frozen in aspic—
planning and pragmatism in the siting of nuclear power stations in britain

Despite efforts at strategic siting and the problems posed by changing circumstances—especially the challenges arising out of climate change—the geography of nuclear power infrastructure is stubbornly inflexible, and has barely changed since it was first established over half a century ago, as Andrew Blowers explains

The geography of nuclear power in Britain was more or less settled by the 1970s and has endured remarkably since then. Speed was of the essence in the early years, a so-called age of 'innocent expectation' or, perhaps more realistically, one of 'trust in technology'. This was 'nuclear's moment',[1] lasting less than three decades, during which time the infrastructure of nuclear development was established around Britain, predominantly at coastal sites.

By the 1980s the moment was over, and a state of geographical inertia had set in. A combination of land availability and infrastructural development (transport, access to the super-grid, the availability of skilled workers) exerted a pull, while resistance from non-nuclear communities projected a push preventing the nuclear industry from breaking out of its redoubts and colonising new sites in greenfield locations.

In the early years of this century a 'nuclear renaissance' was proclaimed: a strategic siting programme consisting of new nuclear power stations built on existing sites and deployed by 2025. In the event only one, Hinkley Point C, is under construction. Far from being ready to cook Christmas turkeys in 2017 as initially claimed by developer EDF, the power station will not be generating electricity until 2027, a decade later.

In the 2020s a further attempt is being made to revitalise the civil nuclear programme as an integral part of the energy mix in order to help meet the aims of the government's net-zero carbon strategy by 2050. Once again, the focus remains on the existing sites, some of which are vulnerable to the long-term consequences of climate change. But there is now a serious disjunction between a geography of nuclear power established more than half a century ago and the realities of site suitability in an age of climate change.

Throughout the history of the siting of nuclear power plants, the role of planning has been reactive rather than strategic. In the early phase, planning was site specific, with development control typically exercised through local planning inquiries. As opposition to nuclear power grew, so the scope of inquiries, notably at Torness and Sizewell B, gradually broadened to incorporate issues such as energy policy, economics, safety, and public trust. During the present century, a strategic siting process was adopted, with individual sites identified through a National Policy Statement for Nuclear Power Generation. In practice, siting remains a specific process, a matter primarily of economic and historical determinism, with a few projects seeking to attract investment to a handful of existing sites.

Setting the stage

Nuclear energy's origins lie in the development of the nuclear arsenal. This required sites for various processes, including uranium enrichment, fuel processing, and bomb assembly. The heart of the industry was the reactors and processing plant

Ian Clarke

The decommissioned Bradwell A nuclear power station

required for manufacturing plutonium-239 and uranium-235. Choosing a site for such a secret enterprise required remoteness, ample water supplies, and substantial electricity. In the UK, the post-war search for a suitable location for the UK's plutonium factory was soon settled in 1947, at Sellafield on the West Cumbrian coast, remote from large population centres and the site of a wartime ordnance factory.

The first nuclear sites, selected under the aegis of the United Kingdom Atomic Energy Authority (UKAEA) and connected to the military programme and research, including Winfrith Heath, Aldermaston, Capenhurst and Dounreay, were developed in secrecy and haste without any in-depth environmental surveys and absent of planning controls. They were a random collection of high-hazard locations, wartime airfields, and sites in friendly ownership, including the UKAEA itself (at Calder Hall). Apart from some concern about unknown radioactivity risks, there was no sense of coherence about these early siting decisions. As Openshaw wryly remarks: 'Perhaps miraculously, post hoc and retrospective evaluations seem to have generally validated these siting decisions.'[2]

Windscale (which later reverted to its former name, Sellafield), with Calder Hall across the Scottish border, were the first-generation dual-use nuclear reactors supplying the grid as well as making plutonium. By 1955, a White Paper, *A Programme of Nuclear Power*, was the first public commitment to a 10-year, 12-site nuclear plan based on Magnox reactor technology. The siting process was rigorous, especially in taking engineering considerations (cooling water, foundation conditions, access to the grid, etc.) into account. There was more flexibility in concern for safety, although remote locations were still favoured. Impacts on environment and local communities were treated as flexible rather than absolute constraints. Locations were chosen individually rather than as components in an overall siting strategy, and each was subject to planning procedures. The resulting sites of these first-generation Magnox power stations were profoundly significant in that they basically committed the future geography of nuclear power in Great Britain.

The selection of Bradwell (in Essex), one of the first Magnox stations, illustrates the process of site selection. Bradwell is fairly remote, set in the marshlands of Essex, but only 50 or so miles from London. Like all the Magnox stations (except Trawsfynydd in Snowdonia), it is on a coastal site, with adequate cooling water, situated on a wartime airfield which was a base for sorties into Europe and a safe haven for those aircraft that returned. The public inquiry, the first held for a nuclear power station, lasted five days in 1956 and was dominated by expert submissions perversely defending remoteness while also claiming that nuclear power was perfectly safe. The inquiry attracted considerable opposition, which, although concerned about safety, focused on environmental (oysters and marine life) and amenity issues, which were regarded as

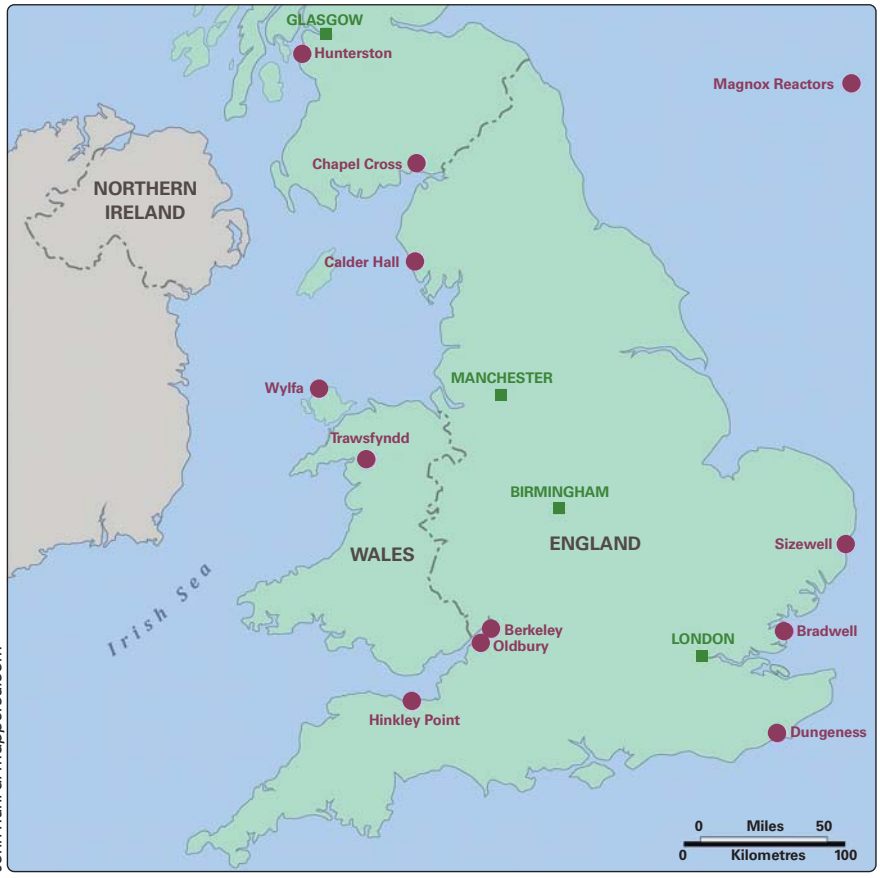
emotional.[3] In a contest between scientific rationality and local protest there could only be, at that time, one winner: 'At the national level the unassailable position of the nuclear enterprise remained inviolate.'[4] Within a matter of five years, during the second half of the 1950s, all nine of the Magnox stations (plus the earlier dual-purpose Windscale and Chapel Cross) had been approved, and, in the following decade, most of them came online, the last and largest at Wylfa on Anglesey, in 1971. The search for sites had yielded a collection around the coast, with three in the South West (Berkeley, Hinkley Point, and Oldbury), two in Wales (Wylfa and Trawsfynydd), one in Scotland (Hunterston) and three in the South East (Bradwell, Dungeness, and Sizewell).

All bar one of the sites were coastal or on estuaries for cooling water, and relatively remote from large populations, allegedly for safety reasons. Most were contested, some of them, like Hunterston, Bradwell and Dungeness, by groups not necessarily anti-nuclear but opposed on amenity and environmental grounds. But the contests were limited, and the need for nuclear energy and technological and economic imperatives quickly overcame the largely unorganised and sometimes febrile opposition. By 1959 the first stage in creating the geography of nuclear power stations was accomplished.

The stage is set

The next stage, the Advanced Gas-cooled Reactor (AGR) programme, proved more controversial, but the relentless drive of the government-backed Central Electricity Generating Board (CEGB) ensured its progress. One problem was the debate about technology and reactor design, with the AGR design eventually chosen for all the reactors in the programme. The first to be permitted, at Dungeness B in 1965, proved the longest to complete, eventually opening in 1984—it provided an early example of the tendency to long delays, missed deadlines and increasing costs that has become commonplace with nuclear projects. Dungeness B was located at a coastal site already occupied by a Magnox station, as subsequently the case with Hinkley Point B and Hunterston B.

The other three sites in the AGR programme extended the fleet into new territory. As the remote siting criteria were relaxed it became, at least for a time, acceptable to site nuclear power stations close to urban centres, Heysham A and B and Hartlepool reflecting this new flexibility. Indeed, Hartlepool was not only close to a major conurbation but also neighboured a petrochemical works and was not far from the Durham coalfield, thereby symbolising nuclear's advance at the expense of the waning coal industry. (In passing, it should be



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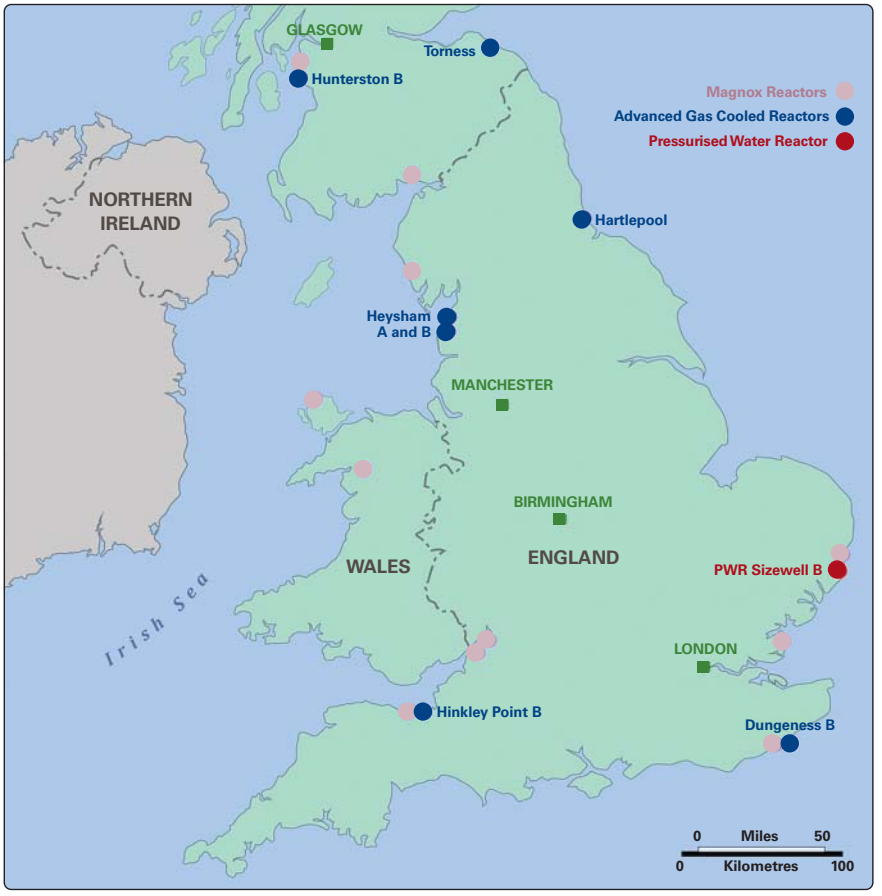
Locations of first-generation Magnox nuclear power stations



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Locations of AGRs (and Sizewell PWR)

noted that a later proposal for a nuclear power station in a coal-mining area further up the coast at Druridge Bay in Northumberland was resisted during the 1980s.) There were some proposals inland that did not proceed, for example at Stourport near Kidderminster, which was successfully opposed, and at sites near Chester and Chepstow.

The last of the AGRs, at Torness on the east coast of Scotland, became the focus of the first full-blown anti-nuclear protest in 1978 and 1979, attracting 5,000 people to the familiar features of fairs, symbols, stalls, camps, speeches, leaflets, workshops, non-violent action, political and media attention, stand-offs with police, and site occupations. The protest halted progress but was eventually cleared. Its target was not just Torness power station but the nuclear industry itself, and the connections between civil and military nuclear power were clearly in evidence. With Torness, the geography of nuclear power in Britain was complete.

Bringing down the curtain

Torness marked the apogee of nuclear's moment in Britain and the genesis of localised anti-nuclear movements, focused on sites, that would flourish in subsequent decades. After 1980, the nuclear industry went into retreat as the decline in coal was supplanted by the rapid development of North Sea oil and gas. Concerns about nuclear safety were made palpable by the catastrophic accident at Chernobyl in Ukraine in 1986.

And the problem of managing a growing burden of nuclear waste was fanning protests over the siting of repositories, which took over from the conflicts over siting nuclear power stations. The management of nuclear waste, which had hardly featured as an issue in the early siting decisions for power stations, had, by the 1980s, achieved considerable prominence. The period towards the end of the century was dominated by long-running conflicts over the Thermal Oxide Reprocessing Plant (THORP) at Sellafield and the siting of repositories for nuclear wastes in Eastern England, culminating in the inquiry into a Rock Characterisation Facility (RCF) for high-level wastes in a deep repository in West Cumbria, the heart of the nuclear industry.

The biggest inquiry of them all was over the proposal for a new Pressurised Water Reactor (PWR) nuclear power station at Sizewell. It ran for 340 days (from January 1983 to March 1985) and proved wide-ranging and discursive, straying into peripheral issues at the heart of government policy. Among those opposing the project was Jennifer Armstrong, on behalf of the TCPA.[5] The inquiry covered the full

panoply of issues of need, economics, safety and local environmental considerations to the extent that 'there were virtually no holds barred'.[6]

Ultimately, the Sizewell B inquiry distilled all the complex, conflicting, practical and moral issues into a simple 'yes' or 'no' to a PWR at Sizewell. Although Sizewell B, which began operating in 1995, did not increase the geographical footprint of nuclear power in Britain, it did extend its timescale, with decommissioning unlikely to begin until around the middle of this century. This, the first PWR and, to date, the largest and last nuclear power station, was widely thought to have brought down the curtain on nuclear power in Britain.

A new revival

But rumours of the death of nuclear power proved to be greatly exaggerated. Early this century, Prime Minister Tony Blair proclaimed a 'nuclear renaissance', with nuclear power having 'a role to play in the future UK generating mix alongside other low carbon generating options'.[7] Nuclear was seen as an essential component in both energy and environmental security. Accordingly, a new nuclear programme was projected in the UK 'to contribute as much as possible' — with around 16 gigwatts of capacity needed to sustain nuclear's contribution as the existing fleet was retired.

The new nuclear power stations were to be built by private investors, British and foreign. A timescale and locations for the plants would be needed. For the first time there would be an overall siting strategy, in contrast to the incremental, individual and evolutionary approach that had resulted in the existing sites. The government embarked on a strategic siting assessment process, identifying strategic siting criteria and inviting developers to nominate sites for new nuclear power stations that could be deployed by 2025. The criteria included environmental and resource issues such as flood risk, water resources, coastal change, biodiversity, landscapes and visual impacts; socio-economic aspects; and impacts on health and wellbeing; as well as specifically local considerations of transport, transmission, hazards, and emergency planning. The criteria were carefully modulated, provisional and discretionary, leading to such facile and inconclusive interpretations such as that provided by the Environment Agency:

> *'The Environment Agency has advised that it is reasonable to conclude that a nuclear power station within the site could potentially be protected against flood risks throughout its lifetime, including potential effects of climate change, storm surge and tsunami, taking into account possible countermeasures.'*[8]

The relatively permissive nature of the criteria was further illustrated by the potential application of 'imperative reasons of overriding public interest' (IROPI), whereby the public interest in the need for nuclear power could trump the adverse impacts on the integrity of sites designated under the European Habitats and Wild Birds Directives where no acceptable alternative site could be found.

Altogether, around 270 sites were screened but, ultimately, only 11 reduced to eight were listed 'as potentially suitable for the deployment of new nuclear power stations in England and Wales by the end of 2025'.[9] Three alternative sites, considered as worthy of consideration, were deemed unsuitable after public consultation and not credible for deployment by 2025. These were non-nuclear locations at Druridge Bay in Northumberland, Kingsnorth in Kent, and Owston Ferry on the River Trent in Lincolnshire, the only inland site. Dungeness, on the original list, was also dropped on the grounds of the adverse harm that would be inflicted on a site of international significance, including impacts of coastal erosion on the unique shingle beach and habitats.

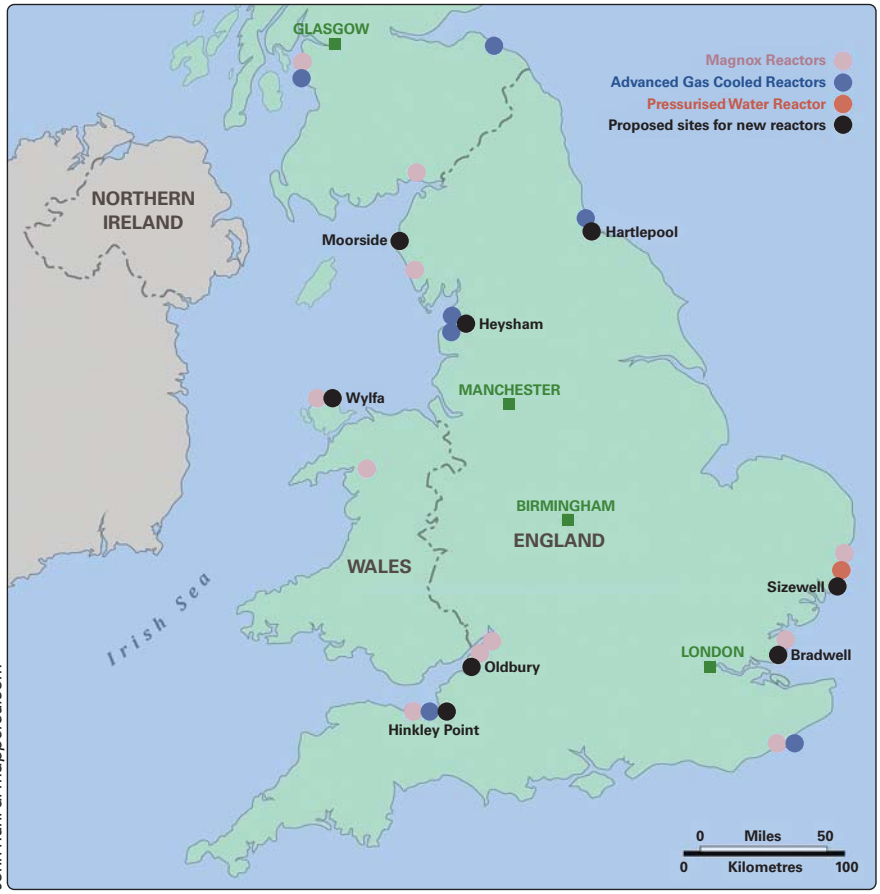
Following consultation and brief but vigorous opposition, two other listed sites were withdrawn from the final list, at Braystones and Kirksanton in West Cumbria. Clearly, these two sites were surrogates for Sellafield, which was also listed and, given its location next to the nuclear complex, was presumed 'unlikely to be excessively detrimental' to the Lake District.[10]

The eight sites that survived were put forward in the National Policy Statement for Nuclear Power Generation as potentially suitable sites — Bradwell, Hartlepool, Heysham, Hinkley Point, Oldbury, Sizewell, Sellafield, and Wylfa. All were on the coast or large estuaries, and all were on available land in nuclear-friendly ownership and adjacent to existing nuclear infrastructures — operating or redundant nuclear power stations and reprocessing works. All were apparently capable of being in operation by 2025. Thus an elaborate exercise in rational strategic planning had merely reaffirmed and reinforced the existing geography of nuclear power.

A faltering finale

In order to ensure swift delivery of the new programme, the system of planning inquiries that reached its procedural apotheosis at Sizewell was replaced by the new system of 'National Infrastructure Planning' introduced to 'streamline the decision-making process for major infrastructure projects, making it fairer and faster for communities and applicants alike'.[11] Under the new system, Nationally Significant Infrastructure Projects (NSIPs) such as nuclear power stations would be examined by the Planning Inspectorate according to a strict timetable and set of procedures. A panel would conduct a public examination and make a report and recommendations for determination by the Secretary of State.

In the event, the nuclear programme stuttered and then stalled, restrained by its persistent problems



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Proposed sites for new reactors

of cost and delay. Only one of the projects, Hinkley Point C, has surmounted the various hurdles necessary to proceed. These included Generic Design Assessment (GDA) approval; financial investment decision (FID) from EDF and its Chinese partner (CGN); planning permission from the Secretary of State on the recommendations of the Planning Inspectorate; and the necessary permits and licences from the regulators. Even so, Hinkley Point C became highly controversial as its costs mounted from £18 billion to an estimated £25–26 billion by the time it begins operation in 2027, a decade later than originally planned.

Of the other sites put forward for development by 2025, Moorside and Oldbury, after initially attracting developer interest, fell by the wayside. Wylfa Newydd, on the Anglesey coast, was pulled by developer, Hitachi, in 2019 for financial reasons; and it was also revealed that refusal of planning permission had been recommended by the Planning Inspectorate on several grounds, most notably the impact of the proposal on Arctic and Sandwich tern colonies near the plant.

This left the two eastern coastal sites, Sizewell C and Bradwell B. In the case of Sizewell C, the Planning Inspectorate's recommendation of refusal on grounds of lack of adequate water supply and lack of information concerning the Habitats Regulations was overruled by the Secretary of State, who concluded that 'the very substantial and urgent need for the proposal outweighs the harms'.[12] This decision was subjected to legal challenge by local environmental groups. Sizewell C still needs to find willing investors, in addition to the French state-owned EDF and the UK Government, who have each agreed to take a 20% stake in the project. It is expected that the additional 60% will be financed through the Regulated Asset Base (RAB) vehicle, intended to incentivise investment by enabling companies to take ownership of the assets and operating costs through the ability to raise up-front revenue through customer bills and government subsidies. Intended initially to finance Sizewell C, RAB was expected to reignite interest in the dormant Wylfa project and, perhaps, resuscitate Moorside (Sellafield) and stir interest among investors further down the line.

Meanwhile, Bradwell B, having achieved GDA for its Chinese reactor, has faltered in the face of local opposition and security concerns over the Chinese State, with its developer, Chinese General Nuclear Power (CGN), declaring it was not 'in a position to provide certainty on the project timeline or more details on our project proposals'.[13] The project is

paused indefinitely and, to all intents and purposes, effectively dead in the water.

All these projects were on existing 'potentially suitable' sites, and it had been assumed that development consent would not prove an obstacle since the siting criteria were largely unchanged since 2011. And, if the Planning Inspectorate had any reservations, such was the political enthusiasm for nuclear energy it was believed that the Secretary of State would grant approval anyway.

After more than a decade, the ambitious nuclear renaissance had secured a very modest yield. By 2030, with the remaining AGR stations closed, only Sizewell B and, probably, Hinkley Point C, will be operating, with Sizewell C a distant prospect. The reduced ambitions were reflected by the National Infrastructure Commission, which argued that big new nuclear plants were expensive, slow to build, and risked delay and other obstacles. It therefore urged government to 'take a one by one approach', which the government duly did in its Energy White Paper,[14] which essentially confirmed one big-gigawatt plant (Sizewell) for final decision by 2024.

Beyond that, there were no concrete plans, merely intentions to remain open to further large projects, and supporting the development of Small Modular Reactors (SMRs) and Advanced Modular Reactors, with a specific commitment to achieving a commercially viable fusion plant by 2040. The White Paper commented that SMRs 'are faster to build than large-scale nuclear plants and are potentially suitable for deployment in a wider number of sites across the country'.[14]

A last performance?

The White Paper set out a relatively modest and tentative role for new nuclear power. Within a year of its publication a far more ambitious programme was being put forward, promoting nuclear as a critical element in the energy mix in the mission to displace fossil fuels by low-carbon sources to meet climate objectives and provide domestic energy security. In the 2022 British Energy Security Strategy a truly enormous nuclear programme of 24 gigawatts was being talked up, progressing eight projects 'so we improve our track record to deliver the equivalent of 1 reactor a year, rather than 1 a decade'.[15] This also responded to the growing fears of energy shortage resulting from the Russian invasion of Ukraine, with the consequent huge hike in energy costs. But deployment on such a scale, even if it could be achieved, could not conceivably be achieved before 2040 at the earliest, and would have little impact on the energy crisis of the 2020s.

As to siting, the British Energy Security Strategy referred to the eight existing designated sites and promised an overall siting strategy for the long term. There had been no change in siting strategy since the National Policy Statement (NPS) for Nuclear Power Generation (EN-6) was approved in 2011, beyond carrying the list of sites forward on the grounds that they were 'likely to be [...] the only sites capable of deploying a nuclear power station by 2035'.[16] There was clearly a need for a review of siting strategy. For one thing, circumstances had markedly changed in the decade since designation. Concern about climate change impacts had deepened. For another, a range of sites would be needed to accommodate the vastly expanded and mixed fleet of nuclear reactors envisaged in the strategy.

Such a review had long been promised and, in 2021, draft NPSs for energy infrastructure were duly published. But the nuclear energy NPS was missing, although it was conceded that it was needed specifically 'to reflect the changing policy and technology landscape for nuclear'.[17] Opportunities for nuclear's 'flexible use may grow' and be fulfilled by an array of large-scale, modular, advanced and fusion power plants.[18] Crucially, the new NPS would present 'a siting approach for new nuclear developments deployable post 2025'.[17]

So far, so good, but events appeared to be overtaking the glacial process of producing a new siting strategy for nuclear. In any event, it seemed unlikely that the existing geography would be disturbed. Hinkley Point C was under construction, and Sizewell C had been approved for development, despite the Planning Inspectorate's recommendations for refusal. It still had financial hurdles to cross, although it was possibly made more attractive by the government (i.e. taxpayers) taking a direct share and consumers providing up-front finance through a supplement on electricity bills.

The government expected the development of other projects, including a revived Wylfa, 'as soon as possible'.[15] It seemed unlikely that, borne along by a tidal wave of enthusiasm for nuclear, the government would let the small matter of planning approval stand in the way of the nuclear juggernaut. New big-gigawatt nuclear stations, if they ever came to pass, would simply occupy existing sites, making no significant impact on the geography of nuclear energy. But such stations are widely regarded as dinosaurs from the 20th century — too big, too complex, too inflexible, too costly and slow to build, altogether too much of a risk. Doubts were being cast on the viability of some of the sites, notably those on the east coast,[19] with questions over whether they could (and should) secure planning permission and licensing.

Attention was rapidly turning to SMRs, which promised more rapid factory construction and assembly on site, and the prospect of lower costs and shorter timescales. In principle, SMRs also offered greater flexibility in siting, with the possibility of not being tied to coasts and feasible in urban settings with distributed local grid networks and heat and power systems. In the UK, Rolls-Royce led a consortium, with some government financial

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'Big Carl', the world's biggest crane, does the heavy lifting during construction of Hinkley Point C

backing, to produce a series of its SMRs to make a major contribution to meeting the ambitious target of 16 gigawatts, or even the fantastical 24 gigawatts, of nuclear energy in the energy mix, so as to reach net zero by 2050.

In early 2022 Rolls-Royce applied for GDA for its design. Its plans, supported by £200 million of government funding, were for 16 reactors, each of 440 megawatts, the first to be ready for deployment by 2030. By the end of 2022 three sites — in Sunderland, Teesside, and Deeside — had been shortlisted for making the SMRs. As far as the siting of the reactors was concerned, there was an assumption that sites were already available. Indeed, EDF, which owns the existing AGR sites entering decommissioning, was urged to make its land available. Similarly, the Nuclear Decommissioning Authority was prepared to offer land, where appropriate, for new build on its 17 sites in Great Britain, beginning with an agreement to help progress development of SMRs on land at Trawsfynydd in Wales. Other sites for SMRs were being promoted too, often with local community and political support, such as at Wylfa (Wales) and Moorside (Cumbria).

Early momentum was building around some of the sites, all of it in advance of the new NPS, which was expected to lay out a siting strategy. It appears that SMRs would be sited in clusters rather than as stand-alone plant. Rolls-Royce SMRs are hardly small — at nearly 500 megawatt capacity one is nearly twice as big in capacity as an early Magnox station such as Bradwell, and a cluster of four would amount to roughly the same capacity and footprint as the proposed Bradwell B. The locational flexibility that might attach to a single SMR is unavailable to SMRs in clusters.

Rolls-Royce is a company clearly in a hurry to seize available sites. It undertook a siting assessment using basic criteria such as geotechnical data, adequate grid connection, and a large enough area to deploy multiple SMRs. This approach is remarkably similar to the rather basic approach used in siting the first-generation Magnox stations, 70 years ago. There is no mention of environmental impact, the legacy of wastes, or community concerns; rather there is a focus on sites that 'maximise benefit to the taxpayer while enabling power to come online as close to 2030 as possible'.[20] Unsurprisingly, Rolls-Royce plumped for the same sites that had been chosen long ago. Its assessment claimed that four sites — Trawsfynydd, Sellafield, Wylfa, and Oldbury — had potential for deployment of plant delivering 15 gigawatts in multiple units; Berkeley, with 3 gigawatt potential required further investigation; and three were deployable, EDF willing, at Hartlepool, Heysham and Bradwell, in total comprising clusters of SMRs with a combined capacity of 5.5 gigawatts.

By the beginning of 2023 the field of SMRs was becoming crowded, with six designs claiming the possibility of early deployment of reactors noticeably smaller than the Rolls-Royce model. Despite the potential locational flexibility, the developers were

Steve Bateman / iStock

The Sizewell A and B nuclear power stations, with the site for Sizewell C to their right

opting for the existing sites, with Trawsfynydd, Heysham and Oldbury in the vanguard.

The putative deployment of a variegated fleet of SMRs in the UK may succeed in achieving some economies from the modular production of multiple reactors. But flexibility in siting does not appear to be on offer, at least in the initial phase of deployment. The most likely siting outcome, if the programme continues, is for two or more SMRs located at existing sites.

'The criteria for site selection require revision, especially in the light of the most recent dire forecasts for the long-term impacts of climate change… In short, the existing geography of nuclear sites is increasingly unsustainable'

As with the first generation, so now with the latest proposals: developers are responding to criteria of availability of land, existing infrastructure (transport, transmission), political promotion, and public acceptability.

Some concluding thoughts

In concluding, I make the following four observations about the persistence of the pattern of sites; a case of geographical inertia.

First, the sites were individually selected on the basis of simple criteria of water and land availability and, in most cases, remoteness. This resulted in predominantly coastal and estuarine locations. There was no planned strategic site selection, although each station had to achieve planning and regulatory consent—a relatively straightforward and largely uncontested process until opposition began to emerge towards the end of the programme, notably at Torness in 1978/79.

Second, by contrast, the putative 'nuclear renaissance' was framed by a strategic siting assessment process leading to an NPS in which, ultimately, eight of the existing sites were designated as 'potentially suitable' for new nuclear stations to be deployed by 2025.

In the event, so far only one, Hinkley Point C, has gained planning and regulatory consent and is under construction. Two stations, Wylfa Newydd and Sizewell C, have passed through the Planning Inspectorate process for permission to develop. In both cases the Planning Inspectorate recommended refusal. At Wylfa the developer has withdrawn, although the government has continued to support nuclear at the site. At Sizewell the Secretary of State has granted approval. Despite the elaborate strategic process, planning clearly is not considered an insuperable barrier in the face of overwhelming political pressure for new nuclear development.

Third, the criteria for site selection require revision, especially in the light of the most recent dire forecasts for the long-term impacts of climate change.

In particular, the case for moving the criteria of 'Flooding, storm surge and tsunami', 'Coastal processes' and 'Access to suitable sources of

cooling' from a 'discretionary' to an 'exclusionary' (exclude the site from consideration) category has become more compelling. Conditions at several sites, such as Sizewell, Bradwell, Hinkley Point, and Oldbury, would be at risk of becoming unviable in the unknowable conditions of the 22nd century. In short, the existing geography of nuclear sites is increasingly unsustainable.

Fourth, strategic planning has so far proved to be no constraint on the persistence of sites selected long ago and in markedly different conditions. Existing sites are still being identified by potential developers on the assumption that they will prove acceptable. The strategic planning process has hitherto been little more than a retrospective legitimation of decisions founded on economic and political criteria.

If and when a new NPS is forthcoming it will be largely irrelevant. It will come too late to arrest the few, if any, proposals for nuclear power stations that survive the economic and technical barriers to progress. The geography of nuclear power, which reflects the nuclear age of the last century, will survive as the geography of decommissioning and waste management into the next century. Truly a case of an industry frozen in aspic.

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Notes

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