Department for Energy Security & Net Zero

Consultation on a new National Policy Statement for Fusion Energy

The proposed approach to siting fusion energy facilities

Closing date: 17 July 2024 (extended from 3 July)

May 2024

Any enquiries regarding this publication should be sent to us at:
fusionregulation@energysecurity.gov.uk

Foreword

The need to generate low-carbon, safe, secure energy has never been more apparent. Fusion energy has the potential to deliver just that and help deliver and maintain long-term global decarbonisation in the face of rising energy demands. The UK has been at the forefront of fusion energy development for decades and is in a unique position to capitalise on the environmental and economic benefits that this transformational new energy source can bring, including at a local and regional level.

To best commercialise this revolutionary technology, developers, investors, and the wider fusion industry will need to be able to plan with confidence. They need to know the regulatory and planning framework in which they will be operating, and the public need to be reassured that this new technology is being developed safely.

The UK has already made significant progress in this endeavour. I am proud to say that the UK was the first in the world to legislate for fusion regulation when we passed the Energy Act 2023. This groundbreaking legislation confirmed that fusion energy facilities would not be treated as a nuclear installation and the UK has already seen the benefits of being proportional and proactive in showing a clear vision for fusion regulation.

The UK cannot take its leadership position in fusion and fusion regulation for granted. The UK's ambition, and commitment to capitalise on this global leadership, were reinforced with the publication of the UK's updated Fusion Strategy[1] in October 2023. As part of this, the Government wants to continue addressing the areas identified in its response to the fusion regulation consultation[2]. This includes clarifying the planning process for future fusion power plants through a Fusion National Policy Statement (NPS), ensuring stability for investors and developers and encouraging the long-term investment fusion energy requires.

When the overarching NPS, EN-1, was updated in 2023, it emphasised the important role fusion could have in providing baseload power. This consultation now builds on EN-1 to set out and streamline the planning process for fusion power plants. The development of a new Fusion Energy NPS (EN-8) will be important in promoting the UK as a natural home for commercial fusion development, support the growth of fusion energy in the UK, and ensure that communities can benefit from the economic opportunities inherent to fusion development.

Through this consultation we want to hear from communities, industry and investors to ensure that the NPS fully supports development of fusion power plants.

Andrew Bowie

Minister for Nuclear and Renewables

[1] UK Government (2023) Towards fusion energy: the UK fusion strategy. Available at: https://www.gov.uk/government/publications/towards-fusion-energy-the-uk-fusion-strategy.
[2] UK Government (2021) Towards fusion energy: proposals for a regulatory framework. Available at: https://www.gov.uk/government/consultations/towards-fusion-energy-proposals-for-a-regulatory-framework.

Contents

General information

Why we are consulting

In 2022, the Government published a response to its Fusion Regulation Green Paper confirming that fusion will be regulated under a different framework than fission. With this different policy approach and the Government's proposal that fission regulation should not apply to fusion energy facilities, a fusion specific National Policy Statement (NPS) was identified as essential to provide clarity to developers and communities.

The updated EN-1 states that fusion can be part of the effort to secure the UK's energy security and meet long-term decarbonisation goals. This consultation begins the process towards designation of an NPS for fusion energy (EN-8), including setting out the broad policy proposals for this NPS and fusion specific planning criteria.

Consultation details

Issued: 8 May 2024

Respond by: 17 July 2024 (extended from 3 July 2024)

Enquiries to: fusionregulation@energysecurity.gov.uk

(please do not send consultation responses to this address, see below details on responding via Citizen Space)

Consultation reference: Scoping EN-8 Fusion Energy National Policy Statement

Audiences: The government wants to hear from members of the public, industry, academia, non-governmental organisations and any other organisation or public body.

Territorial extent:

This consultation relates to the exercise of powers in England and Wales. The Planning Act 2008 and system of Nationally Significant Infrastructure consenting do not apply to Scotland or Northern Ireland. The Wales Act 2017 gives Welsh Ministers the responsibility to consent the construction of power stations of a capacity up to and including 350MW.

Confidentiality and data protection

Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential, please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our privacy policy.

We will summarise all responses and publish this summary on GOV.UK. The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

How to respond

We are inviting responses to this Consultation via the online e-consultation platform, Citizen Space.

In this Consultation, the government wants to hear from members of the public, industry, non-governmental organisations and any other organisation or public body. When responding, please state whether you are responding as an individual or representing the views of an organisation. If you are responding on behalf of an organisation, please make it clear who the organisation represents and, where applicable, how you assembled the views of members.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome. When considering responses to this consultation, the government will give greater weight to responses that are based on argument and evidence, rather than simple expressions of support or opposition.

Consultations receive a high-level of interest across many sectors. Using the online service greatly assists our analysis of the responses, enabling more efficient and effective consideration of the issues raised. Therefore, we strongly encourage responses via Citizen Space. Please contact us if you intend to respond using an alternative method.

Respond online at: : https://energygovuk.citizenspace.com/energy-security/scoping-fusion-energy-national-policy-statement/

We advise that you do not send responses by post to the department at this time, as we may not be able to access them.

Quality assurance

This consultation has been carried out in accordance with the government's consultation principles.

If you have any complaints about the way this consultation has been conducted, please email: bru@energysecurity.gov.uk.

Executive Summary

The commercialisation of fusion energy is accelerating. The industry has attracted over $6 billion in investment internationally to date, a figure which is $1.4 billion more than in 2022[3]. Both public and private sector fusion organisations worldwide are designing prototype fusion power plants, with some organisations planning to start construction before the end of the decade. If the UK is to capture a significant part of the private sector fusion market, clarity around the planning process and framework is required. Not just for private fusion companies, but also for the Government's prototype fusion powerplant programme STEP (Spherical Tokamak for Energy Production), investors, local communities, and all potential developers. To provide clarity and enable the growing fusion industry, the Government is publishing its proposal for designating a new National Policy Statement (NPS) for fusion energy.

In response to its consultation on a fusion energy regulatory framework[4], the Government has made clear that fusion will not be subject to a nuclear site licencing process in the same way as nuclear fission facilities due to the fundamental differences in technology, process and levels of hazard. In October 2023, the Energy Act 2023 was passed to confirm this approach. Building on this, the Government proposes fusion should not be covered by a fission or any other energy NPS. A new standalone NPS, specifically for Fusion energy facilities, will instead give bespoke, effective, and clear guidance to the Planning Inspectorate (PINS), developers and regulators to support the examination of Development Consent Order (DCO) applications.

This consultation proposes that EN-8 should employ an open-sited and technology inclusive approach to siting new fusion energy facilities, using strategic criteria when identifying and assessing new sites. Criteria areas are proposed for EN-8 which will be developed in more detail after conducting an Appraisal of Sustainability (AoS) and Habitats Regulation Assessment (HRA).

The UK's updated Fusion Strategy[5], published in 2023, reaffirms the Government's commitment to support all fusion technologies in creating a UK fusion industry. Therefore, the new Fusion NPS proposes to include all fusion energy facilities, independent of technology[6].

The Government also proposes amending the Planning Act 2008 to include fusion energy facilities of all power outputs in England and independent of whether a facility provides electricity to the grid or generates heat for other industrial uses. This will ensure that all first-of-a-kind (FOAK) prototype fusion energy facilities are included in the Nationally Significant Infrastructure Projects process and if fusion is used for its high-grade heat, these facilities will not fall out of scope of EN-8.

[3] Fusion Industry Association (FIA) (2023) The global fusion industry in 2023. Available at: https://www.fusionindustryassociation.org/wp-content/uploads/2023/07/FIA%E2%80%932023-FINAL.pdf
[4] UK Government (2021) Towards fusion energy: proposals for a regulatory framework. Available at: https://www.gov.uk/government/consultations/towards-fusion-energy-proposals-for-a-regulatory-framework.
[5] UK Government (2023) Towards fusion energy: the UK fusion strategy. Available at: https://www.gov.uk/government/publications/towards-fusion-energy-the-uk-fusion-strategy.
[6] Fusion technologies including fissile material will not be includes within the scope of this NPS although no such technologies are in development in the UK.

Alongside this consultation the Government is also publishing a draft scoping report on the AoS and draft methodology report on the HRA. These reports propose how the AoS and HRA will be undertaken, the level and type of information to be covered in the assessments and how these will be integrated into the development of the proposed new Fusion NPS.

Introduction

Background

What is Fusion?

Fusion has the potential to provide an abundant source of low carbon energy by replicating the process which occurs at the centre of stars and powers the sun. Light atomic nuclei, of elements such as hydrogen, fuse together to form heavier ones, such as helium, and a large amount of energy is released. To do this, fuel is heated to very high temperatures forming a plasma in which fusion reactions take place.

Fusion can be achieved using different technologies and several of these are the basis of plans to design commercially viable fusion energy facilities in the coming decades. There are currently two main approaches to fusion in the UK, magnetic confinement and inertial confinement.

In magnetic confinement fusion, extreme heat strips electrons from nuclei to form charged ions as a plasma. To keep this very hot plasma from touching the sides of the machine, and to make the plasma more dense, powerful external magnetic fields confine and control the plasma where fusion occurs. The magnets allow the fuel to be confined for very long periods.

Inertial confinement fusion is an approach to fusion which relies on reaching very large pressures rather than confining the fuel for long periods. It is a pulsed process, comparable to an internal combustion engine. At the heart of inertial fusion is a millimetre sized fuel pellet. This fuel pellet is made to implode through a rapid delivery of energy. As the fuel is rapidly squashed, it is heated and compressed, reaching fusion conditions and releasing a huge pulse of energy.

The generation of usable energy using fusion would have several distinct advantages:

- **Fuel abundance**: the fuels used in fusion reactions are abundant. Deuterium is readily extracted from seawater, and tritium is produced using lithium;
- **Baseload power**: fusion energy does not depend on external factors such as wind or sun, making it continuously deployable at point of need;
- **High fuel efficiency**: fusion produces more energy per gram of fuel than any other process that could be achieved on Earth;
- **Carbon-free:** helium is the product of the fusion process – no carbon or other greenhouse gases are produced in the fusion reaction;
- **No chain reaction:** fusion is not based on a chain reaction; specific conditions of heat and pressure need to be maintained for fusion to occur. Therefore, in the event of any technical problems, a fusion facility could be immediately switched off and the process would stop itself within seconds or less;
- **Shorter lived waste:** fusion power plants are not expected to produce the very long lived, high level radioactive waste associated with nuclear fission.

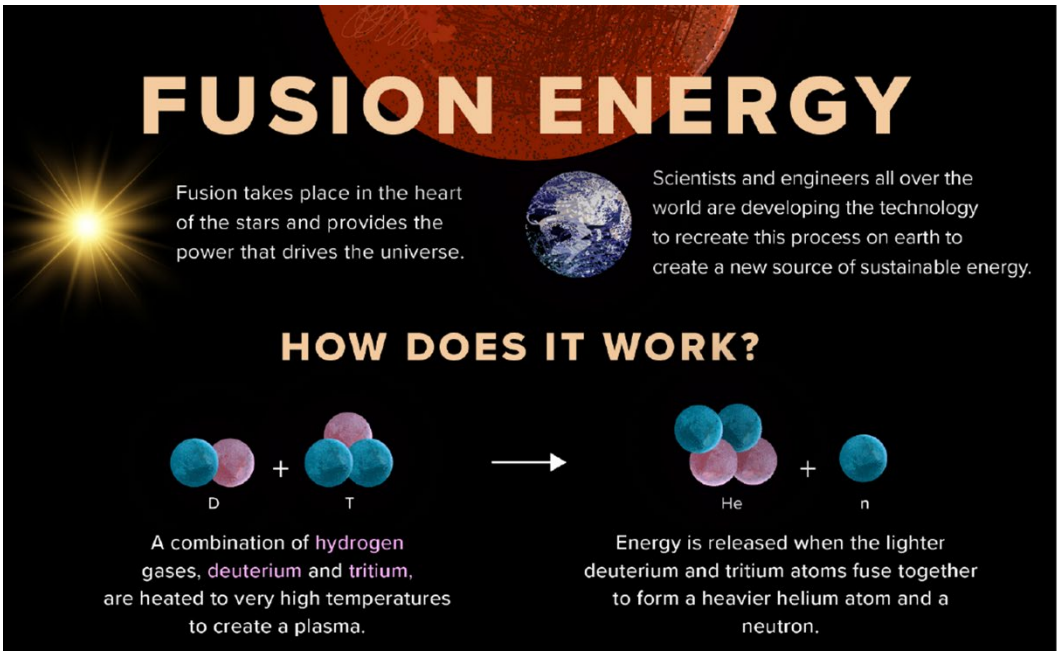

Figure 1 – summary of the fusion process

Opportunities for fusion

The need for domestic large-scale clean energy is increasing to meet growing demand and to build resilience to threats posed by global climate change and challenges to energy security. There is an increased focus by governments internationally on energy sources that are cheap, abundant and reliable which do not depend on other nations for either electricity generation or supply chains.

This drives a global imperative to explore and progress all credible options for clean energy supply both to meet net zero commitments and in sustaining decarbonisation post 2050. Renewables and nuclear fission have an important role to play as part of a portfolio of solutions but alone may not provide global long-term energy security. Fusion has the potential to complement these and provide low carbon, secure, continuous, and abundant energy.

The benefits of fusion energy for the UK not only include the potential for a low carbon and reliable base load energy source for the future but the potential to deliver economic and social benefits through the creation of jobs, attracting investment into the UK and the development of high-value skills.

The UK is not alone in this approach. Other countries also recognise the need to commercialise fusion and have expanded their efforts to do so. In November 2023, the UK and US Fusion announced a partnership[7] to address the technical challenges of delivering commercially viable fusion energy and recently the UK has signed an MoU with Canada to enhance collaboration on key areas of focus, including research and development, regulatory harmonisation, and skills and workforce development[8].

[7] UK Government (2023) UK and US form major partnership to accelerate global fusion energy development. Available at: https://www.gov.uk/government/news/uk-and-us-form-major-partnership-to-accelerate-global-fusion-energy-development.

[8] UK Government (2024) UK-Canada cooperation on fusion energy: memorandum of understanding. Available at: https://www.gov.uk/government/publications/uk-canada-cooperation-on-fusion-energy-memorandum-of-understanding.

The UK's leadership in fusion

The UK remains at the forefront of global fusion capabilities and is widely recognised as a world leader in the most promising fusion technologies. In 2023 the UK published an update to its fusion energy strategy[9]. This consolidated the UK's vision for maintaining its leadership in fusion, focussing not just on the UK's unique scientific and technical expertise, but on commercialisation by developing a thriving UK fusion sector and the development of a prototype fusion power plant in the UK - Spherical Tokamak for Energy Production (STEP)[10].

The UK is also a leader in fusion regulation, being the first country in the world to legislate for fusion regulation[11]. In October 2021 the Government published the Green Paper: *Towards Fusion Energy*, outlining its proposals for a regulatory framework for fusion energy in the UK[12].

Following a review of responses to its consultation, the Government outlined its planned next steps in establishing a regulatory framework for fusion energy in the UK. The core proposal of this framework was for fusion energy to continue to be regulated by the Health and Safety Executive (HSE) and the Environment Agency (EA) or devolved equivalents. This decision was based on the relatively low hazard and risk of fusion energy and ensuring a regulatory framework that is proportionate to those risks and does not stifle innovation.

The Government has now passed legislation as part of the Energy Act 2023[13] which confirms that the Nuclear Installations Act 1965 will not apply to fusion energy facilities. This means that fusion will not be regulated under the same framework as nuclear facilities.

Due to the differences between fusion and fission and the need to ensure an efficient planning process for fusion facilities, the Government committed to developing proposals for a Fusion National Policy Statement (NPS). The Government recognised that the currently assumed planning process for fusion energy facilities in England and Wales would be inefficient and make fusion an outlier compared to complex technologies that produce electricity, but it would be inappropriate to incorporate fusion as part of EN-6 or the newly proposed new nuclear EN-7.

Rationale for Fusion NPS

The need for clarity on the planning regime for fusion energy is apparent throughout the private and public sector.

Private industry is planning to build commercial facilities in the 2030s which requires siting and construction to start this decade. Companies are already starting to identify potential sites for these facilities.

[9] UK Government (2023) Towards fusion energy: the UK fusion strategy. Available at: https://www.gov.uk/government/publications/towards-fusion-energy-the-uk-fusion-strategy.
[10] https://step.ukaea.uk/
[11] UK Government (2023) Energy Act 2023. Available at: https://www.legislation.gov.uk/ukpga/2023/52/contents/enacted
[12] UK Government (2021) Towards fusion energy: proposals for a regulatory framework. Available at: https://www.gov.uk/government/consultations/towards-fusion-energy-proposals-for-a-regulatory-framework.
[13] UK Government (2023) Energy Act 2023. Available at: https://www.legislation.gov.uk/ukpga/2023/52/contents/enacted

The planning process and considerations required to gain development consent will heavily influence designs, and so clarity needs to be provided well before detailed designs are completed. Regulatory certainty will also be a key consideration of investors and companies when deciding where to invest and where to build. An NPS gives a clear market signal to global investors that the UK is providing a stable regulatory and planning base on which long-term investment can be made.

Currently, companies in the UK are developing their plans for fusion powerplants and have long expressed the need for a clear direction from Government to be able to do this.

First Light Fusion

"First Light Fusion is currently planning for its route to a power plant and is continuing to engage with investors on our technology. For pre-commercial technologies with long lead times to market, the presence of a robust, reliable, and clear regulatory and policy landscape is critical, both in terms of investment de-risking, and to inform strategy for our route to market."

Tokamak Energy

"Tokamak Energy is developing the technology today to deliver commercial fusion energy in the 2030s, providing both electricity for the grid and heat for industrial processes. It is therefore vital that, alongside the good regulation already in place, the growing fusion industry has a policy statement which clearly defines the path ahead for power plant siting, associated fusion industries and enables development to proceed at pace. This will be ground-breaking guidance globally for the industry, further signalling the UK's status as the world's most advanced ecosystem for commercial fusion."

In the public sector, STEP is central to the Government's objective to design and build, by 2040, a UK prototype fusion energy plant capable of delivering net energy. Hosted at the West Burton A site in Nottinghamshire, the site of a former coal-fired power station, STEP will play an important role in demonstrating the commercial viability of fusion by integrating and operating industrial-scale fusion systems in a single, energy-producing facility. This anchor project also aims to galvanise the entire fusion sector in the UK and help provide a stimulus to develop the fusion supply chain. Although a site has been selected for STEP, the classification of STEP and other fusion energy facilities as Nationally Significant Infrastructure Projects, and clarity on the criteria for considering applications for a Development Consent Order, will de-risk the development of FOAK facilities. The fusion sector has made clear that the development consenting process for a fusion energy facility could be a critical path for the timescales of developing facilities.

Clarifying the planning regime is not the only consideration in developing a fusion NPS. A bespoke fusion NPS will result in planning applications being considered centrally by PINS in England, with decision taken by the relevant Secretary of State rather than by each local authority. It is unlikely that local authorities will be able to build the necessary expertise to effectively scrutinise developers' plans on the timescales needed for delivery of FOAK facilities. Developers may then be limited to siting in areas where there is existing expertise rather than selecting the most suitable site or the lack of expertise could slow down consenting to a degree that risks UK leadership in this important technology. Developing a Fusion NPS and having planning applications examined centrally will mitigate these risks, and ensure local authorities are not commercially disadvantaged when competing to host fusion facilities. A description of a fusion power plant is given on page 14 which illustrates the complexity of these facilities.

The Planning Regime and National Policy Statements

A crucial foundation for the development of new fusion energy facilities is an effective planning policy framework to underpin determination of the location of potential new sites for fusion power stations.

Nationally Significant Infrastructure Projects (NSIPs) require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008. For such a project, PINS examines the application and will make a recommendation to the relevant Secretary of State, who will make the decision on whether to grant or to refuse development consent. The Wales Act 2017 devolves competence for the consenting of electricity generating stations up to 350 MW both on and offshore to the Welsh Ministers.

Infrastructure outside of the scope of the NSIP process are consented through the Town and Country Planning Act 1990 (TOCPA). Applications through the TOCPA are considered by the relevant local authority in England and Wales.

The energy National Policy Statements set out national energy policy and form the framework for decision-making on applications for development consent for energy Nationally Significant Infrastructure Projects.

The overarching National Policy Statement for Energy, EN-1, sets out the need case for certain energy infrastructure and general assessment principles, whilst the other five NPSs set out technology specific assessment principles. EN-8, a fusion energy NPS, will set out the assessment principles and general impacts that applicants will have to address when considering the siting of their fusion energy facilities.

The characteristics of a generic fusion power plant

There is no precedent on the layout and characteristics for an existing prototype fusion power plant but the general characteristics such as the infrastructure and operational requirements are known. This section provides an overview of a generic fusion power plant for a tokamak based facility in the UK. There will be strong similarities with other fusion technologies, and any differences will be described in this section.

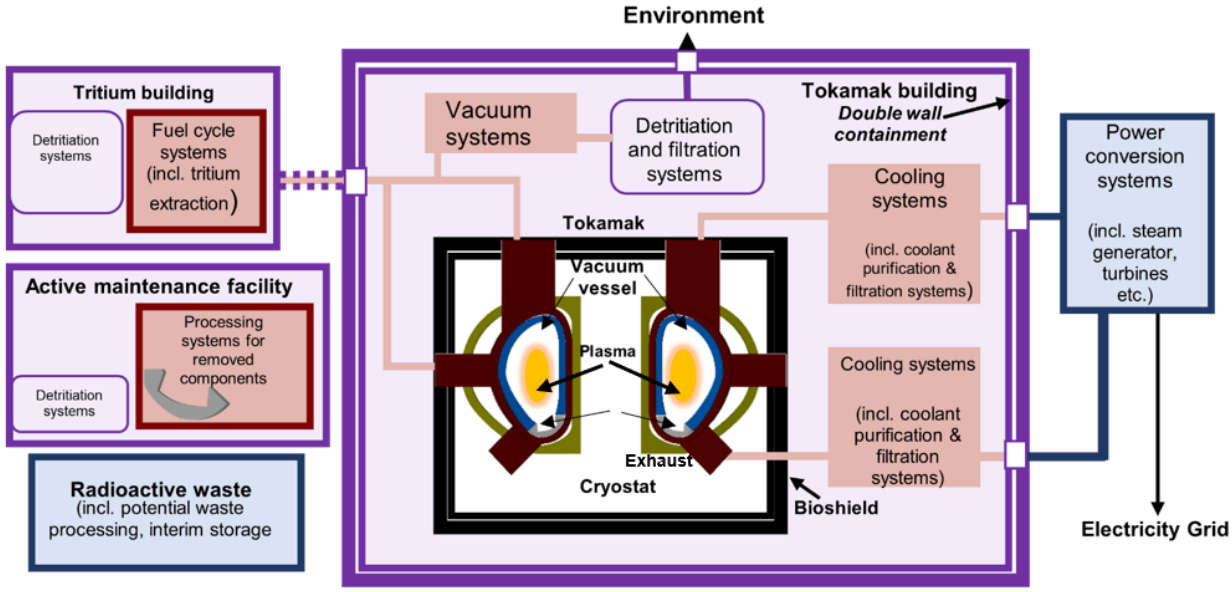

Figure 2 – Simplified diagram of the components of a generic fusion energy facility

Fusion power plants consist of many systems and buildings and a simplified diagram of the basic building blocks of a typical tokamak based fusion power plant is shown in Figure 2 above. Figure 2 shows that the tokamak device for achieving the conditions to create fusion is located within a structure known as the tokamak building. Also contained within this building are cooling systems to extract heat from lithium blankets which is then used to produce electricity to transmit to the grid. Other technologies will not have a tokamak building but will have a central hall to host the reaction vessel. Depending on the technology this building may be smaller than a tokamak building.

Also within the site are systems to extract the tritium from the lithium blanket and exhaust systems to recycle fuel and maintain the fusion reaction. Tritium and deuterium are recovered by using the fuel cycle systems within the tritium building (top left block in figure 2) for re-use within the tokamak. Also within the tokamak building are systems to maintain the vacuum within the vacuum vessel and a cryostat to achieve the extremely low temperature of the magnets, operating at a temperature that is close to absolute zero. Other fusion technologies may use different fuels which would not require lithium blankets.

The fusion power plant will also require an active maintenance building (see block on the middle left of Figure 2) for maintaining and then returning to service radioactive components. It should be noted that considerable effort is currently being expended in the design of fusion power plants to reduce the generation of radioactive waste to a level that is as low as reasonably practicable. However, there will nevertheless be Low and Intermediate level waste produced throughout the lifecycle of any deuterium-tritium based fusion power plant. This waste will not be very long-lived nor High-Level Waste (HLW)[14] but there is a need for a building for the interim storage of this waste and this is shown at the bottom left-hand side of Figure 2. The fusion technology and design choices of the facility will determine the nature of quantity of waste produced and so may affect the size of the waste building.

[14] Nuclear Decommissioning Authority - What are the main waste categories. Available at: https://ukinventory.nda.gov.uk/about-radioactive-waste/what-is-radioactivity/what-are-the-main-waste-categories/

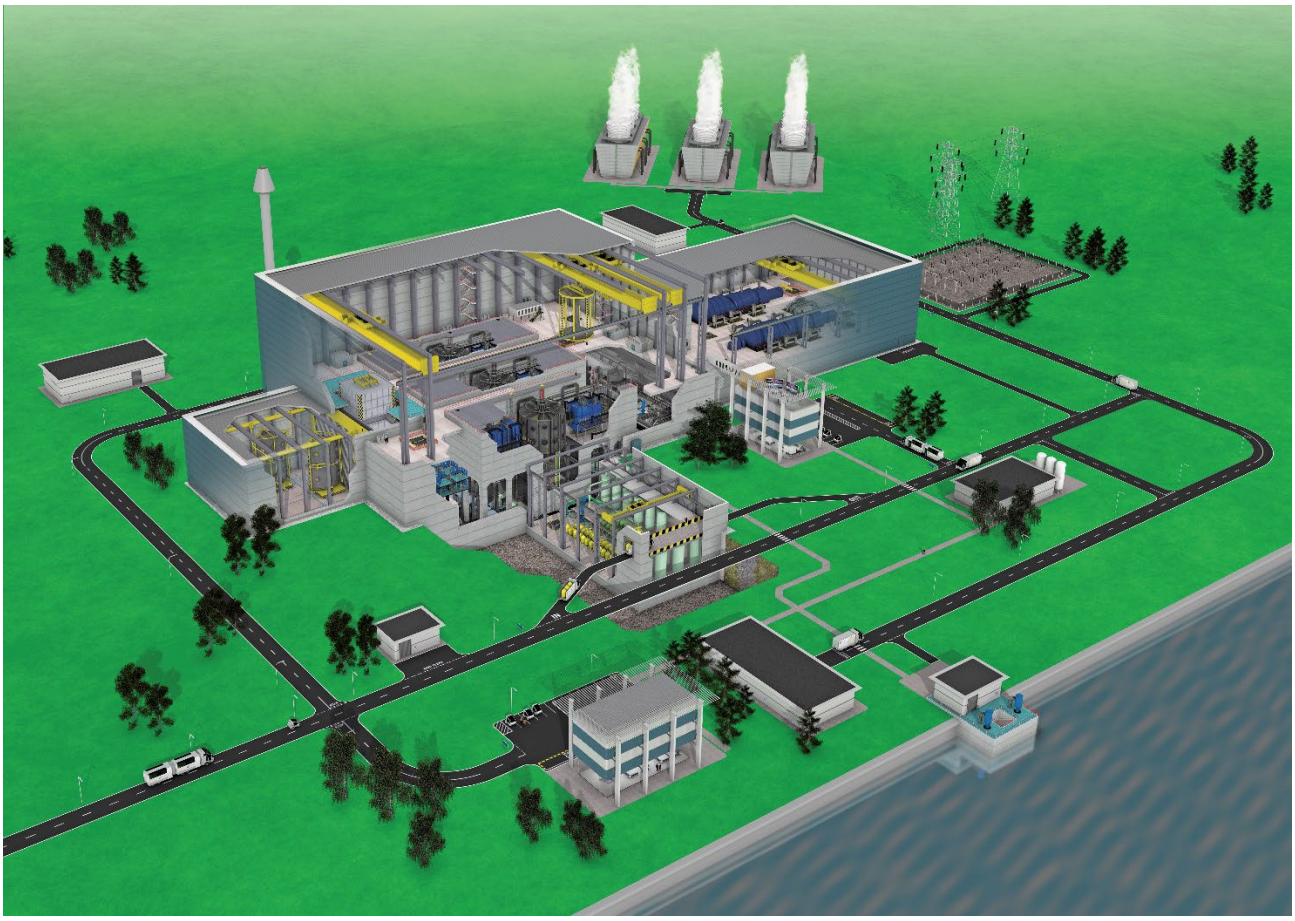

Figure 3 – Representation of a generic fusion energy facility

Fusion NPS Proposals

The Government has previously committed to establishing a fusion NPS to support the commercialisation of fusion as the industry moves from experimental fusion facilities to prototype power-plants.

At present, the only known site for a fusion power plant (in the world) is for STEP, due to be sited at the West Burton A site, Nottinghamshire and constructed by 2040. This site was selected following an extensive cumulative assessment undertaken by UK Atomic Energy Authority (UKAEA), which included assessment of criteria including onsite characteristics, off-site characteristics, commercial terms of access and socio-economic and environmental impacts.

Although the site selection process for STEP provides useful precedent on the requirements for a fusion energy facility, more detailed siting criteria is required to provide clarity to STEP and the wider fusion sector. Through the proposed NPS, the Government is also clarifying that fusion energy facilities will be incorporated into the approval process for Nationally Significant Infrastructure Projects.

Position of a new Fusion NPS - EN-8

EN-1 states the importance and need for new nuclear technologies to have continuous and reliable power, including the need for fusion power plants. Although there are technological differences between fission and fusion which merit a different regulatory and separate planning approach, these technologies can be complementary in providing baseload power as part of a future energy mix.

The Government is confident that the new EN-8 will incorporate information, assessments and statements the Secretary of State will have regard to when a decision is taken on an application for Development Consent for a fusion power plant.

The proposals

There are two primary factors in the consideration of bringing fusion energy into the NSIP planning process: clarifying the process for developers, and where the expertise exists to scrutinise their plans.

Construction of STEP is expected to be completed by 2040 and the ambition of private fusion companies is to deliver commercial fusion facilities in the 2030s. To deliver against these timescales, construction of these facilities will need to start this decade and sites will need to be identified in the next few years. The rapid development and commercialisation of fusion energy necessitates a clear policy approach to siting these facilities and as such the rationale for developing a Fusion NPS to do this is clear.

On page 14, a description of a generic fusion power plant is given. This description illustrates that these facilities will be complex and require specialist knowledge to scrutinise effectively. Given the nascency of commercial fusion technologies and the complexity of a facility, local authorities may not have the specialist knowledge to scrutinise plans on the timescales for FOAK facilities. Designating a Fusion NPS will mean that knowledge can be built centrally to scrutinise across England and Wales rather than building expertise in each local authority.

To provide certainty to the fusion industry and allow the development of fusion knowledge within the planning system, the Government proposes that fusion energy should be aligned to the planning processes for other major energy generation infrastructure projects with due consideration for the technological and operational needs of fusion.

To align fusion with other complex energy generating technologies, a new standalone NPS is proposed to provide private industry, STEP, local communities and potential developers clarity on the planning framework for fusion energy facilities.

The fundamental technological differences between fusion and fission mean a different regulatory and planning approach is needed but the Government recognises that there may be similar considerations for planning approval and the nature of risks to people and the environment, even if they are of different magnitudes. This will also be true of similarities between fusion and other energy generating facilities covered by other NPSs.

The key policy proposals are outlined in this section and summarised below:

- Companies are aiming to develop commercial fusion facilities in the UK using a range of technologies. As set out in the UK's Fusion Strategy[15], the UK takes a technology agnostic approach to supporting fusion in the UK and a Fusion NPS will encompass all fusion technologies[16].

- The Government proposes using an open-sited developer-led approach. This will put the developer at the forefront of site selection and empower developers to undertake site characterisation based on the criteria and considerations in the NPS and scrutinised by regulators (where applicable). These criteria encompass radiological safety and security, environmental protection, and operational requirements.

- The Government proposes including all fusion electricity-producing stations in England in the NSIP process. In the consultation on the new nuclear NPS[17], the Government proposed amending the Planning Act 2008 to include all nuclear electricity-producing stations in England in the NSIP process. It is proposed that fusion energy would be included in the amendment as proposed in the EN-7 consultation subject to the outcome of this consultation.

- Fusion may have a large role in producing high-grade heat for other industrial processes such as hydrogen production or desalination. This consultation proposes amending the Planning Act 2008 to clarify that the output of an energy producing facility includes both electrical and thermal output for the purposes of the NSIP process.

[15] UK Government (2023) Towards fusion energy: the UK fusion strategy. Available at: https://www.gov.uk/government/publications/towards-fusion-energy-the-uk-fusion-strategy.
[16] The exception to this is hybrid fusion-fission facilities, these will require a nuclear site licence due to their use of bulk quantities of nuclear and other radioactive materials.
[17] UK Government (2024) Approach to siting new nuclear power stations beyond 2025. Available at: https://www.gov.uk/government/consultations/approach-to-siting-new-nuclear-power-stations-beyond-2025.

- Fusion energy facilities are not yet deployable in the UK and although the public and private sector have set out timelines for deployment, there is not enough certainty to apply a deployment deadline. The government also thinks applying a deadline to fusion energy facilities would unnecessarily constrict their deployment.

Technology inclusive approach

Commercial fusion devices using different technologies are planned for the coming decades with construction expected to start this decade. The Government has committed in its 2023 Fusion Strategy to build a world-leading fusion industry that supports different fusion technologies. Most fusion technologies are expected to use deuterium and tritium (D-T) for FOAK power plants that are expected to be developed in the short and medium term. Therefore D-T fusion will be considered by the Appraisal of Sustainability (AoS) to bound the sustainability considerations as the use of tritium is expected to determine the most consequential considerations. Other known fusion fuels could achieve fusion with a different and potentially lower hazard profile so the Government is confident that the radiological considerations of the AoS are expected to be bound by D-T fusion.

There will be sustainability impacts of developing fusion power plants that are not radiological but are consistent with other major infrastructure projects such as disruption to local activity and are more consistent across different fusion technologies. As fusion does not create very long-lived or high activity waste and has a comparatively low radiological profile, these other sustainability impacts may be greater than the radiological considerations.

To enable the development of all anticipated fusion technologies the new Fusion NPS proposes to include all fusion energy facilities, independent of the fusion technology.

There are fusion technologies not currently operating in the UK such as fusion-fission hybrids. In line with the definition of a fusion energy facility in the Energy Act 2023, these facilities are not included within the scope of this proposed NPS and would be considered nuclear installations requiring a nuclear site licence.

Open-sited

During the site selection process for STEP, UKAEA identified several sites that they deemed suitable for fusion energy facilities. There will be similarities between sites for all fusion energy facilities such as energy transmission and some water for cooling but different technological approaches to fusion may require different site requirements such as size or volume of water for cooling.

The Government believes that identifying sites for future fusion energy facilities would be unnecessarily restrictive and it would be difficult to apply an all-encompassing approach without disadvantaging some technologies and stifling innovation.

The Government is aware that local communities may be more receptive to fusion technologies compared to traditional nuclear technologies but knowledge of fusion across the public in the UK is low. Identifying sites in EN-8 would bias developers towards areas of the UK where appetite and knowledge of fusion is currently higher as the Government would expect local support if it were to identify sites. On the other hand, an open sited approach retains the opportunity for all communities to put themselves forward in the future. Therefore, an open sited approach could result in fusion being deployed in more areas of the UK in the long-term.

This consultation proposes a developer-led open-site approach to fusion energy facilities which will prevent the stifling of innovation and potentially unlock fusion in new communities. Siting will be determined by adherence to robust criteria or justification of approach against technical considerations. An open-sited approach is in line with the approach taken in other energy NPSs.

The criteria and considerations for an open-sited approach will follow precedent in other energy NPSs encompassing environmental protection (consideration of any impacts on sites of ecological or heritage significance) and share some similarities with the open-sited approach taken in the new nuclear NPS, encompassing operational requirements (e.g. access to cooling water, size of site).

However, the difference in regulatory approach and technical requirements between fusion and fission means that the detail of these criteria or considerations are likely to be different for fusion. For example, when considering safety and environmental criteria, these will be proportional to the risks of fusion. More sites could be available for fusion as the lower hazard profile of fusion means that there is less risk to other industrial facilities and population centres. More information on the criteria and considerations for fusion energy facilities is provided on page 37 and details of any criteria will be developed parallel to the drafting of EN-8, after undertaking the AoS.

Including thermal and electrical output independent of capacity

As a commercial fusion facility has yet to be constructed, the precise electrical and thermal output of FOAK facilities is not currently known. It is expected that these facilities will exceed the 50 MW threshold to be categorised as NSIP, but some private companies have ambitions to develop small scale devices to power energy intensive facilities such as data centres.

If FOAK fusion facilities do not meet the required threshold, the burden for examining the planning application would fall on local authorities through local planning routes and could lead to delays in the assessment of planning applications.

The Government proposes that all fusion energy facilities are incorporated into the NSIP process in England, independent of the output of that facility.

Only energy generating facilities are within scope of this proposed NPS so research facilities will continue to be consented through existing planning routes.

For the purposes of clarifying that fusion facilities will not fall under the definition of a nuclear installation, the Energy Act 2023 defines fusion energy facilities as:

“used for the purpose of installing or operating any plant designed or adapted for the production of electrical energy or heat by fusion, and not also used for the purpose of installing or operating a nuclear reactor.”

The Government does not intend to include research fusion facilities within the NSIP process but recognises that some research facilities such as JET and larger scale facilities planned by industry can be large and complex. Therefore, the Government **welcomes views on whether the definition of a fusion energy facility as defined by the Energy Act 2023 is suitable between research reactors and generating stations for the purposes of this NPS.**

This proposal would require an amendment to the Planning Act 2008 and the usual Parliamentary scrutiny process.

The new nuclear NPS consultation proposes that all nuclear electricity-producing stations in England are incorporated into the NSIP process through amending the Planning Act 2008. Subject to the outcome of that consultation and this consultation, the legislative amendment will be enacted at the same time.

This proposal does not affect the Welsh First Minister's powers to grant consent to new energy projects with a generating capacity of between 50 MW and 350 MW. Applications for generating stations in Wales with an output above 350 MW are examined by PINS and consented by the Secretary of State. Applications for generating stations in Wales with an output between 50 MW and 350 MW are made directly to Welsh Ministers and examined by an Independent Planning Inspectorate outside of the NSIP process.

Separate to this consultation, the Welsh Government will consult on policy proposals to legislate for a unified infrastructure consenting process for 'significant infrastructure projects' with an installed generating capacity of between 50 MW and 350 MW[18].

Large-scale fusion facilities are expected to produce a significant amount of high-grade heat which could have applications including the production of hydrogen and desalination of water. The government will propose that in the case where a fusion facility solely produces heat, it should be subject to the NSIP process and therefore not be subject to local planning processes.

Therefore, the Government proposes amending the Planning Act 2008 to clarify that the MW thresholds are inclusive of both electrical and thermal output combined for fusion energy facilities, subject to the results of this consultation and Parliamentary scrutiny.

While heat-only fusion facilities are not expected to be deployed on the same timescales as FOAK electricity generating fusion energy facilities, multiple amendments of the Planning Act 2008 would be unnecessary, and any changes would be enacted along with the amendments described above.

No siting timelines

The timelines for full deployment of fusion energy facilities are at least a decade away. Although the Government wants developers to bring forward applications for fusion energy facilities to realise the benefits of fusion, the development of fusion cannot be rushed. Setting a deployment deadline could risk unsuitable sites being selected in order to meet this deadline and would introduce new uncertainty for investors.

Therefore, the Government proposes not to set a deployment deadline for fusion energy facilities.

1. **Do you agree that the planning process for fusion energy facilities should be aligned and maintained with other complex energy generation facilities?**

2. **Do you agree with the Government's proposal to include all fusion technologies in the NSIP process?**

3. **Do you agree with the Government's proposal to take an open-sited approach in the fusion NSIP process?**

[18] https://www.gov.wales/new-legislation-will-make-wales-competitive-and-attractive-place-infrastructure-projects

4. **Do you agree with the Government's proposal to include all fusion energy facilities in England, independent of capacity, in the fusion NSIP process?**

5. **Do you agree with the Government's proposal to include both thermal and electrical facilities in the fusion NSIP process?**

6. **Do you think the definition of a fusion energy facility, as provided in the Energy Act 2023, is suitable for distinguishing between a fusion energy facility and fusion research facilities for the purpose of this NPS?**

7. **Do you agree with the Government's proposal not to set a deployment deadline for fusion energy facilities?**

Fusion Energy Strategic Siting Assessment Criteria

Part 4 of EN-1 sets out the general principles that should be applied in the assessment of development consent applications across a range of energy technologies. The following criteria in this section are proposed for specific consideration for a fusion energy facility and are summarised in Annex 2. Some criteria are covered by EN-1 but have been emphasised in this consultation. Additional criteria may be identified upon completion of the Environmental Impact Assessment as part of the AoS and HRA and any additions or removals will be explained in the draft Fusion NPS.

Strategic criteria are crucial in ensuring appropriate sites are selected for development under an open-sited approach, and the following chapter considers how the criteria may be utilised in practice by developers and regulators. The specific detailed criteria for determining the suitability of a site for fusion energy facilities will be developed following this consultation.

We expect the Strategic Siting Criteria, as set out in EN-1 and the proposed EN-8, for determining a site will mostly follow precedent from other energy generating facilities with similar characteristics and there will be few areas that are unique to fusion. However, the detail of these criteria will be specific to fusion technologies. As set out in our proposals, the criteria will be developed to be suitable for different fusion technologies independent of the output of that facility.

All criteria outlined in this section, unless otherwise specified, are discretionary criteria meaning they are considered by PINS during the NSIP process as part of their recommendation to the Secretary of State, but sites will not be automatically disqualified if they fail to meet an aspect of the criteria.

Consideration of the strategic merits of a nominated site in comparison to other alternative solutions

Applicants should thoroughly consider the strategic merits of a nominated site in comparison to other alternative solutions, which may include alternative sites. Developers will need to work with the Planning Inspectorate (PINS) to consider alternative solutions and/or sites at the project level in the same way as for other infrastructure projects.

Developers are required to consider reasonable alternatives to the project, including its components through the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) and any project level HRA.

The key points of the approach to assessment of alternatives are:

- Developers are expected to conduct a thorough assessment of the proposed site and compare it to other potential solutions to achieving their development. This assessment should consider various strategic factors, including but not limited to geological suitability, environmental impact (such as ground and surface water), safety, proximity to existing infrastructure such as transport connectivity, and potential social and economic implications.
- The developer should demonstrate strong strategic merits that make their chosen site a compelling choice for fusion development in comparison to alternatives.
- The site should also be evaluated for its compatibility with the specific fusion technology and facility being considered.
- Developments should consider public feedback and concerns when evaluating the strategic merits of their proposed site.

Further guidance on the current policy and assessment of alternatives is available in Section 4.2 of EN-1.

The Government will be required to consider reasonable alternatives to the policy set out in the Fusion Energy NPS in the AoS and HRA. In line with the proposed open-sited approach to fusion energy development, these reasonable alternatives will be considered at a strategic level. The proposed reasonable alternatives will be set out in the draft NPS, which will be published for public consultation when appropriate, together with the needs case for fusion energy infrastructure.

8. **Should developers consider any other factors in assessing reasonable alternatives for fusion energy facilities?**

Flood risk

Flood risk is clearly a key consideration in any major infrastructure project, and this will be recognised in the proposed EN-8. Flood risk impacts of new energy NSIPs are covered in Section 5.8 of EN-1 and coastal change considerations are covered in Section 5.6 of EN-1.

Flood risk considerations and requirements as detailed in EN-1 remain relevant and will apply to fusion energy facilities under the new proposed NPS. We have considered whether flood risk should be an exclusionary criterion, ruling out the highest risk zones due to climate change, but we have followed the approach as set out in the consultation for EN-7[19] that this is unnecessary as the flood risk assessments are comprehensive and include climate change modelling.

As part of the Strategic Siting Assessment, developers will be required to undertake the Sequential and Exception Tests as part of any flood risk assessment. Developers will have the responsibility of demonstrating that they have considered reasonable alternative sites if they wish to develop in a high-risk flood zone. Given that the flood risk assessments form a crucial part of the planning and environmental permitting processes, early engagement with these assessments can reduce risk both for developers and for regulators.

[19] UK Government (2024) Approach to siting new nuclear power stations beyond 2025. Available at: https://www.gov.uk/government/consultations/approach-to-siting-new-nuclear-power-stations-beyond-2025.

Existing guidance recommends that for novel technologies, early engagement and submission of the permit application will be key to align the permit decision with the DCO examination.[20]

The Government recommends that the most appropriate time for flood risks tests to be undertaken would be as part of the pre-application stage where PINS and regulatory agencies will be holding early-stage discussions on projects before they enter the more detailed DCO considerations. This approach is in line with other technologies, and we would encourage developers to refer to EN-1 and the Department of Levelling Up, Housing and Communities (DLUHC) planning guidance[21] on how a flood risk assessment, and the relevant tests, should be undertaken.

Locational characteristics and population densities

The purpose of assessing the population surrounding proposed sites is to minimise the risk to the public in the unlikely event of an accident involving the spread of radioactive materials beyond the site boundary.

In considering an appropriate and proportionate regulatory framework for fusion, the Government concluded that the hazards and risks of fusion are not of the same magnitude as fission and are more similar to other hazardous facilities such as chemical plants.

The Government does not want to exclude communities that are open to fusion technologies where they would not accept traditional nuclear technologies although it is likely that the first fusion power plants will not be sited close to any urban populations. Regulation would also ensure that the risk to the local population must be minimised to international standards.

Therefore, the Government does not propose applying the ‘semi-urban’ or any demographic criterion to fusion.

The Government proposes that the new fusion NPS will emphasise the significance of safeguarding human health and well-being in the context of fusion projects. It is intended that the proposed NPS will stress the need for mitigation strategies to ensure the safety and protection of individuals living and working near fusion facilities in accordance with relevant safety regulations. Designs will need to address a range of factors that are not planning or site specific, and therefore not part of strategic criteria set out in this proposed NPS, to comply with regulations e.g. seismic performance.

For fusion, safety regulations are imposed by the Health and Safety Executive (HSE) in Great Britain, the Environment Agency (EA) in England and Natural Resources Wales in Wales (NRW), at all stages of the life cycle of a site. A fusion energy facility will not be allowed to operate without appropriate emergency plans and robust safety measures in place. For example, HSE require operators to prepare measures for off-site emergencies through the Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR 2019). Any site proposed by a developer will need to be suitable for compliance with these regulations.

[20] UK Government (2024) Nationally Significant Infrastructure Projects - Advice Note Eleven, Annex D: Environment Agency. https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-eleven-working-with-public-bodies-in-the-infrastructure-planning-process/nationally-significant-infrastructure-projects-advice-note-eleven-annex-d-environment-agency

[21] UK Government (2021) Guidance on planning propriety: planning casework decisions. Available at: Guidance on planning propriety: planning casework decisions - GOV.UK (www.gov.uk).

Hazardous waste management

Radioactive waste generated by fusion energy facilities will be an important consideration within the siting policy. EN-8 will emphasise Government's commitment to implementing a safe and sustainable approach to the management of radioactive waste.

Whilst fusion does not produce any high-level or very long-lived waste, different fusion technologies may give rise to different intermediate level waste streams. The Government expects that developers consider and account for the long-term management of radioactive waste including storage, transportation, and disposal methods.

The UK Government and devolved administrations published a consultation in March 2023 to update policies on managing radioactive substances and nuclear decommissioning. This includes proposals to allow the disposal of intermediate level waste in near surface disposal facilities. The UK Government and devolved administrations expect to publish the final policy in 2024.

If the proposals in the managing radioactive substances and nuclear decommissioning consultation were to be implemented, it's possible that waste from fusion energy facilities could be disposed of in near surface facilities and may not need geological disposal facilities.

Fusion could also produce hazardous waste such as waste involving beryllium, lead, lithium[22] or tungsten[23] but the amount and nature of that waste will vary by fusion technology. This type of waste is not unique to fusion, and neither is the quantity likely to be produced, but the Fusion NPS will ensure that developers consider the planning requirements to safely treat and dispose of any hazardous waste.

Size of site to accommodate construction and decommissioning

Developers will be expected to ensure that they consider all likely site plans and reasonable variations to those plans when identifying potential sites. These considerations should include land required that is additional to the proposed site boundary, for example for the construction of car parks and access roads, as well as for the construction and decommissioning of the fusion energy facility.

Consideration is expected to be given to the possible impact on the surrounding landscape and any possible enhancements that can be made to achieve biodiversity net gain as explained on page 27.

The Government expects the key operational elements of the facility, particularly the infrastructure that has the potential to directly cause a radiological hazard such as the tokamak (or other fusion technology) building and temporary waste stores to be located within the boundary of the proposed site.

[22] It is important to note that beryllium, lead, lithium and tungsten are important resources so a high level of recycle/re-use will be employed at fusion facilities.
[23] UKAEA Technology Report (2021). Available at: https://scientific-publications.ukaea.uk/wp-content/uploads/UKAEA-RE2101-Fusion-Technology-Report-Issue-1.pdf.

Impacts of multiple devices

It is entirely possible that multiple fusion devices could be hosted on the same site but detailed designs for FOAK power plants are not finalised, and as such it is not clear how likely this is for early fusion energy facilities.

If an application were submitted for multiple fusion devices at a site, the potential impacts on the environment, infrastructure and local communities would be considered by PINS, regulatory bodies and the appropriate Secretary of State. The cumulative impacts of multiple fusion devices would need to be assessed as part of this application and mitigated by the developer.

Multiple fusion devices may be constructed at different times as the fusion industry develops and so the Government strongly encourages developers to consider the maximum number of fusion devices that may be deployed to minimise the risk of significant changes to their DCOs and the need to amend any application.

Transport Infrastructure

Fusion energy facilities need to be accessible for the delivery and removal of construction materials, fuel, waste and equipment, and for employees.

Government policy encourages multi-modal transport and materials may be transported by water or rail routes where possible. (See Section 5.13 of EN-1 on transport impacts). Applicants should locate fusion energy facilities in the vicinity of existing transport routes wherever possible. Although there could be environmental advantages to rail or water transport, road transport may be required to connect the site to the rail network, waterway or port. Any application should therefore incorporate suitable access leading off from the main highway network. If the existing access is inadequate and the applicant has proposed new infrastructure, PINS should satisfy itself that the impacts of the new infrastructure are acceptable as set out in Section 5.13 of EN-1.

Grid Connection

Fusion energy facilities will need to connect into a transmission network. The technical feasibility of export of electricity from a generating station is dependent on the capacity of the grid network to accept the likely electricity output together with the voltage and distance of the connection.

Applicants for energy generating facilities will usually have assured themselves that a viable connection exists before submitting the development proposal to PINS and, where they have not done so, they take that commercial risk. Even if the precise route of a connection has not been identified, in accordance with Section 4.11 in EN-1 any application to PINS must include information on how the generating station is to be connected and whether there are any environmental issues likely to arise from that connection.

There will be unique considerations for fusion power plants as these facilities could require a grid connection that will draw from the grid to ‘ramp up’ the fusion process before generating electricity and supplying it back to the grid. The energy needed to ‘ramp up’ the fusion process is not expected to be trivial and so developers should be satisfied that the grid connection and infrastructure can facilitate this requirement. This requirement may not apply to all fusion technologies, so the Government expects developers to justify whether this grid connection requirement is needed when making their applications.

Biodiversity Net Gain

Applicants should consider the guidance set out in EN-1 Section 4.6 at an early stage when developing projects.

Biodiversity net gain is a policy that aims to ensure that development has a measurably positive impact ('net gain') on biodiversity, compared to what was there before development. It means that a development needs to ensure that the biodiversity value of the site is improved, rather than simply avoiding or mitigating harm to biodiversity.

A fusion energy facility land manager or developer may need to:

- Engage with the local community, relevant local planning authority and environmental authorities on biodiversity net gain proposals
- conduct a survey of the onsite habitats
- Use the statutory biodiversity metric to calculate the biodiversity value of habitats for the purpose of meeting biodiversity net gain
- provide long-term monitoring and maintenance of biodiversity creation and enhancement measures

Specific requirements may vary depending on the location and size of a fusion energy facility. This approach is in line with other energy generating facilities.

Climate change and adaptation

The recently revised Overarching National Policy Statement for Energy (EN-1) reemphasises the importance of considering climate change adaptation. The proposed EN-8 will consider and account for climate change and be read in conjunction with EN-1.

We recognise that climate change mitigation is essential to minimise the most dangerous impacts of climate change, and applicants will need to continue to provide information as to how any future fusion energy development incorporates adaptation measures to take account of the effects of climate change.

To support planning decisions, the Government produces a set of UK Climate Projections and has developed a statutory National Adaptation Programme[24]. In addition, the Government's Adaptation Reporting Power will ensure that reporting authorities (a defined list of public bodies and statutory undertakers, including energy utilities) assess the risks to their organisation presented by climate change.

The proposed EN-8 will set out the process for reviewing climate change impact and mitigations. It is expected that there are roles for regulators to assess the evidence in relation to climate change impacts and their view on the adaptation measures proposed.

[24] UK Government (2023) Third National Adaptation Programme (NAP3). Available at: The Third National Adaptation Programme (NAP3) and the Fourth Strategy for Climate Adaptation Reporting (publishing.service.gov.uk)

Groundwater

The overarching EN-1 provides overall guidance on the approach to water quality, including groundwater protection.

The Government recognises the importance of protecting groundwater sources, and would continue to prefer that developers do not develop major infrastructure projects over groundwater zones where possible. However, this is not a fusion-specific issue, with all large-scale infrastructure projects having the potential to pose a contamination risk to these sensitive areas. We also note that protection of groundwater sources forms a core part of other areas of the environmental permitting processes.

As well as the guidance provided in EN-1, the Environment Agency provides comprehensive guidance on requirements, permissions, risk assessments and controls for protecting groundwater sources, which developers should refer to during the environmental permitting process.

We therefore do not think it is necessary to make Areas of Groundwater Protection a specific criterion within the fusion NPS, as this criterion would duplicate already existing protections and create additional unnecessary work for developers and regulators, subject to the Environmental Impact Assessment as part of the AoS.

While we are not making groundwater protection a criterion for the purposes of planning, developers should note that proposed projects that could impact a source protection zone will likely face greater challenges during the environmental permitting process.

Where there is the pre-existing hazard of former contaminative uses of land from previous site uses, if this is not appropriately addressed there is a resultant risk in harm to people (including future site users) and the environment. This risk includes the potential pollution of groundwater and surface water, especially if re-development exacerbates the mobilisation of contamination. This could also result in long term damage to groundwater and any local drinking water supplies that are taken from it.

Proximity to military activities

Sites for fusion energy facilities should seek to avoid the external hazards that could be created by neighbouring military activities and ensure that the capabilities of the armed forces to conduct essential training and operations are not adversely affected by the siting of fusion energy facilities. This criterion will have both exclusionary and discretionary elements.

The proposed EN-8 will set out the details of this criteria but is expected that the exclusionary part of the criteria will determine a set distance that fusion power plants will have to be sited from military sites and that fusion facilities must be sited outside military explosive safeguarding zones.

The discretionary element of this criteria will consider other military sites such as radar and aerodromes which have safeguarding zones around them. As a statutory consultee within the NSIP process, the Ministry of Defence (MoD) will be consulted on any impacts of development within these safeguarding zones.

Biodiversity net gain interventions may increase bird strike risk to military aerodromes. If a fusion powerplant were to be sited within a bird strike safeguarding zone around a military aerodrome or if an off-site biodiversity net gain intervention was in one of these zones, then the MoD will consider, through the NSIP process, if there is any increase to bird strike risk.

The impact of fusion power plants on aircraft routes are not currently known as no detailed designs for fusion powerplants have been developed. It is therefore unclear what the restrictions for siting near a designated Military Air Traffic Zone (MATZ), designated Air Traffic Zone (ATZ), Military Low Flying Tactical Training Areas and Air Weapon Ranges might be.

The Government welcomes evidence on the impact of fusion powerplants on aircraft routes to inform the exclusionary criteria for the proposed EN-8.

Proximity to hazardous facilities

Safety regulation for fusion energy facilities requires that the risks posed by external hazards are minimised. These considerations extend beyond natural hazard issues to include a requirement to consider the man-made external hazards to the site's safety.

Regarding establishments subject to the Control of Major Accidents and Hazards (COMAH) Regulations 2015 (which is determined by chemical type and inventory), the Health and Safety Executive has developed a methodology for assessing development near to such sites – HSE's Planning Advice Web App[25] – Land Use Planning. Learning will be taken from this system to determine what level of mitigation is suitable for fusion energy facilities.

Proximity to civil aircraft movements

Large aircraft crashes are a rare event in the UK, however, the risk across the country is not uniform. It is not currently known whether mitigating actions to protect new fusion energy facilities will have an impact on civil aircraft movements. The Strategic Site Assessment criteria for fusion energy will consider what detailed criteria (if any) is needed to minimise this risk.

Nationally and internationally designated sites of ecological importance

There are numerous ecological sites across the UK that are protected from the impacts of development by domestic legislation, international conventions[26] and agreements. The assessment criteria for fusion seek to ensure that developers appropriately avoid, mitigate or compensate for the adverse impact of fusion energy facilities on the UK's most environmentally sensitive features. More information will be provided in the draft NPS after the undertaking of the Habitats Regulation Assessment and Appraisal of Sustainability.

Access to suitable sources of cooling

Fusion energy facilities will require suitable water resources for the purposes of cooling to maintain efficient operation. Possible options for cooling include:

- direct use of sea, lake or river water without cooling towers;
- use of cooling towers, typically combined with lake or river sites and using considerably less water than direct cooling; and
- air-based cooling, with minimal water requirements but utilising large heat exchangers.

[25] https://www.hse.gov.uk/landuseplanning/planning-advice-web-app.htm
[26] OSPAR is an example of an international convention: Contracting Parties | OSPAR Commission

Both the access to suitable cooling and the mitigation of the impacts on the environment will be considered as part of the fusion siting process and any design choice must be compliant with marine licensing requirements[27]. The environmental impacts of cooling depend largely on the environmental sensitivity of the area, the cooling requirements of the facility and the detailed design of the cooling system. Both abstraction and discharge of cooling water can affect the environment and cooling towers can also have visual impact. Alternative approaches such as indirect cooling through closed loop systems can mitigate some of these effects and should be considered if applicable to the specific fusion technology.

Areas of amenity, cultural heritage and landscape value

The Government proposes a criterion for sites of amenity, cultural heritage and landscape value so if a nominator wishes to propose a site that is in, or could adversely affect, an area covered by these designations, they will have to provide a high-level indication of how they can appropriately avoid, manage or mitigate the effects of development. Similarly, developers should also consider adverse impacts on locally designated or non-designated areas of landscape value.

Protected Landscapes (National Parks, The Broads and Areas of Outstanding Natural Beauty, now known as National Landscapes) are afforded the highest level of policy protection. Great weight should be given to conserving and enhancing the landscape and natural beauty of these areas. Relevant authorities must seek to further the purposes of these designations when undertaking activities which affect land in these areas. EN-1 provides further information for applicants to consider.

The Government encourages developers to engage early with the relevant environmental, historical, and cultural agencies should their development potentially impact a protected landscape or area of cultural heritage.

Public Rights of Way

Proposed sites may affect public rights of way which may need to be stopped temporarily during construction and could be permanently affected due to the location of a site.

Any public right of way that would run through or very close to a potential site could present a security and safety concern. Developers would be expected to manage this public right of way and as far as reasonably practicable, maintain this right of way via an alternative route.

Land Use Planning

Fusion power plants will be large infrastructure projects and as such, are expected to cause disruption to the surrounding area during construction with a lesser impact during operation. This disruption to neighbouring activities can be wide ranging from soil quality for agricultural land to congestion for transport. EN-1 provides guidance for developers on considerations for mitigating these impacts.

[27] Marine licensing applies to UK inshore and offshore waters. This includes any area which is submerged at Mean High Water Springs and the waters of every estuary, river or channel where the tide flows at mean high water spring tide up to the Normal Tidal Limit. A map of affected areas can be found here - https://explore-marine-plans.marineservices.org.uk/marine-plans-explorer

Public Support

The Planning Act 2008 sets out statutory requirements for applicants to engage in pre-application consultation with local communities, local authorities and those directly affected by the project. Although public support will not be a formal criterion for the consent of fusion power plants, developers are expected to secure broad public support for their proposals.

Any fusion energy development will need to follow National Infrastructure Commission design principles[28] including on public engagement: “The range of views of communities affected by the infrastructure must be taken into account and reflected in the design. While it won’t always be possible to please everyone, engagement should be diverse, open and sincere, addressing inevitable tensions in good faith and finding the right balance. And it should not just be designed for people today. Good design will plan for future changes in demographics and population.”

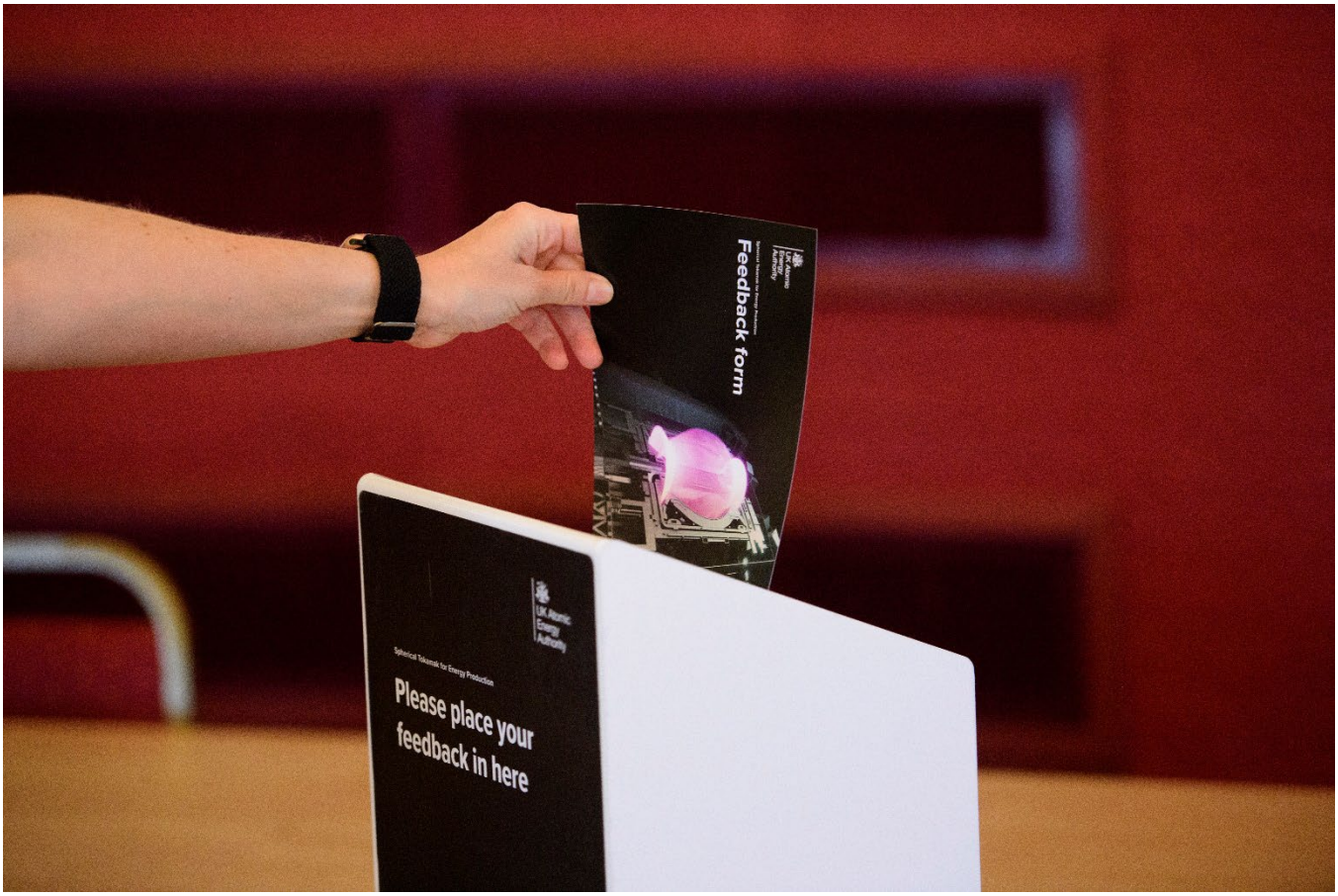

Figure 4 – Public feedback as part of the STEP site selection process

9. **Do you believe that the proposed criteria cover all aspects necessary for assessing the suitability of sites for fusion energy facilities?**

10. **Are there any additional criteria that should be considered in the assessment process?**

[28] National Infrastructure Commissions (Design Principles for National Infrastructure) - https://nic.org.uk/studies-reports/design-principles-for-national-infrastructure/

11. **Do you think there should there be a separate set of criteria for different fusion technologies?**

Implementation of a Fusion NPS

During the DCO process, a project will be considered against the general assessment principles and assessment criteria in EN-1 and the proposed EN-8 which address the impacts arising from infrastructure projects and which developers should address in their DCO applications.

The Government proposes that the strategic criteria identified in the proposed EN-8 are used by developers themselves to screen potential sites they are considering as suitable for development of fusion energy facilities. These criteria and assessments will be used as part of the pre-application discussions with PINS, statutory consultees, and regulators to consider potential site suitability. These criteria should provide reassurance to public bodies and wider society that sites which could have unacceptable impacts on, for example, the environment, public or economy would not go forward within the planning system.

As a project progresses into the DCO application stage, wider considerations identified in EN-1 and the proposed EN-8 become more relevant. Some issues may be pertinent to discussions at the pre-application stage, but it is recognised that some assessments are only possible once greater project and site-level specificity is available. However, the specific impacts and principles will be consulted on as part of the draft NPS itself. Comments are welcome on these wider considerations and how and when to conduct such considerations.

The strategic siting criteria are designed to inform an assessment of the potential suitability of sites for new fusion development at the pre-application stage. Being judged to be a potentially suitable site does not guarantee that development consent will be granted to a particular project, nor does it override environmental permitting requirements[29].

Developers will be responsible in this model for putting forward appropriate sites through extensive engagement with local authorities, statutory bodies and interested parties. Developers will have the responsibility to make the strong case to justify why a fusion energy facility is most suitable for that location to benefit the local community whilst maintaining high standards of safety, security, and environmental protection.

Developers will be responsible for engaging with statutory bodies, the local authority and landowner of the site and interested parties. Initial plans for the site and technology will benefit from the developer coordinating cross-party engagement at the earliest possible opportunity during the pre-application stage of the development consent order process and prior to submitting any applications into the associated regulatory frameworks.

This will enable potential issues to be addressed and allow time to make amendments in advance of a commitment to aspects of the plans as the application moves to the acceptance stage. The use of the strategic siting criteria will help frame considerations with regulators and PINS at this early stage and support the development of more robust applications when they enter the DCO process.

[29] The Environmental Permitting (England and Wales) Regulations 2016 (legislation.gov.uk)

This approach will also work in conjunction with the benefits provided from the DLUHC Action Plan[30]. This allows for PINS to provide greater support to applicants to the DCO process through the facilitation of bringing together different parties in the pre-application stage to address potential examination issues at the earliest point possible. Strengthening early engagement between developers and statutory bodies whilst ensuring local engagement will facilitate DCO applications that pass more efficiently through the regulatory process.

The Planning Inspectorate are in the process of consulting on an enhanced pre-application service for Nationally Significant Infrastructure Projects. It is envisioned that due to the complex nature of fusion energy facilities, should PINS decide to make this service available following consultation, it would be offered to developers. The function of this would be to assist in the coordination of pre-application between regulators, local authorities, and other interested parties.

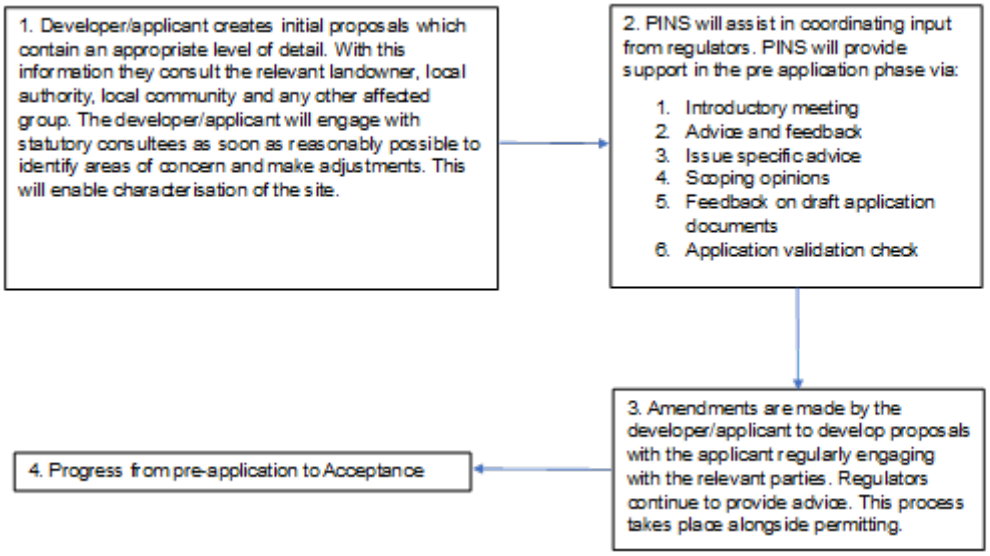

Figure 5 – Diagram illustrating part of the NSIP process

12. Do you agree with the proposed model for implementation of the Fusion NPS?

[30] UK Government (2023) Nationally Significant Infrastructure Projects (NSIP) reforms: action plan. Available at: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-nsip-reforms-action-plan.

Summary of all consultation questions

1. **Do you agree that the planning process for fusion energy facilities should be aligned and maintained with other complex energy generation facilities?**

2. **Do you agree with the Government's proposal to include all fusion technologies in the NPS process?**

3. **Do you agree with the Government's proposal to take an open-sited approach in the fusion NPS process?**

4. **Do you agree with the Government's proposal to include all fusion energy facilities in England, independent of capacity, in the fusion NPS process?**

5. **Do you agree with the Government's proposal to include both thermal and electrical facilities in the fusion NSIP process?**

6. **Do you think the definition of a fusion energy facility, as provided in the Energy Act 2023, is suitable for distinguishing between a fusion energy facility and/or fusion research facility for the purpose of this NPS?**

7. **Do you agree with the Government's proposal to not set a deployment deadline for fusion energy facilities?**

8. **Should developers consider any other factors in assessing reasonable alternatives for fusion energy facilities?**

9. **Do you believe that the proposed criteria cover all aspects necessary for assessing the suitability of sites for fusion energy facilities?**

10. **Are there any additional criteria that should be considered in the assessment process?**

11. **Do you think there should there be a separate set of criteria for different fusion technologies?**

12. **Do you agree with the proposed model for implementation of the Fusion NPS?**

Next steps

This consultation is the first step in the process towards designating a Fusion NPS (EN-8), with a further formal consultation to be conducted on the draft NPS. A high-level timeline of expected activity over the next two years is noted below.

Table 1 - Timeline for the development of EN-8

Stage 1 (Autumn 2024)	- Intended publication of a government response to this consultation on the policy approach to siting -Development of a draft NPS, including detailed criteria and processes to support site selection - An Appraisal of Sustainability (AoS) and Habitats Regulation Assessment (HRA) will be undertaken to accompany the draft NPS.
Stage 2 (estimated spring 2025)	- The Government expects to consult on a draft Fusion NPS. - The Government expects to consult on the draft AoS and HRA.
Stage 3 (estimated Autumn 2025)	- Intended publication of a government response to the consultation on the draft NPS - Development of the final NPS - The AoS and HRA will be updated as necessary in line with the new NPS.
Stage 4 (estimated Winter 2025)	- The Government expects to publish the final NPS, AoS and HRA. - The Government intends to lay the final Fusion NPS in parliament, as per sections 5(4) and 9 of the Planning Act 2008.

Annex 1: What are energy National Policy Statements?

What are energy National Policy Statements?

The current six energy NPSs set out national energy policy and form the framework for decision-making on applications for development consent under the Planning Act 2008 for energy Nationally Significant Infrastructure Projects (NSIPs). EN-1 sets out the need case for certain energy infrastructure and general assessment principles, whilst the other five NPSs set out technology specific assessment principles. Applications for development consent for energy NSIPs must be in accordance with the relevant NPSs.

Relevance to decision makers

The NPSs provide the framework from which decision makers can make legally robust and timely decisions. The way in which NPSs guide the Secretary of State's decision making, and the matters which the Secretary of State is required by the Planning Act 2008 to take into account when considering applications, are set out in Sections 1.1, 1.2, 1.3 and 4.1 of EN-1.

Review of existing energy NPSs

The energy NPSs were first 'designated' in 2011[31]. In December 2020[32] the government announced a review of the energy NPSs under section 6 of the Planning Act 2008 to ensure they reflect the policies set out in the Energy White Paper and that we continue to have a planning policy framework which can support the infrastructure required for the transition to net zero.

The review has been conducted in line with guidance on the NPS review process published by the Ministry of Housing Communities and Local Government (now DLUHC) [33]. Each NPS was considered in turn, with the aim of identifying unaligned or out of date references to the regulatory or policy framework. Where a change was identified, the likely impact of making amendments was considered. In parallel, consideration was given to whether significant changes in circumstance necessitated broader changes to the NPS. Consideration was then given to whether the NPS should be withdrawn, amended or remain as is, in line with the requirements of Section 6(5) of the Planning Act 2008.

The review determined that the existing EN-1 to EN-5 documents should be amended and revised energy NPSs EN-1 to EN-5 were designated in January 2024[34].

[31] UK Government (2011). National Policy Statements for energy infrastructure. Available at: www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure.
[32] UK Government (2020). Energy white paper: Powering our net zero future. Available at: www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future.
[33] UK Government (2021). Planning Act 2008: Guidance on the process for carrying out a review of existing National Policy Statements. Available at: www.gov.uk/guidance/planning-act-2008-guidance-on-the-process-for-carrying-out-a-review-of-existing-national-policy-statements.
[34] UK Government (2024). National Policy Statements for energy infrastructure. Available at: https://www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure

Overview of EN-1 2011 and revised EN-1 2023

The updated version of the National Policy Statement (NPS) for Energy (EN-1) published in 2023, makes clear the Government's view that fusion energy is a low-carbon, near limitless technology which could play an important role as we secure the decarbonisation of our energy sources of electricity and increase the resilience of the UK's energy system in the second half of this century. EN-1 carried out a detailed assessment or analysis of the future need for electricity generation and in light of that assessment made clear that nuclear technologies such as fusion energy has an important role to play in the UK's future energy mix.

The Overarching National Policy Statement for Energy (EN-1) is part of a suite of NPSs issued by the Secretary of State of Department for Energy Security and Net Zero (DESNZ). It sets out the government's policy for delivery of major energy infrastructure.

The EN-1 overarching document, sits above all of the remaining energy NPSs. It has three main roles:

- to set out how the suite of energy NPSs will work and to explain the framework of existing government policy
- to set out assessment principles and generic impacts applicable to all energy infrastructure
- to establish the need for new energy infrastructure

The current need for new energy infrastructure is established in EN-1 both in general terms, by looking at the need for energy supply and a diverse mix of electricity generation, and in terms of the need for specific, low-carbon types of energy infrastructure. EN-1 also contains generic information on certain issues which apply across more than one type of infrastructure, such as assessment principles and impacts.

Annex 2: Proposed high level siting criteria for fusion energy facilities

Table 2 – A summary of siting criteria areas for fusion energy facilities

Theme	Criteria	Discretionary or exclusionary
Safety and Security	Flooding	Discretionary
	Proximity to major hazard sites	Discretionary
	Proximity to civil aircraft movements	Discretionary
	Proximity to military activities	Discretionary and Exclusionary[35]
	Public Rights of Way	Discretionary
Environmental Protection	Internationally designated sites of ecological importance	Discretionary
	Nationally designated sites of ecological importance	Discretionary
	Areas of amenity, cultural heritage and landscape value	Discretionary
	Land Use Planning	Discretionary
Operational Requirements	Size of site to accommodate operation	Discretionary
	Access to suitable sources of cooling	Discretionary
	Grid Connection	Discretionary

[35] Some aspects of this criteria will be exclusionary, and some will be discretionary

Annex 3: Summary of Regulatory Regimes

Development Consent Orders –The DCO is a front-loaded process led by the applicant where the development proposal must be fully scoped and refined before submission. It would be advisable to approach PINS early in the process and setup an inception meeting to scope out the project. This includes statutory requirements and guidance on consultation and community engagement at various points in the process.[36]

Environmental Permits – The Environment Agency or equivalent devolved agencies are responsible for issuing various environmental permits in relation to the building of a new fusion facility.[37]

Health and Safety - Before a fusion energy facility can be built and operated on a specific site, a consent[38] must be obtained from the Health and Safety Executive.

Regulatory Justification[39] - This is a high-level, non-site-specific assessment where practices using ionising radiation are grouped into ‘classes’ or ‘types of practices’. Pre-application advice can be provided by the Department for Energy Security and Net Zero through the regulatory justification application centre.

Fusion for the purposes of producing commercial energy is not currently a justified activity. As confirmed in the Government’s response to its fusion regulation consultation, STEP is preparing an application.

[36] The Planning Inspectorate (2012). The process. Available at: https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/.
[37] The Environmental Permitting (England and Wales) Regulations 2016 (legislation.gov.uk).
[38] The Ionising Radiations Regulations 2017 (legislation.gov.uk) (regulation 7)
[39] The Justification of Practices Involving Ionising Radiation Regulations 2004 (legislation.gov.uk)

This consultation is available from: www.gov.uk/government/consultations/fusion-energy-facilities-new-national-policy-statement-and-proposals-on-siting

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.