All-Party Parliamentary Group on Energy Costs: 'Reassessing Nuclear'
Portcullis House, 23 Nov 2022

1. Back with a vengeance

Fissile Fuel is back - so say UK policy and press. Sunak and Macron are about to sign something, and recent editorials from The Times to The Telegraph, The Independent, The Guardian, and The Observer all reckon everything in the garden is nuclear. Fact or fiction – what's the evidence?

2. Failing to learn from history, again

The fact is, RAB and nuclear have been tried before. The US version of RAB - ECR (Early Cost Recovery) failed, leaving the usual cost and time over-runs, and they've quietly dropped the idea. The point is, apart from a few reassuring words, there's no real data or information from BEIS as to why UK nuclear RAB could or would work any better, or risk failure.

UK and France can sign any deal they like - but if finance market investors don't take up the remaining majority 60% construction costs, Sizewell C is going nowhere.

And the augers aren't good. Last week, Sir Nigel Wilson, Group CEO of Legal & General, UK's biggest asset group with £1.3 trillion investments, told BBC R4 'Today' program that *"We are not big fans of Sizewell C."* Given project's still deeply unfinanced, perhaps the PM should take the Treasury's concerns more seriously.[1]

3. Doing the same thing over and over again and expecting different results

We know the story of the EPR reactor. Vastly over-cost and over-time everywhere and shut down for nearly a year in Taishan China with safety faults. And don't let EDF tell you things are going to plan at Hinkley Point C, where they're working on a 'contingency option' to avoid construction penalties.

The fact is, BEIS clearly state that nuclear costs and construction delays always ramp significantly, putting first generation from Sizewell C between 2036 and 2040 – far too late for our energy and climate crisis.

Not forgetting the horrible mess across the channel, with more than half of France's nuclear reactor fleet offline,[2] EDF are in deep trouble - essentially bankrupt. €45 billion in debt, facing a further €29 billion loss this year,[3] with exponential radioactive waste and decommissioning costs on the horizon. With an estimated €50 billion bill

[1] https://www.bbc.com/news/uk-politics-60903879
[2] https://www.nytimes.com/2022/11/15/business/nuclear-power-france.html
[3] https://www.nytimes.com/2022/11/15/business/nuclear-power-france.html

for reactor safety upgrades,[4] Macron is now forced to fully nationalise the ailing and ageing French nuclear corporation.[5]

4. The SMR that never was

So, with large nuclear struggling, the next thing is the small modular reactor (SMR) concept.

SMR technology is defined as reactors that generate up to 300 MW power.[6] At 470 MW, the Rolls Royce design is not an SMR.[7] It's larger than the UK Magnox reactor, half the size of the 900 MW reactors that make up the bulk of the French nuclear fleet – and about a third the size of the very large EPR reactor design.

This matters because the Rolls design will need big sites, standard nuclear safety measures, exclusion zones, core catchers, aircraft crash protection, and security. It's unsettling to reflect that all UK civil nuclear infrastructure are uniquely implicated in all four 'Tier 1 Threats' identified in the UK National Security Strategy.[8]

All this is important because in calling their design an SMR, or small, Rolls have been economical with the truth - and all that implies for their other claims, especially about time and cost.

Speaking of which, the US NuScale Power SMR cost has just nearly doubled in price, despite being heavily subsidized.[9] An early cost estimate was $55 per MWh and the new price is $90 to 100/MWh – and no doubt set to continue to ramp.

5. Cheaper, Faster, Better

Help is at hand. Last year, solar and wind made up three-quarters of total new electricity generation capacity installed world-wide. With other renewables, the total figure was 84%,[10] with nuclear nowhere.

More recently, wind and solar produced a quarter of EU electricity since the war began, avoiding €11 billion in gas costs.[11] Perhaps because world-leading financial advisory and asset management firm Lazard find that whilst nuclear levelized cost of electricity is $151 per MWh, renewables come in at just $41 per MWh.[12]

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[4] https://www.energyintel.com/0000017b-a7d1-de4c-a17b-e7d3c8f40000
[5] https://www.latribune.fr/entreprises-finance/industrie/energie-environnement/nationalisation-d-edf-l-autorite-des-marches-financiers-se-prononce-aujourd-hui-des-actionnaires-jouent-leur-va-tout-939846.html
[6] https://www.iaea.org/topics/small-modular-reactors
[7] https://www.rolls-royce.com/innovation/small-modular-reactors.aspx#/
[8] HMG [Her Majesty's Government) (2010) : A Strong Britain in an Age of Uncertainty: The National Security Strategy, Presented to Parliament by the Prime Minister, October 2010, Cm. 7953, Stationery Office, London.
[9] https://ieefa.org/resources/small-modular-reactor-update-fading-promise-low-cost-power-uamps-smr @ieefa_institute
[10] https://reneweconomy.com.au/renewables-snapshot-are-we-on-track-to-decarbonise-the-globe/
[11] https://ember-climate.org/press-releases/eus-record-growth-in-wind-and-solar-avoids-e11bn-in-gas-costs-during-war/
[12] https://lazard.com/media/451881/lazards-levelized-cost-of-energy-version-150-vf.pdf

That's why renewables supplied 40% of UK electricity in 2021[13] and a quarter of US electricity during the first half of 2022.[14] All this, because utility-scale renewables can be built on time and to budget.

With a UK Govt. Investment Minister noting that North Sea wind power will be more valuable to the UK than the oil and gas industry,[15] there's no-one left to dispute the fact that UK net-zero heavy-lifting will be done by renewable energy.

As very recent Oxford University[16] and UCL research both say, utility scale renewable systems are comfortably the cheapest and most effective form of electricity production and CO2 mitigation, with UCL stating that *"the current favourable UK Government policy towards nuclear is becoming increasingly difficult to justify."*[17]

As for the idea that renewables are too variable to hack it, McKinsey & Co. leading international consultants to governments, corporations and institutions say renewables are on track to become the new baseload electricity supply for global energy markets.[18] The reality is, it's entirely possible to sustain a reliable electricity system based on renewable energy.[19]

It's not just that nuclear is slow and expensive – it's far too inflexible to ramp up and down with the swings of demand. In contrast, the variability of wind and solar technologies can more easily be integrated into evolving, flexible electricity grids. If there's one thing that half of French nuclear reactors offline proves, nuclear is deeply intermittent.

Not forgetting the lowest hanging fruit – energy efficiency. Reducing the UK's overall energy demand is at the heart of a fair, affordable, and sustainable net-zero.[20] The UK Centre for Research into Energy Demand Solutions has done the most comprehensive assessment to date, and it turns out that our energy use can be hugely reduced, maintaining energy security and quality of life.[21]

And in terms of climate, the International Energy Agency have just published their World Energy Outlook 2022, concluding that *'renewables are the most important way to reduce CO2 emissions in the electricity sector.'*[22] UK coastal nuclear sites are literally on the front line of climate change, but not in a good way,[23] with the UK

[13] https://www.businessgreen.com/news/4053954/official-renewables-provided-cent-britains-electricity-2021
[14] https://www.eia.gov/todayinenergy/detail.php
[15] https://www.thetimes.co.uk/article/growth-in-north-sea-wind-farms-will-eclipse-value-of-oil-and-gas-bgk6vxs08
[16] https://www.cell.com/joule/fulltext/S2542-4351(22)00410-X
[17] https://discovery.ucl.ac.uk/id/eprint/10156347/
[18] https://www.mckinsey.com/~/media/McKinsey/Industries/Oil%20and%20Gas/Our%20Insights/Global%20Energy%20Perspective%202022/Global-Energy-Perspective-2022-Executive-Summary.pdf
[19] https://e360.yale.edu/features/three-myths-about-renewable-energy-and-the-grid-debunked
[20] https://www.creds.ac.uk/publications/energy-demand-reduction-options-for-meeting-national-zero-emission-targets-in-the-united-kingdom/
[21] https://www.creds.ac.uk/wp-content/uploads/CREDS-Role-of-energy-demand-report-2021.pdf
[22] https://www.iea.org/reports/world-energy-outlook-2022
[23] https://www.nuclearconsult.com/wp/wp-content/uploads/2021/06/Climate-Change-UK-Nuclear-June-2021.pdf

Institute of Mechanical Engineers saying UK coastal nuclear infrastructure, including Sizewell, may need considerable investment to try to defend against rising sea levels, even relocation or abandonment.[24]

6. Winter will be a long time in politics

This winter, with millions struggling under the cost-of-living and energy crisis, effectively stuffing huge sums of public money into the deep pockets of EDF won't look good to people, policy, and press.

In terms of cost, time, and do-ability – it's renewable expansion in all sectors, energy efficiency and management, rapidly advancing storage technologies, grid modernisation, interconnection, and market innovation from supply to service provision that will power the UK net-zero energy transition.

The weight of evidence shows that due to the pace, scale, and economics of the renewable evolution, all nuclear can do is make promises it can't keep. Despite all the nuclear sound and fury, fissile fuel turns out to be an expensive and marginal distraction - past its sell-by date.

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[24] Institute of Mechanical Engineers (IME) (2009): Climate Change: Adapting to the Inevitable, IME 2009. https://www.imeche.org/policy-and-press/reports/detail/climate-change-adapting-to- the-inevitable