



No.128 September 2020

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1. New Nuclear Update

In November 2018, the collapse of private sector support for a new plant at Moorside, and in January 2019 the suspension of the Hitachi project at Wylfa, cast doubt on the future of nuclear plants in the UK. To address this, the Government consulted on a new model for funding nuclear reactors, known as a Regulated Asset Base model. The consultation closed in October 2019, but there is still no sign of a response from the Government. (1)

Energy Live News says: *“It has been a running joke in Westminster for some time, well before the current crisis, to speculate when the much-promised Energy White Paper would finally be published.”* (2) The energy white paper has seen numerous delays, having originally been scheduled for publication in summer 2019. Several delays later, Energy secretary Alok Sharma now says the energy white paper will “hopefully” be published this autumn. (3)

Similarly, in December 2019, it was announced that a National Infrastructure Strategy would be published in Spring 2020 – this would encompass a formal response to the National Infrastructure Commission’s detailed National Infrastructure Assessment published in 2018. (4) The Strategy has yet to appear. (5)

It’s possible, therefore, that we might see all three appear in the Autumn – the Energy White Paper, the response to the RAB consultation and the National Infrastructure Strategy.

The National Infrastructure Commission has said we should order no more than one new nuclear station after Hinkley Point C. (6)

In August this year, Sir John Armit, Chair of the National Infrastructure Commission, told Utility Week that *“...the government has a policy, which is some 10 years old, involving a reliance on nuclear. But arguably it’s a policy which at the moment would appear to be undeliverable, because the basis of the investment by any potential nuclear investor requires the government to take some of the risk, and they haven’t in the last two or three years been able to reach a conclusion on how that might be handled ... Nuclear is never going to be able to meet the cost base of renewables. Nuclear only has a real future if in fact there is a capacity argument which says that at the end of the day, we see a need for nuclear as a fallback means for a baseload of generation.”* (7)

One of the National Grid Electricity System Operator (ESO) 2020 Future Energy Scenarios (FES) shows nuclear falling to as low as 5GW by 2050 with Hinkley Point C the only large new nuclear plant built in the UK over the next 30 years. (8)

Moorside

A so-called “clean energy park” is being proposed by a team set up under Cumbria Local Enterprise Partnership (LEP). A small, light-water reactor has been proposed by the Rolls-Royce SMR Consortium, and EDF Nuclear New Build and partners has proposed building two EPR-type reactors. A finance model for this would need to be agreed with the Government. (9)

According to the brochure, the Moorside ‘Clean Energy’ Hub could result in the development of new nuclear plants, linkages with renewable energy generation, and hydrogen. (10)



Wylfa Trumped

Hitachi, the company behind the suspended proposed Wylfa nuclear power station on Anglesey, has been warned by the US Government not to sell it on to the Chinese government. (11) Hitachi says it has no plans to sell the site to a Chinese corporation anyway. (12)

According to the FT, Hitachi subsidiary Horizon Nuclear Power has been holding detailed conversations with U.K. government officials in recent weeks in the hope of reviving plans for Wylfa. Horizon has been trying to convince ministers that with a new financing model for large nuclear power stations plans for the Wylfa Newydd plant on Anglesey could be quickly restarted. A decision on the plant's planning application was expected by end of September. (13)

Just as we go to press, according to news reports in Japan, Hitachi is about to drop Wylfa. The Japanese media site Mainichi is reporting that Hitachi is preparing to ditch the scheme altogether. A decision is expected to be confirmed on 16th September. In response a spokesman for Hitachi told Bloomberg that the company is exploring multiple options and nothing has been decided yet. (14)

Sizewell C

On 24 June, the UK Planning Inspectorate accepted for examination the planning application for Sizewell C. The decision means the Inspectorate is satisfied that the eight years of public consultation by the project was conducted properly and that full examination of the proposals can now take place. (15)

The Planning Inspectorate has three months from 24th June to prepare for the Examination. During this Pre-examination stage, people can register to become an Interested Party on the application by making a Relevant Representation. Registration closes on 30th Sept 2020. (16)

Meanwhile questions are being asked about whether Sizewell C (SZC) can be built without the Chinese state-owned company – CGN, which has a 20% stake in the project. Ian Duncan-Smith has described Sizewell as “*the next Huawei*”. Dr Paul Dorfman, of University College London's energy institute and founder of the Nuclear Consulting Group, said it was hard to see who else would invest in Sizewell if the Chinese pulled out. (17)

The UK Secretary of State for Business, Energy and Industrial Strategy, Alok Sharma, is of the view that the proposed SZC is not likely to have significant effects in any other states outside of the UK. The Planning Inspectorate provided information about possible transboundary environmental impacts according to international conventions as part of its review of the DCO application for Sizewell C. “*Taking into account the United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (the Espoo Convention) and the UNECE Convention on access to information on environmental matters (the Aarhus Convention), the UK government has chosen to inform all signatory states and their public of the Proposed Development and invite their participation in the decision making process,*” the Planning Inspectorate said. (18) Attracta Uí Bhroin, environmental law officer with the Irish Environmental Network, urged the Irish public to make their views on



the plant known. *"The fact that it's not on the west coast of England might make people think it's not so important but that is irrelevant. Chernobyl was a lot further away and we still received radiation from that,"* she said. *"The possibility of something going wrong is very low but there is no going back from the ramifications if something does go wrong. Three Mile Island, Chernobyl and Fukushima have shown us that."* (19)

SZC cannot be completed until at least 2034. Yet carbon emissions generated during the construction phase - the carbon content of the materials and labour - will take six years to be paid off by the output of SZC, if we assume EDF's average carbon reduction forecast, before SZC provides a net reduction in carbon emissions. As new renewables come online replacing fossil fuels, the carbon emissions from UK electricity generation are falling and by the early 2030s, the mean emissions per kWh of electricity will have fallen from about 130g of carbon per kWh in 2020 to about 40g, according to BEIS. However, the BEIS forecasts are out of date and, even when published, lacked credibility. EDF's extrapolation of grid intensity to 2050 takes no account of the UK government's legally binding commitment to make to bring all greenhouse gas emissions to net zero by 2050. This means that SZC will effectively cease to contribute to emissions reductions well before 2050 and will, in fact, make a net addition. (20)

EDF tweeted that SZC would save 540Mt of CO₂ over its (60 year) life (21). This can only be claimed to be true if in the 2090s SZC is still directly replacing natural gas. No one seriously believes natural gas will be providing baseload after 2034 when SZC will come online, let alone 2094. Bear in mind also that the government's legally binding target is for net zero by 2050, and that National Grid's 2020 future energy scenarios say *"by the mid-2030s, the net carbon intensity of electricity generated in GB has become negative in all net zero scenarios."* (22)

EDF's claim that SZC will make annual CO₂ savings of 9 mtCO₂ per year when operational must be based on a comparison with a Combined Cycle Gas Turbine power station, which would emit around 9 mtCO₂ per year. But it would be more relevant to compare the output of a combination of renewables which could be built over the same time period as SZC (2022 – 2033). Assuming you were building sufficient renewables over that 11-year period to replace SZC, the capacity would be gradually ramping up making CO₂ savings over that period. This means that in addition to the 6 years SZC needs to operate to pay back the carbon used during construction it would need perhaps another 4 years to payback the savings made by an alternative renewable scenario before 2034. This takes us up to at least 2044 before there are any net carbon savings from SZC. (23)

A High Court judicial review took place at the start of September into plans by EDF to fell a historic woodland to make space for buildings and car parks. Tory-controlled East Suffolk Council has given planning permission to fell the woodland in advance of the development, but the legal challenge by the Together Against Sizewell C (TASC) campaign argues that permission for the felling should not have been given ahead of permission being granted for the construction of Sizewell C. (24)

The Stop Sizewell C Campaign and Together Against Sizewell C (TASC) have launched a joint petition against the proposals. The construction project will mean an extra 12,000 trucks, buses, vans and cars per day onto Suffolk's roads; An invasion of 6,000 workers; Harm to our local



businesses and tourism industry; Damage to our much-loved landscapes and wildlife habitats, including internationally-famous RSPB Minsmere. Sign here:

<https://www.stopsizewellcpetition.com/?s=09>

Independent consultants have challenged the jobs and economic benefits claimed for Sizewell C – labelling them “exaggerated” and “unrealistic”. EDF Energy has said that Sizewell C will give the county’s economy a £125million a year boost and create 25,000 job opportunities during the 10-year construction period and 900 skilled jobs when the power plant is operational. But research and analysis consultancy Development Economics – commissioned by the Stop Sizewell C campaign – has criticised key aspects of the research and evidence submitted to the Planning Inspectorate. It questioned EDF’s claim of up to “2,410 jobs for Suffolk residents”, saying this included people travelling from up to 90 minutes away, which covers large population centres in Norfolk and Essex. It said these local workers will be the overwhelming source of lower skilled roles, expected to fill 90% of jobs in ‘Site Support’ – cleaners, bus drivers and security guards – compared with only 8% of roles in professional and management. At peak construction 76% of the workforce will come from further away still and will have to be accommodated in the area. (25)

Bradwell B

In early March, CGN revealed its plans for a Stage 1 public consultation on Bradwell B on the eve of the coronavirus lockdown. Despite pleas for the consultation to be aborted since public participation was heavily constrained during the pandemic, they ploughed on – the consultation closed on 1st July. The plans unleashed a firestorm of protest on both sides of the Blackwater Estuary and the proposals were torn to shreds both in principle and in measured, carefully articulated detail. The sense of outrage was palpable.

A Planning Application for land investigations and load test in connection with the new power station was lodged with Maldon District Council. It drew a large number of comments (143) with 138 objecting and only 1 supporting. It was widely presumed that Maldon Councillors would approve the proposal. But 24 councillors voted against and none for – an overwhelming and totally unexpected rejection of the plans from a Council hitherto favouring Bradwell B. (26) This decision was revisited on 20th August following legal advice, but the application was turned down again, with the grounds for refusal beefed up.

On 12th August there was unanimous agreement from Colchester Borough Council to oppose Bradwell. (27)

BANNG Chair, Andy Blowers commented:

“...for BRB the events at Colchester and Maldon Councils are a political catastrophe. Attempts to woo the population with promises of thousands of jobs have been rejected. BRB’s illusory idea of ‘the Bradwell community’, sharing with its nuclear benefactors a common purpose and partnership, has turned to ashes in the mouth. From now on CGN knows it faces a largely hostile population, ungrateful and determined to see its downfall.” (28)



The Nuclear Free Local Authorities submission is here: https://www.nuclearpolicy.info/wp/wp-content/uploads/2020/05/NFLA_New_Nuclear_Monitor_No61_Bradwell_B_S1_submission.pdf

The Chancellor, Rishi Sunak, refused to rule out a U-turn on the involvement of China in the building of Bradwell B, in an interview on LBC radio. He said the Government's position hasn't changed adding "*decisions haven't been made*" for the project. Mr Sunak said he thought the UK should have an "*eyes wide open relationship with China*". (29)

Hinkley Point C

EDF has been fined €5m (£4.5m) by the French financial regulator for misleading investors about the cost of Hinkley Point C (HPC). They told investors in October 2014 that the terms of its deal with the UK government were "unchanged" from the 2013 agreement when, in fact there had "*been significant changes*". Henri Proglio, EDF's chief executive officer at the time, was fined €50,000. (30)

A new report from Professor Steve Thomas, and Alison Downes claims that EDF has no credible means to finance the Hinkley Point C (HPC) project. In November 2019, BEIS acknowledged that EDF had refused the credit guarantees offered by the UK Government. It was obvious by early 2017 that, because about 70 critical welds needed repair at Flamanville including eight that would require robotic techniques that did not exist then, that there was no hope that EDF could fulfil one of the conditions of the guarantee – that Flamanville was operational by the end of 2020. (31)

EDF initially anticipated taking only a 45-50% of Hinkley (about £6.3bn - £7bn), with other investors expected to including CGN taking the rest. But the other investors never materialised leaving EDF with 66.5% of the project. By 2019, the expected cost had increased to £21.5-23.2bn so EDF's share jumped to up to £15.5bn.

The Covid-19 pandemic is threatening delays and further cost increases in the construction of the Hinkley Point C, EDF has warned. France's Court of Audit warned that the HPC project "*weighs heavily*" on EDF's balance sheet. EDF ended 2019 with net debts of €41bn (£37bn), €7.7bn (£7bn) worse than a year earlier. The auditor warned that the eventual profitability of HPC, which has been revised downwards repeatedly since it was signed off, could fall further still. (32)

Steve Thomas and Alison Downes conclude:

"It is hard to avoid the conclusion that EDF has been proceeding with HPC since as long ago as 2015 on the assumption that the HPC project and EDF as a whole is too big to fail and that some means of supporting it will emerge. The only options remaining appear to be the granting of sovereign credit guarantees by either the UK or French government, unlocking debt finance or, as foreseen by the NAO, a renegotiation of the contract terms removing the technology risk from EDF."

"If the project collapses or requires a costly rescue package, it will be British taxpayers and electricity consumers left to foot the bill. There will also be the opportunity cost of the options not



pursued for more than a decade because it was assumed that HPC would provide 7% of our electricity, with a further 12% to come from the follow-on stations of Sizewell C and Bradwell B.”

Senior Conservatives demanded a review of the Hinkley Point C after the *Telegraph* reported that CGN is more closely involved in the project than previously disclosed. Sir Iain Duncan Smith said he believes that ministers had been misled. The *Telegraph* found conflicting statements from the Chinese and the French over the number of Chinese workers on the site. CGN has said it has “more than 100 engineers and technical experts working on Hinkley”, while EDF has put the number at between 20 and 30. The *Telegraph* also alleged that Chinese engineers had proposed a way to lift a concrete dome onto a reactor at Hinkley Point C which would have involved dangling the heavy structure above 5,000 workers. It was later deemed too dangerous. EDF denied the claims. (33)

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2. Disappearing in a puff of nuclear logic

In an opinion piece in the *Telegraph* Shellenberger and Barnard suggest the UK could become the West's leader in nuclear energy by promoting a French nuclear reactor design which can only be described as an abject failure. (1) The two writers worry that the Johnson government is flirting with Small Modular Reactors (SMRs). Opportunistic firms lacking civil nuclear experience, they say, have claimed, without evidence, that smaller reactors would be easier to build and cheaper to operate. They assert that anyone worried about the cost of energy should want larger, not smaller, nuclear reactors.

Shellenberger and Barnard are, perhaps unwittingly, prefacing a fight to the death between supporters of large and small nuclear reactors which can only end in the whole nuclear edifice collapsing in a puff of logic.

The first EPR to be built in Europe, was scheduled to begin commercial operations in May 2009 at Olkiluoto in Finland. It is now expected to begin commercial operation in February 2020 – thirteen years late. It is three times over its original €3.2 billion budget. (2)

The Flamanville 3 EPR in France was estimated to cost €3.3bn when construction started in 2007. It was originally scheduled to be completed in 2012, but is now not expected to be complete before 2023 at the earliest at a cost of €12.4bn. (3)

Construction of two EPR units began at Taishan in China in 2009 and 2010. The first unit was originally scheduled to be completed in 2013, but didn't begin commercial operation until December 2018, due to a combination of construction problems and safety concerns. The second unit began commercial operation in September 2019. (4) The cost estimate of the Taishan nuclear plant also increased. In 2018 CGN reported the total capital cost to date of Taishan-1 and -2 was 71.38 billion yuan (US\$11billion) - 40% over the original estimate. (5)

With the fifth and sixth EPR reactors being built at Hinkley Point C (HPC) it might be expected that sufficient experience would have been gained to build the reactors on time and budget. But in 2019, EDF increased the estimated construction cost of HPC from £19bn to £21.5-22.5bn. It also warned that the target completion date for the first reactor of 2025 was at significant risk of slipping to 2027 and if this occurred, costs would go up by an additional £0.7bn making the range £21.5-23.2bn (2016 money). (6)

Sizewell C cannot be completed before 2034 at the earliest and EDF has acknowledged it cannot finance its 80% share of Sizewell C and will need government support for the Regulated Asset Base (RAB) model of financing. But the government is yet to respond to its own consultation on this proposal. RAB would mean that investors will be guaranteed a fixed rate of return on their investment, but the electricity price charged will be as high as is necessary to ensure this rate of return is paid. In the post-pandemic economic environment the Government will be extra nervous about pushing up consumers' electricity costs. (7)

On the other hand, the growing clamour of support from within government and some sections of the nuclear industry to develop a programme of 'Small' Modular Reactors' (SMRs) may not be



the answer either. SMRs are being put forward as a solution to the high cost and difficulty of financing large nuclear reactors like the EPR. However, there are huge obstacles to overcome. Some of these are technical issues, others are around building up an effective supply chain, while the financing of such schemes will only be possible with significant subsidy from the public purse.

SMR advocates claim that they can compensate for this loss of economies of scale through savings introduced by assembly line manufacture. However, setting up SMR assembly lines would be costly, and the relative economics of SMR production may remain unproven until lots of SMR units have been produced - which, paradoxically, cannot happen until a significant number of orders are placed, a circular dilemma. The company seeking to manufacture and sell SMRs will face a very significant up-front investment that is needed to establish an entire supply chain to sell scores of reactors needed to replace the lost economies of scale with the proposed economies of replication. (8)

For the moment an uneasy truce between small and large nuclear advocates has been established at Moorside in Cumbria, adjacent to Sellafield, where both sides have hitched their wagons. The Rolls-Royce SMR Consortium has proposed building a small, light-water reactor and EDF Nuclear New Build has proposed building two EPR-type reactors. But each proposal would need finance from the taxpayer if it is to go ahead. (9)

Meanwhile the cost of renewables has been dropping dramatically. (10) Why, under these circumstances, would any government want, to paraphrase the National Audit Office, to lock consumers into a risky and expensive project – based on small or large reactors - with uncertain strategic and economic benefits. (11) The National Infrastructure Commission (NIC) says the sharp falls in costs mean that Britain should aim for renewables to meet two thirds of electricity needs by 2030. (12) Offshore wind farms auctioned last September in the UK will probably be the world's first “negative subsidy” projects – wind farms that pay money back to the government over their lifetime. (13) At the same time energy efficiency schemes offer a fantastic opportunity for an immediate boost to the economy as we recover from the pandemic. Research by the IPPR think tank estimates that a green recovery package prioritising jobs in energy efficiency and public transport could create 1.6 million new jobs in the UK. (14)

Rolls Royce responded to the Telegraph article saying the technology is well-understood energy and can create a low-cost power station that is easier and faster to build at a price comparable with intermittent offshore wind, while creating an estimated 40,000 high-skilled British jobs. Rolls Royce says it can support the vital levelling-up agenda by establishing new factories and industrial activity across Britain, targeting billions of pounds in export revenues. (15)

National Infrastructure Commission chief economist James Richardson has warned that the industry has failed to deliver on technological promises in the past. *“You have to have a degree of caution with new nuclear technology,”* he said. *“We have been promised things time and time again and typically the industry tends to be more expensive and take longer than planned. I would be cautious against SMRs, they are a question for the 2030s. SMRs are not going to help in the next decade because they are just not available. By the time they turn up we can see if they are still cost effective or if renewable's have gone beyond.”* (16)



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3. Plutonium Policy

70 years after starting to produce plutonium the UK now has a stockpile of 140 tonnes, the largest in the world, but no use for it. It is also managing around 23 tonnes of foreign, (mainly Japanese) owned plutonium. (1)

This huge inventory has arisen from large-scale reprocessing of spent fuel from both UK Magnox and AGR power stations but also from overseas energy utilities under historical commercial agreements. The Nuclear Decommissioning Authority (NDA) says continued, indefinite, long-term storage leaves a burden of security risks and proliferation sensitivities for future generations to manage, so it aims to identify a solution that puts the UK's civil plutonium beyond reach. This could be reuse as Mixed Oxide Fuel (MOX) in nuclear reactors or as an immobilised product.

The NDA's work on plutonium fits into three distinct areas. Firstly, consolidation has involved moving Dounreay's plutonium inventory down to Sellafield. This task has now been completed but some of this plutonium presents 'unique management challenges' which will require 'increased focus' in the coming years. (2)

Secondly, the NDA needs to ensure all the plutonium is safely and securely stored. This involves repacking the material and moving it into a suite of modern stores. There are a number of plutonium stores on the Sellafield site. Over the past decade, materials have continued to be retrieved from older stores and consolidated in more modern state-of-the-art facilities such as the Sellafield Product and Residue Store (SPRS). The aim is to transfer all plutonium into the SPRS store and its extensions over the next few decades. The SPRS is one of the biggest civil nuclear storage facilities in the world and along with its planned extensions could store all of the UK's civil stock of plutonium if required. It is the first facility built at Sellafield with at least a 100-year life expectancy as the current UK strategy is to store the plutonium indefinitely and Sellafield Ltd has to plan to store plutonium until 2120. (3)

Some of the older plutonium packages and facilities used in early production are now considered by the NDA to be **amongst the highest hazards on the Sellafield site**. Consequently, repackaging and treatment of some packages to stabilise them will be required. A major new specialised facility is required to do this known as the Sellafield Product and Residues Store Retreatment Plant (SRP). However, SRP hasn't started operation, and current estimates are that it may be almost ten years before it does. (4) Yet some of the plutonium facilities and packages are in such a poor condition they require urgent attention. A programme of work was instigated to retrieve these materials from older stores and consolidate them in more modern stores. The NDA reported in March 2019 that this was now largely complete. Now an enhanced package inspections programme has been introduced which is identifying packages which should be promptly repackaged in existing facilities. When the new SRP plant becomes available the contents of these containers will be treated and then repackaged again into containers suitable for long-term storage in the modern SPRS store.



The NDA says the cost of the programme to manage the indefinite storage of UK held plutonium are expected to increase between £0.5 - £1bn from the current estimate of £3.5bn (undiscounted). (5)

The SRP is expected to operate for 40 years (6). In other words, it will take until around 2060 before all the plutonium is repackaged. (7)

Finally, the NDA is looking at plutonium disposition, which means finding a way of putting the separated plutonium beyond reach. Any long-term management solution will take many decades to fully implement. Some of the plutonium could be used to make MoX fuel, but some of it wouldn't be suitable for that. The NDA continues to work with technology suppliers, developers, regulators and the UK government to establish how both reuse and immobilisation options could be implemented. Options for reuse of plutonium as MOX in light water reactors (LWRs) can be shown to be the most mature from a technical and licensing perspective. But the NDA is also developing immobilisation options, some of which may be better suited to part of the inventory.

The NDA's March 2019 document '*Progress on Plutonium, Consolidation, Storage and Disposition*' outlined a series of possibilities for using the plutonium, including the already failed alternative of making MOX fuel. There is also the CANMOX solution offered by a consortium led by SNC Lavalin. This approach would involve the building of a CANMOX fuel plant and at least two CANDU EC-6 reactors in the UK to irradiate the fuel. The NDA says no discernible evidence was offered that this approach would be significantly simpler or more cost effective than reuse as MOX in LWRs.

Another option would be re-use in GE Hitachi PRISM fast reactors. However, the studies undertaken by NDA with GEH over the past few years have shown that a major research and development programme would be required, indicating a low level of technical maturity for the option with no guarantee of success. No further work with GEH has been funded by NDA

That leaves immobilisation. Regardless of the overall solution, a proportion of the plutonium would be unsuitable for use as a fuel and will have to be disposed of. The NDA is working to better understand the proportion that will need to be immobilised, and also continues to develop approaches that could immobilise and dispose of the entire inventory. (8)

See also Climate News Network 3rd September 2020 <https://climatenewsnetwork.net/uks-plutonium-stockpile-is-an-embarrassing-risk/>

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1. 2018 annual figures for holdings of civil unirradiated plutonium, ONR 16th September 2019 <http://www.onr.org.uk/safeguards/civilplut18.htm>
 2. NDA Draft Strategy for Consultation 17th Aug 2020 <https://www.gov.uk/government/consultations/nuclear-decommissioning-authority-nda-draft-strategy-for-consultation> (page 58)
 3. World Nuclear News 24th May 2010 https://www.world-nuclear-news.org/WR-New_storage_facility_at_Sellafield-2405105.html



4. NDA Draft Strategy page 60
5. Letter from David Pettie, CEO of the NDA to Meg Hillier Chair of the House of Commons Public Accounts Committee, dated 22nd July 2019 <https://old.parliament.uk/documents/commons-committees/public-accounts/Correspondence/2017-19/Letter-from-David-Beattie-to-Chair-in-response-to-the-Committee's-report-on-Nuclear-decommissioning-authority.pdf>
6. Progress on Plutonium, Consolidation, Storage and Disposition, NDA March 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791046/Progress_on_Plutonium.pdf
7. NDA Draft Strategy, page 134
8. Progress on Plutonium, Consolidation, Storage and Disposition, NDA March 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791046/Progress_on_Plutonium.pdf



4. AGRs – closing earlier than expected?

On 27th August, the Office for Nuclear Regulation (ONR) announced it was giving EDF permission to restart Reactor 3 at Hunterston B for a limited period – generating up to a total of 16.425 Terawatt days, approximately six months' operation. (1)

Following this announcement, EDF said it is hoping to restart both reactors at the site for two last six-month periods each and then begin decommissioning them “*no later than 7 January 2022*”. The reactors were previously scheduled to be shut down in March 2023.

ONR has yet to give reactor 4 permission to restart or give either reactor permission to operate for a second six months.

Reactor three has an estimated 377 cracks in its graphite core and has been shut down since 9 March 2018. It will only be allowed to operate for six months before it will have to close down again so that its core can be checked for new cracks. Then EDF will need new permission to operate it for a further, final six months.

Reactor four at Hunterston has an estimated 209 cracks in its core, and was shut down on 2 October 2018. It was allowed to restart for four months in 2019, and is now awaiting permission from ONR to start up again.

In much of the media EDF managed to gloss over the outrageous decision by ONR to allow Reactor 3 to restart by announcing that both reactors would close earlier than expected – January 2022 rather than March 2023. (2)

Dr Richard Dixon, director of Friends of the Earth Scotland said “*Whether it was clever press strategy or fluke, EDF managed to use the closure announcement to bury the news that their damaged reactor is starting up again. They must be laughing all the way to the bank.*” (3)

West Kilbride Tory councillor Todd Ferguson called for Hunterston to be shut immediately. He said Hunterston should not be a ‘guinea pig’ for the UK nuclear industry testing how long power stations can last. “*There comes a time when the reactors should remain offline for good. The North Ayrshire Conservative Group believe the time to look at this is now.*” (4)

The NFLA Scotland Forum have joined with Friends of the Earth Scotland, WWF Scotland, CND Scotland and the Nuclear Consulting Group to raise serious concerns over the decision of the Office for Nuclear Regulation (ONR) to allow EDF Energy to restart Reactor 3. The groups said it is extraordinary that Reactor 3 is being allowed to restart when it has been closed for over two years because of appropriate safety concerns. Reactor 4 is known to be in an equivalent state of aging and is likely also to be allowed to restart. It is important to note that the majority of the Scottish population live downwind of Hunterston B and the consequences of an accident will be catastrophic. In terms of the energy generation issues by closing Hunterston B, it needs to be noted that EDF Energy has recently been asked by the National Grid to reduce output at Sizewell B in Suffolk due to a lack of energy demand, providing it with £50 million in order to do this. With the reducing cost and increasing levels of renewable energy coming on stream there is absolutely no need to restart Hunterston B. Restarting for 6 or 12 months is creating an



unnecessary risk to the people of Scotland. If accelerated decommissioning of the site was to take place, many jobs can be diverted into such activity for some time to come. In addition, whilst there is fuel in the reactor, it is a criticality risk and has to be almost fully staffed until it is defueled in 2025. (5)

Hinkley Point B

EDF is now reported to be considering closing Hunterston's sister station, Hinkley Point B (HPB) sooner than planned. Hinkley's two reactors are currently offline for what is known as a 'graphite inspection outage' – checks for cracks in the graphite blocks in other words. Reactor 3 isn't due back until 14th December and Reactor 2, 30th November, although we know these dates can be a moveable feast. EDF now says these reactors could close as soon as the middle of 2022 as well. It will make a decision on their future in November when approval from ONR on restarting the plant is expected. (6)

Some of the media is reporting that HPB could close as much as 2 years early, which basically would mean they wouldn't re-open. (7)

Torness

Meanwhile, the MSP for East Lothian, Iain Gray, who will not be standing for re-election in May, has called for thought to be given to extending the life of Torness. (8) In fact, a recent Office for Nuclear Regulation (ONR) Assessment Report said cracks – like the ones in the graphite core at Hunterston which are causing safety concerns - are now expected to start appearing at Torness six years sooner than previously expected - 2022 rather than 2028. Logically, therefore, we should be preparing for Torness to close six years earlier in 2024, not extending its life. (9)

ONR, has granted permission for the statutory outage on reactor 1 at Torness to be postponed until January 2021. It was due to be taken off line on Friday 24 July for around 11 weeks for an extensive maintenance period, known as a "statutory outage". This outage would have brought more than 700 extra workers to the site at a time when communities are still concerned about the spread of Covid19. Consideration was given to reducing the scope of the outage to limit the additional people on site but it was concluded that postponement, with the support of the regulator, was the most appropriate option. (10)

Dungeness

Dungeness Reactor 22 and Reactor 21 in Kent were taken offline, respectively, on 27 August and 19 September, 2018 – for pre-planned outages. During that work, EDF uncovered issues to do with the main steam line and then corrosion. In recent months attention has been focused on issues to do with the site's boilers. Restart dates were 11 September for Reactor 22 and 21 September for Reactor 21, but these dates have been put back to 10 December for Reactor 22 and 20 December for Reactor 21. (11) These reactors are currently expected to operate until 2028.

Dungeness B has been offline since 2018, but now there are fears that it may never reopen because of problems with its boilers, which EDF has spent about £100m trying to fix. (12)



For more on AGRs see NFLA Policy Brief No.205

https://www.nuclearpolicy.info/wp/wp-content/uploads/2020/08/A318_NB205_The_future_of_the_AGRs.pdf

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1. ONR 27th Aug 2020 <http://news.onr.org.uk/2020/08/onr-gives-permission-for-return-to-service-at-hunterston-b/>
 2. The Ferret 27th Aug 2020 <https://theferret.scot/hunterston-cracked-nuclear-reactors-another-year/>
 3. Scotsman 1st September 2020 <https://www.scotsman.com/news/opinion/columnists/hunterston-nuclear-power-station-restart-unnecessary-risk-dr-richard-dixon-2957658>
 4. Largs and Millport Weekly News 1st July 2020 <https://www.largsandmillportnews.com/news/18533657.dont-turn-hunterston-guinea-pig---call-shut-reactors-now/>
 5. NFLA 2nd Sept 2020 <https://www.nuclearpolicy.info/news/nfla-scotland-and-ngos-serious-concerns-decision-restart-hunterston-b/>
 6. Bloomberg 9th Sept 2020 <https://www.bnnbloomberg.ca/edf-said-to-shut-hinkley-u-k-reactor-sooner-than-planned-1.1491421>
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 8. East Lothian Courier 3rd September 2020 <https://www.eastlothiancourier.com/news/18694407.call-torness-power-stations-lifespan-extended/>
 9. Periodic Safety Review: Assessment of the Heysham 2 and Torness third periodic safety review (PSR3) <http://www.onr.org.uk/pars/2020/heysham-2-torness-19-012.pdf> and The Ferret 6th May 2020 <https://theferret.scot/torness-nuclear-reactors-cracking-2022>
 10. EDF 22nd July 2020 <https://www.edfenergy.com/media-centre/news-releases/letter-torness-local-liaison-committee-22-july>
 11. World Nuclear News 7th August 2020 <https://www.world-nuclear-news.org/Articles/EDF-Energy-prolongs-outages-at-Dungeness-and-Hunte>
 12. Times 6th September 2020 <https://www.thetimes.co.uk/edition/business/nuclear-closures-pose-power-puzzle-d6bnnrcs>



5. Magnox Decommissioning Costs Escalate

The National Audit Office (NAO) estimates that the cost of clearing up the 10 Magnox sites, plus Harwell and Winfrith has increased by nearly £3bn since 2017 and there remains ‘inherent uncertainty’ over final bill. In addition, the cost to the taxpayer of the botched 2014 tender process was £20m higher than when NAO investigated 3 years ago. The Nuclear Decommissioning Authority (NDA) estimates the cost of getting all the Magnox reactors cleared and safely enclosed has increased by up to £2.7bn to around £8.7bn since 2017. (1)

NAO warns that while the NDA has made major progress sorting out its delivery procedures, costs are likely to continue to rise as it gets to grips with the scope of work. The expected cost is now double the original contract price when the initial clean-up deal was signed in 2014 with Cavendish Fluor Partnership. (2)

In September 2014, the NDA awarded a 14-year Magnox contract to Cavendish Fluor Partnership (CFP). In July 2016, the High Court ruled that the NDA had wrongly decided the outcome of the procurement process. In March 2017, the Secretary of State for Business, Energy & Industrial Strategy announced that the NDA had agreed settlements totalling £97.3 million with the bidder that brought the legal claims (Energy Solutions) against the NDA. He also announced that the NDA had decided, based on legal advice, to terminate the contract with CFP nine years early due to a “significant mismatch” between the work specified in the tendered contract and the work that needed to be done.

In October 2017 the NAO reported that the failed Magnox contract had cost the taxpayer more than £122 million by the time it was announced that it was to be terminated. These costs related to the settlement of legal claims with unsuccessful bidders, the cost of legal and external advice provided to the NDA, and the time spent by NDA staff on, for example, the competition, litigation and contract termination. NAO also found that the NDA’s poor understanding of what was happening on the sites had contributed to serious problems after it awarded the contract to CFP in 2014, with its assumptions about the work required proving to be inaccurate. (3)

The results of the NDA’s recent work to update the decommissioning programme for the Magnox sites shows that there remains significant uncertainty around its cost, with current estimates ranging from £6.9 billion to £8.7 billion. With the NDA now taking more direct control over the management of its sites, it will be critically important that it builds and retains better knowledge of the condition of its sites to enable it to plan and deliver decommissioning work efficiently and effectively. The NDA considers that it will be better placed to achieve this under its revised delivery model, but it is too early for NAO to assess the effectiveness of these arrangements.



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 2. Construction Enquirer 11th Sept 2020 <https://www.constructionenquirer.com/2020/09/11/magnox-nuclear-clear-up-cost-soars-to-9bn/>
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6. UK well off target to meet net-zero commitments

From the Citizens' Climate Assembly, Extinction Rebellion and radical bodies like the CBI and the Institute for Government the frustration at the Government's inaction on climate change is palpable.

A ban on the sale of internal combustion engine cars and gas boilers should be brought forward to as soon as 2030, the pioneering citizens assembly set up to help chart the UK's route to net-zero emissions has recommended. The first report from the 110-strong Climate Assembly UK also expressed strong support for on and offshore wind generation and solar but was considerably cooler on nuclear and fossil fuels with Carbon Capture and Storage (CCS). (1)

James Murray, the editor of the Business Green website, tweeted:

"For everyone attacking (Extinction Rebellion) XR ... its tactics are controversial and often flawed. But what are your more effective tactics for putting us properly on track for net zero emissions within 30 years? Because nothing's worked so far."

And (to paraphrase):

The core message of the Citizens' Assembly is *"get on with it"*. Precisely the same message as from business groups, investors, MPs and campaign groups. It's 12 years since the Climate Change Act, five years since the Paris Agreement and 12 months since the UK put net zero on a legal footing. The UK's decarbonisation plan doesn't even put the UK on a path to meet the old 80% target and the President of COP26 has failed to reassure MPs that the updated climate action plan would appear before the end of the year.

A new report by the Institute for Government said there is still 'little evidence' that the UK government has confronted the enormous scale of the task to reach net zero emissions. It warns that meeting the challenge of decarbonisation is more challenging than responding to the COVID-19 pandemic or getting Brexit done, as it will require transformations of every sector in the country's economy. This will take sustained investment over the next thirty years, and change everyone's lives substantially. As such, one of the report's biggest suggestions is to take the responsibility for reaching net zero away from the Department of Business, Energy and Industrial Strategy (BEIS). The Institute for Government highlighted the Committee on Climate Change's previous estimate that reaching net zero will cost 1-2% of GDP per year, the government must work out how to confront this cost and enact it, regardless of its unpopularity with specific groups.

While the report acknowledges that progress has been made in the power sector, decarbonising transport and heating will provide much bigger challenges, but there will be substantial benefits if the right upfront investment is made and the cost balanced between businesses, consumers and taxpayers. This include improved health, new jobs in low-carbon industries and long-term



savings. “But government should be under no illusion about the difficulty of its target, and of securing the public support needed to meet it.” (2)

IfG says the Cabinet Office should be made responsible for co-ordinating the plan and holding departments to account for delivery. Polling suggests two-thirds of people have not heard of net zero, despite the fact that it will mean changing the way they heat their homes, the cars they drive and what they eat. The government should build on parliament’s climate assembly initiative and level with the public on the changes net zero will require.

The government needs to work out how to pay for the shift to a carbon neutral economy – estimated at 1–2% of GDP per year – and how to ensure costs are distributed fairly. It should also renew its focus on preparing for the impacts of a changing climate, such as increased flooding and heatwaves. If the UK fails to show that it is serious about its climate change targets, it risks wasting a golden opportunity to demonstrate leadership in the fight against climate change when it hosts next year’s rescheduled COP26 summit.

The report recommends that the government should build on the successful model of the Olympic Delivery Authority to ensure big changes like housing retrofit and the switch to electric vehicles happen smoothly, and support the creation of a dedicated parliamentary net zero committee to hold the government to account on progress. (3)

Meanwhile, The Confederation of British Industry (CBI) says the Government needs to “*undertake a significant programme of infrastructure investment*” to enable regulators and private investment to create funding for critical net-zero infrastructure. CBI’s new report notes the need for the UK to “develop a world-class environment for private investment in infrastructure” in order to combat the economic damage caused by the coronavirus pandemic. The CBI is calling for the Government to give regulators more control and targets to deliver the anticipated National Infrastructure Strategy (NIS), and have clear regulatory guidelines to support sectors with the net-zero transition.

The Government was meant to publish its long-awaited 30-year National Infrastructure Strategy (NIS) alongside the Budget in March, but it was delayed to give chancellor Rishi Sunak more time with the strategy. Its launch has now been mooted for Autumn this year and reports suggest that the delay will allow for changes to ensure that funding is reflective of the UK’s net-zero target for 2050. (4)

The CBI’s Green Recovery Road Map urges the government to accelerate efforts to develop and scale up renewables, electric vehicle charging infrastructure, green retrofits for buildings, hydrogen infrastructure, sustainable aviation fuels, and carbon capture, storage and utilisation (CCUS) technologies. (5)

Interestingly, CBI Director-General Dame Carolyn Fairbairn, makes no mention of nuclear power. (6)

1. Utility Week 10th Sept 2020 <https://utilityweek.co.uk/citizens-assembly-backs-evs-and-low-carbon-heat-but-unsure-on-nuclear-and-ccs/>



2. **Current 7th Sept 2020** <https://www.current-news.co.uk/news/little-evidence-government-has-confronted-scale-of-net-zero>
3. **Institute for Government 7th September 2020** <https://www.instituteforgovernment.org.uk/publications/net-zero?s=09>
4. **Edie 7th Sept 2020** <https://www.edie.net/news/11/UK-needs-significant-overhaul-of-infrastructure-investment-to-reach-net-zero-report-claims/>
5. **Business Green 14th Sept 2020** <https://www.businessgreen.com/news/4020116/cbi-tells-government-net-zero-action-speaks-times-louder-words>
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7. Geological Disposal Developments

The Geological Disposal Facility (GDF) siting process was launched with the publication of the government's policy in England during December 2018 (1) (Wales January 2019 (2)) and the National Policy Statement (NPS) was designated in October 2019. (3) Another important milestone, according to Radioactive Waste Management (RWM) was approval by the Government of the next stage of the GDF Programme Business Plan. (4) This should be read alongside the Annual Review 2019 – 20. (5) For almost 2 years now, the UK Government has been calling on Local Authorities in England and Wales and other landowners to declare an interest in hosting a deep underground radioactive waste repository.

The Annual Review says during 2019-20 RWM entered into informal confidential discussions with a number of individuals and organisations across the country, to provide information and to explore whether a GDF may be consistent with the vision for their communities. The next stage is to move to Working Groups and a public declaration of interest in exploring the siting of a GDF without any commitment from that community.

The outgoing Managing Director of RWM describes a GDF as:

“...a hugely significant multi-generational project, with the operational stage expected to last for one hundred years or more. It is also a process that requires a willing, informed and supportive community.”

Copeland Council's Executive Cabinet has voted to “open up discussions” on the possibility of building an underground nuclear waste repository in the borough. (6) Cumbria Trust says if, as expected, other areas of the country don't volunteer the desire to make this succeed risks political expediency taking precedence over science once again. On the positive side, Copeland has not repeated the key failure of the last process, by this time ruling out the Lake District from the very start. (7)

In its statement the Council said that this decision does not presuppose support for a repository in West Cumbria. Instead their engagement is intended to help understand more about the project and its implications, given that a number of expressions of interest have been received from other interested parties in the community. Concern has been raised that putting part of a repository off the coast and under the Irish Sea is not being ruled out.

It is understood other Councils and landowners remain interested and are still in discussion in private with RWM.

“A permanent Solution for higher activity radioactive waste” is a new report from RWM (8) which is described as setting out the challenge of delivering a Geological Disposal Facility (GDF). The report looks at the history, policy, and approach for delivering a GDF in the UK, in a single document *“as a reference point for stakeholders”*.



The document makes great play of the “*huge opportunity for an area to transform its economic potential not just through the construction of a GDF, but also through the creation of hundreds of secure, highly skilled and paid jobs which will, in turn, depend on new social and educational facilities to support them. For the right community, in the right place, it could be truly transformational.*”

David Lowry points out that the very first paragraph contains an inaccuracy. It says:

“Ever since the first electricity generating plant opened at Calder Hall in 1956 ...”

Calder Hall was never a “commercial” nuclear plant. In fact, it was clearly stated at the time of the plant’s opening, that it was built for military purposes and designed as a dual-purpose plant to produce plutonium for military purposes as well as electric power.

He also points out that in addition to voluntary “host communities” there will be dozens of affected “involuntary” communities on transport routes. There will be no community benefit for them, as a result of suffering from hazardous cargoes for up to a 100-years, decimated house prices and permanent worry over safety and potential terrorism. Yet again this reality has been conveniently ignored in this highly distorted, very selective picture of a GDF development

RWM Chief Executive, Karen Wheeler, says in the foreword:

“Without action now, we would be extending for decades the risks and costs of handling this waste above ground, and leaving future generations to deliver a permanent solution.”

Bruce McKirdy said:

“It cannot be emphasised often enough: there is a pressing need to address our nuclear past, and we believe we are the generation who should take responsibility for this legacy.”

But there is very little mention of the proposed nuclear future. It’s worth noting, for instance, that in order to ensure that the performance of the bentonite buffer material to be placed around canisters in the GDF is not damaged by excessive temperatures, it will require spent fuel from an EPR to be cooled for around 140 years. (This number was revised upwards by 40 years following a correction to a thermal model used to estimate the cooling time required for spent



fuel.) Given that EPR reactors are expected to have a life of 60 years, it will be 200 years before spent fuel from new reactors can be disposed of in a GDF. (9)

Wheeler and McKirdy's statements sounds similar to the July 2006 argument from the Committee of Radioactive Waste Management (CoRWM) report which said:

"New build wastes would extend the timescales for implementation possibly for very long but essentially unknowable, future periods. Further, the political and ethical issues raised by the creation of more wastes are quite different from those relating to committed – and therefore unavoidable – wastes."

A GDF is not expected to be ready to receive waste before 2040 at the earliest – a date which is looking increasingly optimistic. Then it will take around 90 years to emplace all existing waste before we can entertain the idea of beginning to emplace any spent fuel from new reactors. So, the idea that, in the words of the brochure, that: *"The sooner we make progress, the sooner we can remove this environmental burden from our society and future generations"* is absurd. As Professor Andy Blowers put is:

"Given the timescales involved there is no need to hurry towards a disposal solution that may, in terms of proving a concept and finding a site, be difficult to implement. Society can, and should, take its time in dealing with its nuclear legacy. Meanwhile the focus should be on managing it where it is rather than a premature search for new places and possibly new communities for deep disposal. The problem we already have is difficult enough and will only be compounded if new reactors are built extending the timescales for implementation for very long, unknowable periods in the future." (10)

The report focusses, as in previous RWM literature on the volume of the waste, rather than its radioactivity, declaring, for instance that: "even if all nuclear activities were to stop tomorrow, about 90% of this volume [with all new build stations coming to fruition] would still exist." According to Radioactive Waste Management Ltd, the radioactivity from existing waste (i.e. not including new reactors) is expected to be 4,770,000 Terabecquerels (TBq) in the year 2200. The radioactivity of the spent fuel alone (not including other types of waste) generated by a 16GW programme of new reactors is expected to be around 19,000,000TBq. The amount of radioactivity in the spent fuel from Hinkley Point C in the year 2200 would be 3,800,000TBq – or about 80% of the radioactivity in existing waste. (11)



RWM says it has been able to step up its work to find a suitable site and willing community, by publishing its approach for evaluating potential sites for a GDF. (12) Plans are now in place for the next phase of technical work required for the geological disposal programme. This will include securing permissions for boreholes to inform the characterisation of potential sites for a GDF.

- (1) See Implementing Geological Disposal BEIS December 2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766643/Implementing_Geological_Disposal_-_Working_with_Communities.pdf
- (2) <https://gov.wales/sites/default/files/publications/2019-04/geological-disposal-of-higher-activity-radioactive-waste-guidance-for-communities.pdf>
- (3) National Policy Statement for Geological Disposal Infrastructure, BEIS 17th October 2019
<https://www.gov.uk/government/publications/national-policy-statement-for-geological-disposal-infrastructure>
- (4) RWM Business Plan 2020 – 23
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916521/RWM_Business_Plan_2020_23_Annex.pdf
- (5) RWM 10th Sept 2020
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- (6) Whitehaven News 23rd July 2020 <https://www.whitehavennews.co.uk/news/18597671.council-opendiscussions-underground-nuclear-waste-repository-though-not-lake-district/>
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