

Consultation on the Siting Criteria and Process for a New National Policy Statement for Nuclear Power with Single Reactor Capacity over 1 Gigawatt beyond 2025

Climate Change and Siting – the implications of sea level rise and time-scales for coastal sites

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Overview

The Government's programme for new nuclear power has been substantially focused on overarching strategic issues of foreign investment, finance, technological safety and national security. For one reason and another the programme has proved faltering. Hinkley Point, though approved and under development, remains controversial and its future still insecure. The Moorside project has collapsed as foreign investment has withdrawn and Wylfa has also become a doubtful project presumably dependent on Government intervention to proceed. Oldbury is not yet on the starting blocks. Of the two eastern sites, Sizewell is mired in the final stages of consultation prior to development consent. Finally, Bradwell, once an outlier has come more into the reckoning but remains far behind in the crawl to the finishing line, its prospects speculative at best.

In all the convolutions and contradictions in what passes for a nuclear programme, a key constraint, the availability, suitability and acceptability of the sites themselves has received only passing attention at the strategic level, though it has certainly consumed attention among the affected local communities. There may be two reasons for this. One is that in the early stages the discussions about finance, design and security are at a generic level as projects materialise and become tied to specific sites. The other reason is that there is a general assumption at government, developer and media level that objections and problems with sites can, ultimately, be overcome. It must be said that this complacency is fed by the tendentious approach of the NPS which is clearly designed to legitimate sites to ensure development whatever the costs to environments, communities and security.

This is evident from the criteria for site selection which have changed but little during the decade since they were first developed. The sites were allegedly the only sites available before 2025, yet the self same sites are being recycled with no further site identification until the 2020s. The present Consultation on siting criteria disingenuously asserts the Government's preliminary view that 'the sites listed in EN-6 are likely to be those which can deploy the soonest and are the only sites capable of deploying a nuclear power station by 2035' (DBEIS, 2017, p.12).

The siting criteria remain overwhelmingly discretionary suggesting the sites will again easily pass the thresholds for acceptability. The premise that nuclear energy is

needed in whatever amounts that can be financed by overseas investors remains the *idée fixe* of the Government's energy strategy. The illusion that nothing much has changed persists in the NPS – yet, it is evident that everything has changed.

Changing Circumstances, Unchanging Proposals

The concern here is with siting and more especially with the issue of climate change and the related siting criteria of flooding, storm surges and coastal processes. In the light of recent evidence and changing circumstances it is considered that these criteria must be further reviewed, revised and be made exclusionary. There are three parameters which indicate the need to revisit these criteria. They are: need for nuclear energy; sea level change; time-scales.

Need for nuclear

The arguments are well known and have been rehearsed at the Forum on several occasions, notably through the Crumpton/Blowers papers on Energy Policy Issues of Concern. In short, the argument in EN-1 that nuclear energy is a necessary part of the energy mix that underpinned the justification for the sites nominated in 2011 is not sustainable. It was questionable at the time and is untenable now, certainly not on the scale envisaged. In any case, new nuclear power stations are unlikely to be available until the 2030s, by which time any residual justification for civil nuclear energy will have all but vanished. The National Infrastructure Commission has proclaimed that 'a renewable based system looks like a safer bet than constructing multiple new nuclear power plants' and recommends a 'one by one' approach rather than developing a large fleet. It appears that this will be the situation by default with possibly only Hinkley Point reaching start-up.

It is no longer credible to claim that the necessity for nuclear power is an imperative reason of overriding public interest that should have preference over other public interests in environment, public health or security. This must be reflected both in a review of EN-1 explaining the diminished need for nuclear energy and also in the justification process which evaluates the benefits of new (nuclear) practices in terms of security of supply and carbon reduction in relation to health detriments.

The need for nuclear energy should no longer be taken as a given in the process of site assessment and selection. There should be a review of whether any sites are required for the period 2025-35 with a view to abandoning the strategic site selection process forthwith.

Sea-level change

Over recent months global warming and the consequences for climate change and its impacts have been a prominent international issue arising from the IPCC COP24 in Krakow and, in the UK, the UKCP18 sea level predictions. More specifically, there has been increasing concern about the vulnerability of nuclear sites in conditions of sea level rise, storm surges and coastal processes. Around a quarter of nuclear plants world-wide are in coastal locations; all the sites under consideration for new nuclear

plants in the UK are on the coast or estuaries. Some, like Hinkley, Sizewell and Bradwell are already ‘high risk’ especially vulnerable locations (Vidal, 2018).

The tendency for forecasts of sea level rise, risk of flooding, erosion, storm surges to increase is empirically undeniable. Experience of the rise has been measurable over the past decade and the forecast is upwards. EN-6 was based on the UKCP09 forecasts and these have recently been revised with the UKCP18 forecasts. Overall sea level projections are consistently larger even with lower emissions scenarios and higher mitigation measures. The further forward the prediction, the greater the uncertainty given the variables such as glacier melt, emissions levels, storm tracks and so on. For instance, ‘we don’t yet know whether storm surges will become more severe, less severe or remain the same’ (Met. Office, 2018, p.2). In addition, there is considerable local variability related to coastal processes and land rise. Thus, eastern England has a low-lying coastline, eroding in places with the land falling in postglacial isostatic adjustment thereby contributing to rising sea levels. It must be said that forecasting up to the end of the century is fraught with uncertainties but that global warming and sea level rise will continue is incontestable.

The IPCC’s report on global warming of 1.5⁰C indicates the measures that must be taken to avoid a rise of global temperature above 1.5⁰C, a level likely to be reached between 2030 and 2052. Action is required immediately at global and international level to prevent a continuing rise to 2⁰C and probably more by the end of this century. At such a level adaptation becomes more problematic. ‘A slower rate of sea level rise enables greater opportunities for adaptation in the human and ecological systems of small islands, low-lying coastal areas and deltas.’ (IPCC, 2018, p.9). The problems of protecting major infrastructures at coastal sites might become more manageable but the prospects of slowing sea level rise appears minimal. If present trends continue a rise in global temperatures of 2⁰C and more is inevitable and the consequences for sea level rise and consequent flooding and storm surge at coastal infrastructures could be catastrophic.

Two of the NPS criteria relate to climate change and sea level rise. They are: flooding, tsunami and storm surge; and coastal processes. Both are discretionary criteria which may make a site unsuitable for a nuclear station ‘but which need to be carefully considered in order to come to a conclusion as to the site’s strategic suitability’ (p.18). (Note the preemptive assumption of priority for nuclear energy implied in this statement). This means that, for instance, sites should be in areas with low probability of flooding ‘unless there is no reasonable alternative appropriate for the proposed development’. Thus, development might be permitted in flood zone 3 (highest probability of flooding) which, at Bradwell, covers most of the site. The developer must demonstrate that they can avoid, mitigate or minimise impacts on sites. Two points might be made here. One is that, ultimately such a demonstration would be impossible, even futile, providing false assurance to gain a permit. The other is that where there is no alternative site for the development (a matter of assertion rather than empirical fact) a unique environment of international significance can be disrupted, damaged or even destroyed in the effort to secure a site for an unnecessary nuclear power station.

The problems of *Managing the Coast in a Changing Climate* have recently been set out by the UK Committee on Climate Change (2018). In areas like the East Coast natural protection from saltmarshes, mudflats, shingle beaches, sand dunes and sea cliffs has been rapidly declining. The problems of managing such coasts through adaptive measures such as managed realignment and hard defences may be insuperable in the uncertain circumstances of climate change over the next century. It seems imprudent and irresponsible to contemplate development of new nuclear power stations in conditions which may become intolerable.

In terms of sea level change and related processes it is concluded that:

- **The assessment of potential suitability of sites for new nuclear energy should be informed by the most recent detailed and site-specific data on climate change and consequences for sea levels, flooding, storm surges and coastal processes.**
- **Risk assessment should be based on the highest projections of global warming and sea level rise bearing in mind increasing uncertainty over time.**
- **Criteria for flooding, tsunami and storm surge and for coastal processes should be exclusionary, that, if breached, will categorically exclude a site from further consideration.**
- **Sites in Flood Zone 3 should be automatically eliminated.**

Time-scales

Development and planning for new nuclear power involves decision making that will affect environments and human health over very long, sometimes unimaginable, time-scales. Take an example like Bradwell, where the process from consideration through decision, to development, operation and the later stages of decommissioning and clean-up could span around 200 years and, far beyond if the long-term management of radioactive wastes is taken into account (see Box). Decision-making over such time-scales is subject to increasing uncertainty. Reliance must be placed on forecasts and predictions which, over time, rely on probabilistic assessments of increasing range as variables inevitably involve inaccuracies of measurement and ignorance of information and experiment. Ultimately, it becomes a matter of indeterminacy, where the unknowable is a subject of speculation and fantasy. In a phrase it is the realm of unknown unknowns.

Box Time-scales of nuclear development

Time-scales might be considered in terms of six phases:

Phase 1: Proposal under consideration. 10 years.

Phase 2: Decision Phase including GDA, planning and permitting. 10 – 12 years.

Phase 3: Development phase. Up to 10 years.

Phase 4: Operational phase. Around 60 years.

Phase 5: Decommissioning and Clean-up. Up to 100 years.

Phase 6: Indeterminate and indefinite period of continuing storage or disposal.

This progression from uncertainty to indeterminacy is the case with new nuclear power. In the early stages, uncertainties over design, cost and construction dominate and may be solved over time. The operational period lasting around sixty years is subject to broader, less predictable uncertainties, notably climate change. It is noticeable that statistical predictions of global warming, sea level rise and climate changes are confined to the period up to the end of the century and, even then, the uncertainties introduce a speculative element into decision making (for instance, on measures to protect a power station against the risks of sea level rise, flooding and coastal processes).

Beyond 2100 major instabilities such as the possible substantial melting of the Greenland and Antarctic ice sheets make it impossible to present anything beyond vague, provisional and exploratory scenarios. UKCP18 comments that, 'Based on exploratory results to 2300, sea levels continue to increase beyond 2100 even with large reductions in greenhouse gas emissions.' (UKCP, p.1). In short, beyond 2100 is unknown territory, not only in terms of natural processes but also in terms of institutional continuity and societal stability. Yet, new nuclear power stations will scarcely have ceased operating at this point while it is intended spent fuel and other high active wastes will be stored on site for an unknown period, certainly well into the second half of the 22nd. century. It is assumed that these wastes will ultimately be disposed in the GDF which acts as a kind of Holy Grail for the end stage of the nuclear cycle. Given there is neither concept, nor site available it is surely premature to rely on the GDF which, in any case, might be too late to deal with wastes on deteriorating coastal sites.

In terms of intergenerational equity it should be inadmissible to establish long-term spent fuel and other radioactive waste stores at vulnerable coastal sites without community consent, as is being sought for the GDF. It must also be unethical and irresponsible to permit development which will persist into the far future where physical and social conditions are unknowable, the viability of protective systems untestable and a deep disposal facility unreliable.

On the question of time-scales we make the following observations:

- **Long time-scales lead to increasing uncertainty in planning and implementing hazardous facilities such as nuclear plants.**
- **Beyond the end of this century predictions and forecasts concerning both natural and social systems are speculative, unreliable and indeterminable.**
- **In such circumstances storage of dangerous radioactive wastes on vulnerable sea coasts and estuaries is unviable, unethical and unmanageable.**

- **For this reason alone no new nuclear power stations should be built on coastal locations.**

Conclusion

Over recent months it has become evident beyond any reasonable doubt that the Government's nuclear ambitions, if not its whole strategy, have been fatally undermined. The premises on which EN-6 were based, the need for nuclear, the attraction of foreign investors have disappeared with the availability of cheaper alternatives and the high risks of nuclear investment. The availability of sites has not been a significant issue except at local level. There is a danger that as sites are withdrawn by default, pressure will mount to secure development at those sites where potential developers are still active. In practical terms that means Sizewell and Bradwell, two sites on the fragile east coast where long term viability must be in serious doubt. Any pressure by government or foreign (Chinese and French) interests to ensure these sites are redesignated must be firmly resisted. The wise course would be to acknowledge the sites are unsatisfactory and to halt the process for a new national policy statement for nuclear power forthwith. Therefore,

In light of the diminished need for nuclear energy, the impacts of climate change on coastal sites and the long time-scales involved, the programme of new nuclear power stations should be abandoned.

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References

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