

NOT PROTECTIVELY MARKED

Hartlepool Power Station

Electricity generation – a nuclear perspective
Paul Newman – Station Director



Hartlepool Power Station

Location: Just south of Hartlepool, on the north east coast of England

Reactor type: AGR (Advanced Gas Cooled Reactor)

Net electrical output: 1190 MW. Hartlepool is capable of supplying over 1.5 million households

No of reactors: 2

Built: 1969-1984

Start of generation: 1 August 1983

Projected 2010 output: 8.8 TWh

Estimated decommissioning date: 2014 (Potential plant lifetime extension to 2020)

Paul Newman, Station Director

Joined the CEGB from University in 1983. Worked in a number of central roles within Engineering Division and Safety and Regulation Division between 1983 and 1996, was involved with work on Magnox, AGR and PWR technologies. Moved to Hartlepool power station in 1996 holding the positions of Technical and Safety Manager and Operations Manager. In 2004 moved to Heysham 1 to take up the Plant Managers role, and in December 2006 appointed as Station Director of Heysham 2. BSc Hons degree and a PhD from Birmingham University. Appointed as Station Director of Hartlepool in September 2008.

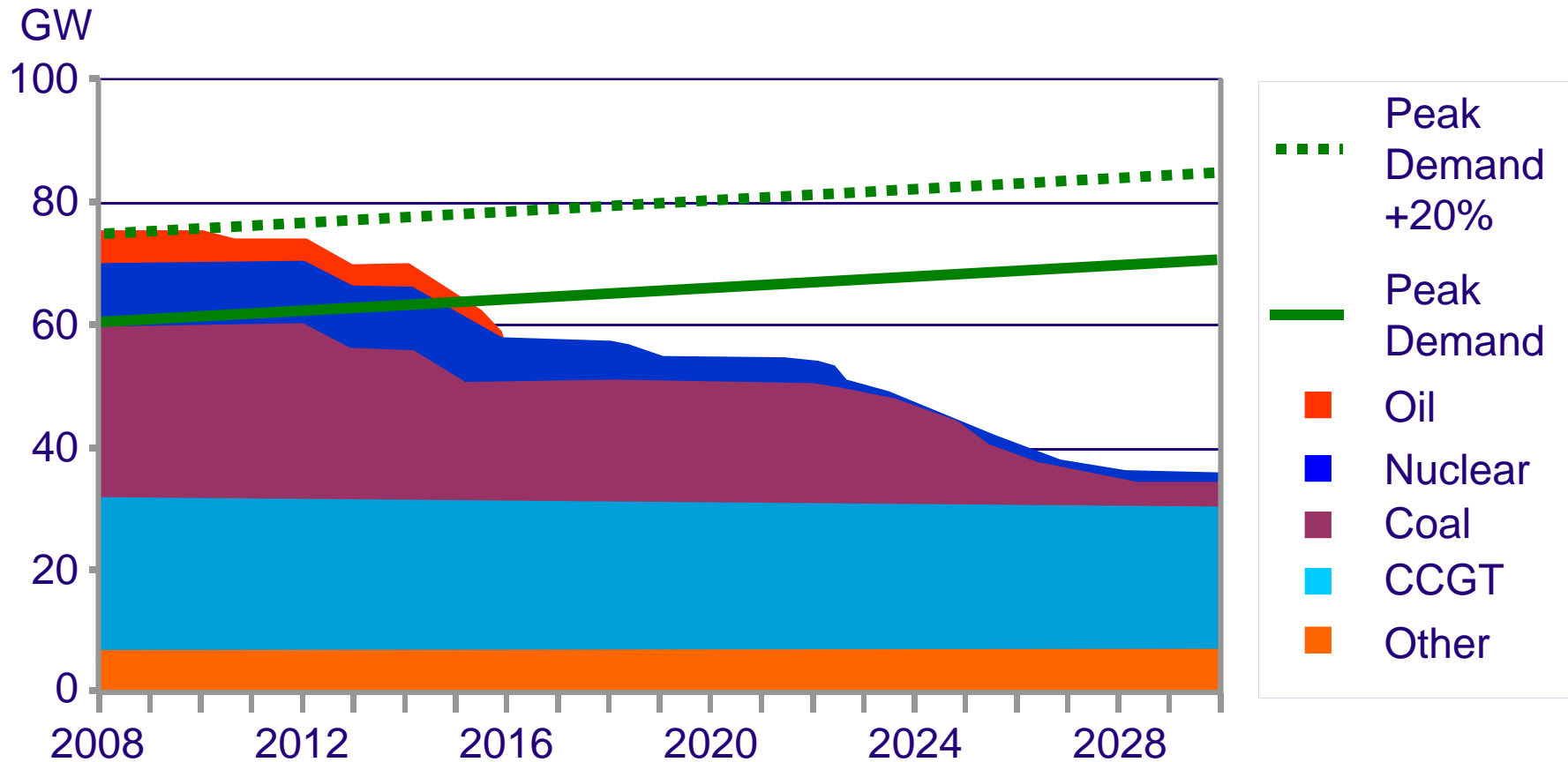
About EDF Energy



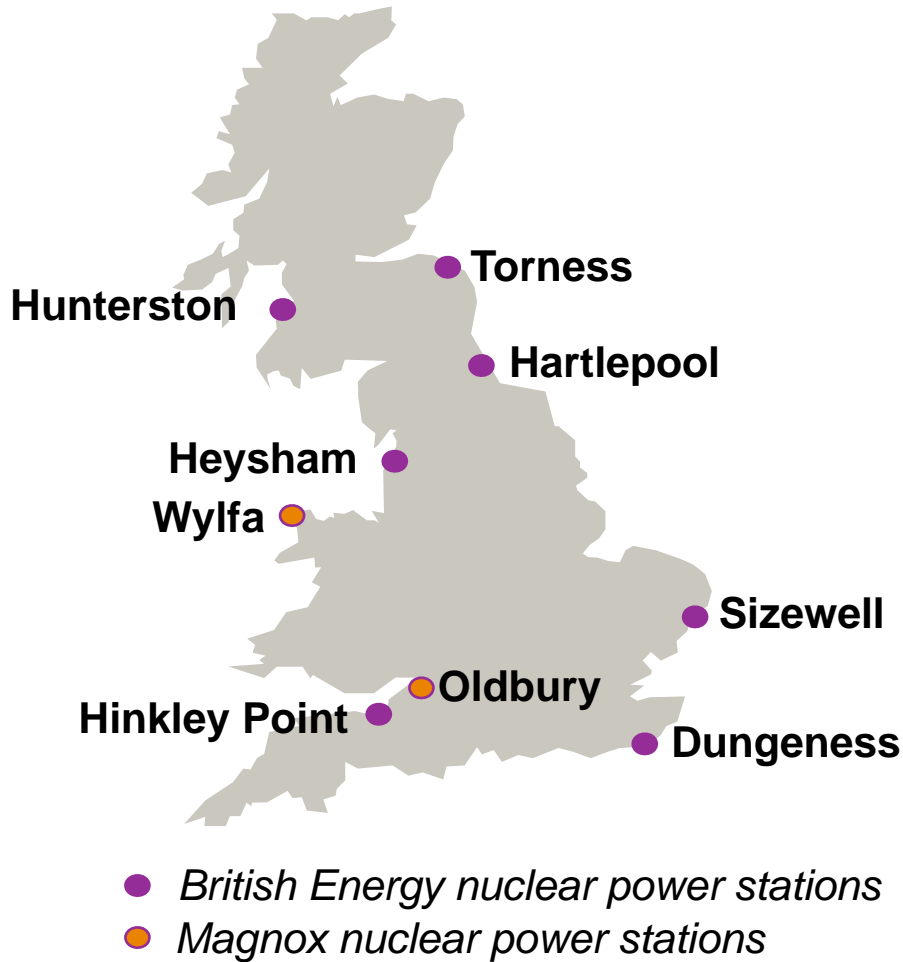
- > UK's biggest electricity generator
 - > Nuclear
 - > Coal
 - > Gas
 - > Wind
 - > Combined heat and power
- > Largest UK electricity network operator
- > Gas and electricity supplier to 5.5 million customers



The energy gap – electricity production



Current Scheduled Closure Dates

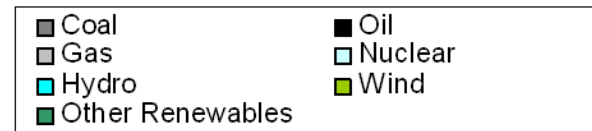
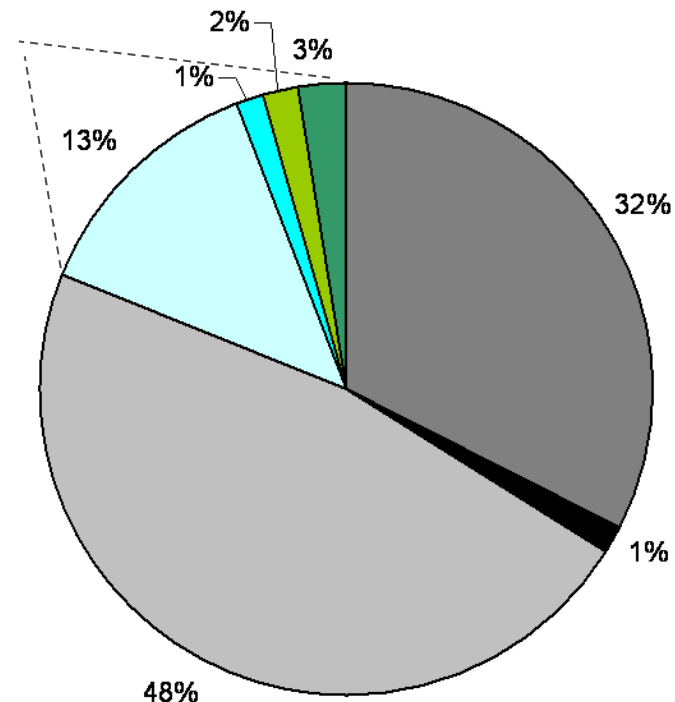


Oldbury	2010
Wylfa	2010
Hunterston B	2016
Hinkley Point B	2016
Heysham 1	2014
Hartlepool	2014
Dungeness B	2018
Heysham 2	2023
Torness	2023
Sizewell B	2035

Today low carbon electricity comes from renewables and nuclear

- > Low-carbon electricity today comes from two generation sources:
 - > Renewables
 - > Nuclear
- > In 2008 this represented:
 - > Under 20% of overall electricity supplies
 - > Avoided carbon emissions of between 31mtCO₂ ²
- > **In future**, fossil-fuel with carbon capture and storage (CCS) is likely to become a third source of low carbon electricity.

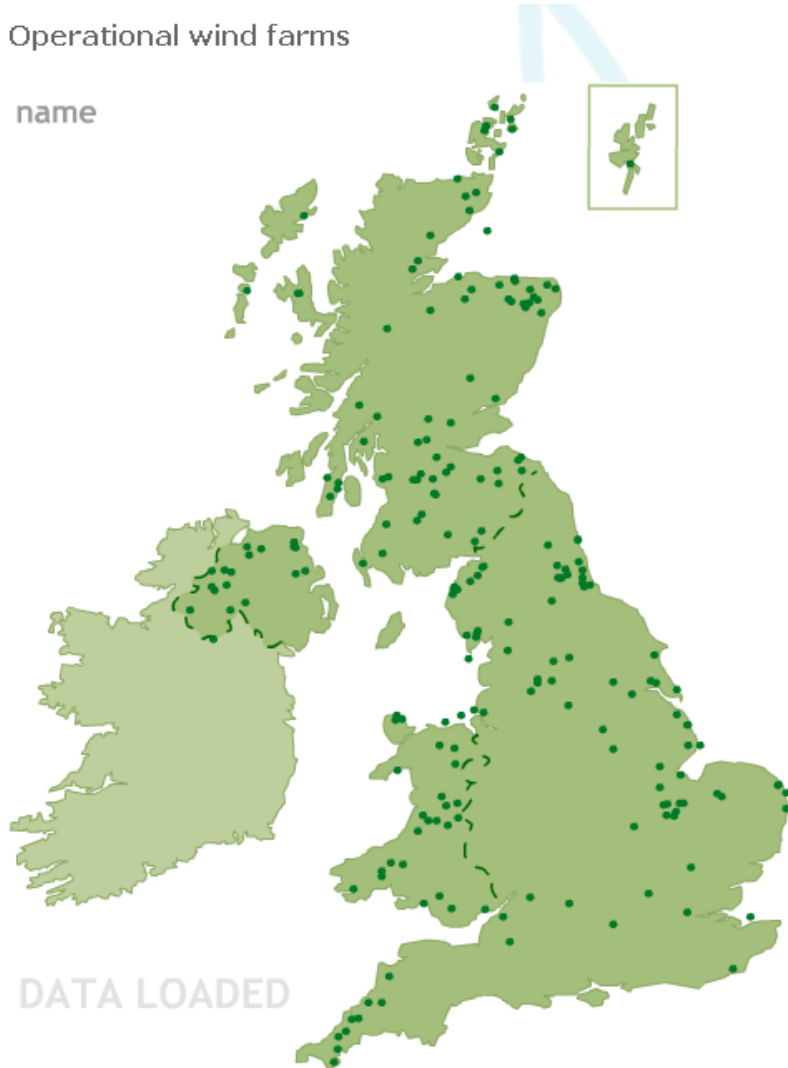
Contribution of low-carbon electricity today



UK wind electricity production

Operational wind farms

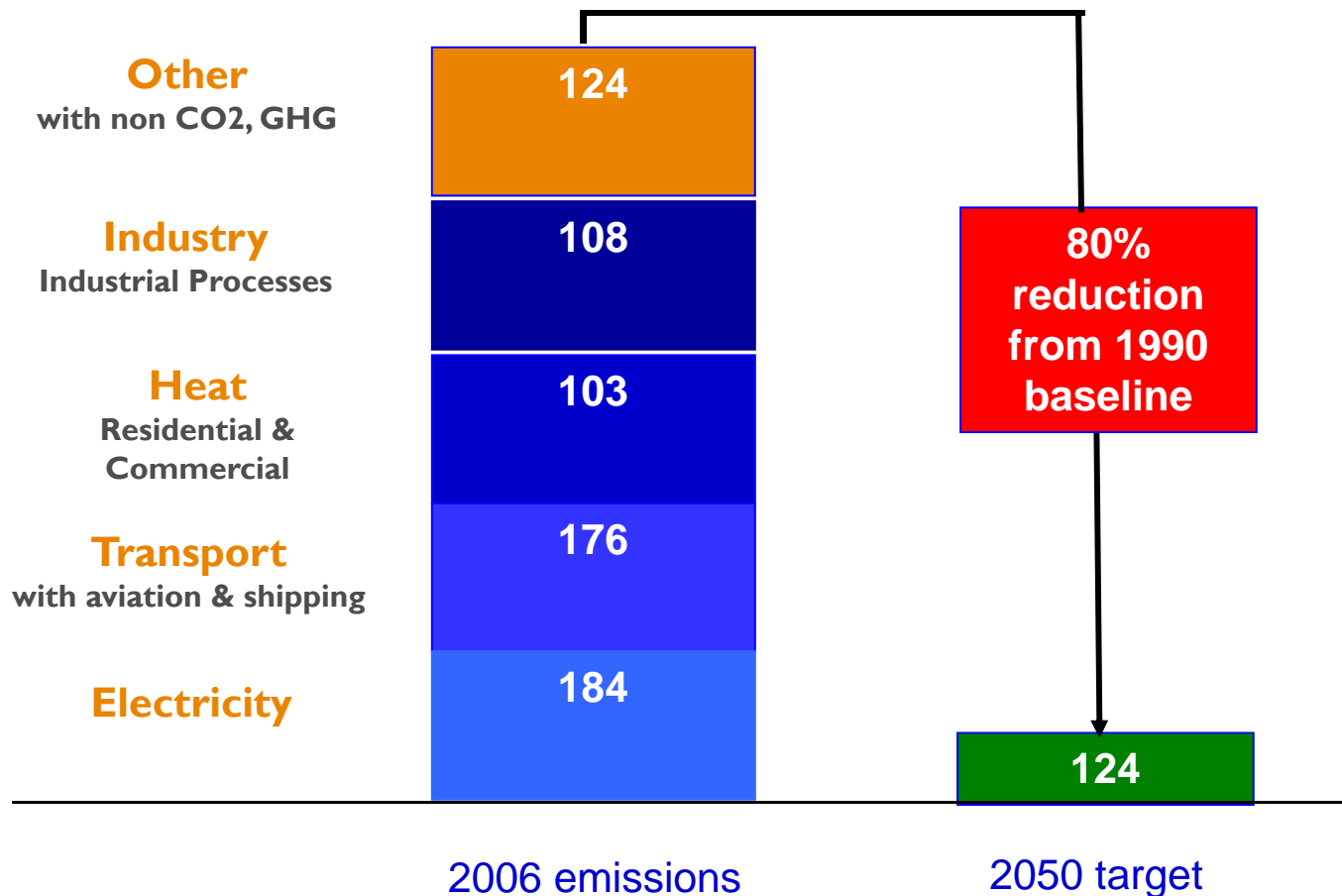
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There are currently 254 wind farms in the UK, that's 2757 turbines across the country with a total capacity of 4113.24 MW

Decarbonising across the economy

UK CO₂e Emissions (million tonnes)



Projected nuclear electricity supply in 2010

- > 60 TWh or ~ 15% of the total UK 2010 production

Emissions avoided

- > Over 30 MtCO₂ emissions avoided, total value to economy of £360 million assuming £12/tCO₂

Resources conserved

- > ~8 bcm gas avoided, total value to economy of ~£700 million assuming 25p/therm

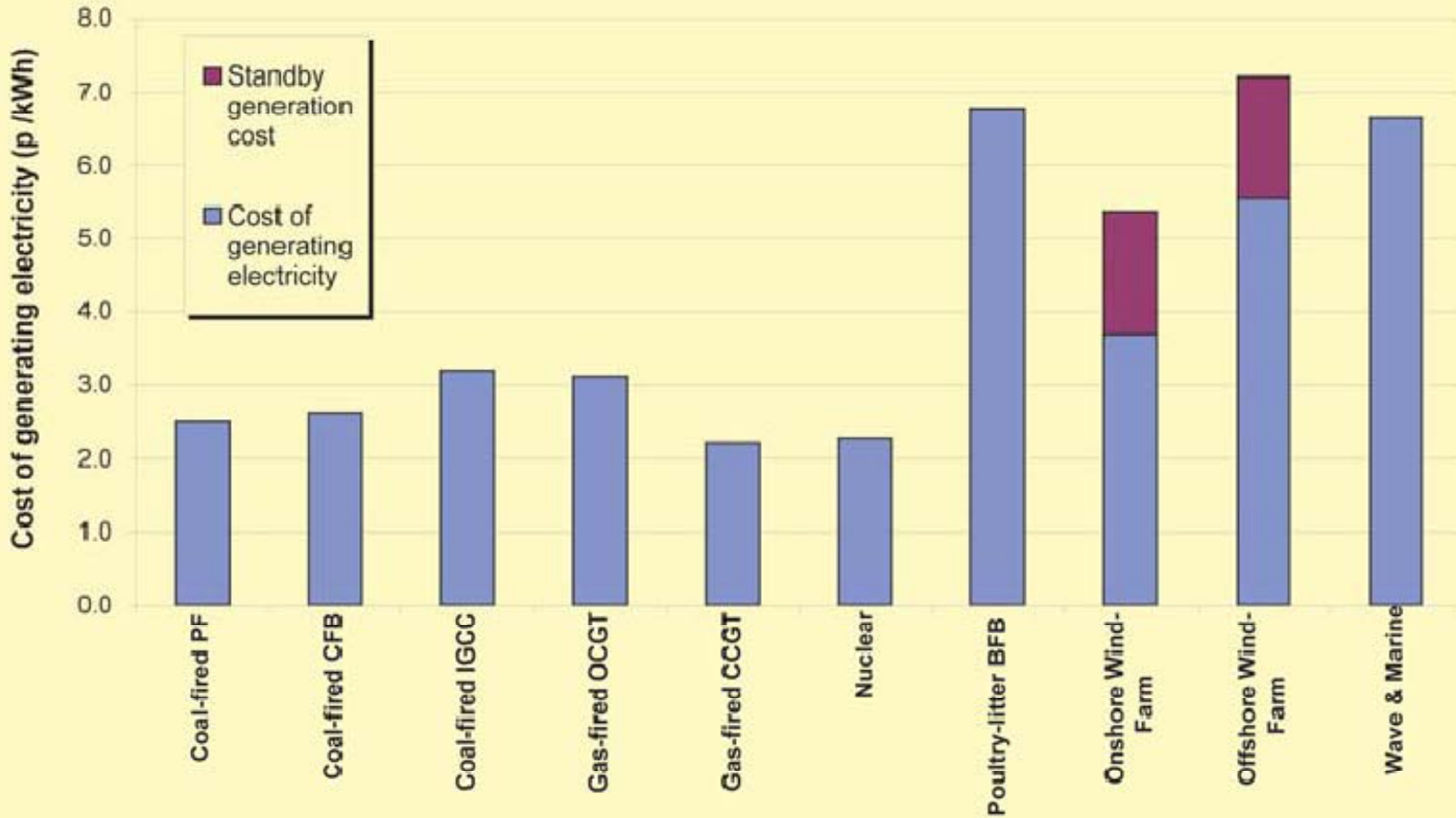
CO₂ savings
equivalent to
removing a third
of UK
passenger cars
from the roads

...[nuclear power] has a minimal footprint on the Earth and yet produces huge quantities of electricity at a very reasonable price that will keep cities going.....”

James Lovelock on meeting the
challenge of Climate Change

First Science.com, 2 February 2007

Comparative costs of generation



Source: Royal Academy of Engineering

The policy case for nuclear

Low Carbon Emissions



Helps combat climate change

Stability of Costs





















Benefits customers and UK competitiveness

Security of Supply



Reduces reliance on imported gas

Comparing options for new-build electricity generation

	 Positive  Neutral  Negative	Lifecycle carbon footprint ¹ (gCO ₂ e/kWh)	Affordability ³	Security of supply implications ⁴	Other factors
Gas-fired CCGT		c.400	 Overall = Moderate Investment cost = Low Unit cost to customers = Variable	 Flexible output; domestic supplies rapidly depleting but imports available	Quick to build
Nuclear		c.5	 Overall = Moderate Investment cost = High Unit cost to customers = Low	 Relatively inflexible output Fuel imports from stable countries	Concern over waste and decommissioning issues
Coal + CCS		c.100 (est.)	 Overall = Expensive Investment cost = High Unit cost to customers = Variable	 Relatively inflexible output; some imports from Russia	Unproven technology
Onshore wind		c.5	 Overall = Expensive Investment cost = High Unit cost to customers = Low	 Intermittent output, not predictable on day-to-day basis	Limited site availability
Offshore wind		c.5	 Overall = Expensive Investment cost = High Unit cost to customers = Low	 Intermittent output, not predictable on day-to-day basis	Technology untested at scale

- > Major decarbonisation is required across all sectors.
- > Decarbonising electricity will be important in its own right.
- > **BUT** it also offers the opportunity of reducing carbon emissions from the Heat and Transport sectors in future.
 - > Low-carbon electricity to power electric vehicles and heat homes.
- > The CCC concluded that electricity decarbonisation will need to be almost complete by 2030, in order to reach the 2050 ambition.
- > Even if the UK can cut its energy demand in half by 2050 through efficiency improvements, the country still needs 16 new nuclear power plants between now and 2030 and an additional 4 by 2050.
- > Around 27000 wind turbines would need to be built by 2030 and an additional 13000 by 2050.
- > This is in addition to increasing output from solar power, waste and biomass plants and developing a smart electricity grid and advanced energy storage technologies.

Regional benefits

- > Currently employ ~700 staff and contractors on site at Hartlepool
- > Total turnover circa £225 million per annum
- > Annual salary bill for Hartlepool is £25 million
- > Other materials, goods and services are £19 million
- > Rates payments are £7 million
- > Over £130 million invested in the plant over the last two years, mostly employing local people

Conclusion

- > The UK and the world at large needs safe, secure, low carbon, economic energy supply
- > The emerging energy gap in the UK shows that action is needed **now**
- > Renewables have a significant part to play in future UK electricity production
- > This needs to be supported by secure cost-effective, low carbon, baseload generation – through nuclear