

## **Nuclear Industry Association Response to the Energy Security and Net Zero Committee's 'Planning for Nuclear Energy Generation' Inquiry.**

The Nuclear Industry Association (NIA) welcomes the opportunity to respond to Energy Security and Net Zero Committee's 'Planning for nuclear energy generation' inquiry.

The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent more than 300 companies operating across all aspects of the nuclear fuel cycle, including the current and prospective operators of nuclear power stations, international designers, and vendors of nuclear power stations, and those engaged in decommissioning, waste management and nuclear liabilities management. Members also include nuclear equipment suppliers, engineering and construction firms, nuclear research organisations, and legal, financial and consultancy companies.

### **Executive summary**

We welcome the inclusion of Small Modular Reactors and Advanced Modular Reactors in the National Policy Statement for Nuclear Energy Generation, the implementation of a criteria-based approach to siting, and the removal of deployment deadlines from the planning framework for new nuclear. We encourage Government to further review the siting criteria of EN-7 — including ending the current use of the Semi Urban Population Density Criterion — to ensure that the opportunities associated with advanced nuclear technologies (ANTs) can be accommodated and leveraged to support the net zero energy transition.

The Semi Urban Population Density Criterion (SUPDC) is not appropriate for modern reactor technologies, whether large-scale, SMR or AMR because its underpinning does not reflect the latest evidence about the safety of nuclear reactors. In the immediate term, it prevents nuclear development at Heysham, a site designated in EN-6 as suitable for nuclear development and a prime site for SMR deployment. It may also obstruct full development at Hartlepool, another EN-6 site.

The Nuclear Industry Association's initial preferred solution is to end use of the SUPDC and allow use of sites that meet the pre-existing requirement that a location must be suitable for the establishment of an adequate emergency plan in accordance with nuclear site licence conditions and the Radiation (Emergency Preparedness and Public Information) Regulations (REPPiR). This process already allows developers to present evidence for why emergency planning zones can be reduced based on the safety features and performance of their reactor. Other solutions are possible, however.

The NIA is preparing a more detailed analysis and recommendations with its members for submission to the Nuclear Regulatory Taskforce by 8 September and will share that with the committee.

### **1. Does EN-7 provide a clear and effective framework for planning new nuclear infrastructure, including both large-scale and modular technologies?**

- a. The draft EN-7 currently includes significant uncertainty for developers.

- b. EN-7 suggests that compliance with the exclusionary Semi-Urban Population Density criterion should be demonstrated as part of a Development Consent Order(DCO) application. However, confirmation of site suitability at the point of submitting a DCO application comes too late in the development process, and poses too much risk for the developer.
  - i. Before submitting a DCO application, a developer must already have secured a site, submitted several safety related submissions to ONR, and engaged with the local community. This means that significant resources will already have been invested by the time site suitability is confirmed.
  - ii. With population growth projected to continue, we would also urge Government to clarify whether population changes and new housing developments (within 30km of site) may result in part of the site failing exclusionary criterion during the development period.
- c. EN-7 proposes that the Proximity to Military Activities criterion will continue to be exclusionary —the rationale for excluding nuclear energy developments from these areas currently remains unclear for developers and we would encourage Government to clarify it to industry.
- d. We would also encourage Government to clarify to industry the rationale and extent of restrictions on aviation around any nuclear infrastructure, as this requirement would essentially exclude significant land in proximity to nearby civil aviation infrastructure.
- e. The draft EN-7 also proposes developers to undertake early engagement with local authorities and regulators to assist with applications for environmental permits and planning consent, which is a significant change from EN-6 wherein early engagement was undertaken with Government.
  - i. Any nuclear development on a non-nuclear site in the UK has so far been accompanied by some form of early government support, which means that this change comes with significant uncertainty for developers.
    - a) The last non-nuclear area to become licensed for a new nuclear power station was Torness 45 years ago, so there is little practical precedent in the current regulatory context.
  - ii. We recommend that the Government commission and publish its own study to identify a non-exhaustive list of potential sites for new nuclear power stations beyond the EN-6 sites. This could be done in context of the Great British Energy-Nuclear SMR programme, as part of the Alternative Routes to Market work, or as a distinct piece of work. This could help to reduce uncertainty.

**2. Is the proposed criteria-based approach to siting appropriate, and does it adequately balance flexibility, safety, and impact on communities and the environment?**

- a. We welcome the proposed criteria-based approach to siting, however, we strongly encourage Government to review the siting criteria detailed in EN-7 to adequately support the deployment of ANTs.
  - i. We urge Government to adjust the siting criteria in EN-7 to take into account the different characteristics, risks and consequences of different technologies at different sites to ensure that the opportunities associated with ANTs can be leveraged (see responses to Questions 3 and 5 for further details).
- b. We also urge Government to protect the previously designated sites outlined in EN-6, to ensure that enough well-suited sites are available for new nuclear projects in the drive for energy security, and for net zero by 2050.
  - i. Nuclear energy developments are directly impacted by other infrastructure and housing developments which are unrelated to nuclear energy. While the criteria-based approach to siting increases flexibility in site selection, it also risks well suited nuclear sites being impacted by other developments. The Government could consider a formal policy to allow it to call in planning applications on or near EN-6 designated land, or a formal policy excluding development with a certain distance.
  - ii. Deployment of new nuclear nearby historic nuclear sites also allows developers to leverage preexisting nuclear site licenses, existing workforce capabilities, and community support for nuclear, minimising risks associated with new developments.
- c. We further urge the Government, perhaps as part of a siting survey as recommended in 1.e.ii above, to audit the status of the land around retired coal-fired and gas-fired power stations to determine whether the land is still commercially available and technically viable for nuclear development, and if other developments are in progress that would prevent this. The coal and gas sites are the most logical targets for further nuclear expansion, but in the absence of a strategic vision for their use, some are already being developed for other purposes.
  - i. Fiddlers Ferry, for instance, formerly one of the largest coal-fired power stations in the country near Warrington in Cheshire with a capacity of almost 2 GW, is now owned by Peel, who intend to build 860 homes on it as part of a mixed development scheme.<sup>1</sup>

**3. The draft EN-7 retains a Semi-Urban Population Density Criterion (SUPDC) for siting. Is this criterion, as drafted, appropriate for all potential nuclear technologies, including SMRs?**

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<sup>1</sup> Fiddlers Ferry (n/a) *Development plans*. Available at: <https://www.fiddlersferry.com/development-plans>

- a.** The SUPDC’s underpinning methodology, designed to prevent harm to the public from radiation, is nearly 60 years old and thus cannot account for the following factors:
  - i.** Modern reactor technologies could have a much smaller inventory of radioactive material that could be released than the reactors on which the SUPDC is based
  - ii.** Modern reactor technologies are often at least 10 times less likely to have an accident than the reactors on which the SUPDC is based.
    - a)** The SUPDC authors themselves indicated that accident probability would be a “more rational basis for assessment” than their prescriptive criteria.
  - iii.** Modern reactor technologies have several safety features to prevent the external release of the vast majority of radioactive iodine in an accident, which is the SUPDC’s principal safety concern
  - iv.** Modern science shows that a higher radiation dose comes from ingestion of radioiodine than inhalation, although the SUPDC identifies inhalation as the greater risk. Ingestion is inherently easier to mitigate and prevent than inhalation, especially in a modern economy where food and drink can be delivered from outside to an accident area.
  - v.** Modern science warns against using collective dose methodology, that is the summation of all doses received by all individuals, irrespective of the individual levels received, to determine epidemiological risk. The SUPDC uses this outdated collective dose approach, which overestimates the risks of low levels of radiation.
- b.** The NIA has identified three potential approaches to solve the issue of outdated and disproportionate siting restrictions:
  - i.** Eliminate SUPDC and consider site suitability through the pre-existing requirement that the location must be suitable for establishing an adequate emergency plan in accordance with nuclear site licence conditions and the Radiation (Emergency Preparedness and Public Information) Regulations (REPPiR). The ONR already conducts this detailed, risk-informed, reactor-specific, and site-specific assessment as part of the nuclear site licencing process.
    - a)** This would enable more flexible, evidence-based siting but would not provide an objective standard from the start to determine site suitability.
  - ii.** Revise the SUPDC based on modern science and evidence.
    - a)** This would also enable flexible siting with a clear and objective standard against which all reactor developers could plan but could take several years to development, delaying the UK nuclear programme.
  - iii.** Allow developers to “argue from” the existing SUPDC based on evidence from their reactor technologies’ design, operation and safety features. That is, if they could show an accident probability 10 times

less than the reactors on which the SUPDC was based, they could argue for a proportionate relaxation of SUPDC restrictions.

- a) The advantage of this solution is that it would allow a swift, evidence-based and risk-informed modernisation of the siting policy and enable development at key EN-6 sites such as Heysham, but it is a stop-gap solution.

#### **4. Is EN-7 adequately future-proofed to accommodate advancements in nuclear technologies?**

- a. Whilst we welcome the inclusion of Small Modular Reactors and Advanced Modular Reactors in the National Policy Statement, the siting criteria detailed in EN-7 must be adjusted to accommodate and leverage advancements in nuclear technologies.
  - i. We encourage Government to further review the proposal that Population Density and Proximity to Military Activities criteria compliance will continue to be mandatory and therefore ‘Exclusionary’.
- b. We encourage Government to acknowledge that it may be advantageous to have advanced nuclear technologies situated close to military activities if there is a requirement for significant, on-site but potentially off-grid power generation, particularly if military vehicles move to using synthetic fuels in the future.
- c. Additionally, close proximity of advanced reactors to industrial clusters and data centres may be advantageous for decarbonisation, and should not be excluded due to Population Density criteria.
  - i. ANTs offer great potential to provide clean heat, power and hydrogen to industrial clusters, which are nearer to population centres and thus might not meet these criteria.
  - ii. Nuclear is the only source of clean heat proven at scale, and clean heat from advanced, high-temperature reactors is key for decarbonising industries reliant on fossil fuels to reach the temperatures they need.
    - a) Existing studies suggest that advanced reactors used for heat provision would typically need to be located within 60-150 meters from the heat consuming industry to balance safety and efficiency with minimal heat loss, which may not be permitted under the current Semi-Urban Population Density Criterion.<sup>2 3</sup>

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<sup>2</sup>Nuclear Energy Agency (2024) *High-temperature Gas-cooled Reactors and Industrial Heat Applications*. Available at [https://www.oecd-nea.org/jcms/pl\\_70442/high-temperature-gas-cooled-reactors-and-industrial-heat-applications?details=true](https://www.oecd-nea.org/jcms/pl_70442/high-temperature-gas-cooled-reactors-and-industrial-heat-applications?details=true)

<sup>3</sup> Idaho National Laboratory (2005) *Thermal-Hydraulic Analyses of Heat Transfer Fluid Requirements and Characteristics for Coupling a Hydrogen Product Plant to a High-Temperature Nuclear Reactor*. Available at <https://inldigitallibrary.inl.gov/sites/sti/sti/3012383.pdf>

- iii. Foreclosing the use of ANTs at industrial clusters would inhibit the UK's progress towards net zero, and would not be proportionate to the very low and rigorously regulated risk profile of these technologies.

**5. How does EN-7 compare to international approaches? Are there lessons to be learned from other countries' planning systems?**

- a. We encourage Government to consider the approach taken by Finland and the United States in adopting a technology-inclusive and risk-informed criteria to assess population related issues for the siting and deployment of ANTs.
  - i. The Finnish nuclear regulator, STUK, requires those applying for a licence for a nuclear power plant to indicate to the authorities what kind of protection zones would be needed to guarantee safety, rather than using zonal requirements independent of technology.<sup>4</sup>
  - ii. The US Nuclear Regulatory Commission considers safety, environmental, economic, and other factors in determining the acceptability of a potential nuclear site that is located away from a very densely populated centre but not in an area of low density.<sup>5</sup>
  - iii. The US Nuclear Regulatory Commission has also accepted NuScale's risk-informed methodology for determining Emergency Planning Zone (EPZ) sizing for SMRs, which allows EPZ to be limited to the site boundary of the power plant. This enables SMRs to be located nearer to users of the plant's output, such as off-takers of process heat.<sup>6</sup>

**6. Are there any other issues, concerns, or opportunities the Committee should consider in relation to EN-7?**

- a. We would urge Government to ensure that the National Policy Statements for energy infrastructure, and the Strategic Spatial Energy Plan and the Centralised Strategic Network Plan developed by the National Energy System Operator are aligned to support nuclear deployment in the lead up to Net Zero by 2050.
  - i. The siting policy detailed in EN-7 should be consistent with the forthcoming siting recommendations of the SSEP, to minimise the risk of judicial reviews for new nuclear developments.

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<sup>4</sup> Radiation and Nuclear Safety Authority (2024) *According to STUK's new regulation, nuclear power plant's precautionary action zone and emergency planning zone are defined on a case-by-case basis*. Available at <https://stuk.fi/en/-/according-to-stuk-s-new-regulation-nuclear-power-plant-s-precautionary-action-zone-and-emergency-planning-zone-are-defined-on-a-case-by-case-basis>

<sup>5</sup> U.S. Nuclear Regulatory Commission (2023) *General Site Suitability Criteria for Nuclear Power Stations*. Available at <https://www.nrc.gov/docs/ML2312/ML23123A090.pdf>

<sup>6</sup> World Nuclear News (2022) *US regulator approves methodology for SMR emergency planning*. Available at <https://www.world-nuclear-news.org/Articles/US-regulator-approves-methodology-for-SMR-emergenc>

- ii. NESO's modelling for the SSEP should take into account:
  - a) Prevailing regulatory requirements for siting new nuclear.
  - b) Traditional nuclear siting hierarchy, plus a consideration to alternative thinking and approaches enabled by EN-7.

### **Further Information**

The NIA is happy to provide more context, or any clarifications desired on the content of our response and to ask our members where appropriate for additional information that may be useful.

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