

# The role of coal in the UK generation industry

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# Recent History

- In 1983 there were 170 underground mines owned by the National Coal Board.
- The Coal Industry was privatised in 1994.
- The power generation industry was privatised in 1989.

# Power Generation in 1989

- TOTAL CAPACITY 77GW
- OF WHICH: Coal 45.355GW; Gas 9.2GW; Oil 4.9GW; Nuclear 13.73GW and hydro, biomass,waste together amounted to around 3.8GW
- Drax was the newest coal-fired station commissioned in 1974
- All the gas stations were Open Cycle Gas Turbines and the newest was Cowes on the Isle of Wight commissioned in 1982
- The newest Nuclear station was Heysham 2 commissioned in 1988.

- Source: Wikipedia list of UK Power Stations

# Today's power generation fleet May 2013

- Total Capacity 92.745GW
- Interconnectors 4.6GW
- Coal 23.1GW; Gas 33.5GW; Nuclear 9GW; Oil 2GW; Wind 8.625GW; Other RENEWABLES and landfill gas, biomass, sewage gas etc. 16GW.
- Source DUKES on [gov.uk](http://gov.uk)

# Today

- There are 3 deep mines currently operating in the UK.
- Drax is still the newest coal-fired power station.
- Pembroke is the newest gas plant completed in 2012 (but mothballed)
- Sizewell B is the newest nuclear station commissioned in 1995

# What happened in between?

- The privatised power generation industry struggled until the turn of the century when the new electricity trading arrangements were introduced. TXU was a notable casualty and many stations changed ownership.
- The privatised coal industry was faced with competition from cheap imported coal and Government driven "dash for gas" in the 1990's which forced cost reduction.
- World Coal prices were also cheap and new import capacity enabled generators to squeeze prices.

# Government Energy Reviews

- 2003, 2006 saw major reviews of the energy scene with increasing attention and importance being given to Decarbonisation.
- Coalition Government in 2010 proposed the Electricity Market Reform as a key component of their Energy Policy and the principal driver of the Energy Bill which became the Energy Act in December 2013.

# And in between?

- In 2007 all parties supported a policy of no new coal plant without
- Labour Government stated "the UK WILL LEAD THE WORLD IN DEVELOPING CCS TECHNOLOGY" delivery from a DECC competition which would deliver up to 4 large scale Coal fired plants with CCS.

# DECC Competition 1

- Restricted to post-combustion capture which was to lead to the ability to retrofit to existing stations in both the UK and globally.
- Showed a lack of understanding about current station efficiencies and the energy penalty of practising CCS.
- Got down to a single contender (Longannet) but then realised that the economics did not work

# DECC Competition 2

- Re-launched by this Coalition Government in 2010 but to include gas fired power plants as well.
- 2013 got down to two eligible projects with two reserves.
- White Rose (Drax coal Dec 2013) and Peterhead (SSE gas Feb 2014) finally get agreed funding to look at Front end Engineering Design, expected to be complete by end of 2015. 8 years after the first competition was announced!
- White Rose receives EU funding up to 300m euros in April 2014.

# Energy Policy

- Electricity Market Reform underpinned by Emissions Performance Standards, Contracts for Differences and a Capacity Mechanism.
- The introduction of a Carbon Price Floor.

# Autumn 2013

- In October 2013 after almost 10 years of thinking driven almost totally by Decarbonisation Ed Milliband reappears with a suggested price freeze on electricity prices until 2017 if elected to be the next Government in 2015.
- Whether deliverable or not it moved the focus back to affordability.
- Around the same time both Ofgem and National Grid reported very tight Capacity margins in the winter of 2014/15 and even tighter in 2018/19.

# Government response

- Hike up prices on cfd's for nuclear and renewables
- Propose Capacity Market rules
- Talk about emergency plans for demand reduction
- Attempt to encourage investment in new plant

# The dichotomy is

- We need fossil fuels (or nuclear) to provide some base load capacity for the foreseeable future as despite incentives we will only have a capability of delivering less than half our requirements at best on a windy, sunny summer's day.
- The first new Nuclear station was going to be built by 2018 after the 2006 Energy Review, the reality is that Hinckley Point may not be ready to operate before 2025.

# The bridge to the low Carbon Future

- DECC believe that the generation fleet will contain a large amount of renewable capacity, some new nuclear plants, some coal and gas with CCS and a large proportion of gas plant to cover peak demand and the intermittency of renewables.
- Unfortunately this scenario ignores the key element of fuel prices

# Gas v coal power generation costs

- For the last 18 months coal prices have been driven lower by the import of US produced coals which were displaced in that market by cheap shale gas.
- Coal-fired generation has produced electricity at half the cost or less of the electricity generated by gas even after taking the cost of Carbon into account.

# NERA study

- Coalpro commissioned a study on the effects of the Carbon Price Floor on the current power generation fleet.

It concludes that if the Carbon Price Floor was frozen at this year's level of £9.55/tonne of CO<sub>2</sub> then:

# NERA Conclusions

- Some 13GW of the remaining coal-fired fleet opts to invest to comply with IED.
- Wholesale power prices are £18/MWh lower and consumers are £63/yr better off.
- The Capital Investment required to bridge through to a world of fossil fuels with CCS is reduced by £13bn.
- The 2030 emissions targets are still achieved but there is a possibility that 2020 targets are just missed dependent on load factors.

# A better route to decarbonisation?

- Coalpro believes that taking a more balanced view of the decarbonisation/ affordability/ security of supply triangle leads to the conclusion that keeping coal in the mix until CCS is commercially developed gives a much more economically viable outcome for UK plc.
- Diversity of generation assets and fuel sources protects against market shocks. (Recent natural events and current geopolitics are just two of the potential supply disruptions)

# The UK 's Coal Reserves

- The Coal Authority believe there to be almost 4bn tonnes of potentially economic resources in the UK of which almost 1bn tonnes can be extracted from surface mines.
- If there was a continuous market for UK coal production there are prospects which would attract investors in the UK industry

# Conclusions

- The UK has a potential capacity crisis because it's generation infrastructure has suffered from a lack of major plant replacement investment.
- Wind and solar power have a place in the mix but need the back up of conventional plant.
- CCS needs to happen NOW!
- Switching from coal to gas now and becoming highly dependent on gas is risky from both affordability and security of supply perspectives.
- Policy has to acknowledge that we are 8 years on from the 2006 Energy Review and re-set the baseline,
- The Last Government which presided over 3 day weeks did not stay in power for long!

# Final thought

Investment in current coal-fired generation plant provides the least risk and most affordable bridge to a decarbonised fossil fuel generation fleet with CCS.