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Paris and Beyond?

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Can the UK help meet the Paris Agreement objectives?

Electricity security in our country is currently in a parlous state, fast approaching the edge and the "Houston we have a problem" moment is here.

Ofgem and the National Grid Company predict no more than 1.2% to 2% margin of capacity over demand and only 8% if our interlinks to France and Netherlands are importing at maximum capacity this winter. The French are not guaranteeing this level of availability.

In the USA spare capacity is required by law to be 15% daily.

In November, the World Energy Council which is UN accredited to assess countries' Energy Trilemma comprising environmental sustainability, energy equity and energy security, has reduced the UK electricity supply rating from AAA to AAB as a first step, commenting, "The UK faces significant challenges in securing energy supply". WEC, having reduced our energy equity rating to 30th from its assessed level of 8th in 2013, expects security to fall further and concludes by advising that "Tightening capacity has put UK on its "Watch List""

The International Energy Agency in its Nov 2015 Report advises "Incidents that led the National Grid Company to using "last resort" of paying energy users to cut their demand would happen increasingly unless investments in the infrastructure increased"

The 2001 EC Large Combustion Plant Directive was already determining closure of around 3/5ths of the UK coal fired electricity output by 2025 –much in use to back up wind, before Energy Secretary Amber Rudd this November declared that the Government would "close coal by 2025 and restrict its use by 2023 if we can shift to new gas by then"

Her November speech also confirmed the UK has today a "higher percentage of our energy from coal in 2014 than in 1999", effectively confirming that wind technology is not working, and reaffirmed closure of onshore wind subsidies.

Concurrent with closing coal, all but one of our present eight nuclear stations are scheduled for retirement by 2023 and it is almost impossible that any new nuclear can be brought on stream before then. This closure combination means we need to replace more than 40% of our present UK power generation before 2023.

Gas power plants, with half of the carbon pollution of coal can just about be built within this time frame whereas any renewables more practical than wind will not have matured enough for any nationally significant level of deployment.

The National Grid Company in its Nov 2015 "Future of Energy System Operability Framework" expresses great concern regarding the progressive loss of crucial UK "system inertia" and reactive power capability which follows with the closure of large generating stations limiting its ability to keep the frequency and voltage stable as wind output varies and collapses.

Neither remaining wind, nor solar, nor planned future high voltage DC links with England, will provide adequate reactive "wattless" power (called MegaVARs) essential for prevention of network voltage collapse.

The National Grid confirms it is also facing new severe "challenges" from the rapid increase in Embedded Generation. This is another unanticipated "whoops, wrong result" that followed the UK Government 2011 "Capacity Mechanism" initiative to provide wind backup. Mostly units are diesel which is second only to coal in carbon pollution and their generation into the low voltage parts of the network is already giving National Grid serious "challenges" around stability, voltage recovery and demand prediction; plus increasing "Challenges in seeing and locating problems... particularly frequency variations" NGC identify an urgent need for "more comprehensive system modelling."

The UK Institution of Engineering and Technology the UK home of chartered electrical engineers, in October identified strong concerns as to the "Significant modelling challenge" to deal "with the threats posed by developments emerging in the GB power system"

Among many recommendations, they urge appointing a "System Architect" for the UK electrical supply to quickly instigate "risk focussed modelling" to "target the management of risks".

The Herald recently carried, as an "Exclusive", the Institution of Engineers and Shipbuilders in Scotland (who have long advocated a full system analysis and a legally empowered electricity system planning body) assessment that without the retention of at least two of the four generators at Longannet, Scotland could need 36 hours to "Blackstart" its grid following a major collapse. Some in the profession talk of 4 to 5 days depending upon cause.

It's sobering that, unlike the banking crisis, born of similar light regulation, in our profession we cannot print electricity.