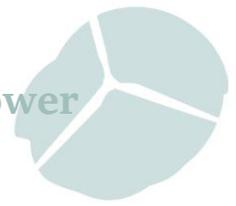




No.106 April 2018

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3. **Notes on Renewable Progress – subsidy-free onshore wind and solar could generate three times as much as Hinkley by 2030; offshore wind no longer a fantasy.**
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6. **Civil Nuclear Energy Policy – An Alternative Perspective.**



1. Hinkley Point C – ONR concerns

The Office for Nuclear Regulation (ONR) has raised concerns with EDF Energy over management failings that could affect safety at the Hinkley Point C power station if left unaddressed. (1) ONR identified five key areas of supply chain management where improvements are needed ahead of acceleration in both construction and manufacturing for the project. ONR has rated an overall inspection finding as ‘amber’. This means that some arrangements are below standard and the ONR is seeking improvements. The five key areas include issues such as improvement programmes, lessons learned, self-assessment and quality assurance. (2)

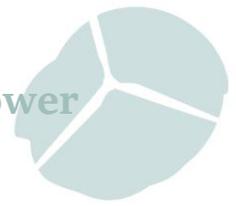
ONR said the inspection of the supply chain for Hinkley Point C was instigated in the context of the records falsification issues that emerged in 2016 at Areva’s Le Creusot forge facility (Now known as Framatome Cresusot-Forge or FCF). The facility is a supplier of key components to the Hinkley project. The falsification issues became apparent after the French nuclear safety regulator, ASN, confirmed that major technical and organisational shortcomings had occurred at FCF. In October and November 2017, a team of 11 inspectors led by Mark Foy, chief inspector at ONR visited the Hinkley site, EDF facilities in Bristol and Paris, and FCF in France.

Although the inspection team concluded that Areva and NNB GenCo [the EDF subsidiary building Hinkley] had made good progress in deploying their improvement programme and had enhanced their manufacturing processes, management system arrangements and the facility’s nuclear safety and quality culture, the inspection was rated “amber”, meaning some arrangements are below standard and improvements need to be made. For example, evidence was not provided to demonstrate how NNB GenCo had learnt from the failings at Creusot Forge and communicated to contractors. NNB GenCo’s own supply chain improvement programme needs further development to make sure it is prioritised and better aligned to the project’s schedule, the ONR said. (3)

Though not serious enough alone to raise regulatory issues, together they “*may indicate a broader deficiency*” in the way the company is run, concluded Foy.

The full reports of the inspection team has been released to *The Guardian* under freedom of information rules, paint a critical picture. They show that:

- The ONR was concerned that EDF’s internal oversight and governance had not identified the shortcomings at the forge;
- Stuart Crooks, Hinkley Point C managing director, admitted that EDF, not the ONR, should have spotted those shortcomings first;
- A lack of resources meant EDF did not undertake an internal audit of its quality control processes during 2017. Foy said this was “disappointing” as it might have picked up problems



On safety, the report said: *“Throughout this ... inspection, themes have emerged that relate to both improvements in NNB GenCo’s processes and to shortfalls in management system arrangements that, if unresolved, have the potential to affect safety.”*

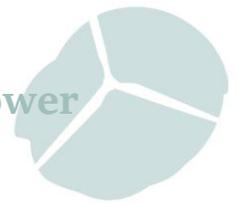
EDF’s own assessment of how it managed Hinkley’s supply chain had discovered shortfalls that could affect safety, the regulator found. The ONR also felt that the company’s plan for improving its self-assessment process was inadequate.

Moreover, they said that it was not clear who at EDF was managing quality control on the supply chain.

Interviews with EDF’s contractors for the Hinkley project, which include civil engineering groups Kier BAM and Bylor, also found that EDF had not done enough to pass on information about the failings at the Creusot forge to its suppliers. However, the regulator said it was confident the company could make improvements before the next key regulatory milestone for the power station, in August 2018. Overall, EDF was found to be operating within the UK’s exacting nuclear regulations. (4)

In response to a letter from the Stop Hinkley Campaign Mark Foy said that FCF has forged three of the main coolant line hot legs for Hinkley Point C since July 2017 and has a further 29 to do. NNB Genco hasn’t finalised the forge supplier for the remaining major nuclear steam supply system components. ONR says it has introduced an enhanced assessment approach which includes witnessing forging and related activities at FCF. ONR has also issued a legal instrument that will require ONR’s Agreement prior to receipt of the nuclear steam supply system components.

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1. Guardian 25th March 2018 <https://www.theguardian.com/uk-news/2018/mar/25/nuclear-watchdog-raises-hinkley-point-c-concerns>
 2. Nucnet 16th March 2018 <https://www.nucnet.org/all-the-news/2018/03/16/uk-regulator-says-improvements-are-needed-in-hinkley-point-c-supply-chain>
 3. Reuters 15th March 2018 <https://uk.reuters.com/article/uk-britain-nuclear-hinkleypoint/uk-nuclear-project-needs-better-supply-chain-management-regulator-idUKKCN1GR1KI?rpc=401&>
 4. Guardian 25th March 2018 <https://www.theguardian.com/uk-news/2018/mar/25/nuclear-watchdog-raises-hinkley-point-c-concerns>



2. National Policy Statement Consultation

We've been looking at some of the responses to the Department for Business, Energy and Industrial Strategy's (BEIS) consultation on proposals for a new National Policy Statement (NPS) for nuclear power above 1GW single reactor capacity for deployment between 2026 and the end of 2035.

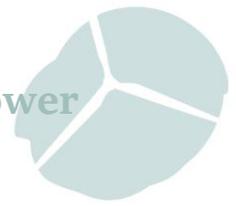
The Blackwater Against New Nuclear Group (BANNG) has a sense of déjà vu because their first consultation response was ten years ago on *'The Strategic Siting Assessment Criteria for New Nuclear Power Stations in the UK'*. This sense of repetition is conveyed by the considerable similarity between the consultation papers of 2008 and 2018. Indeed, it is hard to distinguish any substantial difference between them. This is, perhaps, not surprising since their purpose, though separated by a decade, remains essentially the same, namely, to facilitate the development of new nuclear power stations on existing nuclear sites.

BANNG says on none of these sites will a new nuclear power station be generating electricity by 2025 and only one station, the ill-starred Hinkley Point C, is likely to operate by 2027, and, even now its future remains uncertain. As for the other seven sites, economic, technical, safety and siting issues make it inconceivable that many of them will be deployed let alone producing power before 2030 and, by then, large nuclear power stations will be outmoded.

The Government claims the circumstances are broadly the same as they were ten years ago and there are still only the same sites available that were identified in EN-6. BANNG regards this line of argument as tendentious, disingenuous and deceptive on three counts:

- Firstly changes in energy supply have removed any justification for nuclear energy based on need;
- Secondly the purpose of this strategic siting assessment is to ensure that sites which have already been earmarked for development will continue to be available to the developers who are working up projects. It supports a policy more concerned with levering foreign investment than any concerns about impacts on communities now and in the future who will have to pay the costs and deal with the burdens of the nuclear legacy.
- Thirdly, on the acceptability of sites, the criteria proposed are very little different from those used to select the sites in EN-6 in 2009. This elaborate process is little more than a shallow reaffirmation of the status quo. Yet during the past decade concerns about the vulnerability of these coastal sites has increased. At the same time it has been realised that nuclear activity, including decommissioning and waste management, will be present on these sites well into the next century and possibly indefinitely.

BANNG wants potential developers to be invited to indicate that it is their view that they will be able to operate and manage nuclear facilities, including the storage of spent fuel and other wastes, over the lifetime of the site which at a minimum is likely to be for a period of more than a hundred years from the commencement of operations until final site closure. By the same token Government must consider whether they are confident that the information supplied by



the developer is sufficiently robust to enable the site to proceed to assessment and potential designation. BANNG believes it is unlikely that developers will be able 'to confirm that they can protect the site against flood risk throughout the lifetime of the site, including the potential effects of climate change without increasing flood risk elsewhere'

The situation beyond 2100 is indeterminate but it is likely that during the next century the nuclear facilities, including wastes, remaining on several coastal sites will be severely threatened with inundation and coastal change. It will be impossible to demonstrate with any confidence that these sites will be resilient against changes of the magnitude that are likely.

BANNG concludes: "although we have persevered in responding to this consultation we are fearful that it is a charade and simply a necessary but flawed process to ensure the legitimization of those sites already under development. Therefore, we reiterate our concern that the process for designating potential sites for new nuclear power stations is deeply flawed, unjustified and inadequate."

Taken to TASC

Together Against Sizewell C (TASC) (2) says nuclear development fails the overwhelming majority of criteria for environmental protection themes detailed in the Scoping Report (page 22), making it completely unsustainable and totally unjustified. (3)

TASC says there shouldn't be any sites designated for new nuclear power stations which are in EA flood zone 3. (Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year) (4). This would exclude sites at Bradwell, Oldbury, Hartlepool, and part of Sizewell.

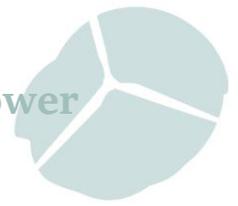
BANNG points out that the criteria for strategic siting is deficient. They are too vague, permissive and constrained. The exclusionary category indicates categorical exclusion of a site but there are very few in this criterion. Discretionary criteria account for the majority and most of them set a low threshold for compliance and are often open to interpretation. Considerable scope is allowed for mitigation.

BANNG and TASC both agree that the 'Flooding, tsunami and storm surge' criterion should be exclusionary, and Bradwell, Oldbury, Hartlepool, and Sizewell dropped from the list. Both groups also want coastal processes (erosion) to be an exclusionary criterion. Research has shown that Bradwell is at risk, and the Sizewell coast subject to rapid erosion. On this basis both should be dropped from the list. Close proximity to a hazardous facility should also be an exclusionary criterion which would discount those sites with an existing nuclear facility even where being decommissioned.

Both TASC and BANNG refer to a paper presented to the BEIS NGO Forum by Neil Crumpton on 17th July 2017, which was discussed further at the recent Forum Meeting on 18th January 2018. This will be looked at in more detail below.

No need for nuclear

The submission from the Nuclear Free Local Authorities (NFLA) (5) focusses on the lack of need for new nuclear power stations. It says there is no "need" for new nuclear power stations.



Energy efficiency has already reduced electricity consumption by 30% compared with what it was expected to be in 2017 at the time that Hinkley Point C was first mooted, and the reductions can continue. And, in the words of Mike Thompson, Head of Carbon Budgets at the CCC says *“It is increasingly apparent that renewables do or will offer the lowest cost of electricity over their lifetime of all generating options.”*

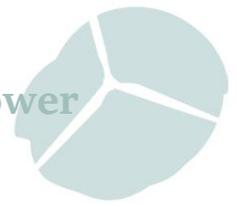
NFLA concludes that the electricity system has changed radically in the years since the project to build new third generation nuclear in Britain was initiated. As Michael Grubb, Professor of International Energy and Climate Change Policy at University College London, told the House of Lords Selected Committee on Economic in 2016, although he had supported new nuclear during his time on the Committee on Climate Change, he felt *“times and conditions had substantially changed ... renewables are now clearly cheaper. Committing to a 35-year contract at that level was economically inappropriate”* He continued: *“renewable energy costs ... appear almost to have halved in the past few years ... We now have more than 10 gigawatts of solar, when the cost projections were that we would get 1.5 gigawatts by about this time ... It is now clear that in the electricity sector we will be delivering more renewables than the Government planned for or expected by 2020.”*

Clearly the Overriding National Policy Statement on Energy (EN-1) upon which the old and new Nuclear NPS (EN-6) depend needs to be completely re-written. There is no “need” for new nuclear power stations. This current consultation should be scrapped and the Government should go back to the drawing board and re-write the EN-1 National Policy Statement.

The Stop Hinkley Campaign point out that in February, the Business Secretary, Greg Clark, told a House of Lords committee the UK would have enough energy if Hinkley Point C was further delayed. EDF Energy has admitted that it could be delayed until 2027. The Minister also admitted the Government has no target for nuclear energy use in the future. So there is plenty of time to implement alternative measures. As Stop Hinkley stressed in its response to the Helm ‘cost of energy’ review the best way for the Government to keep electricity costs to consumers as low as possible over the coming decades, while reducing carbon emissions, and providing secure electricity supplies, is to cancel Hinkley Point C, scrap the new nuclear programme, launch a much more comprehensive energy efficiency programme and expand renewable energy ambitions. Cancelling Hinkley Point C now might incur a cancellation cost of around £2bn, but consumers could save around £50bn over its lifetime. (6)

Greenpeace says the NPS documents appear to be an attempt to smuggle through maximum latitude for future nuclear power decisions with a minimum of genuine public consultation, discussion and justification. Despite the fact that the draft NPS relies on the 2011 overarching NPS on energy to show the need for new nuclear power stations, the Government wants the new Nuclear NPS to sit on its own outside of the 2011 suite.

This is illogical. By drawing heavily on EN-1 to ‘justify’ why nuclear is needed, the new NPS avoids any up-to-date justification for the need for nuclear power in the context of current circumstances. Such a justification would be extremely hard - the document avoids any discussion of the rapid advancement of renewables costs and those of complementary demand management and storage.



In fact the Government has set out a justification for new nuclear in response to the House of Commons Public Accounts Committee (7) who recommended as part of their inquiry into Hinkley Point C that:

“The Department [BEIS] should re-evaluate and publish its strategic case for supporting nuclear power before agreeing any further deals for nuclear power stations.”

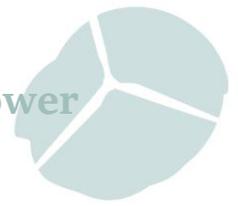
BEIS response in January of this year, stretching credulity, was that it had implemented this recommendation by telling the committee that:

“Nuclear has an important role to play in the UK’s electricity system as part of a diverse energy mix. In particular, it provides reliable baseload power that contributes to the UK’s energy security.” (8)

A programme of many tens of billions of pounds subsidy justified in a single sentence. Even though experts in the field have already for several years regarded the concept of baseload as outdated. (9) So it’s a single sentence that’s out of date. As an explanation of the need for new nuclear power it is both derisory and wrong.

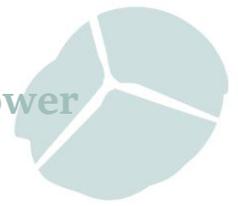
Greenpeace concludes there is no disguising that the pro-nuclear policy in the 2008 White Paper has failed. Circumstances have substantially changed and the justifications used for 2011 NPS no longer apply. If the Government wants to embark on a new statement of need under the 2008 Planning Act then it must first launch a full consultation with full information, including the future which is envisaged outside Euratom, and justify the detriment associated with long term storage of spent fuel on the sites of new nuclear stations.

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1. BANNG Response to the Nuclear NPS, 2018 <https://www.banng.info/news/banngs-response-to-the-national-policy-statement-re-new-nuclear/>
 2. TASC Response <http://tasizewellc.org.uk/index.php/submissions-and-reports/219-tasc-response-to-beis-en6-national-policy-statement-consultation>
 3. See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/666482/AoS_Scoping_Consultation_FINAL_v2_hp_TAdocx.pdf
 4. See <http://apps.environment-agency.gov.uk/wiyby/cy/151263.aspx>
 5. NFLA New Nuclear Monitor No.52 http://www.nuclearpolicy.info/wp/wp-content/uploads/2018/02/NFLA_New_Nuclear_Monitor_No52-NPS-.pdf
 6. See http://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2018/03/StopHinkley_NPS_Response1.pdf
 7. See <https://www.parliament.uk/business/committees/committees-a-z/commons-select/public-accountscommittee/inquiries/parliament-2017/hinkley-point-c-17-19/>
 8. Para 3.2 <https://www.parliament.uk/documents/commons-committees/public-accounts/Cm-9565-TreasuryMinutes-jan-18.pdf>
 9. <http://energypost.eu/interview-steve-holliday-ceo-national-grid-idea-large-power-stations-baseload-poweroutdated/>



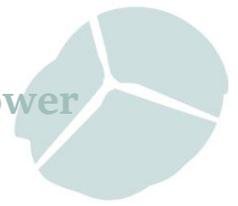
3. Notes on Renewable Progress – subsidy-free onshore wind and solar could generate three times as much as Hinkley by 2030; offshore wind no longer a fantasy.

- Claire Perry has signalled that onshore wind and solar projects will be allowed to compete for subsidies in a future Contract for Difference (CfD) auction. BEIS excluded established renewable technologies, onshore wind and solar, from last year's CfD auction, but the energy and clean growth minister now says that an auction including these so-called Pot 1 technologies is in the pipeline. The Conservative manifesto for last year's general election maintained the government's bar on new onshore windfarms in England but kept the door ajar for such projects in areas of Scotland and Wales where they enjoy public support. The European Commission has told the UK government it will not block moves to allow wind farm projects on the Scottish islands to enter the next CfD auction. (1)
- A report by the Energy and Climate Intelligence Unit (ECIU) has found that re-powering UK onshore wind sites built at the turn of the millennium could build on current capacity. More than 750 turbines at 60 sites are coming to the end of their operational lives, with less than five years remaining of the 20-year period for which they have planning permission. Taller turbines could increase the total capacity of the 60 sites from 440 megawatts to 1,300 megawatts and produce enough power for 800,000 homes. Jonathan Marshall, author of the ECIU report, said this would save consumers more than £77 million per year on energy bills, compared to generating the same amount of electricity from gas-fired power stations, and help put the country back on track to meeting climate change targets. The electricity would be significantly cheaper than that from current onshore wind farms, which received more generous support at a time when less-developed technology needed higher subsidies. The new turbines could be funded with guaranteed payments of about £46/MWh close to the present wholesale price and half the price of electricity from the new nuclear power station being built at Hinkley Point in Somerset. The ECIU report said that taller turbines had "greater resilience to high winds in which older units were unable to operate safely" and their height allowed them to access stronger winds. (2)
- Britain is on the brink of a subsidy-free renewables "revolution" which could create up to 18GW of new capacity by 2030 and attract £20 billion of investment according to Aurora Energy Research (Prof Dieter Helm is a Director). An explosion of subsidy-free renewables would largely snuff out the already dim prospects for new combined-cycle gas turbines (CCGTs). The research highlights the enormous prize and potential in the market, not only in Great Britain but across Europe. *"This will be a true game-changer for the energy industry and policy makers, with a knock-on effect on baseload technologies as*



well as flexible generation." Analysis by Aurora suggested 9GW of solar, 5GW to 6GW of onshore wind and 3GW to 4GW of offshore wind could be built without subsidies by the end of the next decade. It predicted solar and onshore wind would reach grid parity in the early 2020s, whilst offshore wind would hit the milestone in the late 2020s or the 2030s. To achieve the projected build out, financing costs would need to be lowered through a better understanding of the merchant risks for renewable generation. (3) This could mean onshore wind and solar farms capable of generating more than three times as much power as the new Hinkley Point C nuclear plant being built without any subsidy from taxpayers by 2030. (4)

- The offshore wind industry celebrated another milestone after the Dutch government confirmed plans for a 700MW project in the North Sea that will be built under 'subsidy-free' terms. Swedish utility Vattenfall beat Statoil and Innogy in an auction process for the right to develop two 350MW zones known as Hollandse Kust I and II. Under the rules of the auction, the Dutch government only accepted bids that could undercut wholesale power prices, effectively making the resulting price support contracts 'subsidy-free'. The Hollandse Kust projects, which are expected to provide enough power for one million Dutch homes, will now be developed by Nuon, Vattenfall's Dutch subsidiary. They are scheduled to come online by 2022. The 'subsidy-free' bid further underlines the rapid cost reductions that have been seen across the offshore wind industry recently. It is the third of five tenders planned by the Dutch government with each auction round having seen bids fall as developers. Hopes are now rising that further subsidy-free projects can be confirmed through the final tender rounds, as the Dutch government pursues its goal of deliver 3.5GW of new offshore wind capacity by 2023. (5)
- Under sector deals, part of the Government's broader industrial strategy, Whitehall has pledged to provide support for key growth sectors of the economy. Such a deal is currently being negotiated for the offshore wind industry. The industry's vision is to increase generation capacity from the 13GW deployed or contracted today, to 30GW by 2030. This would enable offshore wind to meet one third of the UK's electricity needs. The industry's vision for 2030 envisages £48 billion worth of investment in UK offshore wind infrastructure. The deal estimates that the sector's exports could increase five-fold by 2030 to £2.6 billion a year on the back of a global offshore wind market that is expected to grow to more than £30 billion per annum by the end of the next decade. This expansion would support the creation of 27,000 skilled jobs across the UK, mainly located in coastal areas, compared to the 11,000 it employs today. (6)
- Following hot on the heels of the major shake-up caused by E.ON and RWE's proposed asset transfers and Statoil's decision to ditch its oil-based moniker, the FT reported that engineering giant GE is stepping up its investment in offshore wind power at the same time as cutting 12,000 jobs from its thermal power divisions. "The conventional wisdom, three, four years ago at GE was thermal power [will] keep growing and offshore wind is a fantasy," Jérôme Péresse, chief executive of GE Renewable Power, was quoted as saying. "*Now offshore wind is not a fantasy, it's a market. And GE can positively adapt and invest into it.*" (7)



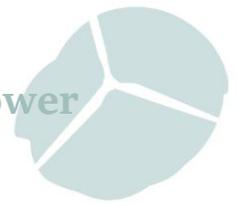
- Residents of the Isle of Canna off the west coast of Scotland have secured £1.3m to largely ditch their diesel power generators in favour of a new community-owned renewable electricity system based on solar PV, wind, and battery storage technologies in a bid to cut fuel usage and costs. Construction of the off-grid renewable energy system is due to start next month and is expected to take around seven months to complete, after which profits from the power generated will be used to cover operation and maintenance costs, and reduce bills for local homes and businesses. The existing diesel generators will continue to be leased to islanders, but it is hoped that upwards of 90% of their electricity needs will be met by the PV panels and six small onshore wind turbines being built on the island. The community has established its own enterprise – Canna Renewable Energy and Electrification Ltd (CREEL) – to own and operate the new equipment. (8)
- Solar school economics is returning. RepowerBalcolme has completed its latest community funded install at a primary school in West Sussex indicating that the economics of such projects are now “coming back” following feed-in tariff cuts. The 20.52kWp system at Holy Trinity Primary School in Cuckfield represents the ninth project to be completed by the group, having now installed 163kWp of community funded solar in the local area. The system was fully funded by RepowerBalcolme in exchange for all of the FiT income and a small maintenance fee, with the school benefiting from 20% of their electricity needs being met by the 18,000kWh generating annually by the system. This is expected to save the school £1000 on their energy bills each year. (9)
- Fuel poor homes in Scotland could benefit from a new community-owned onshore wind farm set to open in East Lothian later this year, under an innovative new Scottish government-backed scheme. Claimed to be one of the first deals of its kind in Scotland, the Pogie onshore wind farm has been financed using a deal structure that supports not-for-profit energy supplier Our Power’s aims to tackle fuel poverty. The financing deal has secured £13m of debt funding to allow the acquisition and development of the Pogie site, backed by a range of stakeholders including Mongoose Energy, Close Brothers Leasing and the Scottish Investment Bank’s Renewable Energy Investment Fund (REIF), which is supported by the Scottish Government. Once completed later this year, the 12-turbine wind farm will boast a total capacity of 9.6MW, and under the financing deal net surpluses from the project are earmarked for the benefit of communities suffering fuel poverty and other local causes, Our Power said. (10)
- Highland Council is to invest £2.3 million in building a range of small solar farms across its estate after agreeing on a scheme that aims to make more than £4 million for the council over 20 years. The council’s current plans would see 2.5MW of solar built, comprising ten 250kWp arrays built on land that according to Councillor Bob Lobban, chairman of the authority’s redesign board, could not be used for anything else.
- North Ayrshire Council is planning to install rooftop solar on up to 500 of its council houses to save residents up to £115 within the first year to help tackle fuel poverty. Cabinet member for place, councillor Jim Montgomerie, said: “As well as helping some of its lowest-income residents, this programme also makes a big environmental



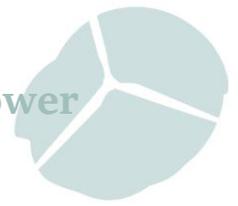
statement.” An initial consultation on the £1.6 million solar panel initiative identified 1,100 council properties in North Ayrshire which could benefit from the installations. The council will now contact these homes again to gauge their interest, with additional properties considered for inclusion on a first-come, first-served basis up to a limit of 500 installations. (12)

- The Building Research Establishment (BRE) has launched a brand new solar carport guide with the intent of stimulating the market. Launched at this week’s Ecobuild exhibition the guide, entitled ‘Multifunctional Solar Car Parks: A good practice guide for owners and developers’, has been funded by Innovate UK and written alongside solar carport specialist Flexi-Solar. (13)
- The Greater Manchester Combined Authority has launched a new £15m loan programme designed to make it easier for property and infrastructure developers to incorporate renewables as part of their projects. Backed with funding from the European Regional Development Fund, the Greater Manchester Low Carbon Fund will offer loans to fund projects that would not attract traditionally commercial finance due to the relatively new technology involved, or projects that would be improved through the fund’s expertise. The loans will then be repaid over a 15 year period with the proceeds then recycled into further green projects across the region. (14)
- Recent announcements in the UK and across the rest of Europe seem to be ushering in a new era of “*subsidy-free*” renewables, which can be deployed without government support. Yet “*subsidy-free*” is a nebulous phrase that means different things to different people. In fact, many of the “subsidy-free” schemes announced over the past 12 months would not meet the purest interpretations of the term. The Carbon Brief website tries to answer some of the questions. (15) Dave Toke, reader in Energy Politics at Aberdeen University says in theory onshore wind power and maybe some solar power projects would be able to generate power to sell at competitive prices on the British wholesale electricity market. In practice most of the potential buyers of energy from new renewable energy projects will not be interested in buying the energy even at cheap prices simply because it conflicts with their own generation portfolios. At the end of the day, there may be lots of potential for generating electricity from renewable energy at prices that are no higher than that from new gas fired power stations. But the British electricity market is skewed against this happening. (16)

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 2. ECIU 27th March 2018 <http://eciu.net/press-releases/2018/report-updating-wind-farms-would-bring-cheap-power-boost>
 3. Edie 22nd March 2018 <https://www.edie.net/news/10/Britain-on-course-for--20bn-subsidy-free-renewables--revolution-/>
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5. Business Green 2th March 2018 <https://www.businessgreen.com/bg/news-analysis/3028814/the-tip-of-a-very-large-iceberg-subsidy-free-offshore-wind-contract-awarded-as-low-cost-renewables-trend-gathers-pace>
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14. Business Green 9th March 2018 <https://www.businessgreen.com/bg/news/3028105/greater-manchester-gbp15m-low-carbon-fund-to-deliver-green-building-renewables-boost>
15. Carbon Brief 27th March 2018 <https://www.carbonbrief.org/what-does-subsidy-free-renewables-actually-mean>
16. Dave Toke's Blog 1st April 2018 <http://realfeed-intariffs.blogspot.co.uk/2018/04/why-britains-distorted-electricity.html>



4. Decarbonising Heat

About 85% of the UK's heating comes from natural gas, which is delivered through the gas network. By contrast, electricity is generated from a mixture of gas, coal and renewables. During peak demand in the recent cold snap, wind contributed 30% of power. The mix highlights that while the country has made significant progress in decarbonising electricity supplies heating has yet to make a similar leap.

Efficiency First

The government's Clean Growth Strategy, published last October, set out targets to improve the energy efficiency of homes and businesses but many of the proposals lacked detail. The strategy called for poorly insulated "fuel poor" homes — households that spend more than 10% of their income on fuel — to be upgraded to the more efficient Energy Performance Certificate band C by 2030 — and for as many homes as possible to be EPC band C by 2035. (1)

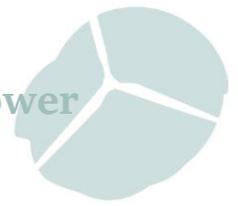
In the latest step in the Clean Growth Strategy, aiming to bring 2.5 million fuel poor homes up to an Energy Performance Certificate rating of C by 2030, the Government has launched a consultation on focussing the Energy Company Obligation (ECO) entirely on low income households. Currently only 70% of beneficiaries are from low income families. Nearly a million more low-income households should benefit from innovative energy saving measures under the new plans outlined. (2) However, Ed Matthew at E3G points out that the Government will need to double investment to meet its own 2030 target for fuel poor households. E3G calculates that public investment in home energy efficiency improvements has been cut by 58% in England since 2012. Wales, Northern Ireland and Scotland now spend respectively two, three and four times as much per citizen on home energy efficiency programmes than is spent in England. (3)

Decarbonising gas

A report on the future of gas published by National Grid said that, while a "combination of solutions" was expected to develop to decarbonise heat, hydrogen was "gaining momentum". A report by KPMG published in 2016 also put the cost of decarbonisation through conversion to a form of decarbonised gas (including hydrogen) at about a third of the estimated £300bn cost of full electrification. But whichever technologies are adopted, the cost will remain a challenge. Domestic electricity bills include a levy which subsidises renewables (and will subsidise nuclear power). Whether carbon-free heating can be paid for with a similar levy is still a matter of debate. (4)

National Grid's report calls for fast-tracked carbon capture funding to help develop low-carbon gas sources. The UK could use methane to produce low-carbon hydrogen. Leeds City Council has already taken steps to convert the gas grid to run on hydrogen, rather than gas and similar plans are afoot to create a "hydrogen cluster" in Manchester and Liverpool. National Grid wants pilot projects to be identified in order to begin undertaking full studies by the early 2020s and be operational by the mid-2020s. (5)

But E3G's Ed Matthew highlights the fact that methane CCS could still create significant carbon emissions at source. He believes Hydrogen may have only a limited role.



The Future of Gas report does talk about partnering gas generation with renewable generation to balance the electricity network; making increasing use of excess renewable generation, when available, to produce hydrogen via electrolysis; continuing to provide energy across GB through cost-effective seasonal agility and supporting daily demand peaks at low cost, avoiding over-investment in generation that could rarely be used; investing in a more flexible GB gas grid, capable of flowing pure hydrogen, natural gas, and blends of gases including hydrogen, natural gas and biogases in different areas.

The report continues:

“Meeting the UK energy needs without gas or a gas network is an enormous challenge. The gas networks deliver three times the energy delivered by the electricity networks. During 2016/17 the total gas demand across the year was 884TWh compared to 284TWh of electricity demand over the same period. A future without gas would require significant changes to be made to meet the needs of domestic heating, industrial uses of gas and balancing the electricity system. Through our work, we have identified no credible scenarios without gas due to the many roles that it plays across the UK economy.”

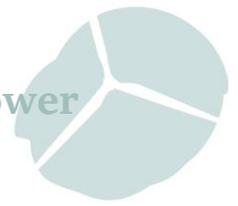
Peak electricity demand is currently up to 60 GW, but peak winter heat demand is 350 GW. If gas for domestic heating is to be phased out:-

“There would need to be a national rollout strategy for low carbon heat, converting 20,000 homes a week, from 2025 to 2050, to an entirely electric heat source with no hybrid (gas/electric) heat pumps. Based on energy prices over recent months, reliance on an entirely electric heat source would be significantly more expensive than hybrid or gas based systems.”

National Energy Action recently highlighted that the decarbonisation of heat could put an additional 2.6m homes into fuel poverty because of higher costs.

The Clean Growth Strategy says work is needed in this Parliament to set up decisions in the first half of the next decade about the long term future of heat. National Grid wants to see active experimentation now to demonstrate and de-risk various pathways to inform and deliver clear policy decisions in the early 2020s. So it wants clarity on the Government’s preferred pathway as soon as possible. National Grid wants to see the establishment of a UK-wide heat oversight body which would coordinate the right time to commence engagement with the consumer on heat decarbonisation.

There are clearly a good few unknowns connected with decarbonising gas. A 2017 report from Imperial College London and Cardiff University (6) investigated the benefits of adopting a fully integrated, flexible approach to operating the gas and electricity networks. The results indicate there would be significant overall system benefits from a combination of flexible gas power stations, multi-directional compressors, demand side response, electricity and gas storage, and power-to-gas (using surplus electricity from renewable sources for electrolysis to create hydrogen from water). There is also a need to consider the role of energy storage more holistically. Whilst batteries are growing in importance, they can only store a fraction of the energy that the gas system provides today at a far lower cost than even the lowest cost electricity storage.



National Grid says its stakeholders insist that Carbon Capture Usage and Storage (CCUS) is crucial to decarbonisation of gas. National Grid says it agrees with the Committee on Climate Change that:

“The Government should not plan to meet the 2050 target without CCS. The Government should set out plans in 2018 that kick-start a UK CCS industry in the 2020s.”

What the Future of Gas report doesn't do is give any idea about the amount of hydrogen it expects to be making by extracting it from methane and capturing the CO₂, and how much it expects to be made using surplus renewable electricity and electrolysis and how much of a contribution will come from biogas. It is difficult to get a picture of the feasibility of installing sufficient electrolyser capacity to decarbonise the gas network without using steam reforming of methane and CCUS.

Sustainability consultant, Chris Goodall, estimates that at today's power and electrolyser prices, hydrogen made from surplus renewable electricity is almost at the same price as hydrogen made via steam reforming (but capturing the carbon would increase this cost). As power prices continue to fall, particularly in periods of high wind and sun, and electrolysers get cheaper and more efficient, the relative advantage of using electrolysis will improve. (7)

Heat Networks

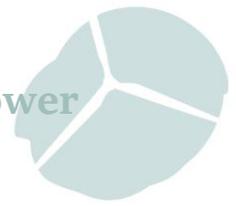
In all of the indicative scenarios set out in the Clean Growth Strategy, heat networks are projected to meet 17% of heat demand in homes and up to 24% of heat demand in industrial and public-sector buildings by 2050, whereas they currently only supply around 1% of buildings heat demand. (8)

The Government has identified heat networks as a key technology to decarbonise heat and has allocated £320m of funding out to 2021 to grow the heat networks market. This funding is expected to draw in up to £2 billion of additional capital investment and lead to the construction of hundreds of heat networks in England and Wales. Scotland has set an ambitious target to connect 40,000 homes to heat networks by 2020, representing 1.5TWh of Scotland's heat demand. (9)

Like hydrogen, heat networks can offer balancing services to the grid. Heat networks allow large scale heat storage systems to be used, enabling the disconnection of heat production and heat use. For instance heat pumps could use surplus renewable electricity to produce heat which can be stored for later use. CHP systems could generate electricity at time of short supply and store the heat also generated for later use.

Heat Politics

Successive ministers and officials have kicked the issue of how to decarbonise heating down the road, partly because it has not yet become entirely clear which technological approach is best, electrification of heating, the use of greener gases such as hydrogen, district heating schemes, or some combination of all three. It's also partly because, at a time when the debate about energy is fixated on the cost to consumers, no minister wants to stand up and be honest with bill-payers – telling them they will need to cough up for a new hydrogen boiler in a decade's time. One thing has been clarified, though, according to the Observer, shifting most of our heating

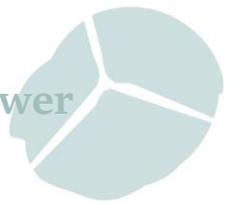


needs off gas and on to electricity through low-carbon options such as heat pumps – which the government was weighing up just five years ago – now looks increasingly fanciful.

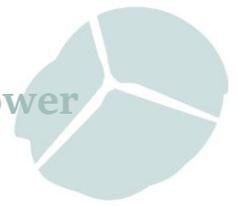
Electrifying heating also looks almost impossibly hard to do at the same time as electric cars begin to have an impact on demand. Experts think the cars will begin to really take off in the 2020s and make a tangible difference to electricity demand, just when we would need to be greening our heating system. For a national solution, we are left with greener gas options, such as hydrogen produced with carbon capture, or biomethane produced from food waste plants. While a serious conversation starts on the longer term, there is a short-term solution that is affordable and should leave no regrets. There is still no proper, ambitious policy on energy efficiency – a situation that not only looks socially unjust, because the poor spend more of their income on energy than the rich, but looks bad for energy security. (10)

- Meanwhile, a pioneering new green gas trial is being demonstrated at Keele University that aims to inject zero-carbon hydrogen into the natural gas network. Keele University will act as the testing grounds for the project and will have hydrogen injected into its private gas network. Keele has the largest university campus in the UK, accounting for more than 12,000 students and staff. With this in mind, the university's 350 mixed-use buildings will act as a small-scale examination of how hydrogen gas could be safely integrated into existing networks. The aim of the trial is to provide practical evidence that a hydrogen-blended gas can be integrated without disrupting gas services to customers. Hydrogen will account for up to a 20% share of the University's gas supply. Solutions firm the Health and Safety Laboratory will oversee all safety aspects of the project, known as the HyDeploy programme. (11)
- In March the Danish Minister of Energy, Utilities and Climate, Mr. Lars Christian Lilleholt, opened a revolutionary combined heat and power (CHP) plant in Denmark, - the first in the whole world to integrate concentrated solar power (CSP) and a biomass boiler while also using Organic Rankine Cycle (ORC) to turn the energy into district heating and electricity. Utilizing benefits of these innovative technologies enables the district heating plant (Brønderslev Forsyning) to achieve record energy efficiency, lower energy prices and a future-proof solution that is no longer dependent on fluctuating fossil fuel prices. Clean energy also means the reduction of more than 25,000 CO2 annually. (12)

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12. **Aalborgcsp 19th March 2018** <http://www.aalborgcsp.com/news-events/newstitle/news/a-world-first-renewable-energy-system-inaugurated-in-denmark/>



5. The Inspector General's report on Nuclear Safety and Radiation Protection 2017

Published on 2nd March 2018, a report written by François de Lastic, EDF Group Inspector General for Nuclear Safety and Radiation Protection, for the Chairman of EDF is available in French and English on the EDF – French website here:

https://www.edf.fr/sites/default/files/contrib/groupe-edf/producteur-industriel/nucleaire/enjeux/securite-des-installations/securite-des-salaries/rapport_igsnr_2017_-_uk.pdf

Global nuclear industry adapting to renewables

It aims, amongst other things, to identify any early warning signs and recommend areas for improvement. It therefore focuses on difficulties and weaknesses rather than strengths and progress.

The Inspector's view of 2017 starts with the headline "*a global nuclear industry adapting to the development of renewables*". He says there was a much higher global investment in renewable energy than in new nuclear build, as indicated in the 2017 World nuclear industry status report.

He says recent developments indicate a search for a new balance based on a synergy between nuclear energy and other low-carbon energies in the fight against global warming. The fact that low-carbon nuclear electricity has both a high level of safety and the ability to compensate for daily – and above all seasonal – variations in electricity demand gets little coverage.

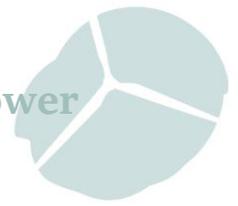
EPRs

In 2017, as in 2016, EDF SA experienced considerable technical problems, in particular the series of carbon segregation issues, the examination of the unmarked files (see insets) and some new hazards. Correcting defects and improving nuclear safety has led to a heavy workload for the operator and the engineering division. The Inspector remains concerned by the excessive workload which has gone on for at least two years now and is affecting the morale of some staff.

The Hinkley Point C construction site is well under way with strong logistical and organisational support, and industrial safety is one of the main priorities. The current reorganisation of the project's governance will improve relations with the Office for nuclear regulation (ONR) and should improve the interface with engineering.

EPR milestones reached in 2017:

- Taishan: the hot functional tests were started in April 2017 and the first fuel element was introduced into the fuel building's storage pond in October.
- Flamanville 3: the cold functional tests ended in December 2017, followed by the successful completion of the hydrostatic test on the primary system in January 2018.



- Hinkley Point C: the first nuclear safety concrete for the galleries was poured in March 2017.
- EPR 2: the configuration for the next design phase was selected in October 2017.

Hinkley Point C

The Inspector General says over the last decade, its nuclear generation fleet and the ONR have successfully rebuilt relationships based on trust. But as far as Hinkley Point C is concerned there is still an unsatisfactory level of trust. (This sounds a problem for Hinkley Point C.)

The Inspector says the fact that skills were lost due to the lack of orders for new reactors in France partly explains the problems at Flamanville. Can these same problems be avoided at Hinkley?

Learning lessons from Flamanville 3, EDF is continuing to reorganise engineering, which has included setting up EDVANCE in 2017, a joint subsidiary of EDF SA and AREVA NP. Its first challenges will be its contribution to the project for the two Hinkley Point C EPRs in the UK and the design studies for a new reactor, destined for the renewal of the French fleet and for export.

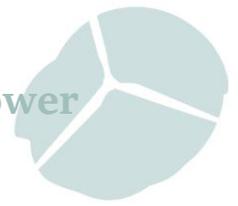
The Inspector General says new project governance has been put in place at Hinkley Point C taking into account findings from a number of reviews and audits. This should help to optimise roles, clarify responsibilities and reinforce confidence in the relationship with the ONR.

“When I visited the construction site where some 2,500 people work, including several from CGN, I was struck by the extent to which the organisation, safety culture and quality controls were already in place and aligned with WANO’s ten traits. [Ten traits of a healthy nuclear safety culture developed by WANO] All of this goes a long way towards instilling confidence in the project’s future success.”

AGR Graphite Cracks

The Inspector notes the higher frequency of inspections of the graphite in those AGRs most affected by cracks. These inspections are becoming increasingly important as the reactors approach the end of their service life.

(Hinkley Point B reactor 3 was taken offline on 2nd February for its planned interim maintenance and graphite inspection. During the 16 day programme, 26 channels were successfully inspected in the reactor core to confirm its expected safe condition. The unit was successfully returned to service on 19th February. EDF said the findings underlined that the graphite is behaving as predicted, and we therefore remain confident in our plant lifetime forecasts. [Each reactor core is made up of around 6,000 blocks - 3,000 of these are graphite bricks containing fuel channels] which are all connected together. At Hunterston B Reactor 3 was taken offline on 9 March for a graphite inspection outage as agreed with the ONR and will involve inspection of the reactor core as well as a range of other maintenance and inspection work which can be carried out while the unit is offline. The reactor is expected back online on 30th March.)



The Inspector says characterisation of cracks in the graphite bricks of AGR cores is the key factor in determining their length of service life (the oldest reactors - Hunterston B and Hinkley Point B - came online in 1976). Regular inspections tailored to each reactor remain an essential means of ensuring there are no fast-developing cracks and of re-evaluating methods of control. In 2017, three new keyway root cracks were reported in two of the three reactors inspected. The total number of cracks remains well below the limits specified in the safety case for each reactor. He welcomes the increased frequency of inspections for the lead reactors

In the UK, EDF Energy will soon have to make some key decisions regarding the life extension and subsequent final shutdown of the AGRs in its fleet.

AGR Fuel Elements

8 elements were found to have leaks out a total of about 40,000 used in the reactors. Most of these failures were discovered in the same reactor. (Which one?) This led to the operator taking specific measures, including reducing the reactor power, lowering the rates of power increase, and increasing the cooling of the most highly irradiated fuel assemblies. The total number of leaks in this reactor fell from 16 in 2016 to 6 in 2017. The cause of these failures seems to be associated with carbon deposition on the fuel elements. This physical-chemical phenomenon is a highly complex issue to resolve. Solutions are currently being studied and I will monitor their effectiveness.

Other AGR notes

In the UK, post-Fukushima modifications consistent with AGR characteristics have been completed and operator training programmes now include beyond-design-basis accidents.

Collective exposure on AGRs is limited due to their design, and the collective doses measured are among the lowest in the world (0.02 man-Sv/unit). The annual collective dose for the Sizewell B PWR remained low (0.3 man-Sv), which places it in the top quartile worldwide. The maximum individual exposure for all reactors was 5.54 mSv.

Spent Fuel Transport

Transport of spent fuel: de-tensioned flask lid bolts It was reported in the UK that several bolts used to secure the lid of a transport flask containing spent fuel were found to be loose on arrival at the storage facility. This INES Level 1 event had no impact on safety but could have caused a contaminated water leak outside the flask had it endured a major accident. This event highlighted not only the inadequate incorporation of OPEX (Operational Experience) gained from a similar event that occurred 15 years earlier, but more importantly, a lack of compliance with procedures. (Where did this happen?)

Loss-of-grid events in the UK

The energy transition in the UK has led to the closure of coal-fired power stations in favour of renewables, which has reduced the national grid's capability to come back online quickly following a blackout. A review of the safety studies for all nuclear plants was undertaken to demonstrate their ability to operate without the grid for longer periods of time. This necessitates larger on-site stocks of fuel oil so standby diesel generators can be used for longer



periods. Blackout operating procedures have been reviewed and corresponding training actions have been instigated. The problem is limited in France because of the high levels of inter-grid connection across Europe and the different reactor technology to the UK.

Nuclear Skills

Managing the transition from AGRs to EPRs is a key issue for the future of EDF Energy. The end of the service life of the AGRs will lead to a reduction in the number of staff operating the sites concerned between 2023 and 2030. At the same time, the need for skills to implement new projects and operate future nuclear units will increase. New skills will also be needed for decommissioning activities.

In the UK AGRs have not had any problems retaining staff. This, however, is not the case at Sizewell B where a number of operators were recruited by another PWR operator - a newcomer to the nuclear industry working in English. Action was quickly taken to deal with this situation, which could happen again.



6. Civil Nuclear Energy Policy – An Alternative Perspective

This is a shortened version of a paper, written by Neil Crumpton and recently presented to the Business Energy and Industrial Strategy NGO Forum at which many of the UK's anti-nuclear groups are represented.

It is becoming increasingly obvious, month by month, to more media and UK public that the cost of nuclear energy is becoming significantly more expensive than a mix of intermittent renewable technologies even after higher estimates of additional system integration costs are added in. The Hinkley Point C (HPC) CfD deal has faced widespread public criticism including from the Public Accounts Committee (PAC).

The Sept 2017 offshore windfarm auction awarded 15 year contracts around £ 60/MWh for 2022 delivery. Contracts for 2025-27 delivery could well fall further. Additional 'system' costs, i.e. the extra needed for intermittent renewables [offshore wind], comprising gas-fired back-up, 'gas' balancing, electrolyzers and other costs, are likely to be in the range of £7.50/MWh more than a new-build nuclear-inclusive system equivalent.

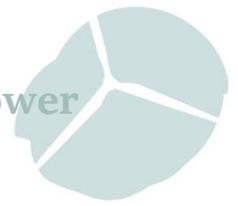
So a reasonable offshore wind+ system comparator or 'counterfactual' for mid to late 2020s delivery would be around £ 67.50 /MWh (in 2017 prices) for the first 15 years. Contract costs would likely fall further by the time the 2020s turbines would need replacing in the late 2040s. In contrast, HPC CfD cost is £ 98/MWh (in 2017 prices) falling to £95/MWh if a Sizewell C is built.

A case can be made that the BEIS Sept 2016 Value for Money (VfM) assessment of HPC was so flawed in various assumptions and analyses that the next generations of British children will pay around £ 30 billion more as electricity consumers than they would have if HMG had followed a renewables pathway.

Yet Chancellor Hammond in his November 2017 budget spoke about 'not saddling our children with debts' one moment then announced that renewables funding to 2025 will be minimal the next. Notably, 2025 is when the Government is hoping that several nuclear new-builds will be coming online. So new nuclear schemes would from that time be drawing on the lion's share of low-carbon funds or other major subsidy mechanisms for 35 years (to around 2060) leaving renewables to fight for scraps.

That said, a 2017 National Grid report suggests that offshore wind may not need any subsidy by 2040 and the new BEIS climate change minister Claire Perry was enthusiastically saying on TV recently that some PV schemes are already subsidy-free.

From a range of possible cost scenarios it can be shown that even IF subsequent nuclear CfD prices fell to between £ 70 /MWh and £ 82.50 /MWh then each remaining 3 GW scale project would still cost probably between £ 5-16 billion pounds more than an offshore wind system counterfactual which includes a highly reliable and resilient gas-fired back-up (including full replacement after 30 years). A five project 16 GW (125 TWh/y) nuclear deployment between



2025-2030 would likely cost consumers £ 50-85 billion more than a renewable energy / offshore wind deployment by 2030, assessed over 65 years between 2025 and 2090.

Given the criticisms of the HPC CfD deal HMG seems now to be looking to other funding mechanisms, such as equity finance, to procure any or all of the subsequent projects that comprise the five-six project 16-18 GW first-tranche new-build nuclear programme. Minister Harrington stated at a recent nuclear conference in London that 'nuclear will be cost competitive' with other forms of electricity generation.

Clearly, IF the cost of borrowing £ billions for years is minimised by HMG backing for nuclear energy but NOT for large-scale renewables, particularly offshore wind, PV and PV-Thermal sources, then presumably nuclear could be made to look competitive to the lay-person even though it would be an anti-competitive action, and very probably outside public consent.

Offshore wind will likely be a major part of any renewable Grid, or indeed any Grid mix considering the 1,000+ TWh/y UK Continental Shelf (UKCS) resources. Yet the Government's vision of a 10 GW deployment in the 2020s represents a deceleration of the 10 GW built by 2020 from a standing start in about 2009. The Government could be aiming to build 35-40 GW or more of offshore windfarms from 2018 to 2030 which would generate the same annual electricity as a 16-18 GW nuclear programme.

The three pillared rationale for nuclear new-build

The three officially stated reasons for the 16-18 GW first-tranche nuclear programme are that it would provide (timely) low-carbon electricity, energy security and be affordable to consumers.

These three stated pillars are all now in ruins:

(1) Climate: renewables were always low-carbon, and bio-energy can be carbon-negative if coupled with CCS technology. The Government has shown zero concern that the significant slippages in the 2018-2025 nuclear programme will mean that 200 MtCO₂ of emissions will not now be avoided by new-build nuclear as planned by 2025. In 2015 it also scaled back low-cost renewables and imported more Russian gas. So, a genuine commitment by Government to its professed 'climate' rationale is highly questionable.

(2) Security of supply: cost-effective and practical UK Continental Shelf renewable energy resources are very large-scale, indigenous, geographically-dispersed, ever-replenishing and unstoppable, which can be harnessed by thousands of large and millions of small energy schemes and devices. Combined with widely dispersed 'gas'-fired and other back-up and storage, such resources would provide very high energy security, a highly reliable Grid supply, and a highly resilient Grid system, to match constantly changing consumer demand to changing supply. Centralised nuclear power infrastructure is a tempting terrorist target which could have devastating long-term radio-toxic consequences.

(3) Cost: renewables costs inclusive of their additional system costs are clearly becoming significantly cheaper than the nuclear projects.



Baseload and Intermittency

Minister after minister, since Tony Blair's 'nuclear back with a vengeance' speech in 2006, have claimed that nuclear energy is 'key', 'crucial' or of 'absolute' need, and that it provides 'baseload' and that renewable sources are intermittent and hence unreliable. This is a kindergarten level of understanding of an electricity system. How can a variable supply (from renewables) and a variable demand (by consumers) be balanced by the fixed output from a baseload (nuclear) supply?

Yet, the constant repetition of this baseload versus intermittency argument continues and new energy ministers (averaging one a year) do seem to get taken in by it. It seriously misrepresents the actual technical situation and engineering options that are available and likely to be built at scale in ANY likely future UK electricity-energy system, particularly 'gas'-fired back-up and electrolyzers and energy storage.

It needs pointing out that the amount of 'gas' burnt and its annual carbon content ('gas' = Natural Gas, bio-methane, bio-SNG and electrolytic hydrogen) is likely to be about the same to balance the system in any likely 2050 energy scenarios nuclear-inclusive or not. The same year - 2015 - that significant reductions were made to renewables support, particularly onshore wind and PV, Centrica signed up for increased gas imports from Putin's Russia.

So, it is clear that HMG would rather import gas from a nation implicated in proxy wars and the shooting down of a civilian airliner than build PV and onshore windfarms which the majority of the British public continue to support in probably every poll ever carried out. Avoiding dependence on Natural Gas from Russia was a primary rationale for new-build nuclear in the first place.

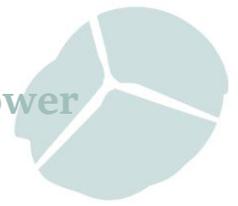
Security Issues

In terms of National Defence and energy security it would be difficult to significantly disrupt a decentralised renewable energy system, described above, even by concerted malicious or military actions or after major natural events. In stark contrast, large coastal radio-toxic critical infrastructure provide a relatively highly vulnerable, potentially devastating (and hence tempting) targets for terrorists or rogue states for at least 100 years to 2130.

The author's estimate (in previous papers) of nearly 40millionTBq of mainly Spent Fuel radioactivity (nearly half of all the UK's 87 mTBq legacy arisings) would have accumulated after 60 years at EACH of the five or six planned new nuclear sites has not been rebutted or confirmed by DECC or BEIS. Does BEIS actually know the amount for security analysis?

A mix of renewable energy sources would provide significantly more UK energy security and energy system security than a nuclear-inclusive energy mix, let alone a nuclear-predominant Grid which is the Government's preferred vision and likely policy IF SMR's by 2030 can be made to look low-cost. Yet, despite the strength of these arguments, including that of falling renewables costs by 2016, the Government still pushed ahead with HPC.

This has led many observers to consider that some significant but hidden factor is playing on ministers' decisions that is not part of the three pillar rationale for a new nuclear programme.



A hidden military rationale for a civil nuclear programme?

The Government's commitment to new nuclear build is now baffling many observers. Some form of secret national security and hence an unspoken rationale (real or perceived) has been proposed by the Science Policy Research Unit (SPRU) at Sussex University. It would explain so much that it needs to be considered.

The SPRU presented evidence to the recent PAC inquiry stating that the Government's infatuation with a new nuclear programme: '...is partly due to a perceived need to subsidise the costs of operating and renewing the UK nuclear-propelled submarine fleet'. (1)

Yet, while such concerns may have seemed pressing and persuaded Tony Blair in the post-Iraq War period, before the seven Astute-class SSNs and four Dreadnought-class SSBNs were ordered, this is hardly a convincing case by 2016. The Astute class construction is now half completed and the Trident replacement deterrent submarines have been voted by Parliament and are beginning construction for late 2020s delivery. These submarines will not stop being built by a large workforce at BAE Barrow shipyards just because HPC is late or never works or the other nuclear schemes do not get consented. Any unspoken military rationale for new civil nuclear build is a ministerial misperception carefully cultivated by the nuclear industry and its advocates.

Summary

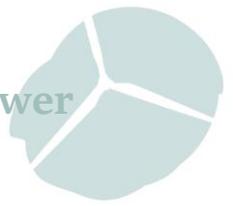
The three stated pillars of the nuclear programme rationale, (timely) low-carbon electricity, energy security and consumer affordability have been completely eroded by the reducing cost of renewables and the major delays in the planned nuclear programme. Hinkley Point C will, if completed, cost around £ 30 billion more than a renewables strategy and a 16 GW programme could now cost £ 50-85 billion more than a 100% renewables by 2050 strategy. If there ever was an unspoken military rationale for a new civil nuclear programme then that too has now turned seriously counter-productive as renewables costs have fallen.

Continuing with the planned (largely foreign) nuclear programme while reducing the speed of deployment of offshore wind, PV, PVT, onshore wind, other renewables and CCS has and is likely to cause serious harm to British innovation, invention and jobs in those technologies, which have safe export potential. The Government's industrial strategy is looking day by day more a case of industrial suicide.

Worse, there would be major and seriously long-term national defence and security issues surrounding any new civil nuclear infrastructure which are completely avoidable.

In total contrast, renewable energy systems and infrastructure would be, by their decentralised nature, highly reliable and highly resilient to both strategic-scale malicious and natural events. As the protection of a country's people is one of the first duties of a government then the national defence benefits of a renewables versus a nuclear-inclusive energy system should also be a major consideration.

The planned leviathan new nuclear structures would be built in thick reinforced concrete and would stand until the end of this Century at least and the Spent Fuel stores would remain well into the next. Some sites would be threatened by sea level rise and storm conditions.



These would not be the kind of lasting monuments any political party would want. As of 2018 such structures are already looking likely to become one of the costliest industrial blunders in UK history. The Government now has overriding reasons to discontinue its support for the first-tranche nuclear energy projects and plan for a major expansion of renewable energy systems in the UK, and for safe export globally, instead.

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1. See Guardian 29th March 2018 <https://www.theguardian.com/science/political-science/2018/mar/29/why-is-uk-government-so-infatuated-nuclear-power>