



UK Government

Fusion Regulation Landscape

An overview of regulations for fusion in
England and Wales



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Introduction

The UK's Fusion Strategy *A New Energy Revolution – The UK's Plan for Delivering Fusion Energy* sets out how the government will build on its record investment of over £2.5 billion in fusion research and development, supporting the UK's growing fusion industry and reaffirming Britain's leading position in the global race for fusion energy.¹

With timescales for fusion deployment shortening and investment around the world accelerating, this strategy sets out a clear plan for how the UK will continue to build an industry to remain at the cutting edge of fusion development, support investment and skills, and establish a world-leading policy framework with STEP at the heart of our approach and a regulatory framework suitable for all fusion approaches.

As part of this strategy, the government committed to publish a roadmap setting out regulatory processes for developers. Alongside publication of the draft National Policy Statement (NPS) for Fusion Energy (EN-8), this regulatory landscape demonstrates how the UK continues to deliver our strategy and continued global leadership on fusion regulation.²

Fusion Energy

Fusion energy is the process that powers the sun and involves the fusing of two light atomic nuclei, of elements such as hydrogen, at very high temperature to form heavier ones, such as helium, and vast amounts of energy. Harnessing it on Earth would provide a transformational energy source with unique advantages:

- Energy dense – 1kg of fusion fuel is equivalent to 1 million kg of fossil fuel
- Fuel abundant – can use hydrogen isotopes found in seawater meaning fuel sources can be virtually inexhaustible in Earth's lifetime.
- Carbon free – no carbon is produced in energy generation.
- No risk of meltdown and no very long-lived or high-level radioactive waste.
- Baseload – provides continuous generation.

Fusion energy could therefore be transformational both for attaining and maintaining global net zero, and for providing significant strategic and economic advantage to countries who lead on the technology.

¹ <https://www.gov.uk/government/publications/uk-fusion-strategy-2026>

² <https://www.gov.uk/government/consultations/draft-national-policy-statement-for-fusion-energy-generation-en-8>

UK Regulatory Context

The UK has long been at the forefront of global fusion regulation development. The UK was the first country to clarify how fusion power plants would be regulated, taking a proportional and robust approach by confirming the Health & Safety Executive (HSE) and the Environment Agency (EA), or devolved equivalents, as fusion regulators.

In 2023, we legislated to confirm that fusion energy facilities are not nuclear installations for the purposes of the Nuclear Installations Act 1965. This reflects the lower intrinsic hazard of fusion, including the fact that fusion does not use fissile materials, has no risk of a runaway chain reaction or meltdown, and no high-level radioactive waste, making it disproportionate to incorporate fusion energy facilities into nuclear regulations.

The UK continues to advocate for global harmonisation of regulation to ensure a safe and pro-innovation environment for this transformational technology.

Regulation and the Devolved Administrations

In Great Britain (GB), fusion energy facilities are principally regulated jointly by the Health and Safety Executive (HSE) and the relevant national environment agency: the Environment Agency (EA) in England, Natural Resources Wales (NRW) in Wales and the Scottish Environmental Protection Agency (SEPA) in Scotland.

In Northern Ireland, the Health and Safety Executive for Northern Ireland (HSENI) and the Northern Ireland Environment Agency (NIEA) would be the relevant principal regulators for fusion activities.

This regulatory landscape document will focus on regulation in England and Wales while indicating where some regulations apply to England only or where regulation is UK wide.

Licensing and Regulatory Regimes

In England, fusion energy facilities are principally regulated jointly by the Health and Safety Executive (HSE) and the Environment Agency (EA) with the Energy Act 2023 legislating to confirm that fusion facilities do not require a nuclear site licence or regulation by the Office of Nuclear Regulation (ONR).

The EA and HSE have a long-standing relationship, working together to regulate sites of mutual interest. Both regulators carry out risk-based, proportionate, goalsetting regulation according to the hazards of the site and the activities carried out there, across a number of regulatory regimes.

The EA and the HSE also have established ways of working to ensure effective coordination of the regulation of plant, processes and substances, and measures to protect people and the environment where these are subject to control by both bodies.

Justification

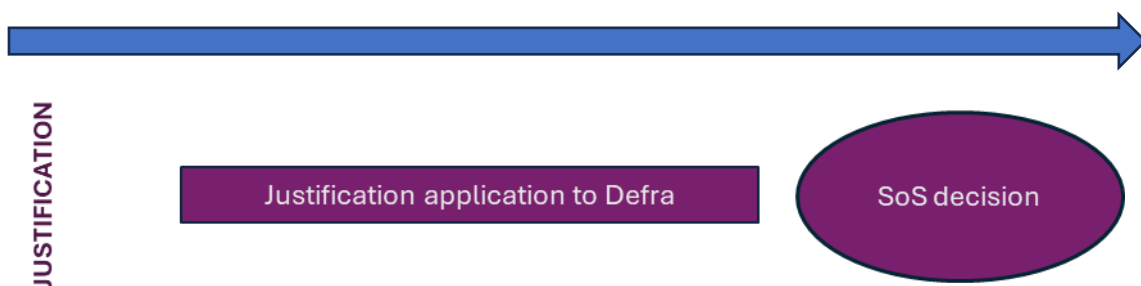


Figure 1 - Illustrative diagram of Justification process for use of ionising radiation in the UK

Justification is a process required by law that must take place before any new class or type of practice involving ionising radiation can be introduced in the UK. The UK government must first assess the new activity to determine whether the individual or societal benefit outweighs the health detriment it may cause. This principle of justification derives from the recommendations of the International Commission on Radiological Protection (ICRP).

A decision that a class or type of practice is justified does not in itself allow practices of that class or type of practice to be conducted. There are other regulatory regimes that need to be met for health and safety, and environmental protection. These regimes control the manner in which a practice is conducted in order to ensure compliance with the ICRP principles of optimisation and dose limitation.

The use of ionising radiation to generate energy through fusion processes is not currently a justified practice in the UK. However, as part of the UK's 2022 consultation response on fusion regulation, the Spherical Tokamak for Energy Production (STEP) programme was asked to apply for regulatory justification on behalf of the UK fusion industry.³ This was submitted on 15 December 2025 by UK Industrial Fusion Solutions (UKIFS) before it was re-named UK Fusion Energy (UKFE).⁴ This application intends to provide justification for all fusion energy facilities using Deuterium-Tritium fuel to produce electricity or heat for industrial use from fusion.

A developer seeking to use ionising radiation in this way will need to establish whether this has been previously justified or seek justification from the UK government.

Pre-application advice is provided by the Justification Application Centre, an administrative office in the Department for Energy Security and Net Zero (DESNZ), which provides an initial point of contact for applicants. Justification decisions for energy producing activities, however, are made by the Department for the Environment, Farming and Rural Affairs (DEFRA).

The onus is on an applicant to provide sufficient information to allow the Justifying Authority to reach a decision. There is no standard application form but the information required includes:

- the applicant's name and contact details;
- a description of the class or type of practice, with drawings and diagrams;
- an appraisal of the benefits and detriments of the class or type of practice, including economic, social, environmental, health and safety, waste disposal and decommissioning;
- an assessment of the health detriment it may cause, including the effects of potential and expected radiation exposures on both employees and any other persons;
- an indication of the expected extent of the practice.

It is advisable that an application is made at the earliest opportunity, before significant expenditure has been made. The Justifying Authority will provide an indicative timetable to the applicant within one month of receipt of the application. Further guidance can be found here:

[The Justification of Practices Involving Ionising Radiation Regulations 2004: guidance on their application and administration](#).

Developer summary

STEP is submitting a Regulatory Justification application covering the use of fusion to produce electricity and industrial heat using Deuterium-Tritium fuel. If you are planning to deploy in the UK using a different fuel, then separate justification is required and you should engage with DESNZ at an early opportunity for pre-application advice.

³ <https://www.gov.uk/government/consultations/towards-fusion-energy-proposals-for-a-regulatory-framework>

⁴ See the list of applications here: ['Justification of Practices Involving Ionising Radiation application register'](#) (May 2013)

Planning Regime

Planning Inspectorate

The Planning Inspectorate are the government agency that deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework. The Planning Act 2008 and related secondary legislation establish the legislative requirements in relation to applications and proposed applications for orders granting development consent for Nationally Significant Infrastructure Projects (NSIPs).

The Planning Inspectorate manage the application process for NSIPs across England and Wales. NSIPs, such as new harbours, roads and power stations, require development consent before they can be constructed.

The UK government has confirmed through its modern Industrial Strategy and 2026 Fusion Strategy that it will develop a National Policy Statement (NPS) specific to fusion energy generation to simplify the planning regime for fusion companies located in England and Wales. The Planning Inspectorate is well established in dealing with and adapting to new/novel infrastructure projects and fusion is already part of their work programme.

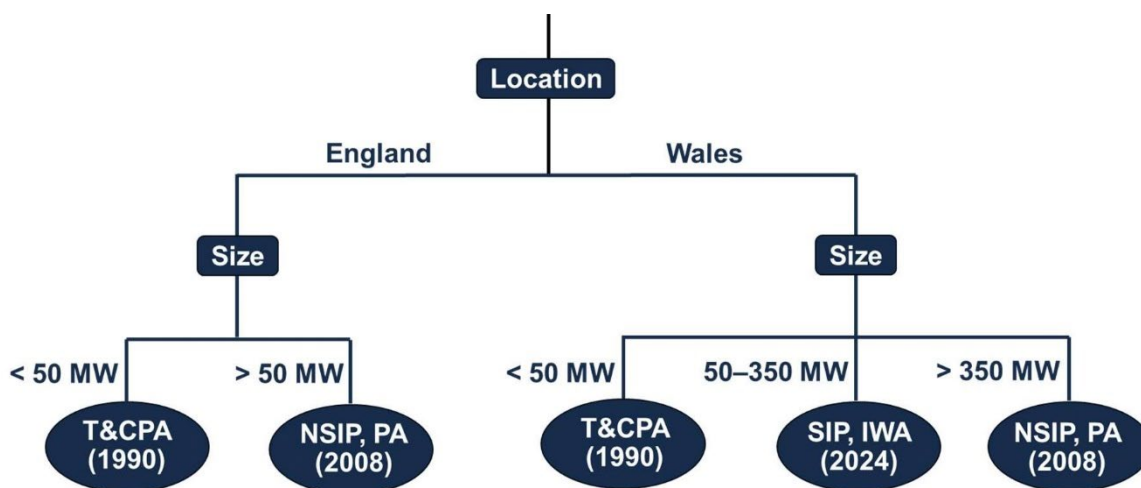


Figure 2 - Flowchart indicating the consenting regime a fusion project may be subject to, depending on the proposed project's location and electricity generating capacity (size). Flowchart does not represent the ability of the Secretary of State or Welsh ministers to give direction for a project to be considered under the NSIP or SIP regime, respectively.

An NSIP must be expected to have capacity greater than 50 megawatts (MW) in England and 350 MW in Wales. Such projects will require a Development Consent Order (DCO) from the Secretary of State for Energy Security and Net Zero before development can commence. Where an application for development consent covers multiple units on a site, the development as a whole will be expected to meet the requirements of an NSIP.

Projects equal to or below the 50 MW threshold are subject to the Town and Country Planning Act 1990 and therefore do not require a DCO.

Fusion energy facilities in Wales with an electrical generating capacity between 50 and 350 MW are considered a Significant Infrastructure Project (SIP) under the Infrastructure (Wales) Act 2024 and SIP applications are considered by Welsh Ministers.⁵

Importantly, the Secretary of State (in England) or Welsh Ministers (in Wales) may direct that a project with an energy output below the standard threshold be treated as an NSIP or SIP, respectively, if deemed appropriate. This is provided for under section 35 and 35ZA of the Planning Act 2008 (England) and sections 22 and 23 of the Infrastructure (Wales) Act 2024 (Wales).

Development Consent Order Guidance

Applications for a DCO are received by the Planning Inspectorate (PINS) who appoint a panel to examine an application, and make recommendations to the relevant Secretary of State (SoS) on whether permission for development should be given. The relevant Secretary of State then makes the final decision. There are several stages in the process for considering whether a national infrastructure project should be given consent, these are:

- Stage 1 – Pre-application
- Stage 2 – Acceptance (28 days)
- Stage 3 – Pre-examination (3 months)
- Stage 4 – Examination (up to 6 months)
- Stage 5 – Recommendation (< 3 months)
- Stage 6 – Decision (3 months)
- Stage 7 – Post Decision (6 weeks for any challenges)

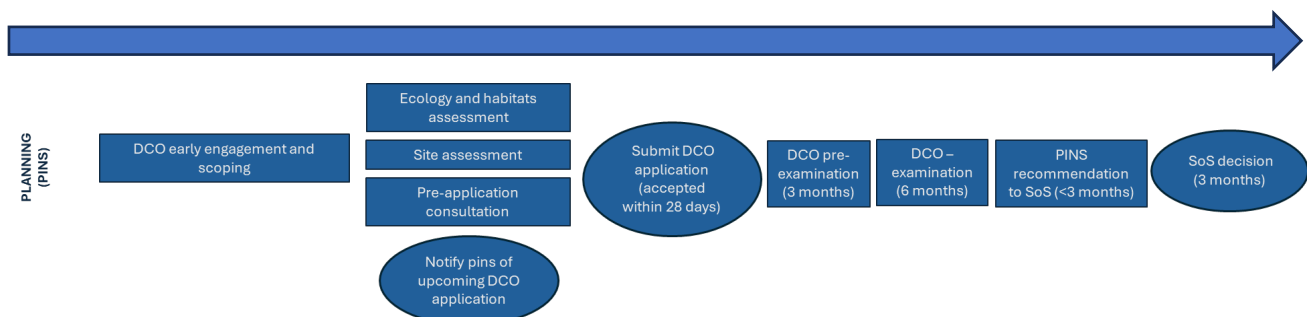


Figure 3 - Illustrative diagram of the planning consent regime in England. An equivalent process is in place in Wales.

⁵ <https://law.gov.wales/infrastructure-wales-act-2024-2>

The process from application acceptance to SoS decision can take around 18 months, therefore early engagement and preparation by the applicant is preferable and the Planning Inspectorate has published extensive guidance for applicants available on their website.⁶

Applicants should adhere to the Planning Inspectorate's guidance, which outlines the statutory requirements and steps to be taken to prepare a DCO application. The pre-application process is intentionally front-loaded, requiring thorough planning and consultation at the early stages, to ensure that potential issues are identified and addressed early and thus streamlining the subsequent stages.

The Planning Inspectorate has published a pre-application prospectus which sets out its new pre-application service.⁷ The key areas of operational reform supported within the Inspectorate's new service are:

- The introduction of three pre-application tier options reflecting different levels of service that applicants may receive from the Inspectorate ahead of submitting an application;
- The introduction of pre-application fees associated with the service under each pre-application tier, discharging government's policy ambition for the Inspectorate to achieve full cost recovery for the services it provides;
- The introduction of a 'Fast Track' procedure which will allow some applications, that are able to satisfy a new Quality Standard, to potentially receive a decision within 12 months from the point that the application is accepted for examination.

Developer summary

If your fusion development aims to generate over 50 MW of electricity in England or 350MW in Wales then you are required to submit a Development Consent Order (DCO) for planning approval. Planning considerations for such fusion energy facilities will be determined by EN-8 (once designated).⁸ PINS provide a pre-application service and applicants are encouraged to engage with statutory consultees at an early stage.⁹

⁶ <https://www.gov.uk/government/collections/national-infrastructure-planning-guidance-portal>

⁷ <https://infrastructure.planninginspectorate.gov.uk/application-process/pre-application-service-for-Applicants/>

⁸ EN-8 is the National Policy Statement for Fusion Energy Generation which provides instructions to applications for nationally significant fusion energy infrastructure projects. The draft EN-8 can be found at:

<https://www.gov.uk/government/consultations/draft-national-policy-statement-for-fusion-energy-generation-en-8>

⁹ <https://infrastructure.planninginspectorate.gov.uk/application-process/pre-application-service-for-Applicants/>

Health and Safety Regulation

HSE

HSE is GB's national regulator for workplace health and safety. It is dedicated to protecting people and places and helping everyone lead safer and healthier lives.

The Health and Safety at Work etc. Act 1974 (HSWA) is the overarching legislation governing health and safety at work in Great Britain. It ensures that businesses are effectively and proportionately managing their health and safety risks to workers and others, recognising that those who create the risk are best placed to manage it.

HSWA sets out the general duties of duty-holders under a goalsetting and risk-based proportionate framework. Duty-holders must take measures to protect people from risks "So Far As Is Reasonably Practicable" (SFAIRP).¹⁰ Most of HSE's regulatory frameworks do not prescribe in detail what measures the duty holder must take to prevent an accident or mitigate the consequences. Duty-holders are responsible for identifying, profiling and managing the risks they create in a systematic way whatever the hazard and associated consequence.

HSE is a multi-disciplinary regulator undertaking a variety of responsibilities such as permissioning of high-risk activities, carrying out interventions (to encourage and support duty-holders to comply with their legal responsibilities) and proportionate enforcement action to hold to account those who do not comply with health and safety law.

Where appropriate, HSE publishes guidance and Approved Codes of Practice (ACOPs) to provide advice to help duty-holders understand how to comply with the law (for example, the 'Working with ionising radiation. Ionising Radiations Regulations 2017. Approved Code of Practice and guidance').¹¹

HSE is the health and safety regulator for fusion energy facilities in GB and have a significant amount of experience through regulating projects such as the Joint European Torus (JET) project in Culham, Oxfordshire. As such, relevant guidance is already in place, which is suitable for large scale fusion facilities (for example, guidance on notifying HSE on work with ionising radiation).¹² HSE has established collaboration with GB-based fusion facilities as well as with international organisations to ensure that the GB fusion projects are aligned with global health and safety standards. HSE keeps regulatory frameworks under review and will continue to do so as the fusion industry develops.

¹⁰ A dutyholder is the person or organisation responsible for managing risks under UK law

¹¹ www.hse.gov.uk/pubns/books/l121.htm

¹² www.hse.gov.uk/radiation/ionising/notify-register-consent.htm

Health and Safety Regulatory Pathways

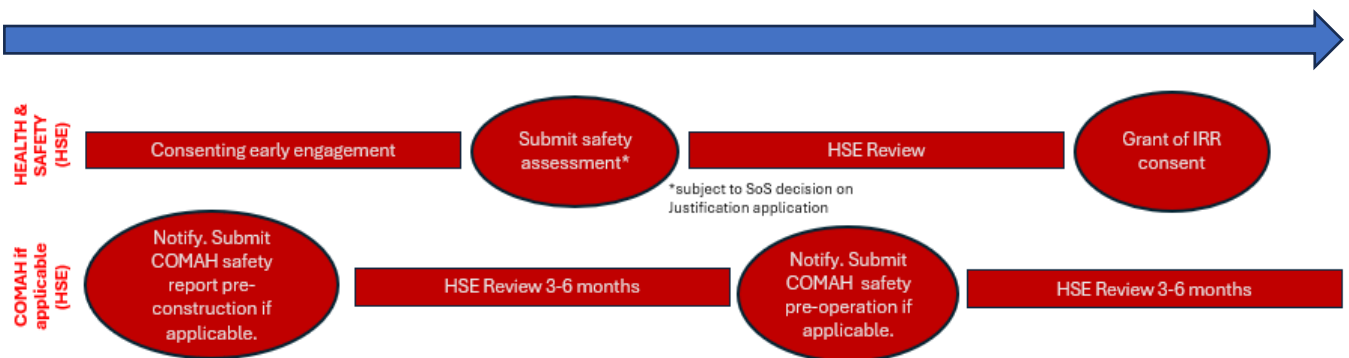


Figure 4 - Illustrative diagram of the GB Health and Safety regime applicable to fusion. Additional processes may be required for emergency planning under REPIR 2019, and CDM and COMAH regulations.

Consent under the Ionising Radiations Regulations 2017 (IRR17) prior to operation will be required for the majority of fusion facilities. The required information for a consent application is set out in IRR17 schedule 2. This is distinct from notification (low-risk) or registration (medium risk) which may also apply to some activities carried out on fusion sites. Submission of documentation is required with regular reviews and risk-based inspections. IRR17 also sets out in Schedule 4 the requirement for involvement from Radiation Protection Advisors for certain aspects of the regulations.

HSE recognises that early engagement is an opportunity to de-risk new technology projects by clarifying regulatory expectations and emphasising good practice. Proposals for an initial early engagement approach to fusion have been published by the EA and HSE, recognising that any early engagement with vendors must add value to all those involved.¹³ It must be enabling, allowing for experimentation, development and innovation, exploring risk-based and proportionate options.

Radiation Emergency Response

The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPIR) are concerned with preparedness for radiation emergencies. The regulations establish a framework of preparedness measures to ensure arrangements are in place to effectively respond to that emergency, both on the site of the emergency situation and offsite where members of the public might be affected.

Where REPIR applies, these regulations ensure that members of the public are provided with information, both before and during an emergency where appropriate, so that they are properly informed and prepared about what they need to do in the unlikely event of a radiation emergency occurring.

¹³ <http://hse.gov.uk/fusion/index.htm> and <https://www.gov.uk/guidance/fusion-energy-developers-engage-early-with-regulators>.

Further guidance on environmental regulation at: <https://www.gov.uk/guidance/fusion-energy-environmental-regulation>

The operator of a fusion activity will need to determine if the regulations apply, by comparing the quantities of radioactive material they hold on with the threshold quantities specified in the Regulations. The operator will need to carry out a hazard evaluation and then a consequence assessment. They are then required to prepare a consequence report. These evaluations and assessment determine whether there is a potential for a radiation emergency at that site. A list of statutory consultees for these processes is set out in REPPIR.

Both reports must be sent to the Health and Safety Executive. The consequence report must also be sent to the local authority, who, if required, will be responsible for developing an appropriate off-site response plan in conjunction with the operator.

Construction (Design and Management) Regulations 2015 (CDM)

CDM sets out the roles and responsibilities on various duty-holders during the design and construction phase of a project, and considerations across the lifecycle. Fusion powerplants are likely to require an F10 notification to HSE prior to construction. More information is available here: The Construction (Design and Management) Regulations 2015 – HSE.¹⁴

Control of Major Accident Hazards (COMAH) Regulations

The COMAH regulations are aimed at preventing major accidents involving dangerous substances and limiting the consequences of any that do occur. COMAH applies to facilities that hold above specific quantities of hazardous materials, such as flammable gases, toxic chemicals, or explosive substances. Fusion operators should consider whether the site inventory reaches qualifying thresholds of dangerous substances given in Schedule 1 of the COMAH regulations. COMAH is enforced by a Competent Authority (CA) that comprises of HSE acting jointly with the EA in England and NRW in Wales. More information is available on the HSE website.

Other Health and Safety Regimes

Other health and safety regimes are regulated by the Health and Safety Executive under the Health and Safety at Work Act 1974, a non-exhaustive list of other relevant subsidiary legislation includes:

- Control of Artificial-Optical Radiation at Work Regulations 2010
- Control of Substances Hazardous to Health Regulations 2002 (COSHH)
- Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Control of Electromagnetic Fields at Work Regulations 2016
- Electricity at Work Regulations 1989
- Electrical Equipment (Safety) Regulations 1994

¹⁴ <https://www.hse.gov.uk/construction/cdm/2015/index.htm>

Further detail regarding HSE regulations, including relevant Approved Codes of Practice and guidance, is available on the website.¹⁵

Developer summary

Developers of fusion energy facilities should consider early engagement with HSE on health and safety consenting regimes.¹⁶ Developers should also consider whether their radiological inventory qualifies them for emergency planning and inventories of other hazardous materials qualify under COMAH regulations.¹⁷ If so, developers should engage with HSE and the relevant local authority at an early stage.

Environmental Protection and Permits

EA

The Environment Agency (EA) is a public body, dedicated to protecting and improving the environment, managing flood risks, and promoting sustainable development. Its mission is to protect and enhance the environment in England, ensuring a rich, healthy, and diverse environment for present and future generations. The agency's vision emphasises sustainable development, climate resilience, and safeguarding natural resources.

The Environment Agency's responsibilities include:

- Flood and coastal risk management: Reducing risks to people and property from flooding and coastal erosion.
- Pollution control: Regulating land, water, and air pollution to protect ecosystems and human health.
- Water resource management: Ensuring sufficient water supply for people, wildlife, and agriculture.
- Waste management and conservation: Overseeing proper waste disposal and promoting biodiversity.
- Climate change adaptation: Preparing communities and ecosystems for the impacts of climate change while working toward a net-zero nation.

¹⁵ www.hse.gov.uk/index.htm

¹⁶ <http://hse.gov.uk/fusion/index.htm> and <https://www.gov.uk/guidance/fusion-energy-developers-engage-early-with-regulators>.

¹⁷ [Control of Major Accident Hazards \(COMAH\) - HSE](https://www.hse.gov.uk/comah/) - <https://www.hse.gov.uk/comah/>

The Environment Agency is the regulator for environmental protection on industrial sites in England with responsibilities covering a wide range of activities, including:

- Radioactive substances regulation – including keeping and use of radioactive substance, security of High Activity Sealed Sources (HASS), accumulation and disposal of radioactive waste
- Industrial installations regulation, including landfills, metal processing and manufacturing
- Abstraction from and discharges to controlled waters
- Flood defences and flood response
- Fishing licences, reservoirs and navigation on certain waterways
- Chemicals, ozone depleting substances and fluorinated gases
- Agricultural activities
- Groundwater protection and contaminated land
- Together with HSE, form the Joint Competency Authority regulating COMAH in England

There are many environmental protection regimes regulated by the Environment Agency. The regime of most relevance to fusion activities is the Environmental Permitting (England and Wales) Regulations 2016, which provides a legislative system for permitting for activities that have the potential to cause harm to human health or the environment. Operators of industrial sites undertaking polluting activities are required to obtain permits that contain limits and conditions intended to protect the environment and human health.

The Environment Agency would determine any permits needed for proposed activities during construction, operational and decommissioning phases, e.g. surface water management, non-radiological wastes, deposit for recovery activities during construction and decommissioning. During operations, permits would be potentially required for radioactive substances activities and other industrial activities.

Radioactive substances regulation uses a “goal setting” regime, which requires operators to demonstrate that their radiological impacts are As Low As Reasonably Achievable (ALARA) through the application of Best Available Techniques (BAT). Regulatory effort is proportionate to hazard and risk, following a “graded approach”. Permits granted for other regimes, e.g. non-radiological discharges to water and industrial emissions, use a standards-based approach.

The Environment Agency has been regulating the UKAEA site at Culham for many years and is experienced with the environmental protection and regulatory challenges associated with experimental fusion operations. It is recognised that more work is required to build the Environment Agency’s capability to assess and regulate future fusion sites, which will be bigger and more complex than Culham. However, the Environment Agency also has a great deal of experience in the assessment and regulation of new power stations, including Nationally Significant Infrastructure.

The Environment Agency is developing plans to enhance regulatory skills for fusion regulation. HSE and the Environment Agency have jointly published a more formal initial early engagement process to de-risk future fusion new build.¹⁸

Natural England

Natural England (NE) is a non-departmental public body and is the government's adviser for the natural environment in England. Established by an Act of Parliament in 2006, their purpose is to help conserve, enhance and manage the natural environment for the benefit of present and future generations, thereby contributing to sustainable development.

Natural England is a statutory consultee for planning projects in England, providing advice on how a development may impact the natural environment. Natural England's main responsibilities relate to providing advice on Environmental Impact Assessments (EIA), the Habitats Regulations, the regulation of Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended), as the licensing body in respect of protected species. Natural England is also a consultee in relation to development of best and most versatile agricultural land or mineral and waste site reclamation to agriculture, and as an adviser on landscape matters.

Natural England strongly advises that developers engage at the earliest possible opportunity with Natural England should protected species licences be required. Developers are encouraged to utilise the digital tool to identify relevant impact risk zones (e.g. SSSIs) and highlight areas which require specialist advice from Natural England.

Consultation with Natural England is also required in respect of projects in England to which the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 apply. Input is vital in the pre-application process in cases where there are likely to be significant impacts on the natural environment and desirable where there are opportunities to deliver environmental net gain.

¹⁸ <http://hse.gov.uk/fusion/index.htm> and <https://www.gov.uk/guidance/fusion-energy-developers-engage-early-with-regulators>.

Environmental Protection Regulatory Pathways

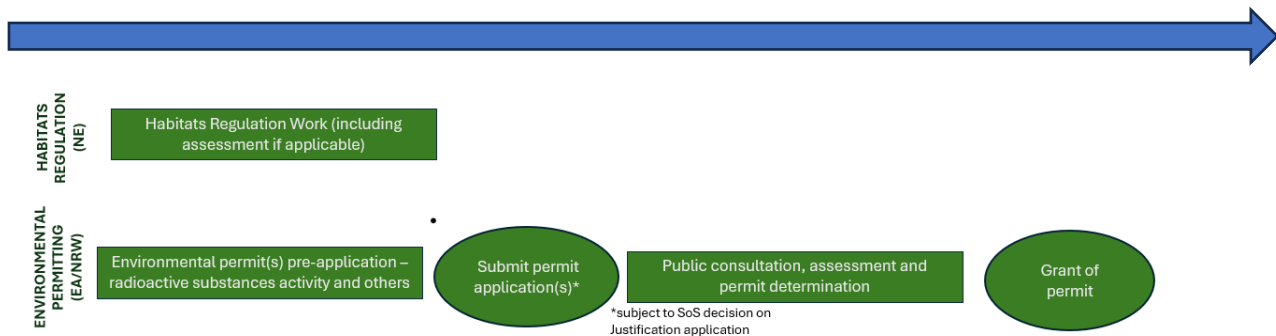


Figure 5 - Illustrative diagram of environmental regimes applicable to fusion in England and Wales.

In the UK, most environmental protection is devolved. Depending on the location of fusion activity, either the Environment Agency (in England) or Natural Resources Wales (in Wales) are responsible for receiving and determining applications for any environmental permits that are required as part of the construction, operation or decommissioning of a fusion energy facility. It is an offence to undertake certain activities without a permit.

In England and Wales, certain activities that could cause pollution require a permit through the Environmental Permitting Regulations (England and Wales) 2016. Relevant activities that require an environmental permit include discharges and disposals of radioactive waste; operation of a combustion plant; abstraction of water; waste operations, including incineration; discharge of cooling water to groundwater or surface waters; and work on or near main rivers, flood or sea defences.

Different permits may be required at different lifecycle stages of a development, particularly construction. Applicants should refer to the guidance provided and engage with the relevant national environment agency to receive advice regarding what permits are required. A fee will be charged to process and determine an application for an environmental permit. The exact cost will depend on the regime. Fees are specified in the relevant environment agency's charging scheme.¹⁹

The agencies offer a range of early engagement processes:

- Section 37 of the Environment Act 1995 allows the agencies to establish an agreement with a prospective permit holder to provide regulatory advice. The scope of this advice will be defined in the agreement, and the agencies will charge for their time.
- Pre-application advice: a developer wishing to apply for an environmental permit can apply for advice from the agencies. There are two levels of advice available:
- Basic advice, which is free, but advice is limited to:

¹⁹ <https://www.gov.uk/government/publications/environmental-permits-and-abstraction-licences-tables-of-charges>; <https://naturalresources.wales/about-us/what-we-do/how-we-regulate/our-charges/our-charges/?lang=en>

- Whether a permit is required and whether they are the regulator for the type of permit the operators is looking for, we can advise on what type of permit is needed
- General advice on how to prepare an application
- Providing information about any additional guidance available
- Confirmation of the application fee
- Explaining the permitting process
- Enhanced advice, which is chargeable, but the scope and cost of advice is agreed in advance. Advice can include:
 - What type of permit is needed
 - If complex modelling is required to support the application and how this modelling might be obtained, for example by using a specialist contractor
 - Preparing risk assessments, for example radiation dose assessments
 - Specific substances assessments
 - Monitoring requirements, including baseline environmental monitoring that will be important when an operator wants to surrender their permit in the future
 - Providing a view on whether the documents prepared meet regulatory expectations.

The environment agencies will decide if a permit should be issued and, if so, will attach conditions to a permit to prevent pollution and ensure that people and the environment will be protected. It is an offence not to comply with the conditions of an environmental permit. Permit conditions will include requirements for operators to demonstrate competence and management arrangements for limiting discharges and disposals and where relevant, for the use of BAT to prevent or minimise pollution. The regulator will periodically check that an operator is complying with their permit and can take enforcement action to bring an operator back into compliance.

Environmental permits may be required at the earliest stage of a project to enable site investigations and characterisation. It is advisable to apply for environmental permits prior to applying for a DCO so permitting information can be fed into DCO decision making, and to help ensure that permits are in place to enable commencement of works.

Environmental permitting is a publicly transparent process. The environment agencies are required to maintain Public Registers of Information about permit applications, the information they receive and decisions they make. There are some exemptions for information that is commercial-in-confidence or that has national security implications. For more significant permit applications, the agencies will also engage the public through a consultation process and are required to take account of any responses they receive in their permit determination.

The environment agencies welcome early engagement with prospective operators and applicants of new fusion power plants to ensure that there is good understanding of the requirements and expectations in environmental permitting and in planning, where they are statutory consultees.

Other Environmental Protection Regimes

The environment agencies also regulate other environmental protection regimes that do not require a permit before operation, but contain rules which are assessed during inspection and are subject regulatory enforcement. These includes regimes that are often relevant to industrial applications and energy generation, for example fluorinated gases (f-gas) and ozone depleting substances.

Developer summary

Developers of fusion energy facilities should consider early engagement with environmental agencies on radioactive substances regulations and environmental permitting.^{20,21} Developers should also engagement environmental agencies to understand if other environmental protection regimes would apply to their designs.

Transport of Radioactive Materials

Office for Nuclear Regulation

The Office for Nuclear Regulation (ONR) is the regulator for nuclear safety, nuclear site health and safety, civil nuclear security and safeguards on nuclear licensed sites across Great Britain. Whilst the nuclear site regime does not apply to fusion energy facilities, the ONR is also the Transport Competent Authority (TCA) regulating the transport of radioactive materials on road, rail and inland waterways in Great Britain. It is expected that existing transport processes will be used by fusion duty-holders for any Class 7 dangerous goods (radioactive material) associated with fusion facilities.²²

It is important that the TCA, part of the ONR, is informed of any new transport packages that fusion facilities may introduce. The current expectation is that no new package types are required for fusion material, but fusion will increase the number of tritium and waste packages transported a few years after fusion facilities begin operation.

²⁰ <http://hse.gov.uk/fusion/index.htm> and <https://www.gov.uk/guidance/fusion-energy-developers-engage-early-with-regulators>.

²¹ <https://www.gov.uk/government/publications/radioactive-substance-regulations-rsr-guidance>; <https://naturalresources.wales/permits-and-permissions/non-nuclear-radioactive-substance-sites/apply-for-a-bespoke-permit-for-a-radioactive-substances-site/?lang=en>;

²² [Frequently asked questions | Office for Nuclear Regulation](#) - <https://www.onr.org.uk/our-work/what-we-regulate/transport-of-radioactive-material/frequently-asked-questions>

Other Licences and Arrangements

An applicant may need to obtain other licences during the project which are exemplified below.

Electricity Generation Licence

An electricity generation licence may be required, as set out in The Electricity (Applications for Licences, Modifications of an Area and Extensions and Restrictions of Licences) Regulations 2019. Guidance is available from Ofgem.²³ Further licences may be required, as well as heat networks, fuel transport, and emergency management arrangements.

Marine Licence

A marine licence is required for a development which will abstract or discharge seawater or otherwise interfere with the seascape. Applicants must determine if the proposal is considered a marine licensable activity under the Marine and Coastal Access Act 2009. Proposals may be progressed under exemption orders or require a self-service marine licence in some instances. It is recommended that applicants use the Marine Management Organisation's (MMO) online interactive tool to determine if the proposed works contain marine licensable activities. The applicant is responsible for determining the licensable activities.²⁴

Any marine licence application submitted to the MMO must accord with the Marine Plans, and so applicants are encouraged to refer to the Marine Plans at an early stage. The Explore Marine Plans digital service can be used to understand relevant Marine Plan policy considerations.

Applicants should seek early engagement with the MMO (or Natural Resources Wales if the site is within Wales), including when they are considering numerous sites. Both organisations can offer early engagement discussions to assist the applicant in their assessment of impacts of the works. The MMO have numerous guidance documents which should be considered when preparing marine licences.²⁵

Rather than seeking consent for a marine licence from the MMO directly, the applicant may choose to seek a deemed marine licence as part of the Development Consent Order. EN-1 encourages that the MMO is consulted to agree the content of the deemed marine licence and the range of conditions which will be applied.²⁶

²³ <https://www.ofgem.gov.uk/energy-regulation/how-we-regulate/energy-licences-and-guidance/licences-and-licence-conditions>

²⁴ <https://www.gov.uk/guidance/get-permission-for-marine-work>

²⁵ <https://www.gov.uk/guidance/explore-marine-plans>

²⁶ EN-1 is the Overarching National Policy Statement for Energy which sets out the need for new nationally significant infrastructure projects and provides instructions to applications for all nationally significant energy infrastructure projects

Fusion Regulation Landscape

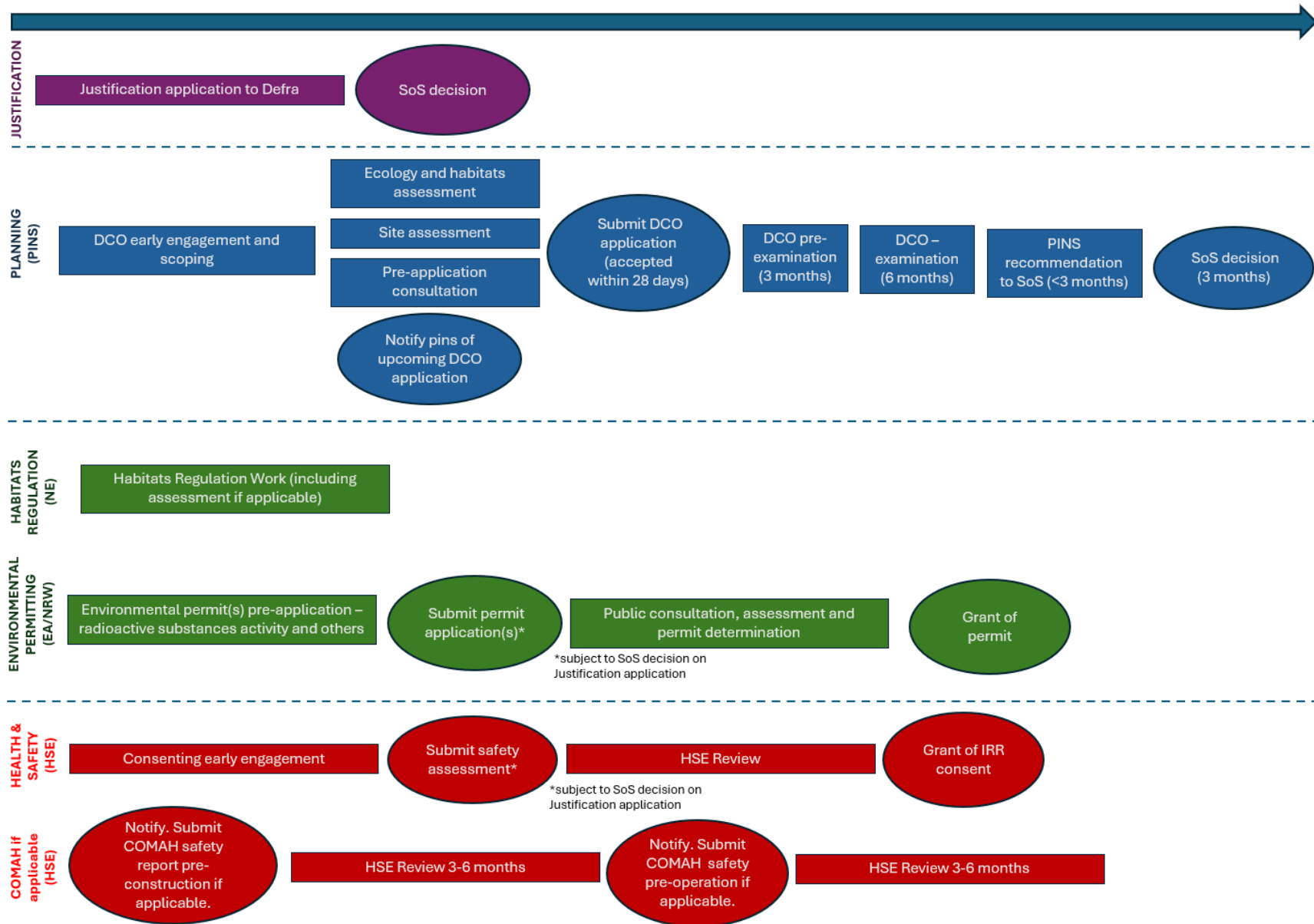


Figure 1 – Illustrative diagram of regulatory regimes applicable to fusion up to operation. Regulatory regimes do not have to be progressed concurrently. Ovals describe actions for developers while rectangles describe processes.

Conclusion

The regulatory landscape presented in this report shows the potential approval route for the development and operation of a fusion energy facility. Developers should use this document as a starting point to understand the actions they will need to take including engagement with the relevant regulators as they develop applications and consulting further guidance specific to the relevant regulatory regimes.

It is recognised that fusion energy facilities will be complex and there are uncertainties around their detailed designs. However, the risk-based and goal-setting approach of UK regulators such as the Environment Agency and the HSE enable a more adaptable and innovative approach to determining whether a fusion energy facility is managing the risks proportionately and effectively.

All regulators will continue to review the regulatory framework and build technical capability to ensure new fusion facilities are appropriately regulated in the UK. The UK government will also update this document as further regulatory clarity is provided as detailed in the UK's Fusion Strategy.

HSE and the EA have jointly published an initial early engagement process to successfully manage regulatory risks for new and emerging technologies across a range of industrial sectors and regulatory regimes. Their proposals for fusion early engagement continue to put the UK at the forefront of global regulatory development.

This publication is available from: www.gov.uk/government/publications/fusion-regulation-landscape

Any enquiries regarding this publication should be sent to us at:
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