB Power)
- Potential operators also attaching additional risk premiums to projects so costs are even higher than FOAK at the moment (“ZOAK”)
- If CCS electricity is significantly more expensive under the post-EMR market CCS electricity will not be despatched
- The challenge is to take actions to reduce risks, so that FOAK and then NOAK costs are realised



# Offshore wind setting the pace

## June 2011:

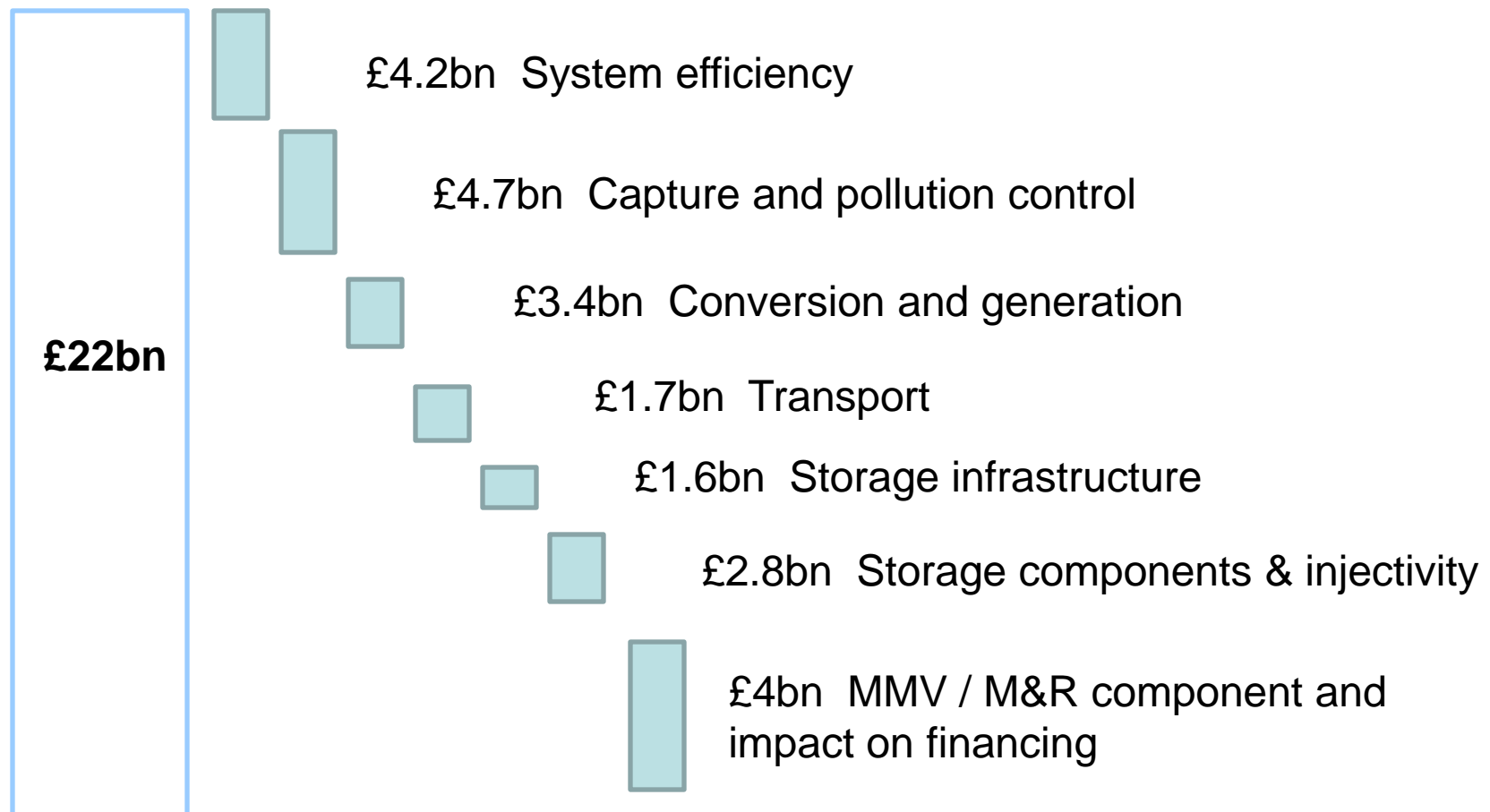
- Offshore Wind Cost Reduction Task Force established to set out action plan for reducing levelised cost to £100/MWh by 2020
- Significant deployment likely if this is achieved
- If costs were to fall to £100/MWh, then the cumulative offshore wind deployment in 2020 could increase deployment a further 5 GW by 2020 above the level set out by the CCC.

# Where might cost reductions come from?

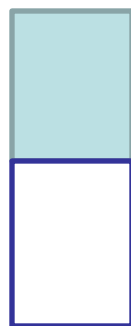
- **Govt support for a series of CCS projects could deliver sustainable cost reductions for future commercial CCS deployments in the 2020s through:**
  - Creating a network system for CO<sub>2</sub> disposal (akin to NDA model for radioactive waste disposal from nuclear power stations)
    - Potential for **direct cost reduction** – network replaces point-to-point disposal – maybe £25/MWh?
  - Proving storage in North Sea subsurface
    - Potential for **indirect cost reduction** – through pricing of risk into unknown subsea storage
  - Learning by repeated doing
    - Potential for **learning curve cost reduction** – repeated learning by doing moves from FOAK to NOAK – like FGD or SCR

# Innovation through learning by research: £10-45bn cost reduction

- **Mid scenario (1.5GW 2020; 30GW 2050) gives saving of £22bn**



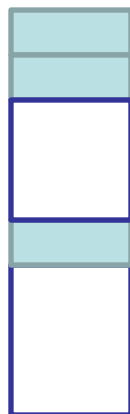
## £125m CCS R&D Programme 2011-2015



**c£40m Fundamental Research and Understanding**

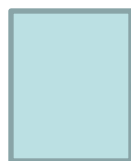


**c£30m Component development and applied research**

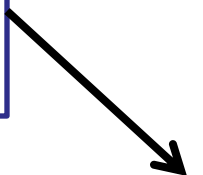


**c£55m Pilot scale demonstration (c5-10MWe)**

## c£40m Fundamental Research and Understanding



- £5m EPSRC Gas CCS projects
- £4m UK CO<sub>2</sub> storage atlas (published 2012)
- £3m CCS Modelling Toolkit
- £1m Bio-CCS techno-economic study



- **£10m UK Centre**
- **£5m? “Grand Challenge”**
- **c£12m to be decided**

## c£30m Component development & applied research

- c£4.5m CCS and Carbon Abatement projects

- **£20m CCS Innovation competition**

- Announced 13 March 2012
- Briefing days 26 March & 30 March
- Deadline 29 June 2012

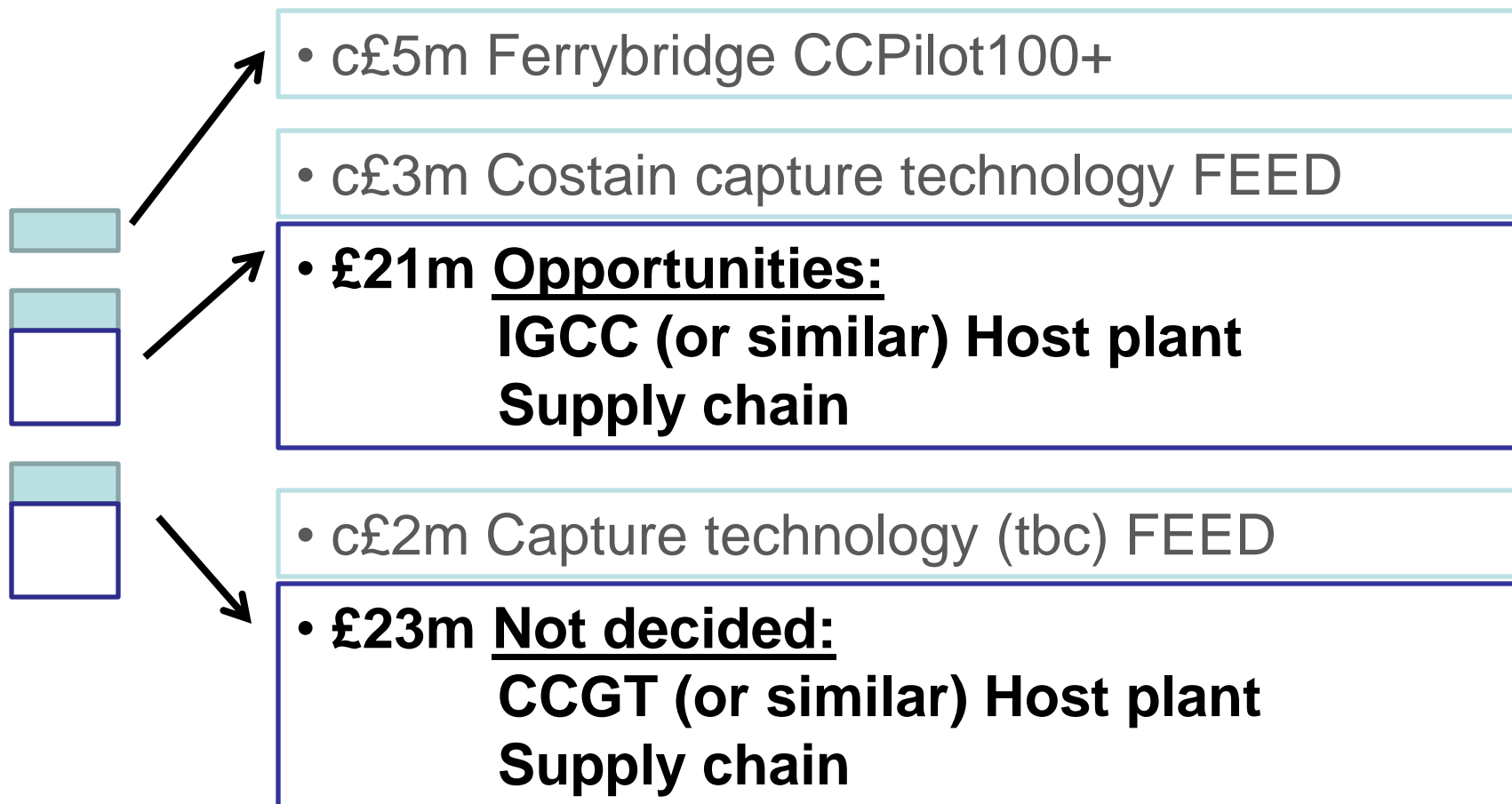
[www.decc.gov.uk/](http://www.decc.gov.uk/)

[ccs.innovation@decc.gsi.gov.uk](mailto:ccs.innovation@decc.gsi.gov.uk)

- **£5m MMV technologies (ETI)**

- Announced Spring 2012

## c£55m Pilot scale demonstration (c5-10MWe)



# £20m CCS Innovation call

- **Strand 1:** Feasibility studies looking to use CO<sub>2</sub> from the Aberthaw and Ferrybridge CCPilot100+ projects
- **Strand 2:** Component development and demonstration

Event	Date
Competition announced	13 March 2012
Competition guidance notes and application form released	21 March 2012
Briefing days	26 March 2012
<a href="mailto:ccs.innovation@decc.gov.uk">ccs.innovation@decc.gov.uk</a> to register	30 March 2012
Competition opens for application	30 April 2012
Registration deadline	22 June 2012 (noon)
Deadline for receipt of full applications	29 June 2012 (noon)
Decision to applicants	31 August 2012