CEGB Man’s Potted History of UK Gas and Electricity Situation

From Steve Browning : 7th June 2022

(Plus additional comments and modifications by Fred Starr)

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We joined the EEC in 1973 with our North Sea Gas production increasing annually Shortly afterwards the EEC issued Directive 1975 404, restricting the use of Natural Gas in Power Stations. This may have been due to lobbying by the EU Gas Industries and awareness that burning gas in steam power stations was not very efficient. Furthermore, at the time CCGT (Combined Cycle Gas Turbine) plants were also not much more efficient than the best coal and oil fired power stations. Circa 40%????

But, in this country, in the mid 1970s, the CEGB had an excess of large coal and oil units. These had been built to meet the expected continuing meteoric rise in electricity demand, based on what had happened in the 1950's when British Gas was on its knees. Plus, the demand from a growing economy, and the effect of the Clean Air Acts.

In practice, British Gas recovered and was able to cut their energy costs from the early 1960's, even before the discovery of North Sea Gas. This was achieved with the steam reforming of cheap naphtha.

North Sea Gas followed the on shore discovery of natural gas in the Netherlands in 1959, with the first North Sea Gas being landed in 1967. And because of the way that the legislation had been written, British Gas was able to buy the gas at a fair (and essentially fixed price from the oil companies. The prices it paid were not really related to the energy market, which at the time was dominated by oil.

After 1973 when the price of oil, and then coal, soared, this being a result of the Arab-Israel War, British Gas was in very good position. It was still buying gas at a very low price. Power plant construction by the CEGB virtually stopped. The only coal fired power plant that was built was Drax, which after seven years in construction, came on line in 1974.

Given the excess of generating units the CEGB was able to shut down and clear the sites of the last of the pre-nationalisation designed Class B (up to 1000 MW) Stations which were situated near towns and cities.    
  
Moving forwards to the 1980s, when electricity was privatised, we had Leon Brittan (Thatcher Govt Minister 1980s) as the EU Competition Commissioner. Brittan then worked 'hand in hand' to promote “single market activity” with the Portuguese Energy Commissioner. The EU then issued directive 1991 148 repealing 1975 404 Directive

It resulted in the “Dash for Gas” for power generation, with the EU and Britain making no real plans for security of supply.  Britain did however enlarge and built some new LNG terminals in the 1990s (as recommended by the Gas Regulator's Engineering director). British Gas also purchased two Norwegian Gas fields, these having a dedicated pipeline to connect with our onshore gas transmission network. And with the exhaustion of the Rough Natural Gas Field, it converted this to a longer term storage facility.  
  
Full Privatisation brought in a set of Independent Power Plant Operators who were able to make use of the cleared Class B sites. These were of a much larger area than needed for CCGTs of a similar size. The sites, of course, had excellent connections to the Grid and more than adequate cooling water access. (CCGTs, when using air cooled condensers, can dispense with the need for cooling water)

Hence, we have the same station names as we had in the 70's!!!!  The location of these new CCGT stations, on the old city and town based B should have helped relieve the load on the Supergrid, as this had been designed to take power from coal generating sets that were built on the Yorkshire and Nottinghamshire coal fields.       
  
And in 1995, with our gas, from the North Sea, cheaper than Europe, we open the first gas interconnector between Bacton and Zeebrugge. Liberalisation of the privatised market has meant that the existence of this link is an important way in which North Sea Gas prices are no longer controlled in a “fair price” manner. For example, the new Isle of Grain LNG Facility which was built with Russian money, imports liquefied gas from all over, with the aim of selling to the Continent via interconnectors. Sellers charge what the market will bear, and we now have “energy traders” helping to push up the price.

Short term (i.e., financial) considerations shut down the Rough Field in 2017, taking out a massive amount of storage, equivalent to 9 days of usage by Britain. Rough, following the Ukraine War was will be reopened. But on its own it will have only a marginal effect on the gas price or energy security.

Britain in terms of energy security is about as badly off as it was when a combination of the 1973 Arab-Israeli war and the early 1970s miners strikes struck. Then we were dependent on Middle East Oil and British Coal. Now all of or heating requirements and half of our electricity comes from gas. The Continent is in a somewhat similar state.

Looks like President Putin was hiding his intentions (Active 'Sleeper' mode from 1991 to 1998) after the 'dissolution' of the USSR by simple declaration (Yeltsin and the heads of Ukraine and Belarus who we three of the four SSRs who originally legalised the USSR in 1922).  
  
Now we are getting a mainly Offshore and big Onshore Wind concentrated in the North of Scotland.  So considerable reinforcement of the Transmission from Caithness to Northumberland and Lancashire is needed

Also, relatively large circuits out to Orkney, Shetland and the Outer Hebrides.  So, designing for Future Electricity Delivery, with even more remote and variable Generation, is quite a challenge.

And with all the appropriate additional Network Equipment to deal with non-Synchronous Generation and sparser Generation near load centres.  With the massive additional demand from Heat and Transport.    As I've said privately to Mark, we need to run his plant combination through the detailed analysis process.  
  
Exciting stuff...  
  
Regards  
  
Steve (and Fred)