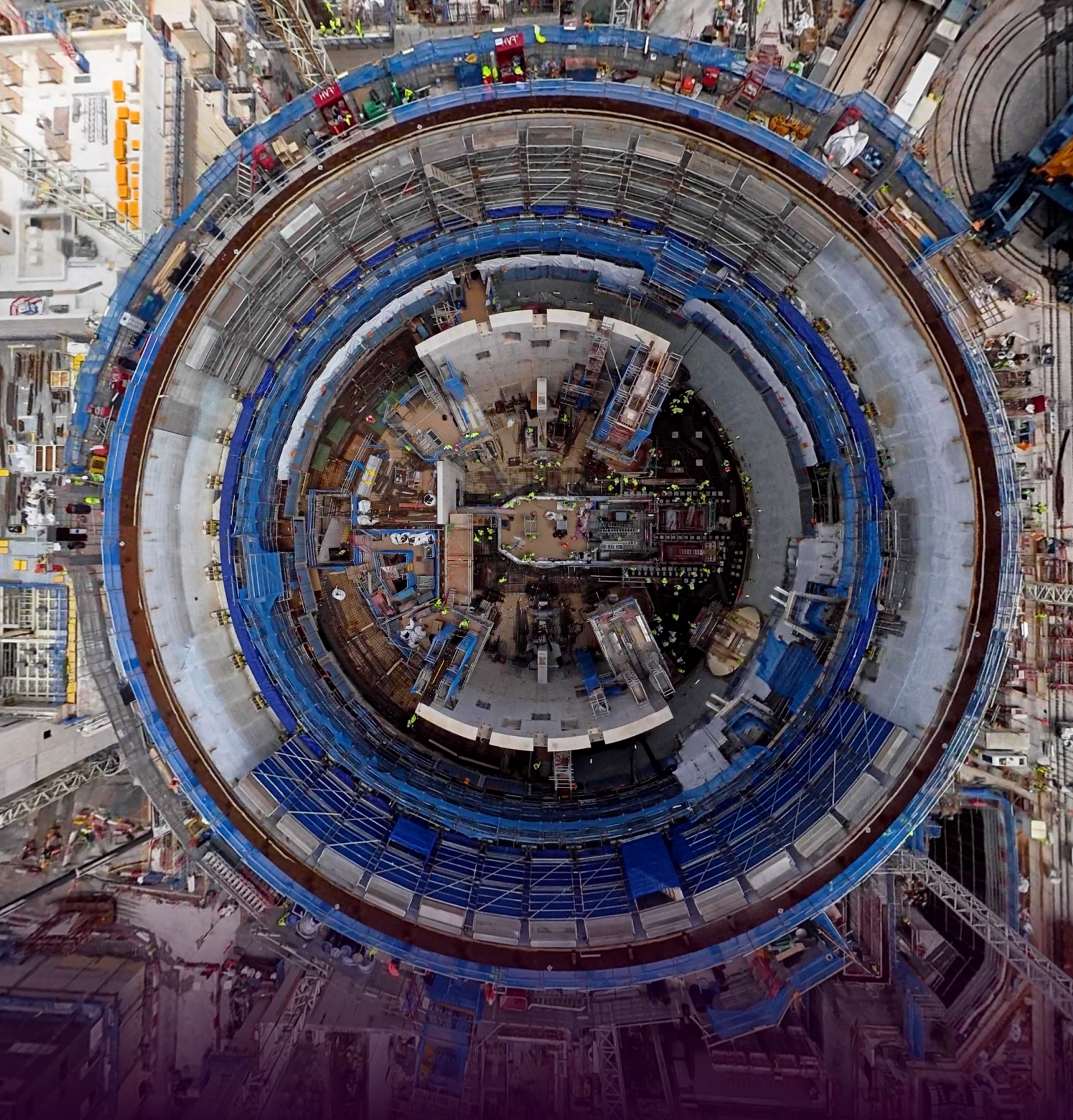

Nuclear Regulatory Review 2025

Enabling nuclear delivery through regulatory reform

John Fingleton

Dear Prime Minister

In April, you asked me to lead an independent Taskforce to review civil and defence nuclear regulation. The Taskforce was asked to propose radical reforms, and to treat this as a once in a generation opportunity to regulate nuclear energy in a way that promotes better delivery without compromising safety.

The Taskforce was formally appointed in late May, and I have pleasure in enclosing our final Report. I am grateful to my colleagues Mark Bassett, Sue Ion, Mustafa Latif-Aramesh and Andrew Sherry who brought huge expertise and dedication to this endeavour.

There are three fundamental regulatory drivers of high cost and delay in the nuclear sector. My experience suggests these apply more generally in other sectors and areas of regulation.

First is the **risk aversion** that arises because the system punishes failure but cannot reward success. This is worsened by inconsistent and insufficient political risk appetite.

Second is the priority for **process over outcome** using complex procedures as protection. This reduces accountability, judgement, and allows poor outcomes to be excused by “excellent” process adherence.

Third is the **lack of incentives** aligned with the public interest. Regulators and operators are not incentivised to maximise social benefits or minimise social costs.

Reforming regulation is very difficult because our system gives many the power to block change, but few the incentive or ability to enable it. Each government department has its own priorities and constraints. This makes it difficult to get them to prioritise systemic government-wide reforms that require coordinated effort and political capital across departments.

Our recommendations are radical and span multiple departments. Only determined and persistent direction and pressure from the very top of government will be able to cut through these obstacles. You will be told you need time to consider, consult and dilute. I encourage you to resist. The time for action is now.

The sector is home to world-leading scientists and engineers. They are committed to tackling climate change, safeguarding national security, and advancing environmental goals. Many we’ve spoken to share our perspective and are frustrated that the regulatory system constrains their contribution to delivering societal and environmental benefits. We sense a strong willingness in both regulators and industry to embrace reform, so long as it comes from the most senior level.

A safe and well regulated nuclear sector is vital for the UK’s future: to lower energy prices, achieve net zero, strengthen national security, and support nature and planning. It encourages investment, builds a domestic industry, and grows exports. We cannot be an AI and technology superpower if not a leader in advanced nuclear technologies.

Reforming the regulation of nuclear power to improve delivery is challenging, but the rewards are many times greater. I encourage you to see this as an opportunity for the UK to enact serious policy change that will result in enormous benefits for our society for decades to come.

These recommendations taken together and properly implemented will forge a clear path for stronger economic growth and improved productivity through technological innovation and leadership. This is a prize worth fighting for.

This report would not have been completed without the assistance, efforts and expertise of many people. I would like in particular to thank:

- First, all the individuals and organisations who engaged with the review whether by responding to our call for evidence and interim report questions, participating in workshops, meeting us, and hosting us on visits;
- Second, the team drawn from DESNZ and MOD who have supported the Taskforce; and
- Third, my fellow Taskforce members – Sue Ion, Andrew Sherry, Mustafa Latif-Aramesh, and Mark Bassett, whose technical experience and knowledge have helped provide expert guidance, as well as good challenge and debate up until the last moment.

Yours sincerely,
John Fingleton

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Part 1

Introduction

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Introduction: The Strategic Imperative for Reform

The United Kingdom's nuclear sector is at a critical juncture. The safe and efficient delivery of nuclear technology is essential for achieving national security, energy security, and Net Zero targets. However, the current regulatory and delivery model is failing. A comprehensive reform of the regulatory framework is a matter of strategic national importance.

The UK was historically a global pioneer in nuclear energy. It was the first country to produce commercial power from a nuclear source and a leader in nuclear defence. Today, it has become the most expensive place in the world to build nuclear projects. Both civil and defence programmes suffer from large cost overruns and schedule delays. **Regulation is central to this relative decline**. The increasing complexity and risk aversion of our regulatory system has contributed to a weakening of the UK's leadership and competitiveness.

Revitalising the UK's nuclear enterprise is a national priority for several reasons:

- **Energy Security & Net Zero:** Nuclear power is vital for meeting the UK's 2050 Net Zero commitment and accommodating a projected doubling of electricity demand. It provides a secure, low-carbon energy source. It is a complement to renewable technologies making them more sustainable.
- **Economic Growth:** A functional nuclear sector supports high-paying jobs and is a critical enabler for future industries, such as the expansion of AI-capable data centres, which will place significant new demands on the national grid. Lower energy prices for business and consumers will drive productivity and growth.
- **National Defence:** The nuclear deterrent is a bedrock of the UK's defence strategy. The effective delivery of this capability is dependent on a high-performing national nuclear enterprise.

The primary barrier to achieving these national goals is a systemic failure within the regulatory framework. This report diagnoses that failure and presents a blueprint for its comprehensive reform.

Diagnosis: A Systemic Regulatory Failure

This is a systemic problem that cannot be attributed to any single entity. The issues span regulators, government, and industry, creating a cycle of inefficiency, delay, and excessive cost. This is deeply rooted and embedded in the sector's culture. Interconnected failures feed on each other, acting as bottlenecks that prevent the effective delivery of critical nuclear projects.

The five primary regulatory problems are as follows:

1) **Fragmented Oversight:** A single project faces multiple regulators, sometimes as many as six on a single defence project, with no single designated lead. This results in misalignment, inconsistency, and delay.

2) **Disproportionate Decisions:** Regulators frequently make overly conservative and costly decisions that are not proportionate to the actual risk being managed.

3) **Flawed Legislation:** Underlying laws and regulations prioritise process over outcomes, leading to time-consuming delays and suboptimal decisions.

4) **Government Indecision:** Government departments are often slow and indecisive in their roles as policymakers and regulators, failing to provide clear direction.

5) **Weak Industry Incentives:** The near-monopolistic status of much of the industry provides weak financial incentives to reduce costs or challenge disproportionate regulatory decisions.

These issues have cultivated a deeply ingrained **culture of complacency and extreme risk aversion** across the sector. This "status quo mindset" perpetuates the cycle of inefficiency and is a fundamental barrier to progress and delivery. Addressing this systemic failure requires a series of radical, root-cause solutions that fundamentally reshape the regulatory landscape.

Blueprint for Reform: Core Recommendations

The Taskforce's recommendations provide a coherent blueprint for a "radical reset" of the UK's nuclear regulatory system. The proposals are structured as a direct response to the systemic failures identified, offering a clear path from diagnosis to cure.

Responding to Fragmented Oversight

This is a complex and multifaceted problem, requiring coordinated action to drive change at all levels in the system. We recommend that the **Prime Minister** issues a **Strategic Steer** to government departments, regulators and dutyholders, setting out immediate government priorities and expectations for how the sector should accelerate delivery.

Structural reform is essential to counter the paralysing effects of fragmented and duplicative oversight. We recommend establishing a single, unified decision-making body, a **Commission for Nuclear Regulation**, to act as a final one-stop arbiter on all major nuclear regulatory decisions. This body would listen to the views of regulators, industry, and other stakeholders in public, subject to national security, to make a balanced decision, consolidating authority that is currently dispersed. As an immediate interim measure, a formal **lead regulator** model should be established, with the Office for Nuclear Regulation (ONR) as the default. Furthermore, the Defence Nuclear Safety Regulator (DNSR) should be merged with the ONR to reduce duplication, improve resource allocation, and enhance technical capability. Finally, we recommend that **safety case development** be returned to its original purpose as a document for dutyholders' use, not a paper exercise for regulatory approval.

Responding to Disproportionate Decisions

To correct the overly conservative, process-driven culture, the Government, not individual regulators, must define the national standard for the **tolerability of risk**. This will provide a clear policy benchmark for applying the "As Low As Reasonably Practicable" (ALARP) principle proportionately. Major reforms to environmental assessments are also required to shift the focus from process to outcomes. This includes creating an **alternative compliance pathway** for the Habitats Regulations, allowing developers to make a substantial payment to a nature fund as a substitute for lengthy and inefficient site-specific mitigation studies that produce disproportionate outcomes.

Changing the Culture & Embracing Innovation

To ensure success, transformation of the nuclear industry's culture is fundamental, requiring decisive action at all levels. We recommend that boards re-align their organisation's cultural values to focus behaviours on **delivering faster and more economical outcomes while maintaining safety**. To embed cultural change as the nuclear sector grows, we recommend that the **Nuclear Skills Delivery Board accelerate its efforts**, focussing on non-technical as well as technical skills. The nuclear sector can be slow to embrace change, but to achieve a radical reset it must maximise the take up of digital technologies including AI as a tool for safety experts, modernising approaches to whole-life safety and regulation.

Responding to Systemic Blockages

Several changes are required to remove legislative and policy bottlenecks and accelerate project delivery. The planning process for Nationally Significant Infrastructure Projects (NSIPs) must be streamlined to avoid excessive and duplicative project-by-project analysis. The full breadth of national policy must recognise the **"Critical National Priority"** status of nuclear technology and enable an efficient fleet-based approach. Outdated policies that restrict site selection must be reformed, specifically by revising the **Semi-Urban Population Density Criteria (SUPDC)** and default outline planning zones under **REPPIR19** to reflect modern reactor safety. Finally, the duplicative **"Justification"** process for new Light-Water Reactors must be eliminated, as its purpose is already served by other, more effective regulatory stages.

These structural reforms are necessary but not sufficient. Their success is contingent on a fundamental cultural shift across government, industry, and regulators – moving from rigid process-adherence to a focus on delivering safe, timely, and cost-effective outcomes for the nation.

Conclusion: A Path to Renewed UK Nuclear Leadership

The overarching vision of this report is to create a regulatory environment that enables the UK to capitalise fully on the strategic benefits of nuclear technology for the nation. Implementing these recommendations will transform the sector, enabling the safe, timely, and cost-effective delivery of the nuclear programmes essential to the our future.

These reforms are designed to be radical but measured, addressing the root causes of systemic failure. By simplifying structures, restoring proportionality, and modernising processes, the UK can overcome its current challenges. This will allow the nation to reclaim its position as a global leader and capitalise on the worldwide nuclear renaissance, ensuring a secure and prosperous future.

Chapter 1

Overview and Objectives of the Taskforce

This chapter outlines why the Taskforce was created and what it aims to achieve.

Summary

On 6 February 2025, the Prime Minister announced the creation of a Nuclear Regulatory Taskforce to reform the civil and defence nuclear regulatory framework.

The objective is to achieve faster delivery and better value for money in both civil and defence nuclear, whilst not compromising safety outcomes.

The Taskforce has built on past reviews, relevant legislative and other reforms that are underway, and previous actions by government and regulators.

The final report and recommendations aim to address all identified issues and deliver balanced solutions for all relevant stakeholders, informed by consultation and engagement.

The Taskforce cannot make recommendations for Devolved Governments in devolved areas.

1. Nuclear technology is essential to the UK's future. Nuclear technology must be delivered safely, efficiently, and at pace, if it is to attain energy security, achieve net zero targets, drive economic growth, value for the taxpayer, improve living standards, and safeguard sovereign defence capabilities.

2. The UK has not delivered nuclear projects to time and cost in recent years. Projects have struggled to secure financing, and several collapsed early in development. Those that have proceeded are over budget and over schedule. Urgent change is needed if we are to capitalise on the opportunities nuclear technology can provide.

3. Regulation is not the only factor in delivery, but it is the foundations upon which decisions are made. The Prime Minister announced the setup of the Nuclear Regulatory Taskforce to consider reform of the civil and defence nuclear framework and regulations.

Taskforce Objectives

4. The UK nuclear sector has an excellent safety record overseen by expert and independent regulators. The majority of organisations consulted have emphasised the high level of credibility and trust in UK regulators nationally and internationally. This is important to the nuclear sector's 'social licence' to operate and public confidence in the use of nuclear technology.

5. There is no intent to weaken nuclear safety. This review addresses the underlying causes of over-complexity, duplication, and regulatory waste. We expect safety to improve by making processes simpler, more transparent, and by focusing resources where they have the greatest impact.

6. The Taskforce has focussed on the following areas:

a) The suitability of the existing regulatory frameworks;

b) Relevant legislation and supporting guidance;

c) The scope and capacity of regulatory bodies;

d) The expectations on regulatory outcomes;

e) The culture and processes within the nuclear sector;

f) Support for innovation and the deployment of new nuclear; and

g) International harmonisation of regulatory approaches.

Scope of the Review

7. The Taskforce has examined all aspects of the regulation of civil and defence nuclear programmes including safety, environmental, planning, and other relevant areas. The review excludes nuclear security and safeguards, environmental protection in the devolved administrations, and nuclear fusion.

8. Some challenges are unique to nuclear because of the sector's specific hazards. Others are shared with other high-hazard industries and big infrastructure projects. The Taskforce recommendations are specifically addressed to the nuclear sector but may also have relevance to other sectors and regulatory reviews. We have, in our work, drawn upon recent reports, including those by Dan Corry and Lord Banner KC.

9. The Taskforce respects the UK's commitment to relevant international agreements and standards.

Our Approach

10. On 6 February 2025, the Prime Minister announced the creation of the Nuclear Regulatory Taskforce to consider reform of the civil and defence nuclear regulatory framework.

11. In April it was announced that John Fingleton CBE had been appointed as head of the taskforce. A panel of experts was subsequently appointed.

12. An initial call for evidence was released, requesting views from stakeholders with an interest in the regulation of defence and civil nuclear technologies. This call for evidence concluded on 19 May 2025.

13. The Taskforce has engaged with sector stakeholders, including industry leaders, government departments, regulators, and non-governmental organisations (NGOs). We visited many important sites and facilities across the country, a full list of which is provided in Annexe A.

14. The Taskforce published an Interim Report on 11 August 2025.(1) This outlined our emerging thinking and summarised how over-complexity and disproportionality pervaded much of the regulatory framework and its application.

15. The interim report posed a further set of questions as a second call for evidence. We have relied on the responses to these questions and insights from a series of workshops with industry, academia, regulators, and NGOs to develop the evidence and analysis that underlies our recommendations.

16. This final report concludes the work of the Taskforce. It summarises the assessment of the problems, the changes that need to occur to resolve them, and the specific recommendations by which that change will happen.

17. Stakeholder consultation responses and supporting evidence for case studies are not directly referenced in the main text of this report, because of the complex form of returns, the desire to get people to speak openly, and the privacy considerations of respondents.

Our Philosophy

18. The regulation of nuclear power in the UK is a huge endeavour. It ranges from reactor design and radiation safety through to conservation and marine management. The system spans legislation in many different areas, design codes, regulatory guidelines, and individual judgement. Most of these rules were written in isolation by individual domain specialists, years apart, and with little consideration of how the wider jigsaw would eventually fit together.

19. The purpose of nuclear regulation is to create a proportionate framework that enables the safe delivery and operation of nuclear power. The taskforce believes it has become divorced from this goal.

20. Our report is based on the following principles:

a) The merits of nuclear power

The UK Government is committed to new civil nuclear power investment and renewing the nuclear deterrent. We have taken the Government's commitment to civil and defence nuclear power as given for the purposes of this review. Where we outline the benefits of nuclear, it is primarily to understand the proportionality of regulation and the impact of our recommendations.

b) Simpler regulation can deliver safety at lower cost

Nuclear regulation exists to ensure safety. Good regulation is critical for reducing risk, driving a culture of continuous improvement in industry, and maintaining public confidence in the safety of nuclear power. Reform must not undermine safety standards.

Society deserves nuclear power at the lowest cost consistent with achieving safety. Bad regulation can impose additional direct cost, delay and complexity. When developers and regulators are forced to navigate complex or duplicative regulation, this can be bad for both cost and safety. Each bespoke system or parallel rule adds complexity. Not only does this drive resources into low-value administrative work, but it also leads to plants that are costlier to run and harder to maintain.

We believe that simplification of regulation can maintain or enhance safety standards and other outcomes, while reducing costs.

c) Regulatory processes should not trump outcomes

Environmental conservation is of the utmost importance. Any programme for clean energy should enhance the environment, rather than sacrifice or degrade it.

This is a serious problem. Since 1970, UK species have declined by about 19% on average, and nearly 1 in 6 species are now threatened with extinction.

A new approach is emerging, focused on achieving natural recovery and enhancement as key outcomes. The preservation of protected sites is enshrined in government policy and nuclear power. When delivered properly, it should result in improved outcomes for nature and the environment.

Too great a focus on process can often impair the outcome. Processes should be designed to achieve the best possible outcome, not the best possible process.

Ineffective or duplicative assessments and wasting resources on the mitigation of phantom risks do little to advance environmental objectives.

d) A regulatory system must acknowledge trade-offs

The delivery of new nuclear projects, and the potential for adverse and local impacts requires a balance. There may be trade-offs in some areas. Good decisions require recognising these and making a trade-off decision that relies on evidence and higher-level policy priorities. These decisions should be made quickly, given the high capital cost of nuclear projects.

It is essential that nuclear projects receive adequate regulatory and public scrutiny. No infrastructure project, no matter how politically important, should be above accountability.

At the same time, there is a cost to time and process. Each delay caused by a new environmental survey or legal challenge results in a delay in the delivery of nuclear projects in the UK. This means a continued reliance on highly polluting fossil fuels. Each additional layer of complexity added to a design results in a more expensive plant. This is bad for our energy security, bad for the environment, and bad for the consumer.

e) A systemic, and systems problem

It is not our intention in this report to single out one actor. We believe that the problems of UK nuclear regulation are the product of a system failure. There is enough blame to go around. Issues arise across the processes which apply. Lawmakers have not adequately considered the downstream implications of new duties before imposing them. Regulators have failed to define safety cases proportionate to the risk and apply rules proportionately, and have given insufficient thought to outcomes. Dutyholders and developers have failed to offer adequate challenge, or control costs.

f) Radicalism bounded by feasibility

New rules and systems can cause temporary uncertainty and take time, even if ultimately beneficial. Procedural tweaks can have substantial impacts but may not be so significant as to realise the full benefits of nuclear. We have sought to identify solutions based on both.

g) Status quo mindset

The Taskforce has been surprised that across industry and regulators there is a complacency that accepts and protects the status quo. This too is a product of the system in which challenges to improvements are prioritised over the will to achieve certainty and improvements. This mindset must change.

21. These principles guide the recommendations in our report, which apply to both civil and defence nuclear programmes and fall into three categories:

a) Clarifying the current regulatory framework for nuclear and removing duplicative or unnecessary obligations that do not enhance safety;

b) Ensuring that the framework for environmental conservation serves its intended purpose; and

c) Creating the incentives that will instil greater challenge in the system and prevent it creeping back to its present state.

Guide to the Report

22. The report is organised into four main parts:

a) Part 1 introduces the taskforce's remit and objectives;

b) Part 2 provides an overview of the UK's nuclear landscape;

c) Part 3 examines key challenges in detail and sets out recommendations for regulatory reform; and

d) Part 4 outlines the way forward, presenting the taskforce's vision for the future of nuclear in the UK and how the regulatory system should operate.

23. The opening section provides historical context on nuclear activity in the UK. This framing includes an overview of current nuclear activities and operational sites, future intentions (Chapter 2), and the legislative and regulatory frameworks that define the overarching system (Chapter 3).

24. Chapter 4 summarises the problems identified during taskforce consultations, many of which build on findings from the interim report. Chapter 5 explores the need to simplify the nuclear regulatory landscape, while Chapter 6 addresses challenges in risk management, proportionality, and the application of the ALARP principle.

25. Chapter 7 examines necessary reforms in environmental assessment and permitting processes and legislation. Chapter 8 focuses on changes to the planning regime.

26. Chapter 9 discusses culture, capacity, capability, and innovation in the nuclear sector. Chapter 10 considers the need to encourage and remove blockers to international harmonisation. Chapter 11 addresses any remaining issues.

27. Chapter 12 sets out the taskforce's vision for the nuclear sector. Chapter 13 summarises the recommendations which apply to both civil and defence.

28. The nuclear sector is rich in acronyms. We spell out the full acronym on first use in each chapter. A full list is provided in Annexe C.

Part 2

The Current Nuclear Landscape in the UK

Chapter 2

Nuclear in the UK

Chapter 2 looks at the history of nuclear in the UK, key contributions both civil and defence nuclear provide to the UK, and what nuclear can offer in the future.

Summary

Nuclear power has been part of the UK's electricity supply since the 1950s, providing low carbon, secure energy to the grid.

The nuclear industry, supporting power generation and defence, consists of existing operational facilities, decommissioning activities, current build sites and future build sites.

The nuclear deterrent provides part of the UK's national security. This relies on a range of operational nuclear sites across the UK.

The demand for energy is expected to increase continually in the coming decades. Studies suggest that the UK will only meet its 2050 net zero goal if nuclear power is a large part of the energy mix.

There are a large range of nuclear projects currently underway in the UK, covering civil power generation, fuel production, defence, decommissioning and waste management.

The History of Nuclear Power in the UK

29. Britain was a pioneer in civil nuclear energy. Calder Hall, opened by the Queen in October 1956, was the world's first full-scale civil nuclear reactor. By 1965, the UK had more nuclear power stations than the US, USSR, and France combined. The UK remained the top global producer of nuclear energy until 1970.

30. The UK was the third nation to launch and operate a nuclear-powered submarine, following the United States and the USSR. By 1969, a full fleet of Resolution Class Nuclear Powered Ballistic Missile submarines were at sea, providing the Continuous at Sea Deterrent (CASD).

31. Britain's early lead in civil nuclear energy declined from the 1970s due to technical issues with reactor design, changing political priorities, and the growth of North Sea oil and gas. The UK has not completed a new reactor since Sizewell B in 1995. Nuclear power peaked in electrical output to the grid in 1998 before steadily declining as older reactors were retired.

32. The UK currently operates nine civil nuclear reactors across four sites, with all but one scheduled to retire by 2030. These provide around 15% of the UK's electricity requirements. This will fall as Heysham and Torness are retired, before rising during the 2030s with the commissioning of Hinkley Point C and Sizewell C. Despite its diminished footprint, nuclear power remains a big contributor to the UK economy across four key areas: supporting net zero, creating high-paying jobs, underpinning the UK's security and providing grid stability.

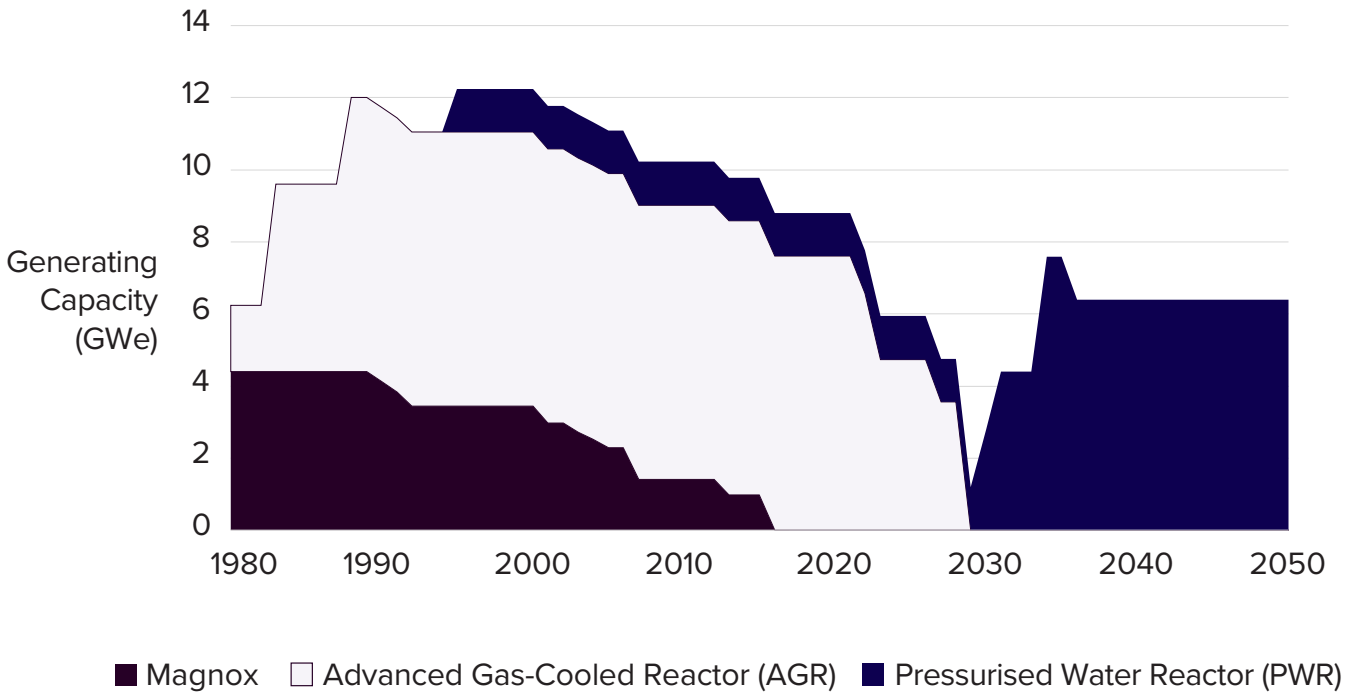


Figure 1 – Nuclear electrical power generation in the UK per reactor type

The Role of Nuclear

33. The UK is committed to achieving net zero by 2050, which means that total greenhouse gas emissions must be equal to the emissions removed. The UK has made significant progress towards this goal, cutting greenhouse gas emissions by 50% since 1990 largely through expanding wind and solar power.

34. Electricity generation now accounts for 11% of UK emissions and 16% of total energy use. Future decarbonisation will require electrifying transport, heating, and industry, meaning electricity demand is expected to double even as efficiency increases.(2) Achieving the production of secure, low-carbon electricity at affordable cost is vital for successful decarbonisation. Alongside its climate goals, the UK Government views artificial intelligence as a transformative opportunity for economic growth. The Government plans to expand AI-capable data centre capacity which is expected to require at least six gigawatts by 2030, adding further demand for electricity. The UK will need additional gas or nuclear power to ensure reliable supply of low carbon electricity as the huge increases in battery storage (which have their own safety, environmental and land-use concerns) that would be required is far beyond what is currently expected.

35. The Government has stated that nuclear power will be a key part of the UK's future energy mix. Studies from both the Energy Systems Catapult and Aurora Energy Research indicate that there is no realistic path to both meeting net zero goals and providing energy affordably and securely, unless nuclear is a large proportion of the UK's energy mix.(3)

36. Power grids depend on alternating current within a tight band: 49.8 to 50.2 Hertz. Going outside that band can cause a catastrophic grid collapse. Giant rotating masses like the turbines turned by gas, biomass, and nuclear power plants create inertia, keeping the grid at frequency if generators briefly cut out, averting total blackout. This makes nuclear energy an important complement to wind and solar, contributing further to sustainability and system stability. It also requires far smaller amounts of land.

37. The grid also needs to be able to provide different levels of power throughout the day, as consumer demand varies and the output of wind and solar fluctuates. Nuclear power stations can meet this requirement for load-following, as is currently done in France, and thus provide a zero carbon replacement for gas in balancing supply and demand on the system.

38. The UK's Strategic Defence Review 2025 emphasised that a modernised nuclear deterrent is the bedrock of the UK's defence and the basis of its commitment to NATO and global security.(4)

Existing Sites

39. There are 36 licensed and/or authorised nuclear sites in the UK which include operating reactors, defence infrastructure, nuclear fuel production, research facilities, health companies and sites undergoing decommissioning. These are shown in Figure 2.

40. Nuclear technology is critical for many medical and industrial applications. In medicine, radionuclides are being used in diagnostics, such as PET scans, and cancer treatment. In space programmes, radioisotopes from stored radioactive waste are being explored for long-duration batteries used for space missions.

41. The UK maintains a nuclear legacy of closed nuclear plants, laid up submarines, and other waste. The UK must manage this storage and disposal of waste as efficiently and safely as possible. There are particularly complex decommissioning challenges in the UK, for which cutting edge solutions are being researched and implemented.

42. The UK Government has committed to construct a Geological Disposal Facility (GDF) to safely and securely store this waste long-term. A site has yet to be selected, and the process is expected to take decades.

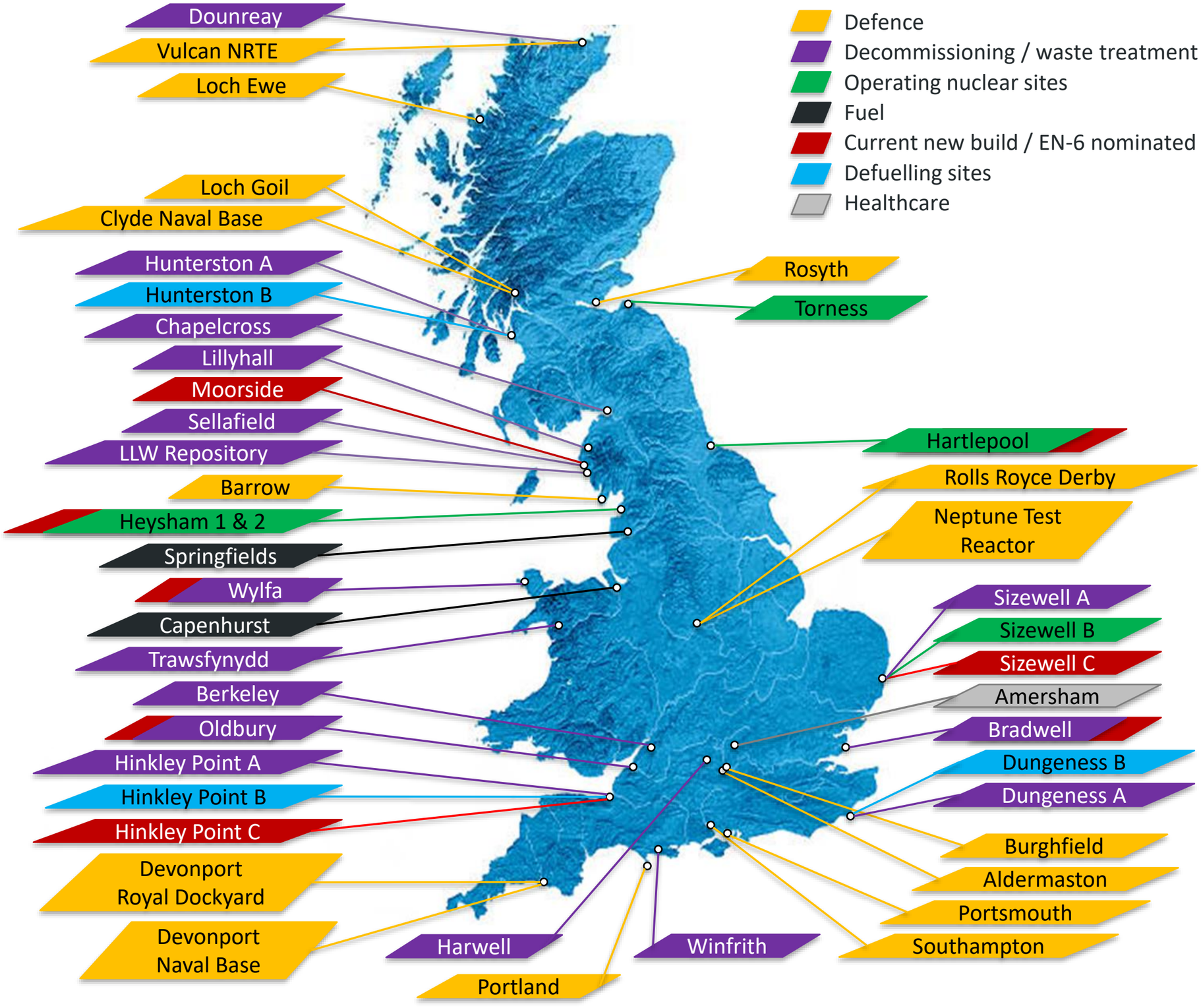


Figure 2 – Nuclear licenced and/or authorised sites in the UK

Future Sites

43. The construction of Hinkley Point C and Sizewell C, along with planned small modular reactor (SMR) deployment, will bring the next generation of nuclear power stations online within the next decade.

44. The Government supports the wider use of land for new nuclear projects. This will happen through developers identifying sites which may be new sites, or by reinvigorating older sites that are being decommissioned.

45. In September, the Government announced new initiatives as part of wider cooperation with the United States. This included support for X-Energy and Centrica in Hartlepool; Holtec, EDF and Tritax at Cottam; Last Energy and DP World at London Gateway; Urenco and Radiant; and TerraPower with KBR.

46. There are other opportunities in the nuclear sector including Generation IV reactors, Advanced Modular Reactors (AMRs), Floating Nuclear Power Plants (FNPPs), commercial maritime shipping reactors, and reactors on floating barges. AMRs and FNPPs have the potential for a range of applications beyond low-carbon electricity generation, such as industrial heat and the production of hydrogen. Maritime shipping could one day reduce carbon emissions from transport. Our regulatory framework must be capable of adapting to new nuclear technology.

47. Future nuclear programmes will require decommissioning and disposal mechanisms. Newer technologies will produce different types of waste but in smaller volumes. All new developments must have a funded decommissioning programme for construction to begin.

The UK's Nuclear Deterrent

48. The UK has nuclear powered and nuclear armed ballistic missile submarines at sea working to provide our CASD. The design, construction, commissioning, operation, and disposal of these assets and their infrastructure is carried out under mostly identical nuclear regulations applicable to civil power generation.

49. The UK Government has committed to building up to 12 SSN-AUKUS Class submarines, each powered by its own naval nuclear reactor. These, alongside the Dreadnought Class ballistic missile submarines, which are currently undergoing construction, and our sovereign warhead capability will form the foundations of national defence for decades to come. Effective regulation is needed to ensure the safe delivery and operation of these platforms to time and cost.

Chapter 3

Regulation of Nuclear Activities in the UK

This chapter focusses on the regulation of nuclear activities in the UK, considering the different regulatory organisations, key pieces of legislation, and key nuclear safety and environmental principles.

Summary

The UK adopts a largely 'goal based' regulatory approach, where dutyholders (the regulated operators) are responsible for meeting safety and environmental objectives in ways that suit their operations.

Central to this, for health and safety, is the principle of reducing risks to As Low As Reasonably Practicable (ALARP), and balancing risk reduction with money, time, and trouble.

The Nuclear Installations Act 1965 (NIA65) underpins the licensing regime, requiring dutyholders to meet 36 Licence Conditions (with equivalent Authorisation Conditions for some defence activities). Other relevant legislation includes the Health and Safety at Work Act 1974 (HSWA), Ionising Radiation Regulations 2017 (IRR17), and Environmental Permitting Regulations 2016 (EPR 2016), which collectively govern health and safety, radiation protection, and environmental compliance.

To protect the environment, operators must also demonstrate that radiation discharges are within limits and optimised, so that they are 'As Low As Reasonably Achievable' (ALARA) taking social, economic, and environmental factors into account. This is given effect using the concept of Best Available Techniques (BAT).

Key regulators include the Office for Nuclear Regulation (ONR), the Defence Nuclear Safety Regulator (DNSR), and the Environment Agency (EA), each with distinct vires.

Dutyholders must produce and maintain Safety Cases to demonstrate risk management, while processes like the Generic Design Assessment (GDA) and Justification ensure early regulator and developer confidence, as well as societal benefit assessments for new nuclear designs or activities.

The regulatory framework involves overlapping systems and multiple regulators, creating challenges for dutyholders in managing differing expectations.

Approach to Nuclear Regulation

50. Nuclear safety and environmental protection are national responsibilities. While nuclear regulatory approaches vary across countries, most align with the non-binding safety standards established by the International Atomic Energy Agency (IAEA). Notably, several countries with long-standing nuclear programmes, such as the United States, United Kingdom, and Canada, developed their safety principles and regulatory frameworks prior to or shortly after the formation of the IAEA. These early frameworks helped shape the IAEA's standards, but they did not converge into a

single, uniform approach. As a result, national regulatory frameworks reflect both historical context and differing legal systems, even as they adhere to shared international principles reflected in international conventions.

51. There are two general approaches for the achievement of regulatory objectives:

a) **Goals Based (Non-Prescriptive) Regulatory Approach** – This approach typically involves the articulation of high-level goals, outcomes, principles, or standards. It is characterised by minimal prescription regarding how dutyholders should meet these requirements.(5)

b) **Rules Based (Prescriptive) Regulatory Approach** – This approach typically relies on precisely drafted, highly specific, and prescriptive rules. It provides dutyholders with clear guidance in advance about which actions are permitted or prohibited.(5)

52. Goals-based and rules-based regulatory approaches each offer distinct advantages and disadvantages. In general, goals-based regulation is seen as more flexible and conducive to innovation. It encourages dutyholders to take greater ownership of safety, adapts more readily to changes in the regulatory environment, and allows regulators to tailor enforcement strategies to specific contexts. This approach is well-suited to decommissioning activities, particularly complex high-hazard facilities, where hazards and risks can evolve during the decommissioning process. In contrast, rules-based regulation is often valued for its precision and predictability. It provides clearer guidance for dutyholders, limits regulatory discretion, thereby helping to control costs and making it easier to assess whether dutyholders have met defined outcomes.(5)

53. The UK primarily uses a goals-based regulatory approach, similar to countries such as Canada and Finland. In contrast, the United States and Brazil have traditionally used rules-based approaches. Some countries align their regulatory model with that of the nation where the reactor design was originally licensed. These approaches are evolving. The US Nuclear Regulatory Commission (US NRC) is transitioning towards a goals-based framework for advanced nuclear reactors, and Brazil's new regulator, the National Authority on Nuclear Safety (ANSN), is also adopting a goals-based model. It is important to note that no large nuclear state adheres exclusively to a single regulatory model. In practice, most operate hybrid systems, applying different approaches across various regulatory domains.

54. Greater harmonisation of regulatory approaches between national nuclear regulators is emerging as a key international priority. This reflects growing recognition of the benefits of standardised nuclear power plant fleets and the need to support the global expansion of nuclear energy. Countries are increasingly pursuing bilateral, multilateral, and international arrangements to align regulatory practices.

Legal Framework

55. Legislation for health, safety, and environmental protection is founded on the key principle that those who create risks are responsible for managing them.

56. Within the general duties of the Health and Safety at Work etc Act, HSWA, 1974, dutyholders must take measures to protect people by reducing risks 'So Far As Is Reasonably Practicable' (SFAIRP). Dutyholders are not expected to eliminate all risks, but to do everything 'reasonably practicable' to reduce them or not expose persons to them. This means that measures to reduce risk should be implemented unless the cost, in terms of money, time, or trouble, is grossly disproportionate to the benefit gained from the reduction in risk.

57. The legal requirement SFAIRP is often called the 'As Low As Reasonably Practicable (ALARP) principle' by regulators and dutyholders.(6) Chapter 6 describes how this has been implemented in practice.

58. For sites with substantial hazards, a 'permissioning' regime applies, requiring the dutyholder to obtain regulatory agreement to operate following the submission of a safety assessment, commonly referred to as a safety case. These safety cases are primarily written by the dutyholder for internal use, they demonstrate how hazards are controlled, and safe operation is maintained. Although not written for the regulator, the regulator assesses the safety case as part of the permissioning process.

59. Although the accident risk from nuclear installations is low, their high hazard potential gives rise to societal concerns which must be addressed. The Nuclear Installations Act 1965 (NIA65) established the UK's nuclear site licensing regime, a stringent form of permissioning. To obtain a nuclear site licence, dutyholders (referred to as licensees) must make and implement 'adequate arrangements' to comply with 36 Licence Conditions (LCs), which also provide the regulator with additional enforcement powers. Certain defence-related sites are licensed under this regime, while other sites and activities fall outside it but operate under separate arrangements with comparable Authorisation Conditions (ACs).

60. Other important pieces of the safety legislative framework include the Ionising Radiation Regulations 2017 (IRR17), Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR19), and Justification of Practices Involving Ionising Radiation Regulations (JoPIIRR). These set out further protections for workers and the public from ionising radiation, as well as requiring the benefits of the use of ionising radiation to be 'justified' before a specific usage is approved.

61. The Environmental Permitting (England and Wales) Regulations 2016 (EPR 2016) includes requirements for the keeping, use, accumulation and disposal of radioactive substances and waste. The regulations also include security requirements for high activity sources on non-nuclear sites. Unlike health and safety law, environmental regulation is a devolved matter across the UK, meaning Scotland, Wales, and Northern Ireland each operate under distinct frameworks and agencies tailored to their regional priorities.

62. To protect the environment, operators must demonstrate that radiation discharges are within legal limits and are optimised, so that they are 'As Low As Reasonably Achievable' (ALARA) taking social, economic, and environmental factors into account. This is given effect using the concept of Best Available Techniques (BAT).

63. There are also a wide range of other environmental laws in the UK, some of which are more prescriptive. These include laws related to pollution prevention and control, waste management, water resources and quality, and protection of habitats and biodiversity.

64. Most new nuclear installations fall under the Nationally Significant Infrastructure Projects (NSIP) regime. It is a streamlined planning and consenting process established under the Planning Act 2008 for large infrastructure developments in England and Wales. It is designed to provide a faster, more predictable route for projects deemed of national importance. Nuclear developments below the NSIP threshold will require consents under the Town and Country Planning Act 1990.

65. In specific circumstances, the defence sector is able to apply Derogations, Exemptions, or Dis-applications (DEDs) from UK legislation and regulation where full compliance is not possible and there is an overriding defence imperative to maintain operations. In such cases the MOD is required to maintain arrangements that, so far as reasonably practicable, achieve outcomes at least as good as those required by legislation.

Key Stakeholders

66. The UK's nuclear regulatory framework is overseen by several key regulators, each with distinct responsibilities to ensure the safe, secure, and environmentally responsible use of nuclear technology. This review shall briefly discuss the roles of the largest regulators, while also outlining the concept of the dutyholder in the nuclear sector.

67. Dutyholders:

In the nuclear sector, the Office for Nuclear Regulation (ONR) uses "dutyholder" to refer to the licensee of a nuclear site, or any person with duties under the nuclear site licence or relevant statutory provisions

The dutyholder must ensure that nuclear sites operate safely and securely, and while the regulators set safety, security and environmental goals and standards, the dutyholder is always responsible and must decide how best to comply in accordance with the law. Nuclear regulators and dutyholders are expected to engage constructively through inspections, reporting, and dialogue, with the system working best when there is active, open debate and discussion between parties. Nevertheless, the dutyholder is always responsible for safety and environmental protection.

68. Office for Nuclear Regulation (ONR):

The ONR, established in the Energy Act 2013, is the UK's regulator for nuclear safety, security, safeguards and transport. It is an independent arm's length body under the Department for Work and Pensions (DWP) and employs over 600 staff including many highly qualified and experienced inspectors.

Its main role is to regulate nuclear sites in the UK through the NIA65 and HSWA. This is achieved via regular site inspections, the assessment of safety cases, and the provision of regulatory permissions under licence conditions. The ONR also provides advice to dutyholders on legal and regulatory compliance. It retains legal enforcement powers under the HSWA and those conferred through the licence, including the authority to direct the shutdown of operations that pose an unacceptable risk, and the power to prosecute.(7)

Dutyholders may challenge decisions made by ONR inspectors through an escalatory process. There is also an appeal available to those affected by a regulatory decision. There is no appeal against decisions to prosecute or the issuance of improvement or prohibition notices under the HSWA. Dutyholders do not typically appeal decisions.

The ONR operates primarily on a cost recovery model, with approximately 95% of its costs recovered from dutyholders through fees associated with the provision of regulatory services. Activities such as research, international engagements, and staff training must be directly linked to technologies or activities that the ONR already regulates such that it can recover associated costs.

69. Defence Nuclear Safety Regulator (DNSR):

The DNSR operates within the Defence Safety Authority (DSA) of the Ministry of Defence (MOD) alongside other defence regulators. It oversees the nuclear safety and regulatory compliance of the UK's defence nuclear programmes, their environmental impact, and the transport of defence nuclear material.

DNSR authorisation largely mirrors ONR licensing to ensure regulation to the same standard. It also includes Further Authorisation Conditions (FACs) and a Transport Condition (TC) to address issues unique to the delivery of military capability. These unique requirements and the national security imperative explain its current separation from the ONR.

The DNSR does not have direct legal powers. Its authority is derived from MOD policy rather than statutory legislation. It can raise concerns, provide recommendations, and escalate issues to senior MOD leadership, but ultimately does not have the powers of enforcement that the ONR has.

70. Environment Agency (EA):

The EA is the regulator in England responsible for protecting and improving the environment and contributing to sustainable development. Natural Resources Wales (NRW) and the Scottish Environment Protection Agency (SEPA) provide similar regulatory activities in Wales and Scotland. Together these agencies' remit includes oversight of the UK nuclear industry's environmental impact. This review focusses primarily upon the EA as its scope relates to England only.

The EA ensures that dutyholders comply with environmental standards, including for radioactive materials. It is primarily funded through a combination of government grants and fees charged for its services. It issues environmental permits for nuclear sites, monitors discharges, and enforces compliance with regulations to prevent pollution and safeguard natural resources.

The EA is subject to judicial review and any decisions they take can be appealed by third parties to a far greater extent than those of the ONR. The Office for Environmental Protection oversees the EA's decisions. Judicial review is more common than for the ONR.

71. In addition to the stakeholders discussed, there are many other relevant civil and defence regulators or organisations with an interest in nuclear projects. These are shown in Figures 3 and 4 for the civil and defence landscape respectively, and listed below:

a) **Health and Safety Executive** – Britain's regulator for workplace health and safety, responsible for setting standards, conducting inspections, investigating incidents, and enforcing laws to protect workers and the public from risks arising from work activities across all sectors.

b) **Natural England** – Established by an Act of Parliament in 2006, it is the Government's statutory adviser on the natural environment in England, responsible for protecting biodiversity, promoting nature recovery, managing designated landscapes and sites, and supporting sustainable land use and access to the countryside.

c) **NatureScot** – Advises the Scottish Government on nature conservation, biodiversity, and landscape protection.

d) **Natural Resources Wales** – Combines the functions of the former Countryside Council for Wales, Environment Agency Wales, and Forestry Commission Wales. It manages natural resources, including biodiversity, water, and forests.

e) **Northern Ireland Environment Agency** – It is responsible for protecting, conserving, and promoting the natural environment in Northern Ireland through regulation, enforcement, and environmental stewardship.

f) **Maritime and Coastguard Agency** – An executive agency sponsored by the Department for Transport, responsible for producing legislation and guidance on maritime matters, and provide certification to seafarers.

g) **Defence Nuclear Security Regulator** – Responsible to Secretary of State Defence for the assurance of security throughout the Defence Nuclear Enterprise. Separate from the Defence Safety Authority.

h) **Defence Safety Authority (DSA)** – Established by a Charter issued by the Secretary of State for Defence in 2015, updated in 2023, it regulates safety across defence in terms of aviation, nuclear, maritime, land, ordnance and explosives, and fire. It also is responsible for investigating defence accidents and is the Defence Authority for safety (including health and environmental protection). It includes but is not limited to the following teams:

i) **Defence Nuclear Safety Regulator** – As discussed, DNSR is a team within the DSA.

ii) **Defence Ordnance, Munitions and Explosives Safety Regulator** – Provides cross-defence regulation, assurance, and expert advice on the safety and compliance of all MOD activities involving ordnance, munitions, and explosives.

iii) **Defence Environmental Protection Regulator** – It is responsible for third-party assurance, regulation, and enforcement of environmental protection across the defence sector.

iv) **Defence Maritime Regulator** – It is an independent regulator responsible for the regulation of Health, Safety and Environmental Protection (HSEP) in the Defence Maritime Domain.

v) **Defence Land Safety Regulator** – It regulates the acquisition and use of equipment within the Land domain, the safe conduct of defence movements and transport activities, and MOD fuel and gas installations worldwide.

vi) **Defence Fire Safety Regulator** – It provides regulatory direction and enforce UK fire legislation to ensure the MOD achieves and maintains safe operating environments across the defence sector.

vii) **Military Aviation Authority** – The single regulatory authority within the MOD responsible for overseeing and regulating all aspects of air safety across defence aviation activities.

Civil Nuclear Regulatory Landscape

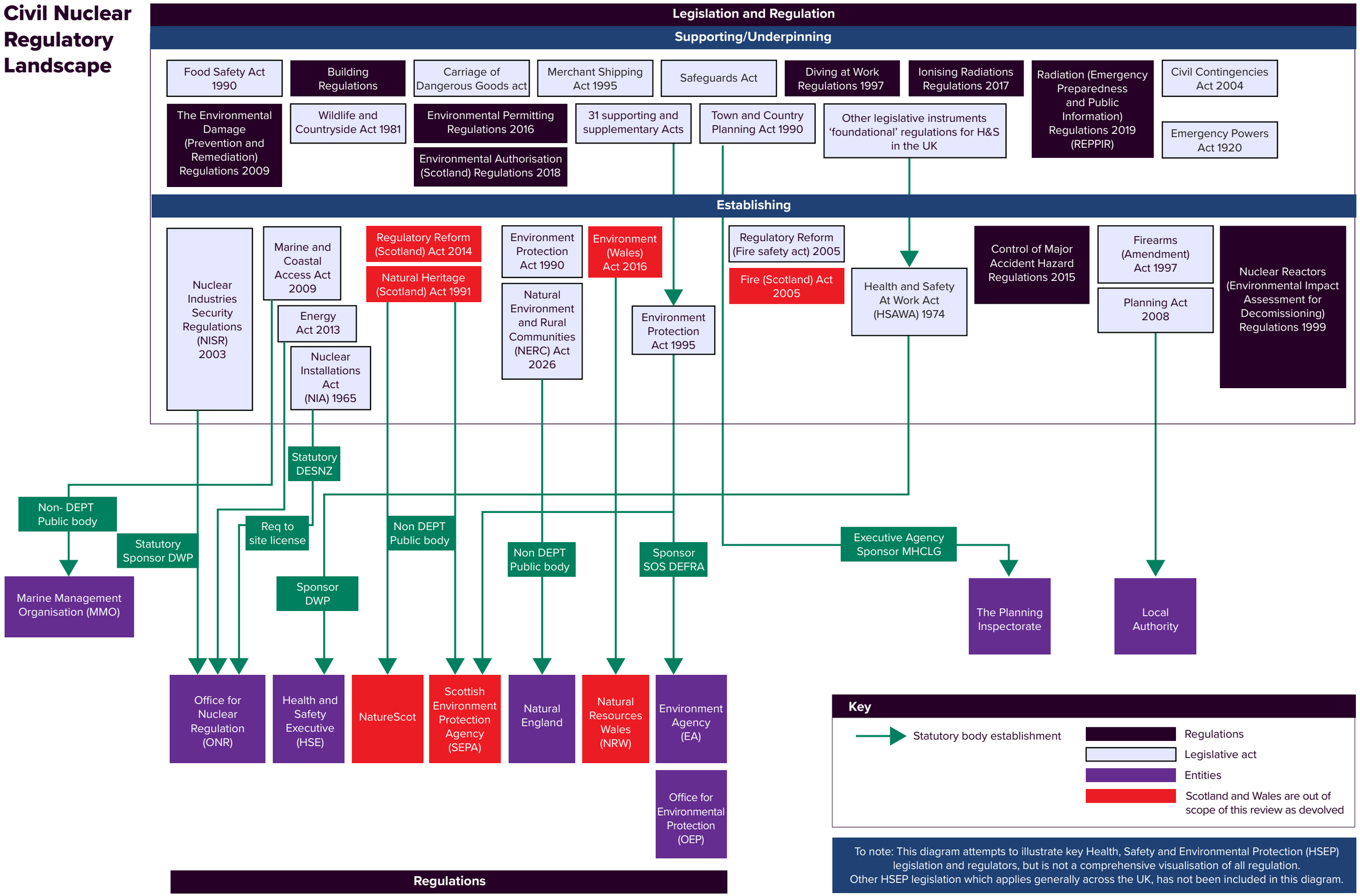


Figure 3 – The civil nuclear regulatory landscape

Defence Nuclear Regulatory Landscape

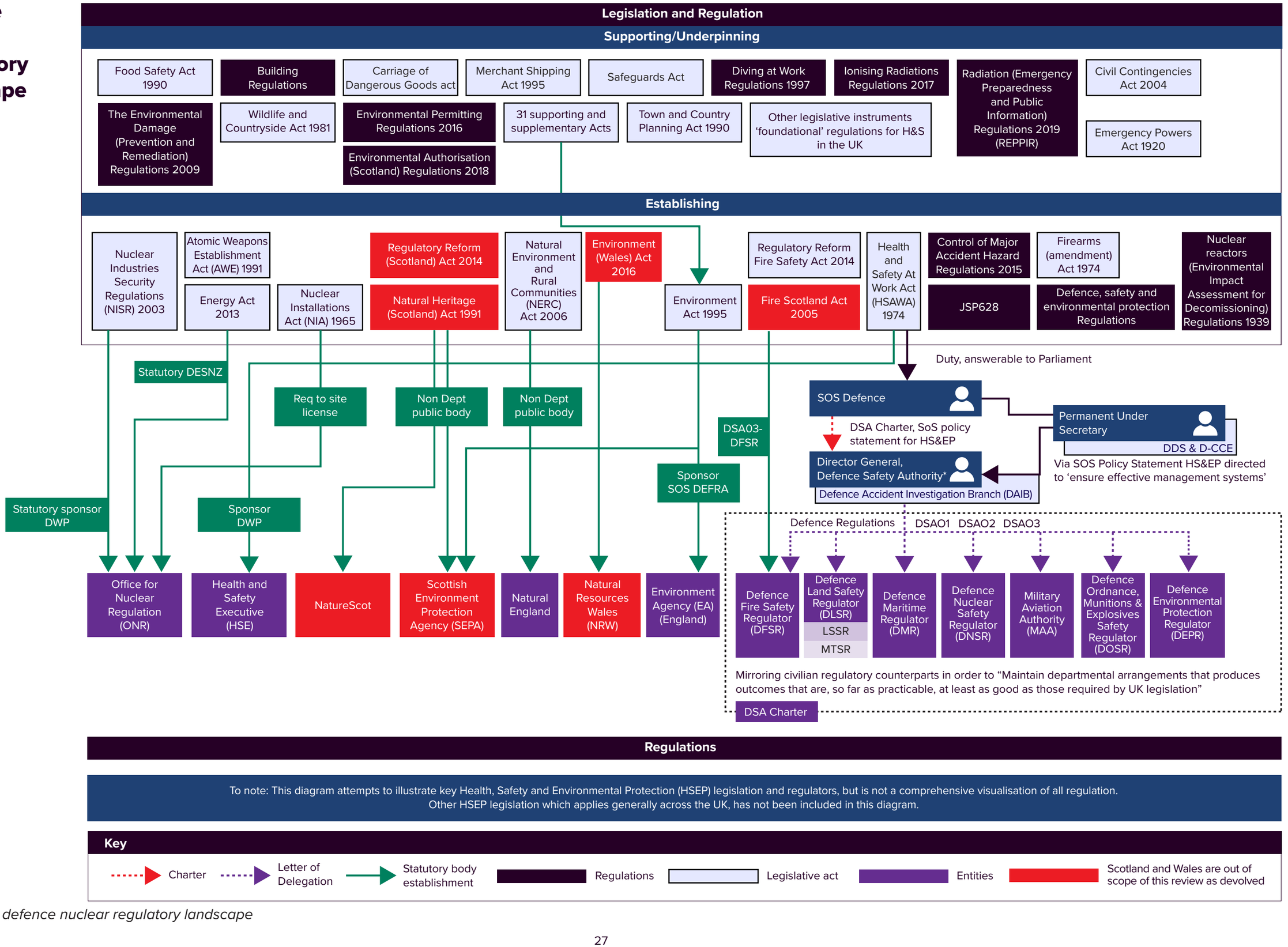


Figure 4 – The defence nuclear regulatory landscape

Regulatory Processes & Tools

72. Civil and defence nuclear operations require a series of critical agreements and regulatory permissions to ensure legal, environmental, and societal acceptability before they can commence. These include:

a) The justification process under JoPIIRR;

b) Development Consent (Planning Permission) typically granted through the NSIP regime;

c) An Environmental Permit to regulate emissions and waste;

d) A Safety Case that is produced and maintained by the dutyholder to demonstrate that risks are being appropriately managed; and

e) A Nuclear Site Licence granted by the ONR to enable construction and operation.

73. JoPIIRR requires any new class or type of practice involving ionising radiation introduced in the UK is assessed by the Government (a regulatory decision currently made by DEFRA) to determine whether the individual or societal benefit outweighs the health detriment it may cause. This process is called 'Justification'. Application of this principle is recognised as international good practice. Relevant government departments must be consulted before making a justification decision, with either the appropriate Secretary of State or the relevant devolved administration providing the final decision.

74. Planning permission is required before development can commence, as with all construction. Different layers of national and local government are responsible for planning decisions depending on the location and the megawatt-output of a reactor. In England, reactors over 50 MWe are classified as NSIPs and must obtain development consent. Local planning applications are used for enabling or ancillary development. Planning permission is also necessary for decommissioning and defence activities.

75. Environmental permits are required to ensure nuclear facilities operate in a way that minimises their impact on the environment and complies with environmental laws and standards. This process is governed by the Environmental Permitting (England and Wales) Regulations 2016 (EPR 2016) and overseen by the relevant environmental regulators. These permits must be granted for a range of activities such as radioactive substance discharge, waste management, cooling water use, and construction or decommissioning of the facility itself. Permits can place conditions on facilities such as limiting radioactive discharges, setting requirements for monitoring and reporting, or plans to manage and dispose of radioactive waste.

76. Dutyholders produce formal documents termed 'Safety Cases' to demonstrate that all relevant hazards are understood and that risks have been reduced ALARP. These are developed in advance of key stages of a nuclear facility's lifecycle, such as pre-construction, commissioning, operation, and decommissioning. The safety case must be maintained and updated whenever significant changes occur, such as modification to plant systems or changes in operating conditions and periodically reviewed.

77. ONR Inspectors make use of the ONR Safety Assessment Principles (SAPs) to make consistent regulatory judgements on the safety of activities, including the adequacy of safety cases. The SAPs are supported by Technical Assessment Guides (TAGs), Technical Inspection Guides (TIGs), and other guidance. Although it is not their prime purpose, the SAPs, TAGs, and TIGs are often used as guidance to designers and dutyholders on the appropriate content of safety cases.

78. The ONR must grant a nuclear site licence under NIA65 before construction or operation of a nuclear installation can begin. This licencing process begins with the organisation which intends to install or operate a nuclear installation applying to the ONR. In assessing suitability, the ONR will consider the technical and organisational capability of the applicant; whether the applicant has appropriate arrangements as required under licence conditions; and any relevant site characteristics. The nuclear site licence is site-specific and must be supported by other necessary environmental and planning consents before operations may begin.

79. There is a separate voluntary process outside of licensing whereby, at the request of nuclear reactor vendors and with the Department of Energy Security and Net Zero (DESNZ) Secretary of State's approval, the ONR and the environmental regulators assess new generic (i.e. site independent) nuclear power station designs. This process is termed the Generic Design Assessment (GDA) and is intended to de-risk later licensing and permitting by enabling potential operators or developers to gain early regulatory confidence before committing to site-specific plans and construction.

Planning Approvals

80. Developments that meet NSIP qualification (for example, exceeding 50 MW of generating capacity) must apply to the Planning Inspectorate (PINS) for a single consent known as a Development Consent Order (DCO). The decision on this consent is granted by the relevant Secretary of State.

81. A development that proceeds under either the NSIP regime or the Town and Country Planning Act 1990 requires a full Environmental Impact Assessment (EIA). The EIA must set out in detail the project's likely effects on air, water, soil, noise, landscape, heritage, and ecology, along with proposed mitigation measures. In many cases, multiple EIAs are prepared to address different aspects or phases of the development.

82. The Secretary of State or the relevant planning authority, advised by Natural England (or Natural Resources Wales), applies the Habitats Regulations. This involves screening for any 'likely significant effects' on protected sites such as Special Areas of Conservation or Special Protection Areas. Consent may only be granted if the developer provides adequate compensatory measures to address adverse impacts.

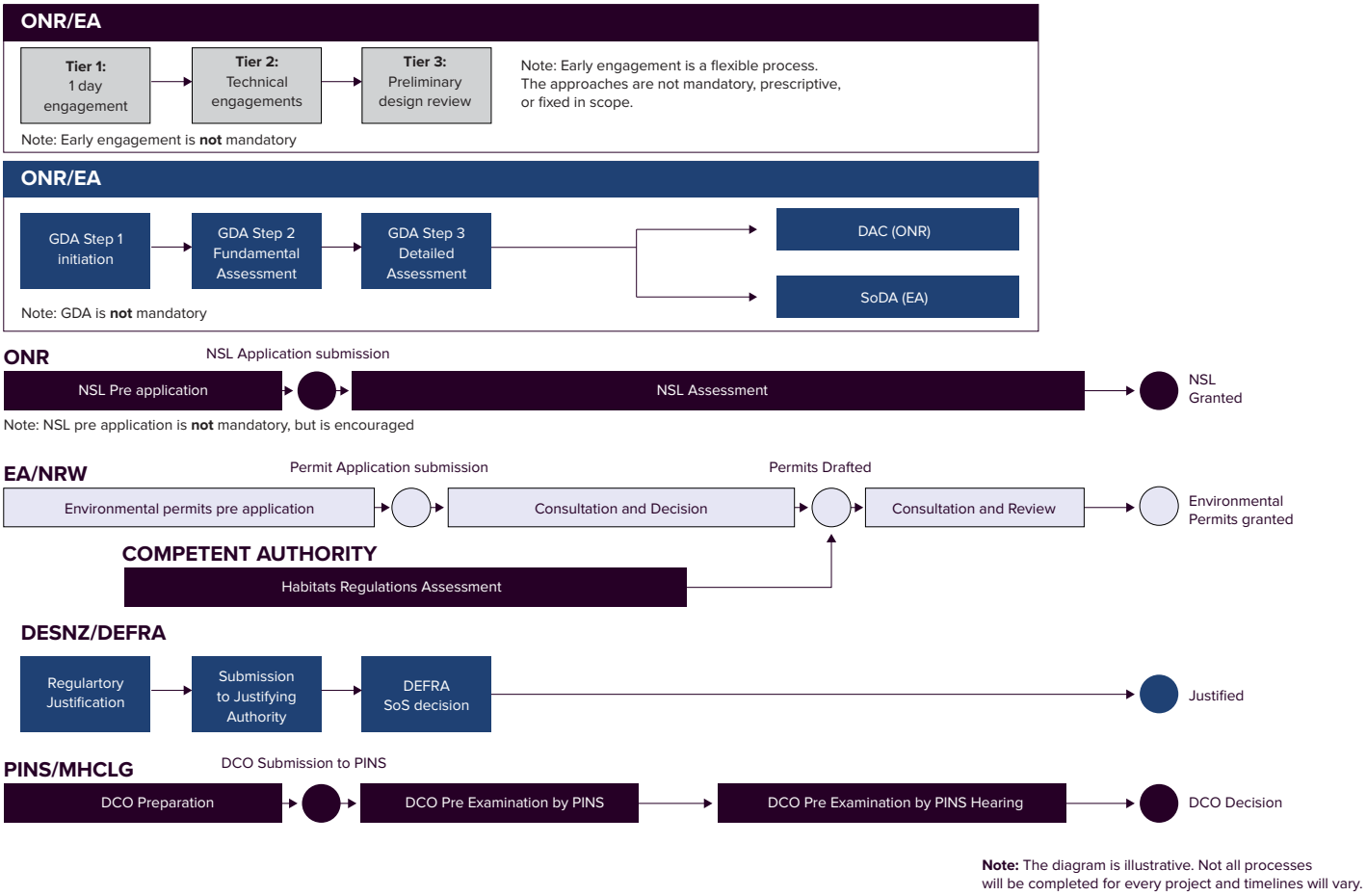
Overall System

83. These regulatory obligations create a complex interlinked and overlapping system for dutyholders to navigate. The requirements to produce Environmental Impact Assessments and Habitats Regulations Assessments add further complication. Dutyholders must manage elements of both goal based and prescriptive regulation, necessitating different approaches and interaction with multiple regulators. At times, this can lead to differing regulatory expectations of how the same risk should be managed by the dutyholder organisation. Sometimes, these expectations can become mutually exclusive, leading to considerable delay and difficulty for dutyholders to satisfy all regulatory requirements consistently and simultaneously.

84. The interaction between different regulatory organisations and approaches can increase the complexity of the safety arrangements for managing challenging hazards. At some sites, individual arrangements have been made to improve coordination and handover between regulators, including informal 'lead regulator' arrangements. This is not formalised or standardised, and in many cases, there are numerous regulatory decision makers who need to be consulted on any individual issue.

85. This complexity is not unique to civil nuclear sites. There are nine different authorising entities in the defence sector. No lead entity oversees regulation of the entire defence nuclear programme. This makes balancing safety decisions across the whole defence landscape fragmented and complex.

Figure 5 - UK Regulatory Processes for New Nuclear Build



Note: The diagram is illustrative. Not all processes will be completed for every project and timelines will vary.

Chapter 4

Summary of the Problem

This chapter summarises systemic issues with regulation of the UK nuclear sector. These are discussed, alongside evidence, remedial options and recommendations in later chapters.

Summary

Nuclear regulation has grown over decades to become increasingly complex and multifaceted. Regulators, government departments, and dutyholders (in their compliance activities) all make regulatory decisions. Additional international standards and constraints apply.

There is risk aversion in how ALARP is applied by dutyholders and regulators, stemming from how "Reasonably Practicable" is interpreted. There is no high-level portfolio view of risk, resulting in siloed local decisions with limited consideration of the balance of risk across the system. There is no integrated regulatory view to optimise safety, environmental protection, security, and planning.

Time and cost are added to decommissioning and waste management programmes by not agreeing proportionate end states for sites or progressing the Geological Disposal Facility, whilst layering caution upon caution in nuclear waste management.

The application of Habitats Regulations Assessments (HRA) and Environmental Impact Assessments (EIA) is often duplicative and lacks proportionality. Underlying legislation is inflexible and the risk of judicial review creates risk-aversion and delay. The Nationally Significant Infrastructure Project (NSIP) regime, intended to streamline planning, results in lengthy pre-application and decision phases, causing project delays and increased cost.

The shortage of nuclear expertise in regulators and dutyholders alike affects both defence and civil programmes. Poor cultural behaviours in dutyholders and regulators impacts progress and cost through excessive risk aversion, rigid adherence to complex procedures, and poor decision-making. This culture is misaligned with the ambition for safe, timely, and affordable delivery of nuclear projects. Incentives to get this right are weak.

The UK's goal-based nuclear safety regime should allow dutyholders to rely on accepted standards from reputable jurisdictions, but this potential benefit is not being realised. Operators face unclear alignment between national regulators, making it difficult to identify where approaches differ or overlap.

Only a radical reset will enable the sector to deliver the timely benefit of nuclear technologies safely and at a reasonable cost to the taxpayer.

Complexity – The Need for Simplification

86. The nuclear sector is complex, involving multiple organisations, global supply chains, and regulators. The sector rightly has stringent safety and environmental standards, but systemic barriers prevent effective delivery across civil and defence domains. Root causes are varied involving a range of cultural, organisational, environmental and economic factors including the way government departments contract and oversee nationally important programmes.

87. The UK's regulatory framework is multi-faceted, requiring many approvals from various regulators, leading to excessive documentation and delays in project delivery without necessarily improving safety or environmental outcomes. The complexity of the landscape results in duplication of effort, overlapping responsibilities and inconsistencies between and within regulators. This delays delivery, increases costs, and hinders established and new participants in the sector.

88. Approval processes for new nuclear projects are subject to overlapping requirements and scope creep. Regulatory Justification, for example, is duplicative, demanding extensive design information early and requiring developers to prove safety and environmental benefits scrutinised elsewhere, without streamlining later approvals.

89. Some government policy decisions have aims or effects that are regulatory in nature. These add to this complex picture, impacting the sector in the following ways:

a) Justification is implemented in a burdensome manner, in place of a statement of government policy intent;

b) The Semi-Urban Population Density Criteria (SUPDC) for siting restricts the possible sites for nuclear facilities;

c) The contracting structure and routes from the MOD create barriers to risk management and strategic decision making;

d) The public procurement rules constrain the weight that can be given to selecting the best technology;

e) The policy on geological disposal and site end states constrains waste disposal options;

f) Ministerial decisions and approvals often lack clear time limits, reducing pace of delivery;

g) Lack of a fleet approach to nuclear new build limits the opportunity to reduce regulatory cost and maximise learning of best construction practice;

h) The lack of coordination across government reduces the ability to act as an effective customer across defence and civil new build; and

i) The spending controls on arm's length bodies which require escalation to less specialised decision makers.

Site End States

90. Site end states represent the condition that civil nuclear sites will be taken to at the end of decommissioning and remediation activities. Assumptions on the preferred end states are reviewed regularly as policy, technology, and expectations change. Community engagement remains vital to consider options from restoring sites to 'greenfield' for unrestricted use, reclassifying as 'brownfield' with limited reuse, or keeping long-term storage and institutional controls in place.

91. Secondary legislation to enable proportionate arrangements and earlier delicensing, known as the Proportionate Regulatory Control (PRC) regime, was laid on the statute books but never progressed. PRC would signal where more proportionate arrangements should apply and enable earlier site delicensing.

92. None of the alternative delicensing plans can be implemented until the changes to the NIA65 which will deliver PRC are brought into force. Meanwhile, substantial unnecessary work continues under the current regime, wasting taxpayer money from NDA budgets and the Nuclear Liabilities Fund (NLF). There are opportunities to improve safe, sustainable outcomes but, without PRC, the NDA and regulators face undue limits on exploring alternatives.

93. Exploration of broader options for end states would also help ease the nation's decommissioning burden from a cost, schedule and risk perspective whilst maintaining acceptable safety and environmental performance.

Geological Disposal Facility

94. The UK Atomic Energy Authority (UKAEA) proposed deep geological disposal for radioactive waste in the 1970s, following the Flowers Report. In the 1980s and 1990s, Nirex sought to develop a repository at Sellafield but was blocked in 1997 after strong local opposition and a public inquiry. This prompted a shift toward public engagement and voluntarism.

95. By 2008, deep geological disposal became official UK policy, with site selection based on community consent. Nuclear Waste Services (NWS) leads the effort, supported by geological screening and community partnerships. Three communities joined: one in Lincolnshire, two in Cumbria. Lincolnshire withdrew after the June 2025 local elections, leaving the two Cumbrian sites, both with similar geology, under consideration.

96. Globally, Finland's Onkalo facility is set to begin disposal in the late 2020s. Sweden and France have chosen sites and are moving toward construction. Canada and Switzerland are advancing site selection, while Belgium remains in planning. Over 20 countries, including the USA, Germany, Japan, and South Korea, are pursuing geological disposal, reflecting broad international support.

97. Progressing a deep geological repository in the UK is impacted by at least two factors: public engagement and planning processes, e.g. the use of Development Consent Orders (DCOs) under the Planning Act 2008 for deep borehole investigations. The slow process to date means that there is an enduring requirement to continue to store intermediate and high-level waste safely. It is also apparent that there may be substantial value in the radioisotopes contained in legacy wastes for a range of medical and space exploration purposes.

Risk Management & Proportionality

98. Effective and proportional risk management is essential in the nuclear sector. With increasing demands for timely project delivery, it is necessary to reassess whether the UK's risk management approach supports proportionate delivery.

99. There are big challenges in how ALARP is applied by both dutyholders and regulators, largely stemming from the interpretation of what constitutes "Reasonably Practicable". The prime focus is on a local view of risk reduction, with broader strategic factors such as cost, programme delay, or national priorities often neglected. This leads to overly conservative outcomes, prevents decision-making in the interests of operational outputs, and limits the escalation of issues. This is seen most clearly in the defence sector where central leadership on balancing risk across dutyholders and their respective facilities and programmes does not exist. This prevents a systems-wide approach to risk management with individual risks being targeted in a fragmented way despite interdependencies between them.

100. We have seen numerous instances of costly, risk-averse measures that far exceed ALARP requirements. These are frequently driven by a desire for 'right first time' success in safety cases, insufficient or no cost benefit analysis, and often exacerbated by weak financial incentives. Regulatory guidance, intended to support proportionate risk management, has become prescriptive, pushing risks to levels far below everyday standards.

101. Dutyholders rarely challenge regulatory decisions, fearing reputational damage and/or delay. This lack of regulatory tension pushes risk reduction beyond what is proportionate, as ever-higher standards become entrenched and a risk-averse mindset grows, regardless of the time, cost, or effort required. Again, the lack of competitive financial incentives makes the problem worse.

102. Some sites, like Sellafield and Devonport, have formed groups of senior government, dutyholder, and regulator stakeholders to enable coordination and coherence to address this challenge. The G6 group at Sellafield has had a positive impact on mitigating safety risks from the legacy ponds and silos. This approach has worked less well at other sites, perhaps because they lacked a 'burning platform'. Without foundational reform to develop a more proportionate approach to risk management, the sector's inefficiency and risk aversion will continue to undermine confidence in the regulatory process and the timely delivery of nuclear project outcomes.

103. The Government's Orange Book describes the three Lines of Defence (3LoD) model for risk management:

a) Line 1: Dutyholder responsible for identifying and managing risks;

b) Line 2: Functions that assure risk management practices are implemented and that risk-related information is reported throughout the organisation;

c) Line 3: Internal Audit that independently evaluates how well risks are managed and how well Lines 1 and 2 operate; and

d) Regulators sit outside this structure, providing independent scrutiny of risk management.

104. Good practice requires that organisations have clarity of how the 3LoD model operates in their sphere of safety responsibility. In some parts of the nuclear estate, we see a clarity of approach. In others, safety arrangements have evolved to remove this clarity. In some instances, we observe ambiguous responsibilities, duplication of effort, and intense scrutiny of one dimension of risk at the expense of others. Consequently, programme delivery is not optimised for safety, cost, or time and the positive influence of each line of defence on safe outcomes is less than it might be.

105. This confusion of roles and responsibilities across the 3LoD combined with weak oversight and limited understanding of operational realities, has inflated the size and complexity of safety cases and prolongs their production, assessment and approval. Excessive focus on technical review has duplicated effort and diverted attention away from other critical issues. A fundamental reset is essential; safety cases must be owned and developed by dutyholders with an appropriate level of assurance and independent audit. Regulators should adequately assess the full breadth of licence and authorisation conditions.

Proportionality in Environmental Assessment & Permitting

106. Nuclear projects require environmental assessments, public consultation, and compliance with multiple regulations. Evidence suggests that the application of Habitats Regulations Assessments (HRA) and Environmental Impact Assessments (EIA) often lacks proportionality, driven by legislation and the risk of judicial review.

107. Recent government reviews aim to address these issues, but the process remains costly, sometimes implementing mitigation measures that do not improve environmental outcomes. This is particularly relevant for nuclear sites, which may harm habitats during construction but can enhance them over decades of operation due to their remote locations and low emissions.

108. Environmental regulatory approaches tend to be prescriptive, focusing on protecting existing habitats rather than supporting nature recovery. Developers also face inflexible permitting systems, where even minor changes can trigger lengthy reassessments, discouraging optimal solutions.

Challenges with the Planning Regime

109. The UK's nuclear planning regulatory framework is tailored to traditional large-scale reactors, making it difficult for innovative designs to gain regulatory approval. This creates barriers for safer, novel technologies like Small Modular Reactors (SMRs) and Advanced Modular Reactors (AMRs). The complexity of the framework can also deter new entrants and innovative companies.

110. The Nationally Significant Infrastructure Project (NSIP) regime, intended to streamline planning, often results in lengthy pre-application and decision phases, causing big project delays.

111. The lack of a fleet approach means each new nuclear project is treated as a standalone effort, requiring separate approvals, documentation, and planning, which is inefficient and costly.

112. Policies such as population density criteria and planning zone distance are based on older reactor types and do not reflect advances in technology or local conditions. This has prevented suitable new sites from coming forward, undermining efforts to enable new nuclear capacity.

Culture, Capacity, Capability & Innovation

113. A successful nuclear sector depends on sufficient resources with the right technical expertise and experience. Even well-designed regulations are ineffective without adequate capacity and capability, making it hard to achieve consistent, timely, and cost-effective outcomes.

114. The shortage of nuclear expertise affects both defence and civil sectors. Some parts of the regulatory system are under resourced. This is not just about headcount, but also the depth and breadth of experience and expertise, known in the industry as Suitably Qualified and Experienced Personnel (SQEP).

Cultural Issues

115. Organisational culture strongly influences programme delivery by shaping people's behaviours around stated or unstated core values. Safety culture has been prioritised such as through ONR's Nuclear Industry Safety Culture Inventory (NISCI) but other traits like excessive risk aversion, rigid adherence to complex procedures, and weak decision-making slow programme delivery and increase costs.

116. Improving the safe delivery of an expanding nuclear programme requires that poor cultural behaviours, misaligned with the organisation's mission, are addressed. Regulators and dutyholders must define and promote the values and behaviours needed for efficient, safe delivery. Achieving a cultural shift requires strong leadership, clear incentives, and an inclusive transformation programme.

117. The goal should be a culture that delivers societal benefits, challenges unnecessary complexity, prioritises real safety over paperwork, streamlines safety cases, and enables effective decision-making rather than prolonged discussion in multiple committees. Without change, a poor culture will be a drag on the radical reset called for.

Capacity & Capability

118. The sector relies on sound judgement by confident and experienced individuals within duty-holder and regulatory organisations to ensure that proportionate, consistent and well-informed decisions are made. A lack of SQEP can lead to overly cautious thinking and overly conservative decision-making on safety issues. The current availability of SQEP is not sufficient to deliver and regulate the breadth of nuclear programmes planned in the UK.

119. The UK Nuclear Skills Plan highlights the following challenges:

a) Skills gap and workforce shortage;

b) Ageing workforce;

c) Competition for talent;

d) Diversity and inclusion;

e) Training and career pathways;

f) Reliance on contractors; and

g) Retention and pay.

Innovation

120. The nuclear sector is conservative in its ability to drive innovation in technology and practice, in part due to a reliance on tried and tested methods, a suspicion of new technologies, and a reluctance to adapt.

121. Whilst the sector has sought to capture benefits from advanced materials and manufacturing, in other areas such as digital control and instrumentation, manufacturing modularisation, data-centric engineering, artificial intelligence, and autonomous robotics, the sector has been slow and, in some cases, actively resistant to technological advances.

122. We were told by one dutyholder that they did not adopt modular manufacturing practices that could have saved substantial time and money because there was risk involved in changing existing designs and, in their view, the regulator would not have liked it. On the same example, the regulator told us that they had not been asked. This exemplifies how conservative expectations about a possible regulator response can restrict the adoption of innovation.

123. The sector has also been slow to adopt modern practices in the digitisation of safety cases, reluctant to reduce the complexity of management processes and layers of decision-making, and to simplify operational procedures that are unnecessarily bureaucratic with multiple levels of authorisation and approvals.

International Harmonisation

124. Nuclear projects present opportunities for international collaboration through harmonisation and standardisation of industry and regulatory approaches. Developers favour a fleet-based approach, aiming for common designs within and across countries to maximise economies of scale. Each national regulator has its own interpretation of international standards and legal frameworks, resulting in substantial complexity, costs, and delays for approvals, even for individual components, which often require revalidation in each country.

125. While regulators must ensure designs meet national safety standards, duplication occurs when trusted international regulators have already thoroughly assessed a design or component. Ideally, a goal-based system would allow dutyholders to rely on accepted standards from reputable jurisdictions, but this benefit is not fully realised in the UK. Operators face unclear alignment between national regulators, making it difficult to identify where approaches differ or overlap. This forces them to tailor submissions for each country, increasing duplication. Signposting areas of regulatory alignment would enable reuse of justifications and evidence, streamlining approvals.

126. UK regulators rarely recognise international regulatory decisions, even when components have a proven safety record abroad. Separate UK approvals and in-country testing are typically required. Intellectual property restrictions and differing engineering codes further complicate matters. In safety cases, UK organisations must often conduct their own testing to meet domestic standards, despite substantial evidence of safe use elsewhere. This approach increases costs and delays, undermining the benefits of international collaboration and standardisation in the nuclear sector.

127. The landscape has evolved over decades and is now so complex that only a radical reset will free the sector to deliver the full benefit of nuclear technologies for society through clean energy, national defence, decommissioning and waste management alongside the positive impact of nuclear medicine and space applications

Part 3

The Solutions

Chapter 5

Simplification of Nuclear Regulation

This chapter addresses the need to reduce regulatory complexity across the sector to achieve better outcomes. It highlights the importance of clear, top-down strategic direction from government to the regulators.

Summary

The nuclear sector is complex, involving stringent safety and environmental standards and global supply chains. Systemic barriers prevent effective delivery across civil and defence nuclear domains. Root causes are varied involving a range of cultural, organisational, environmental and economic factors. The manner in which government departments contract and oversee critical projects and programmes across both civil and defence sectors perpetuates this.

The UK's regulatory framework worsens that complexity. It is fragmented, requiring multiple approvals from various entities, leading to duplication, excessive documentation, and delays in project delivery, without necessarily improving safety outcomes. The complexity of the landscape with multiple regulators considering the same sites or projects, results in duplication of effort, overlapping responsibilities and inconsistencies between, and within, regulators.

Resources, capability, and capacity inside regulatory bodies, including the extent of work outsourced to third party consultancies, compounds the challenges of proportionate and efficient oversight.

There is an opportunity to simplify, streamline, and improve coordination across the regulatory landscape through a one stop regulatory model for delivery, initially through combining some regulatory functions, then the appointment of a lead regulator, and finally setting up a Commission for Nuclear Regulation for the UK.

Success requires close coordination between government, industry, and regulators, with government playing a leadership role in setting strategic priorities and driving delivery. In the absence of clear strategic direction, the sector suffers from fragmentation, inefficiency, and duplicated efforts.

128. The primary challenge in the current nuclear regulatory system is the prevalence of unnecessary complexity and risk aversion. The following principles underpin the recommendations proposed in this chapter:

a) **Unified decision-making** – Regulatory decisions should be consolidated within a single, clearly accountable body;

b) **Transparency, accountability, and independence** – The regulatory system must operate independently while remaining open, transparent, and accountable to the public;

c) **Timeliness** – Decision-making processes must be faster, particularly for large projects where delays incur substantial costs; and

d) **Proportionality and challenge** – The system must have the expertise and mechanisms to identify and address excessive conservatism by duty holders and ensure the ALARP principle is applied appropriately.

Reducing Complexity in the Regulatory Landscape

129. The previous chapter outlined the complexity of the regulatory landscape. Our work has shown that this results in a number of practical problems. In summary, we have seen the following.

130. Dutyholders face many different regulators who often require duplicate activities. Oversight can be inconsistent between regulators who review the same assets and issues through different lenses. It is possible for two parts of a single site to be regulated by different regulatory bodies, with potentially different standards on either side.

131. It can also be inconsistent within the same organisation. Individual inspectors (or subject matter experts to whom they have subcontracted assessments) may concentrate on minor detail and fail to consider the wider implications on project delivery. Different internal functions may not be consistent. Insufficient escalation often prevents resolution of these errors.

132. Government departments undertake regulatory functions and take important policy decisions, often at too slow a pace, with cost for projects and uncertainty for investors.

133. The dutyholders are often risk averse and overcomplicate solutions to avoid regulatory challenge. They often lack sharp financial incentives. They do not challenge sufficiently to avoid delay, cost, and reputational (in the eyes of the regulator) risk.

134. This has led to safety cases, associated management processes, and other documents becoming longer, and increasingly complex and technical. This consumes huge resources within dutyholders and makes review by regulators more difficult. The prioritisation of technical detail over clarity and usability, combined with the overall complexity, may undermine the purpose of safety cases, as people are unable to see the wood for the trees.

135. Some regulators and dutyholders outsource much of their assessment work to manage the overcomplication of safety cases. This has sustained a consultancy ecosystem that thrives on complexity and lacks the incentives for efficient delivery. It weakens direct regulatory scrutiny.

136. This can blur the roles of dutyholder and regulator, diluting dutyholders' accountability for safe operation and outcomes. The erosion of the ALARP principle throughout the nuclear sector, has resulted in steady increases in the costs of design, construction, maintenance and operation of nuclear facilities, infrastructure, and equipment.

137. This issue is acute across the defence sector, most notably DNSR where there is heavy reliance on contractors, undermining oversight. This leads to regulator-dutyholder duplication of effort on technical assessment and risks reducing focus on regulating compliance with Authorisation Conditions.

138. Insufficient oversight driven by limited expertise and resources, has led to higher costs and project delays, ultimately undermining rather than improving safety outcomes. In defence, the governance, delivery, and assurance of nuclear safety have contributed to the size and complexity of safety cases. Dutyholders and regulators contract out provision of safety case support services.

139. The problem has evolved over the years. It will get worse over time if not corrected. It is systemic in the sense that no one player within the system can easily change it. The solution requires acting on all the elements of the system simultaneously to bring about a radical reset.

140. In this chapter, we focus on three core recommendations to move from complexity to simplicity. The first is a strong strategic steer from the Prime Minister and the Government to drive delivery and simplification in the system. The second is a set of proposals for simplification of structures of decision-making under a single Commission. The third relates to the simplification of safety cases.

Strategic Steer for the Nuclear Sector

141. The Government should set a clear strategic direction for nuclear policy, ensuring alignment across departments, regulators, and dutyholders and their supply chains. This should make clear the single imperative of ensuring faster and lower cost delivery without lower standards. It should have the following elements:

a) **Set a national priority** – Position the safe, secure, and affordable delivery of nuclear projects, as essential to sustainability, economic growth, and national security;

b) **Emphasise urgency** – Call for immediate action based on the findings of the Nuclear Regulatory Taskforce; and

c) **Balance safety with delivery** – Reaffirm that safety, security, and environmental protection are priorities, but delivery must be faster and more cost-effective.

Recommendation 1: HMG Strategic Steer to the Nuclear Sector	
Owner: All of Government	**Delivery Timeline:** End of January 2026
The Government should set a clear strategic direction to nuclear policy, ensuring alignment across departments, regulatory agencies and dutyholders and their supply chains. This steer should set a national priority, emphasise urgency, and balance safety with delivery.	

Commission for Nuclear Regulation

142. Delivery of nuclear projects requires multiple approvals from various entities, any one of which can halt overall progress. This results in repetitive safety cases, environmental assessments, and planning applications, often producing documentation in the tens of thousands of pages. Any one of these can be a bottleneck, without clear authority to unblock quickly.

Case Study: Sellafield G6 working group

The Sellafield G6 working group was formed in 2014 to drive greater coherence and consistency to accelerate critical decommissioning priorities. It consists of six key organisations involved with the Sellafield nuclear site:

- Department for Energy Security and Net Zero
- UK Government Investments
- Nuclear Decommissioning Authority
- Environment Agency
- Office for Nuclear Regulation
- Sellafield Limited

With a simple governance model, the group brings senior representatives together quarterly to identify and remove barriers to progress. This unified approach has led to significant successes, including exporting canned fuel from the Pile Fuel Storage Pond and creating interim storage for spent fuel after Magnox reprocessing ended.

143. The experience of the G6 at Sellafield, where six organisations aligned to remove barriers and accelerate essential decommissioning, demonstrates the benefit of a lead regulator. It also shows that it has only worked where there is an agreed urgent priority. While collaboration exists, such as the ONR-EA Memorandum of Understanding (MoU) during GDA and site operations, regulatory overlap still causes friction.(111)

144. The lead regulator model should not be confined to a single regulatory domain. To ensure efficient and effective delivery it must encompass nuclear safety and security, environmental, and planning functions. Without this breadth, the risk remains that any one domain could introduce delays or disrupt progress.

Case Study: Winfrith Asbestos Regulator Interactions

Like many UK decommissioning sites, Winfrith's Steam Generating Heavy Water Reactor (SGHWR) contained asbestos throughout its operational areas. This asbestos had to be safely removed before decommissioning the reactor core, made more difficult by high radiation and a complex site layout.

Specialist asbestos contractors worked with NRS to carry out the removal in line with the Ionising Radiation Regulations and Control of Asbestos Regulations. Planning involved the licensed asbestos contractor, ONR, and HSE asbestos experts. NRS remained responsible as both the Principal Contractor and Nuclear Site Licence Holder, while the contractor ensured compliance with asbestos safety rules.

After four years of progress, a change in regulators led to the withdrawal of the approved work plan. NRS had to obtain an additional asbestos licence, despite the contractor already holding one. This caused duplication of records and did not change how the work was done.

The resulting 12-month delay cost around £4 million in staff and contractor expenses, with a further £4.5 million added due to postponing the next phase.

145. We propose the establishment of a Commission for Nuclear Regulation to formalise collective decision making and leadership for the sector going forward. This would not be a new regulator, but rather a consolidation of the decision-making that is currently fragmented across different regulators and areas.

146. The primary duty of the commission should be:

"To protect the health and safety of workers and the public, and enable the safe, secure and environmentally responsible deployment of nuclear technologies, through efficient, effective and proportionate regulation for the benefit of society"

147. The Commission's secondary duties should include:

a) To promote speed of delivery and cost effectiveness; and

b) To enable and encourage innovation.

148. The Commission should comprise of five full-time members, presided over by the Chief Nuclear Inspector (CNI), who also serves as CEO of the Office for Nuclear Regulation (ONR). In cases of conflict, a Deputy CNI, a new statutory role, would preside. There should be two Deputy CNIs: one each for civil and defence. Independent members would be appointed by the Prime Minister based on skill, experience, and judgement. Consideration should be given to achieving a balanced composition within the Commission, ensuring a mix of experience across civil and defence sectors, and across regulatory areas including environmental protection and planning.

149. The Commission should consolidate oversight and legal authority across all nuclear governance domains, covering safety, security, safeguards, environment, planning, and defence, all within a single independent body. It would include the vires of existing regulators of nuclear projects and hold parallel powers with them, acting as the final sign-off authority for substantial regulatory decisions and delegated policies, intervening only in substantial matters. Novel or contentious decisions should be escalated quickly to the Commission for decision.

150. The Commission could hold public hearings, gathering input from regulators, duty holders, experts, NGOs, and the public to enhance transparency and resolve regulatory boundaries. A small secretariat would support its operations, including case preparation and administrative tasks.

151. Defence regulators within the Defence Safety Authority (DSA) would feed into the Commission via the Deputy CNI Defence. Defence-related decisions would be handled by a subset of the Commission with appropriate clearance. Final decisions may rest with the Secretary of State for Defence. These matters would not be subject to public hearings or published decisions due to security concerns.

152. The Commission must be able to rapidly convene independent expert advice. Advisory support could come from the Nuclear Innovation and Research Office (NIRO) and the Defence Nuclear Safety Expert Committee (DNSEC), with additional experts co-opted as needed. New funding from government would be required to increase the capacity of these organisations and to enable them to draw down on international expertise in areas where UK experience is limited. Their terms of reference should be updated accordingly.

153. The Commission should regulate its own procedures to support escalation of novel and contentious issues and with clear time limits to make rapid decisions.

154. A core feature of the Commission should be to ensure the views of dutyholders and the public are heard and meaningfully considered in decision-making.

155. The ONR and EA should each establish an internal challenge function within the organisation for important projects. This could be a member of staff from outside the relevant team whose role it is to challenge overly conservative regulatory decisions. Where issues get escalated or go to the Commission, the challenge views would be considered. This should be done with immediate effect.

156. The Commission should be funded by His Majesty's Treasury (HMT). It should be based in the Cabinet Office, or other location, where it has independence from DESNZ, MOD, and other relevant departments. It should be independent of the individual regulators.

157. Commission-based models have a proven track record of achieving complex, discrete objectives across diverse stakeholder interests and competing priorities. Examples include the Bank of England's Monetary Policy Committee in the UK, and nuclear regulatory commissions in other countries.

Other Commissions for Nuclear Regulation

The US Nuclear Regulatory Commission (NRC) is appointed by the US President and confirmed by the Senate, with one member designated as the chair. The NRC operates as an independent federal agency, meaning it does not report to or take direction from other government departments or regulatory bodies. The Commission makes high-level decisions on the licensing of new reactors and facilities, updates to rules and the regulatory framework, the development of regulations for emerging technologies, enforcement actions, and strategic planning.

Other countries with large nuclear sectors also adopt commission-based models. France's Autorité de Sûreté Nucléaire (ASN) is an independent administrative authority reporting to Parliament, led by a President and supported by regional divisions. Japan's Nuclear Regulation Authority (NRA), established after the Fukushima accident, is an independent commission under the Ministry of Environment. The Canadian Nuclear Safety Commission (CNSC) closely mirrors the US NRC, with the key difference being its direct accountability to Parliament. South Korea's Nuclear Safety and Security Commission (NSSC) is an independent commission under the Prime Minister's Office.

158. The Commission model offers several advantages. Set up correctly, it would establish clear lines of accountability and authority, with the President of the Commission and the Commissioners having clearly defined roles and modus operandi in relation to governance, regulation, and decision-making. Commissioners elsewhere tend to be knowledgeable on nuclear matters; the majority being experts in specific nuclear or regulatory fields, which would bring greater expertise, objectivity in terms of priorities and decisions, accountability, and a better focus on regulatory and strategic outcomes at the highest level of governance.

159. Transitioning to a Commission would enable more informed regulatory decisions and well-considered policies that align with national interests, while maintaining high industry standards and the continued protection of society.

160. The political independence of regulatory decision making by existing regulators should apply equally to the Commission. The ONR should continue to support UK Government policy on nuclear matters, and the strategic outcomes it desires, but it is essential that ONR's decisions on the safety, security, and safeguards performance of the sector are not subject to external intervention. This will ensure industry, public, and international stakeholder confidence in the ONR as a credible, robust, and independent statutory regulator.

161. The Corry Review proposed appointing a lead regulator for environmental matters to streamline permitting and consenting for nuclear projects(8). The aim was to establish a single point of coordination to improve efficiency, reduce duplication, and provide clearer guidance to developers.

162. Finland has recently enacted comprehensive similar reforms to its environmental and planning regulations. These include the creation of a new Finnish Supervisory Agency to centralise environmental permitting and provide a 'one-stop shop' for low-carbon energy projects(9).

163. The following examples illustrate the types of issues on which the Commission would be empowered to make decisions:

a) Setting nuclear regulatory guidance, including defining acceptable levels of risk to workers, the public, and the environment, and ensuring consistency across regulatory bodies;

b) Agreeing site end states, encompassing the final radiological condition, intended future land use, environmental restoration requirements, and structural disposition, to guide decommissioning and regulatory closure;

c) Resolving disputes and regulatory deadlock, particularly where disagreement arises between regulators on matters such as planning, environmental permitting, and nuclear safety, thereby enabling timely and coordinated decision-making;

d) Making decisions on planning appeals, deciding planning applications made directly to it, and in the event of a recommendation for refusal on an NSIP, automatic referral to the Commission; and

e) The ability to give directions to regulators on the conduct of an ongoing application, at the request of a developer or regulator.

164. The following examples set out areas in which the Commission would not hold decision-making authority:

a) Day-to-day regulatory decisions, including enforcement, concerning the operation of existing nuclear installations shall remain the responsibility of the ONR; and

b) Decisions relating to the operation or deployment of defence-related naval nuclear reactor plants or nuclear weapon systems shall remain outside the Commission's authority and within the remit of designated defence bodies.

165. The precise accountability of the Commission should be determined with the experience of the interim lead regulator (next section).

Recommendation 2: Establish a collective decision-making body for nuclear regulatory decisions with an internal challenge function within individual regulators	
Owner: Cabinet Office	**Delivery Timeline:** End of 2027
The establishment of a Commission for Nuclear Regulation to formalise collective decision making and leadership for the sector going forward. The Commission should: • Comprise of five full-time members, presided over by the Chief Nuclear Inspector (CNI). In cases of conflict, a Deputy CNI, a new statutory role, would preside. There should be two Deputy CNIs: one each for civil and defence. Independent members would be appointed by the Prime Minister based on skill, experience and judgement; • Consolidate oversight and legal authority across all nuclear governance domains, safety, security, safeguards, environment, planning, and defence, into a single independent body; and • Be able to rapidly convene independent expert advice.	

Interim Lead Regulation

166. The establishment of the Commission and accompanying measures will require primary legislation which will take some time. We consider that the need to reform decision-making is urgent. It is also desirable as a package to make our other recommendations, many of which could be implemented immediately, to work more effectively.

167. To this end, we propose that the ONR, DNSR, EA, and other relevant regulators start immediately to set up a formal system of lead regulator for significant projects. They should seek to put in place as much of the Commission model and its aims as can be done now without statutory change.

168. This would deliver change more quickly. It will make the establishment of the Commission easier in due course. Its operation will inform the legislation for establishing the Commission.

169. This interim lead regulator model should be implemented with immediate effect, with ONR designated as the default lead regulator for the nuclear sector.

Recommendation 3: Pending enactment of recommendation 2, establish a lead regulator model for any instance where multiple regulators are involved, with the Office for Nuclear Regulation (ONR) as the default lead regulator for the nuclear sector.	
Owner: ONR, EA and other regulators	**Delivery Timeline:** March 2026
We consider that the need to reform decision-making is urgent. In advance of the establishment of a Commission, a formal system of a lead regulator role should be set up between relevant regulators, such as the ONR, DNSR, and EA. The ONR should be designated as the default lead regulator for the nuclear sector. This should be done for significant projects in order to provide leadership and reduce regulatory complexity.	

Simplification of Nuclear Regulatory Bodies

170. There should be an ambition to simplify the regulatory landscape by ensuring there is only one regulator per hazard type or regulatory function. This will ensure duty holders only need to interact with a single organisation, saving considerable time and cost.

171. The ONR and DNSR should be merged. This would reduce duplication and improve resourcing.

172. On sites regulated by both ONR and DNSR, dutyholders are required to comply with two nuclear regulatory regimes, often for the same asset. This dual oversight can lead to duplication of effort and can complicate regulatory engagement and delivery. In some cases, sites have adopted informal ‘lead regulator’ arrangements to streamline interactions and clarify regulatory primacy. Such practices remain the exception rather than the norm.

173. This would allow flexible use of ONR-cleared personnel and support internal capability development. There could be reduced reliance on consultancies for specialist input.

174. This merger would:

a) Broaden DNSR's expertise through access to ONR's technical workforce and specialist capabilities in areas such as seismic analysis, core physics, and digital control and instrumentation;

b) Help maintain intellectual parity with emerging technologies while promoting sharing of best practice between civil and defence parts of the sector;

c) Position DNSR as a key element in ONR's organisational culture programme and enable sharing of current best practice from each organisation;

d) Strengthen DNSR's ability to influence dutyholder culture and improve the quality of safety case submissions; and

e) Enable greater promotion and adoption of innovation in technology and practice, including the development of digitised safety cases, the use of AI, and participation in, and access to, wider international programmes.

175. Whilst there are legislative and treaty issues to resolve, a unified structure would reduce interface challenges between the two regulators and enhance overall efficiency by enabling a single set of management processes and procedures.

176. DNSR's non-statutory functions should remain uncompromised. Defence-related decisions should continue to be made independently and in alignment with national security imperatives. This means that DNSR must retain the ability to:

a) Regulate in-service submarine reactors, whether during commissioning, at sea, or in maintenance, and all other aspects within DNSR's vires, via authorisation, without interference from civil statutory regulation;

b) Integrate the views and decisions of other DSA regulators, such as DOSR and DFSR, and also take account of the views of the Defence Nuclear Security Regulator (DNSyR);

c) Separate information critical to the defence of allied nations from civil regulatory oversight;

d) Make no changes to how sensitive information is protected and ensure that MOD Freedom of Information process governs MOD information assets;

e) Establish, own, and maintain, independent regulatory policy where necessary and as required by the Secretary of State for Defence; and

f) Apply and maintain Derogations, Exemptions and Dis-applications (DEDs) from legislation to support defence objectives.

177. The Government should consider whether it wishes to consolidate all nuclear security functions within ONR by transferring the DNSyR and its vires, leveraging ONR's existing role in overseeing security on civil nuclear sites.

178. We have also considered the transfer of the regulation of radioactive substances from the EA to the ONR. This would create a single, integrated approach to radiation protection consistent with the principle that there should be at most one regulator for each hazard type. It would:

a) Replace overlapping regimes with a unified optimisation process; and

b) Create benefit for talent and careers as with DNSR.

179. As arguments against this, we have been told that:

a) The overlaps in this area are less problematic;

b) It risks the other parts of the EA dealing with pollution and habitats becoming less familiar with the specific issues in the nuclear estate;

c) The need for a move may be ameliorated by a single decision-making model; and

d) It would be disruptive for the EA which is currently undergoing substantial change.

180. The desired outcome is that any individual nuclear site should have just one regulator for radioactive material. This might also be achieved by giving ONR the same vires in this area as the EA currently has. In this way, the agencies could agree who leads on a site-by-site basis.

181. We recommend that:

a) The ONR be given the same vires as the EA for radiological substances; and

b) Consideration be given in the light of the new regulatory model whether further consolidation is necessary.

Recommendation 4: Simplify the nuclear regulatory landscape by consolidating the majority of nuclear regulatory functions within a single organisation	
Owner: Multiple government departments including Cabinet Office, MOD and DESNZ	**Delivery Timeline:** March 2026
There should be a commitment, so far as possible, to only have one regulator per hazard type or regulatory function. • Merge DNSR and ONR, generating a specific defence enclave. • Consideration should be given to transferring other regulatory responsibilities for duplicative entities into a single regulator, for example regulation of radioactive substances or nuclear security. • The ONR should be given concurrent vires for radiological substances as the EA.	

182. DWP is ONR's parent department because of its origin as the Nuclear Installations Inspectorate, a division of the Health & Safety Executive prior to 2013. Many stakeholders raised this with us as an anomaly which weakens accountability. DWP has no policy responsibility or other interest in nuclear regulation; this sits with DESNZ for civil and MOD for defence. There are benefits to leaving it under DWP given the close relationship with HSE and the expertise brought from other high hazard industries.

183. We have considered whether another parent department would be more appropriate. DESNZ would have closer policy links on civil, but not on defence, and vice versa for the MOD. Some have expressed concern about the effect on ONR's independence if it were reporting into a department with responsibility for promoting nuclear technology. Any decision in this regard should take account of the Convention on Nuclear Safety, to which the UK is a signatory, and the IAEA Fundamental Safety Principles.

184. In the absence of a clear solution, we do not make a recommendation here.

Simplification of Safety Cases

185. A reset is required to ensure that safety cases are derived by, and for, the dutyholders to demonstrate they understand the assets for which they are responsible. This reset should focus on simplifying and shortening safety cases to restore them to a practical, usable format. It can be achieved by:

a) **Early engagement:** Dutyholder leaders should engage with regulators early to establish simplicity as a shared objective and ensure alignment on risk management;

b) **Empowered teams:** Leaders must encourage teams to simplify processes and challenge unnecessary steps, shifting from compliance for its own sake to real risk management;

c) **Frontline leadership:** Those closest to hazards should lead efforts to remove redundant checks and complexity, driving cultural change and delivering practical improvements; and

d) **Regulatory challenge:** Regulators should expect simplicity, and challenge added complexity, ensuring innovation improves safety without making processes harder.

186. The defence sector's implementation of the Three Lines of Defence (3LoD) model has deviated from its original intent, leading to duplication of safety case assessment. This drift stems from undervaluing controls within the Technical Authority (Rolls-Royce), causing both the second and third lines to re-examine technical data and detail. Additionally, the regulator has assumed a third-line role, contrary to HMG's Orange Book, which requires regulator independence.

187. The roles within the 3LoD model must be realigned to reflect its original intent. Each line has a distinct purpose, and a reset is required to ensure these roles are delivered with minimal duplication and a balanced resource. Success should be measured by a progressive shift; from detailed design focus in the first line to increasing emphasis on process adherence and application in the second and third lines.

Recommendation 5: Reset safety case development	
Owner: Dutyholders and regulators	**Delivery Timeline:** March 2026
Reset the approach to safety case development and assessment to eliminate duplication and embed simplicity. This should aim to shorten safety cases overall and return them to their original purpose as documents for use by the dutyholder to support operation. The defence sector should realign with the Three Lines of Defence (3LoD) model in accordance with HMG's Management of Risk – Principles and Concepts. The first line undertaking the majority of technical review, the second line providing process assurance and targeted assessment of high-risk areas, and the third independent line providing assurance that management arrangements and governance frameworks operate effectively. The regulator should exist external to the 3LoD structure.	

Chapter 6

Risk Management & Proportionality

This chapter focuses on risk management and its application across the nuclear sector.

Summary

The application of the ALARP (As Low As Reasonably Practicable) principle has become overly stringent. It sometimes functions as a ratchet that demands ever-lower risk levels and radiation exposures, even when the benefits are negligible or the costs disproportionate. This is in part due to a lack of clear direction on the tolerability of risk and in the assessment of proportionality when considering what risk reduction measures are reasonably practicable.

The inappropriate application of these principles is driven and exacerbated by a culture of risk aversion in both regulators and dutyholders. Dutyholders can be reluctant to defend an ALARP risk position even in the face of clearly conservative regulatory challenge.

The interpretation of Relevant Good Practice (RGP) has become far too prescriptive in the pursuit of risk reduction. It is applied too rigidly by both dutyholders and regulators leading to excessive nugatory effort and the stifling of innovation.

The nuclear sector frequently neglects to consider a portfolio view of risk in its application of ALARP. This drives risk reduction in local instances without accounting for the macro-scale, strategic factors, and the risks associated with inaction and poor programme delivery.

Defining tolerability, understanding proportionality, the application of RGP and standards, and the willingness of dutyholders to defend positions of risk all require radical reset.

188. The management of health and safety risk in the UK, whether to society or individuals, is conducted under the philosophy that risk should be tolerable and reduced to ALARP.

189. The effectiveness of the goal-based ALARP system has declined. The focus by dutyholders and regulators has increasingly been on the ‘as low as’ and less on the ‘reasonably practicable’ parts of the ALARP principle, and a culture of over-conservatism and risk aversion has become entrenched. This has resulted in a slow overall decision-making environment where innovative choices are discouraged.

190. Nuclear installations have a high hazard potential with societal concern, but some expectations and safety targets have become disproportionate to the actual risk. The selection and approach to adherence of dose targets for normal operation illustrates this deeper systemic issue. These and some other safety targets are lower than those seen in other countries, leading to disproportionate decisions and designs, which in many cases provide no greater protection to the public, at higher costs to the taxpayer.

191. While the UK is recognised internationally for its robust approach to nuclear safety management, greater emphasis must be placed on cost and timely delivery.

192. Clean baseload power reduces the amount of gas the UK needs to burn to meet energy demand. Each terawatt hour of electricity produces 400,000 tonnes of carbon.(10) One of HPC's reactors produces 1.6 gigawatts of electricity, or about 12 terawatt hours per year, potentially preventing 4.8 million tonnes of carbon every year. These emissions from burning gas, in turn, have significant effects on health outcomes.(11) Regulators cannot take this into account in individual decisions, but the Government should consider it when setting the tolerability of risk and clarifying disproportionality. This accords with R2P2 which states that "it would be quite proper for Government (as opposed to HSE) to consider such matters."(12)

Tolerability of Risk

193. The concept of 'tolerability of risk' arose during the 1987 Layfield inquiry into Sizewell B. In the inquiry report, Sir Frank Layfield recommended that the HSE should 'formulate and publish guidelines on the tolerable levels of individual and social risk to workers and the public from nuclear power stations'. This led to the development of the "Tolerability of Risk" (ToR) framework, which was later formalised in the 1992 HSE document titled "The Tolerability of Risk from Nuclear Power Stations."(13)

194. The HSE's Reducing Risks Protecting People (R2P2) was published in 2001 as an evolution of the ideas first formalised in the "Tolerability of Risk" framework, generalising the framework for all industries. R2P2 now serves as the primary guidance document outlining the principles and framework for how the HSE and ONR interpret and apply health and safety law, particularly the HSWA 1974. ALARP is law derived from the HSWA. The ToR framework is HSE and ONR policy.(12)

195. This risk management framework can be highly effective if interpreted and implemented appropriately. It encourages a proportionate approach to safety, ensuring solutions are only enacted if 'reasonably practicable' and that sufficient consideration is given to the impact in terms of time, money, and trouble.

196. The ToR triangle introduces the idea that there are risks above which society considers intolerable even if ALARP. In R2P2 this is called the "unacceptable region". Below that is the "tolerable region" where risks are tolerable if reduced ALARP.

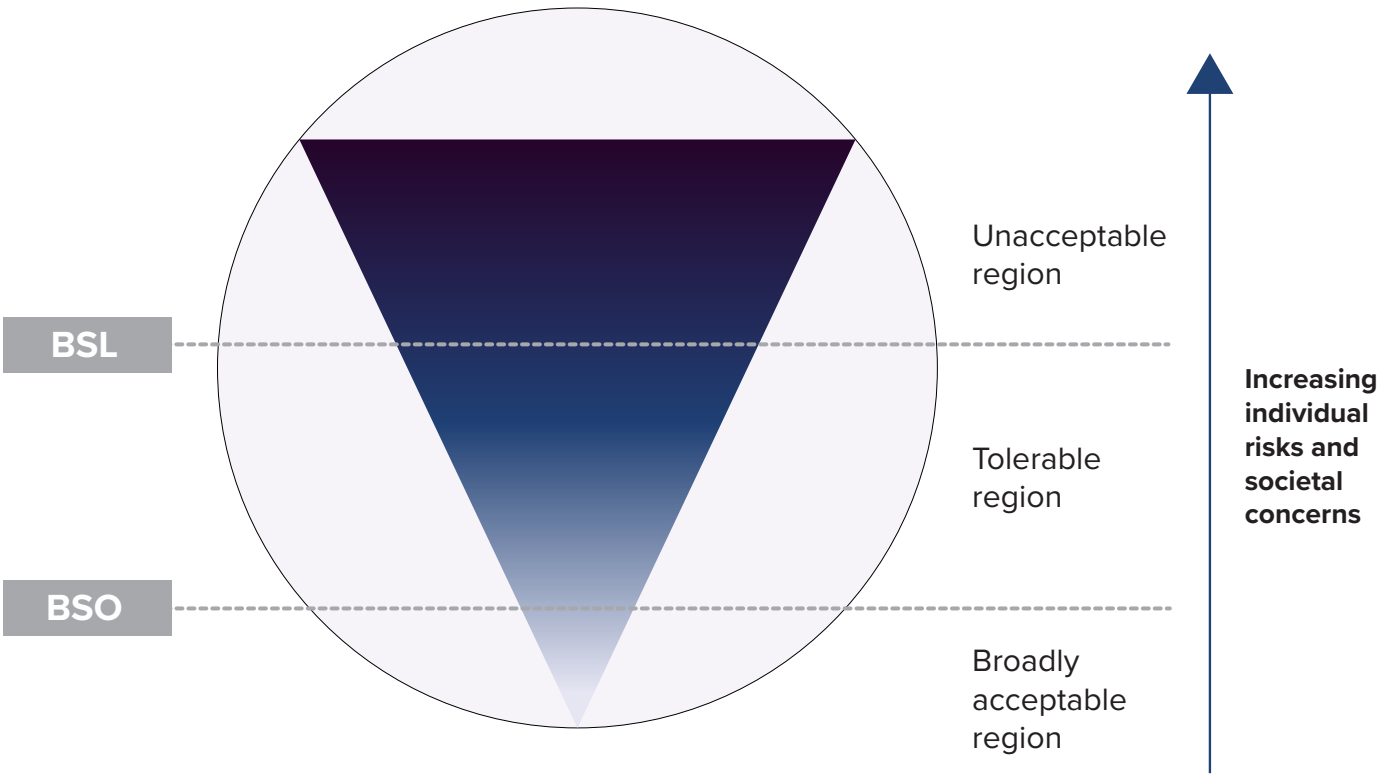


Figure 6 – The Tolerability of Risk (ToR) Triangle: HSE framework for tolerability of risk (12).

197. In the ALARP (or tolerable) region the cost-benefit balance is between the costs (which in case law is money, time or trouble) of introducing safety measures against the risk-reduction benefits of those safety measures.

198. With very low risks there is a further region called the "broadly acceptable region" in which, although risks must be ALARP, regulators will not push to reduce them further.

199. Implicit in these ideas is that risks are tolerable because of the individual and societal benefits gained from the activities that are generated by them. The ALARP principle does not explicitly include wider societal benefits in any assessment, although the term "trouble" has sometimes been used by regulators to judge, for example, whether a nuclear plant should continue to operate.

200. ONR's Safety Assessment Principles (SAPs) contain numerical targets that are based on the ToR framework. There are nine of them and the SAPs state that safety cases should be assessed against these numerical targets for normal operation, design basis faults, and radiological accident risks to people on and off the site.

The International System of Radiological Protection

201. The International Commission on Radiological Protection's (ICRP) system of radiological protection provides a structured framework for managing exposure to ionising radiation. It is built around the core principles of justification, optimisation, and dose limitation. It incorporates the As Low as Reasonably Achievable (ALARA) principle, which the ONR considers broadly equivalent to ALARP.(6) This system allows for the quantification of health impacts including from low-dose exposures, such as those typically encountered at UK nuclear sites under normal operating conditions. It is embedded in UK law through legislation like IRR17 and REPPIR19 and is supported by regulatory guidance such as the ONR SAPs.

The ICRP's Fundamental Principles of Radiation Protection

1. Justification – No practice involving exposure to radiation should be adopted unless it produces a net benefit;

2. Optimisation – Radiation doses should be kept As Low As Reasonably Achievable (ALARA), taking into account economic and societal factors; and

3. Dose Limitation – Individual doses must not exceed prescribed limits.

202. The ICRP's system, adopted in the International Atomic Energy Agency (IAEA) Safety Standards, incorporates the Linear No-Threshold (LNT) model. This assumes that any amount of ionising radiation, no matter how small (that is, there is no threshold), carries some risk of causing harm (typically cancer) and the risk increases linearly with dose.

203. The reality of radiation exposure is more complex. Some critics say the LNT model over-estimates the risks at low doses and argue that there is a threshold. The recent US Executive Order on 'The Reform of the Nuclear Regulatory Commission' signals an intent to move away from this ALARA and the LNT system in the United States.(14)

204. The broader international radiological protection community, including the ICRP and the UK, continue to support its use as the best available tool for public health policy and radiation protection.

205. Those supporting the continued use of LNT recognise there are uncertainties with the estimation of radiological risk particularly at low doses. The ICRP itself states that the LNT model carries "uncertainty on health effects at low doses", underscoring the need for a proportionate approach with cautious application at very low doses.(15)

What is a millisievert (mSv)?

The Sievert (Sv) is a measure of radiation dose. In LNT, for every millisievert (mSv) of dose absorbed, the probability of a person developing cancer that leads to death at some point in their life increases by approximately 0.005%.

The UK Health Security Agency calculated that on average people are exposed to about 2.7 mSv of radiation a year. 99% of this exposure is derived from natural background radiation and medical procedures. In Cornwall this increases to 8.3 mSv/yr due to higher naturally occurring levels of radioactive radon gas. A transatlantic flight will incur approximately 0.08 mSv.(112)

206. UK law in IRR17 sets dose limits for workers at 20 mSv/yr and for the public at 1 mSv/yr, in line with the ICRP principle of dose limitation. This is consistent with international standards and levels set by many other countries and the EU.

207. Dose constraints, which stem from ICRP principles, are used to plan levels of radiation exposure. These are set below dose limits to ensure that individual doses remain ALARA. This is consistent with the ICRP principle of optimisation.

208. For workers, neither ICRP nor IRR17 sets a dose constraint. They recommend that they should be set below the dose limits and, depending on the situation, will typically be in the range of a few mSv/yr up to 15 mSv/yr.

209. For members of the public, the ICRP and UK Health Security Agency recommend that the dose constraint should be no more than 0.3 mSv/yr from a single planned source exposure. Such values are typically used by others such as Canadian and Japanese licensees who typically place public dose constraints in the range of 0.1 to 0.3 mSv per year.

The Derivation and Use of Numerical Targets

210. ONR's SAPs uses the ToR concepts of unacceptable and broadly acceptable to determine numerical risk targets called Basic Safety Levels (BSLs) and Basic Safety Objectives (BSOs) respectively. Each of the nine targets has BSLs and BSOs, some are in the form of dose levels, others are expressed in frequencies or risks.

211. ONR's policy is that a new facility or activity should at least meet the BSL. Two of the BSLs are legal limits. The dose limits of 20 mSv/yr and 1 mSv/yr, for workers and public respectively, mentioned earlier must be met. For other BSLs, ONR's policy is that the level of gross disproportionality should be very high, and it would be highly likely that additional improvements to safety will prove reasonably practicable. Continuing to operate while failing to meet a BSL would only be acceptable if the dutyholder can demonstrate that there are no options that are reasonably practicable in the short term. There needs to be a clear plan to reduce risks within a period as short as reasonably practicable if operation is to continue. ONR will consider taking regulatory action to shut down the facility or prohibit or curtail the activity where a BSL is exceeded.

212. ONR policy is that the BSOs form benchmarks that reflect modern safety standards and expectations, providing a value beyond which it is recognised further consideration by ONR of the safety case would not be a reasonable use of resources. ONR states that the dutyholder is not given the option of stopping at this level. ALARP considerations may be such that the dutyholder is justified in stopping before reaching the BSO, but if it is reasonably practicable to provide a higher standard of safety, then the dutyholder must do so by law.

213. The BSO dose targets in the SAPs are based on R2P2's determination of tolerable and broadly acceptable fatality risks combined with the LNT model for ionising radiation.

214. R2P2 proposes that, in the case of a member of the public, the broadly acceptable individual risk of death from work activities should be one in a million per year. The LNT model states that the increased risk of death is 5% per Sv. Combining these gives 0.02 mSv/yr. The ONR sets this as the BSO for normal operation for any person off the site (SAPs Target 3).

215. The combination of an annual fatality risk target and the strict assumption of LNT at low doses results in BSOs that are over a hundred times less than that which the average person in the UK normally receives in a year. This is an example of a BSO which is overly conservative and well below what could be appropriately considered "broadly acceptable".

216. For normal operation, the BSO for employees working with ionising radiation is 1 mSv/yr, which is less than dose constraints recommended by ICRP and in IRR17, and for other employees on the site it is 0.1 mSv/yr (Target 1).

217. Combining very low dose values to determine numbers of deaths is also cautioned against by the ICRP, due to the significant uncertainties in the LNT model at very low doses.

218. The conservative setting of dose targets shifts their function away from optimisation and planning and instead promotes the elimination of risk.

219. The net result is that the UK sets target dose levels below the levels needed to ensure the safety of the public and workers in normal operation. They are below levels recommended internationally, those adopted by many other countries, and those in non-nuclear applications (for example medical uses) in the UK. The targets have also been lowered over time. When the SAPs were updated in 2006, the dose targets were lowered to reflect declining average dose levels in the nuclear industry. The ONR notes that "these reductions in the BSO levels were not prompted by reviews of risk estimates, which did not change significantly."(6)

220. This has substantial cost implications throughout the design, construction, operation, and decommissioning of nuclear plants. It is one of several factors that lead to the UK having higher costs for nuclear technology than our partners and competitors internationally. This increases prices for consumers and costs for the taxpayer and reduces the competitiveness of the nuclear sector for no meaningful health and safety benefit.

221. Defenders of the current approach argue that the BSOs are only a guide to inspectors when not to pursue further and therefore are not binding. However, the SAPs clearly state that the BSOs "reflect modern standards and expectations".(6) As a result, both dutyholders and regulators treat these as true "targets" and "objectives" (as the names imply).

222. This is one clear example of over regulation and there are others. Not all the numerical targets have similar issues. While some of them reflect high hazard potential with associated societal risks and concerns, they should all be reviewed to ensure proportionality. More generally, BSOs and BSLs have become inflexible across the whole sector despite the contextual nature of tolerability. The rigid application of such targets prevents the concepts of 'unacceptable' and 'broadly acceptable' from being applied as per the intent of the R2P2 ToR framework.

223. The BSLs and BSOs should reflect better what society deems to be unacceptable and broadly acceptable. This can change over time as technology changes, or as we reevaluate the threats of climate change or hostile states. Such change needs to be better understood and considered in dutyholder and regulator decision-making.

224. Government, building on R2P2, should define how these key terms are to be interpreted because it is a judgement about how society values the benefits and risks of nuclear activity. It is for regulators to implement this. Government has failed to provide sufficient clarity in this area. Regulators have had to fill this gap.

225. The Government should review tolerability to align modern risk interpretations with current societal concerns, and appropriate review timescales should be agreed to ensure the definition remains up to date.

226. We recommend that this review by government is given the highest priority and done at pace, so that the design of new nuclear plants can benefit from a more proportionate regulatory approach.

227. We have considered whether a 'safe harbour' (i.e. a fixed level at which a risk is deemed to be ALARP) should be established in the application of ALARP by reference to dose targets. On balance, we consider that the use of directions will establish the appropriate presumptions that will ensure proportionality.

Recommendation 6: Government should define the tolerability of risk for nuclear.	
Owner: DESNZ, DWP and MOD	**Delivery Timeline:** June 2026
The Government should take responsibility for defining the Tolerability of Risk for the nuclear sector. In doing this, the Government should consider the modern state of the nuclear sector, and the societal demand for its outputs across energy, decommissioning and defence. This should be clearly communicated to regulators and periodically reviewed. The Government should make a direction to the ONR under section 92 of the Energy Act 2013 and to the EA section 40 of the Environment Act 1995 so that, in exercising their functions, risks at or below broadly acceptable levels are deemed to be ALARP and ALARA unless there are strong and compelling reasons to the contrary. This direction and definition should form the basis of the revision of the guidance in recommendation 7.	

228. Regulators should undertake an immediate review of all the numerical targets set in their guidance. Dutyholders should review and update their guidance accordingly. This review should ensure alignment with the government definitions of tolerability and their application, with the revised values for the BSLs and BSOs reflecting the definitions of "tolerable" and "broadly acceptable". The revised targets should be consistent with accepted international standards and those of other international bodies and align with what is deemed acceptable for radiation safety in non-nuclear settings in the UK.

Misapplication of Relevant Good Practice

229. Relevant Good Practice (RGP) is a core concept in UK health and safety approaches. It is often used to demonstrate that risks are reduced ALARP. It refers to established and accepted standards, methods, and measures that represent a proportionate and effective way of controlling risks. It is particularly useful for those dutyholders regulated by HSE who manage lower-hazard activities. It can help them demonstrate that risks are reduced ALARP without detailed safety cases. The concept is also used in high hazards industries including the nuclear sector.

230. ONR's SAPs and TAGs are guidance for inspectors in assessing whether a safety case has demonstrated that the dutyholder's obligations under law (risk reduction ALARP) have been met, and include guidance on RGP.

231. Dutyholders and designers commonly misinterpret them as a pre-defined set of requirements for design and operation. Regulators, both in safety and environmental protection, describe RGP as "expectations" and a starting point for assessment.

232. The perception of RGP as a set of regulator expectations leads dutyholders and designers to attempt direct adherence as a default approach, believing this to be the smoothest path to regulatory compliance and approval. This is demonstrated when RGP is incorrectly, but tellingly, called regulatory (not relevant) good practice by some. This is compounded by shortfalls in capacity and capability, causing dutyholders to look to regulator RGP guidance as a crutch in the absence of the expertise required to take an alternate, more pragmatic, and proportionate approach.

233. The evolution of RGP can be driven by the latest plant design and accompanying safety case evidence. Given that RGP is often applied (and accepted) as mandatory requirements by both dutyholders and regulators, this leads to an overall increase in the demands of RGP over time with no clear link to an increase in risk. This ratcheting up of standards and regulatory expectations raises cost, stifles innovation, and chills the introduction of novel technology.

Case Study: ABWR Lift Limit Regulatory Challenge

The Advanced Boiling Water Reactor (ABWR), a proven Boiling Water Reactor design, entered the UK's GDA process with its spent fuel pool on the operating deck; a standard BWR feature. Hitachi GE Nuclear Energy (HGNE) argued this approach met ALARP, supported by international experience. However, some ONR Inspectors challenged this, citing Sizewell B's 30 cm lift limit as RGP despite fundamental design differences. Alternatives proposed by the inspector including dual lifting systems, ramps, or major building redesigns. One ramp option required a 230 m structure, effectively redesigning the entire licensed site. These were grossly disproportionate and, in some cases, increased risk. The original design was eventually accepted after significant additional time and cost had been consumed in addressing the regulator challenge.

234. This problem also applies in the defence sector. The ONR guidance focuses on the civil sector. It can be difficult to judge and justify legitimate divergences between civil and defence, where civil standards may not be RGP for defence.

235. The nuclear sector often fails to consider RGP from other high-hazard industries. The aeronautical, oil and gas, and pharmaceutical industries routinely engage in complex hazard management. The hazards involved in these industries, like nuclear, have the potential for large scale harm at an individual and societal level, yet they have a track record of delivering new products to market at pace. They remain capable of innovating, growing to meet consumer demand, and maintaining their principal outputs despite their highly regulated, safety-critical status.

236. Dutyholders and regulators need to view RGP as a "toolset" for guidance and discussion at the outset of a nuclear development, not as a regulatory expectation. It is for dutyholders to identify practices which are good and relevant. Agreeing what is to be considered RGP early in the programme lifecycle is vital to effective delivery. Maintaining this through development, and preventing requirement growth, is equally important.

237. These concerns related to RGP are also reflected in environmental protection guidance related to the Best Available Technology (BAT) principle.

238. The ONR SAPs and TAGs should be updated to remove the potential for misinterpretation of RGP and to prevent them from being used as a set of prescriptive requirements for dutyholders. Environmental protection guidance should also be reviewed for the same purpose.

Recommendation 7: Review nuclear regulator guidance in line with revised tolerability of risk	
Owner: ONR and EA	**Delivery Timeline:** June 2026
Regulators should undertake an immediate review of numerical targets set in their guidance. This review should ensure alignment with the government definitions of tolerability and their application. It should also align with levels set internationally. Regulatory guidance should be thoroughly reviewed to ensure it is consistent with a primarily non-prescriptive regulatory system. The updates to this guidance should: a) Re-establish the role of SAPs/TAGs as guidance to inspectors; b) Ensure consistency across the TAGs and ensure greater focus on implementing the safety principles in the SAPs rather than specific implementation practices; and c) Set the expectation that it for dutyholders, not regulators, to identify applicable RGP and BAT including those from other high-hazard sectors. Challenge to what constitutes RGP should be proportionate to the risks, and the relevance of the practice.	

A Lack of Appropriate Tension Between Dutyholders and Regulators

239. The interaction between regulator and dutyholder requires some tension if it is to produce optimum outcomes. Dutyholders, as the ultimate risk owners, should develop their safety arguments to demonstrate to themselves that risks have been reduced ALARP, not to what a regulator may consider acceptable. Likewise, a regulator should naturally interrogate and challenge this position where necessary to assure themselves that the risk position is acceptable and has been reduced ALARP.

240. Too often, a regulator can be happy to say “not good enough” but not willing to say what good enough looks like, seeing that as the role of the dutyholder. On the other side, the dutyholder may adopt an expensive risk-averse solution that has zero risk of not meeting regulatory standards. The lack of constructive tension can result in excessive cost for little or no extra benefit. Where dutyholders apply a proportionate attitude, regulators can accept this, creating an overall benefit. There are positive examples of this, the Atomic Weapons Establishment (AWE) has demonstrated a circa £94m capital cost saving and nine month benefit against delivery of a programme of work by pushing for, and achieving, proportionate treatment of seismic controls on a new facility.

241. Other contributors to this problem include:

a) The inability of dutyholders to define and maintain an ALARP position;

b) Assumptions about regulator expectations without discussion;

c) Shortcomings in regulatory guidance and advice; and

d) Concerns by some new entrants to the UK sector that pushing back may damage their reputation with regulators.

242. Dutyholders often choose to implement additional hazard controls, or undertake further safety case work, to satisfy the regulator rather than pushing back and maintaining a position which they consider tolerable and ALARP. This is due to the perception that any additional effort in risk mitigation will be substantially less than the effort required to challenge the regulator and make a justification that no further action is required.

Case Study: ABWR GDA HVAC System HEPA Design Change

The Advanced Boiling Water Reactor (ABWR) implemented ventilation design changes during GDA to introduce Heating, Ventilation and Air Conditioning (HVAC) High Efficiency Particulate Air (HEPA) filtration to the radioactive waste building exhaust and the fuel handling exhaust area systems. This expensive design change cut emissions by one ten-thousandth the legal dose limit, providing negligible gains in safety.

243. The issue stretches beyond the immediate dutyholders and into their respective supply chains where safety case development and engineering design adopt the same approach. Such an approach becomes hugely labour intensive and time consuming whilst being based mostly on risk averse assumptions about regulator expectations. The clear setting of standards at the outset between dutyholder and regulator is vital.

244. Regulators can fail to provide guidance and challenge to dutyholders to prevent them 'going too far' in their efforts to demonstrate risk reduction. The Regulators' Code published by the Government states that regulators should enable businesses to achieve compliance without unnecessary burdens, to reduce complexity, and to reach proportionate outcomes.(16) Despite this, sometimes a passive stance of 'more is better' is adopted and dutyholders are left to continue gold-plating without intervention.

245. This aversion to push back is rooted in issues with dutyholder culture, and a lack of sufficient SQEP (discussed in detail in Chapter 9: Capacity, Capability, Culture & Innovation). It is also driven by the inability of the dutyholder to make effective quantitative arguments in opposition to regulatory challenge.

246. Cost benefit analysis (CBA) offers a framework, widely used in Government and elsewhere, for comparing the benefits of reducing risks against the costs incurred for a particular option for managing risks. It does this by expressing all relevant costs and benefits in a common currency – usually money. HM Treasury publishes guidance on methods to be employed.

247. R2P2 discusses how CBA can be used to manage health and safety risks and presents some details about its application. HSE generally expects that RGP will form the baseline in demonstrating ALARP. There will be occasions, particularly in safety case regimes, where dutyholders will be expected to show that quantitative comparisons have been made between the costs of introducing options with the risk reduction achieved. This is not necessarily a full CBA. ONR's SAPs state that CBA can be used to demonstrate ALARP if its application follows HSE's guidance but that it should not form the whole argument.(6)

248. Probabilistic Safety Assessment (PSA) is widely used in the nuclear sector as a basis to assess the benefits of reduction in risk from the introduction of safety measures, but there is little use of CBA for the cost side. A large majority of ALARP assessments by dutyholders are based on qualitative arguments, and in practice this can result in disproportionate decision-making by both dutyholders and regulators.

249. CBA should be used more widely by dutyholders to support their safety arguments, and regulators should be prepared and ready to take decisions based on the evidence presented in CBAs, recognising that ALARP factors include money, time and trouble, and the potential impact of significant delays. The challenge function within regulators should assist with this.

Gross Disproportion

250. "Gross disproportion" is a legal principle relevant to the application of ALARP. It has its origins in case law. It means that unless the expense for a particular measure is in gross disproportion to the risk, the measure must be undertaken. In practice, it has been interpreted when a proposed nuclear installation is at the BSL, the cost must be at a factor of 10 to be avoided, and when it's BSO, the cost must be at a factor of 1.

251. We have been shown clear evidence that the case law in this context is inconsistent. Early case law confirmed that "what is "reasonably practicable" depends upon a consideration whether the time, trouble and expense of the precautions suggested are disproportionate to the risk involved."(17) Following this, some case law indicated that the test involved showing "gross disproportion."(18) More recently, Lord Mance in a Supreme Court judgment stated that the phrase "gross disproportion" was "an unjustified gloss on the statutory wording which requires the employer simply to show that he did all that was reasonably practicable".(19) We understand some take the view this comment is binding, whilst others do not.

252. In light of our view that CBA should be used more, it is important that the law is clarified. We note that the concept of "gross disproportion" is not used internationally. The ICRP itself references the need for "proportionate" decision-making. The UK is an outlier. We consider that the focus should be to err on the side of proportionality, but with a clear acknowledgement of the nature and level of the risks which can be mitigated.

Recommendation 8: Define the meaning of proportionality in the Health and Safety at Work Act	
Owner: ONR, EA, HSE, DESNZ, MOD, DEFRA and DWP	**Delivery Timeline:** June 2026
Government should propose secondary legislation under section 50 of HSWA which clarifies the law. The test should not be whether a measure is grossly disproportionate, but instead what is proportionate taking into account a multi-faceted consideration of the level of risk. This secondary legislation should confirm that whether an action is proportionate to that risk shall be established by reference to: a) the nature of the hazard concerned; b) the likelihood of that hazard occurring; c) the scale of the potential impact in terms of the degree of harm and the numbers of individuals who might reasonably foreseeably be affected; d) the cost, time and difficulty involved; e) any relevant policy guidance established by the Secretary of State or the relevant regulator; and f) whether undertaking the measure might prevent a desirable activity from taking place (either at all, to a particular extent, or in a particular way). R2P2 should be updated to reflect this secondary legislation and err on the side of proportionality, taking into account the nature of the risk.	

Portfolio Risk Balance & Strategic Factors

253. Dutyholders have a legal obligation to reduce risks ALARP only for hazards they control. There are often several dutyholders, and the actions of one can impact the activities or safety of another. For example, a delay in the implementation safety improvements on a dockyard could impact safe operations at sea. There is currently no framework where overall risks across the system, sometimes called portfolio risk, are properly considered. The reduction of risk in one part can lead to an increase in risk to another area. No single entity has an overall duty to ensure the risks are ALARP across the sector. This problem is common in both defence and decommissioning.

254. There needs to be a “controlling mind” at the portfolio level who has sight over the entire portfolio and can internalise these externalities. This should be the Ministry of Defence (MOD) for the nuclear warhead and submarine programmes and the NDA for decommissioning. This would require close working between the top-level authority, the individual dutyholders, and the regulators. This would ensure risk assessment across the activities are aligned to allow the overall portfolio risks to be identified, appropriate directions given to dutyholders, including clarity on meeting their own legal duties to reduce risks ALARP, and regulators using the strategic factors in their enforcement models appropriately. In our view, this does not happen currently.

255. Such a system would allow portfolio risks to be properly managed while maintaining the respective duties and responsibilities of all parties.

Recommendation 9: Establish an enterprise-wide system of portfolio risk management across the defence and decommissioning sectors	
Owner: MOD and NDA	**Delivery Timeline:** December 2027
Develop and implement systems that allow portfolio risks across defence and decommissioning sectors, to be properly managed, while maintaining the respective duties and responsibilities of dutyholders and regulators. Adopt a system of top-down risk apportionment which accounts for the interdependency of activities across each sector portfolio risks to produce an overall ALARP position and achieve defence and decommissioning missions.	

Conflation of Nuclear and Conventional Health & Safety and Environmental Management

256. The standards of nuclear safety are often incorrectly applied to conventional non-nuclear hazards simply because they are within a nuclear site boundary. A nuclear site boundary contains a wide range of hazards of which nuclear and radiological hazards are a subset. Many activities, systems, and materials are indistinguishable from any other industrial settings (for example lifting equipment, high-voltage electricity, and hazardous chemicals). Problems in these areas can potentially have an impact on nuclear safety. These should be identified in the nuclear safety case, for example fire hazards that can impact the nuclear plant.

257. Other operations on a licensed or authorised site do not affect nuclear safety. The application of nuclear safety standards, and consequently greater regulatory attention, in those circumstances is not appropriate. A conventional health and safety approach should instead be used.

258. The nuclear site licence and authorisation conditions mainly refer to the requirement for the licensee or authorisee to "make and implement adequate arrangements". This should provide the appropriate flexibility for dutyholders to address this, but this is seldom done. Where adherence to licence or authorisation conditions is no longer appropriate, then adherence to a standard health and safety approach should apply, for example submarines without fissile material.

259. Many environmental considerations across nuclear sites are also indistinguishable from those of conventional power generation or heavy industry. Despite this, the focus on environmental considerations for nuclear often extends to all aspects of a site, with greater attention and scrutiny than would otherwise be applied.

260. The misapplication of the 'nuclear label' therefore stretches across conventional safety and environmental control. Dutyholders should take steps to change their arrangements so that they are commensurate with the hazards related to all of their facilities and operations and not default to nuclear standards.

Recommendation 10: Review arrangements to prevent conflation of nuclear and conventional risks	
Owner: Dutyholders and regulators	**Delivery Timeline:** December 2026
Dutyholders should work with the ONR, DNSR and EA to distinguish radiological and nuclear risks from conventional risks and change arrangements accordingly, which could include disapplying relevant licence/authorisation conditions.	

Chapter 7

Environmental Assessments & Permitting

This chapter covers the interactions between environmental regulations and the nuclear sector.

Summary

Environmental protection is of huge importance. Our recommendations are designed as much as possible to respect the mitigation hierarchy (avoidance, mitigation, restoration and then compensation as a last resort) and the need for avoidance as the primary approach to avoid further depletion of nature. Nuclear energy frequently complements environmental protection. Examples include its small land footprint and remote location that fosters ecosystems. Some trade-offs may be inevitable to achieve clean energy and lower household bills.

The Habitats Regulation assessment regime examines whether new developments could harm protected natural areas, such as special wildlife sites. Currently different regulators run overlapping assessments to judge the potential harm. Strict protection has created onerous mitigation and compensation requirements where the measures sometimes exceed the actual level of risk. In many cases, the process has taken years and been an additional bottleneck for delivery. A vast amount of money has gone on process and gold-plated solutions that have different environmental costs (e.g., use of concrete) instead of to nature.

We propose that a very large contribution to a new nature fund should be an alternative application of the Habitats Regulation. Rather than identify every individual harm over several years, we would accept that the harm is substantial and move directly to off-site nature conservation. We set out the details and rationale below.

Environmental Impact Assessments (EIA) give decision makers and the public a clear picture of a project's likely effects on the environment before consent can be given. Developers and public bodies want to shield projects from legal risk, leading to lengthy and complex environmental assessments across infrastructure projects. Mechanisms such as the 'Rochdale Envelope' are meant to reduce the need for reassessment but in fact do not create the intended flexibility. The balance must be re-calibrated to create proportionality within the EIA regime. Allowing the development of Modular Low-Carbon Acceleration Zones and a single environmental assessment for one area would further increase the proportionality in assessments.

EIAs for nuclear projects must demonstrate a detailed understanding of the site and its surroundings. Each topic requires baseline data that capture existing conditions over at least one full seasonal cycle. A central repository should exist, so developers are able to access the data they need for their EIA.

Developers also face delays whilst waiting for permitting decisions. This is partly due to developers not wanting to sour relations with regulators or to the potential appeals process which can further delay projects.

The Environment Act 2021, introduced a mandatory Biodiversity Net Gain (BNG) requirement in England for new developments under the Town and Country Planning Act (TCPA) 1990, meaning they must deliver 10% BNG and leave habitats in a better state for wildlife than they were in before. This potentially adds significant cost, and disincentivises decommissioning.

The UK designates certain areas 'national parks' and 'national landscapes' (formerly known as 'areas of outstanding natural beauty'). These receive additional legal protection for their natural beauty, wildlife, or cultural heritage. A recent duty, legislated in 2023, has caused confusion, and will likely delay, and add cost, to nuclear development

The risk of legal challenge is a key contributor to the risk aversion displayed by regulators and developers. Hinkley Point C and Sizewell C have faced seven separate legal challenges between them. This causes risk and delays to projects and comes at huge cost. Increasing cost caps, and ensuring courts have powers in relation to repeated claims, could limit the amount of times judicial reviews can be bought against developers.

261. Environmental protection is of utmost importance. Environment depletion is a serious problem in the UK. Since 1970, the populations of monitored animal species in the UK have declined by about 19% on average, and nearly 1 in 6 species (16.1%) is threatened with extinction. Environmental NGOs stressed the importance of ensuring adequate environmental protection in the nuclear sector.

262. Our nature protection framework uses the mitigation hierarchy (avoidance, mitigation, restoration and then compensation as a last resort). NGOs stress the need for avoidance as the primary approach to avoid further depletion of nature. NGOs would prefer the siting of nuclear developments away from areas with international and national designations.

263. Several NGOs argued that protecting nature should come before cost considerations, believing that one cannot put a price on species or habitats. Others think the current system works well and that high costs are mainly due to developers not planning enough for mitigation.

264. There is not always a trade-off. Nuclear power may enhance the environment, even relative to other forms of low carbon energy. Nuclear power is low carbon. It complements other low carbon technologies like wind and solar, making them more sustainable as part of the energy mix in the long term. It has a much smaller footprint per gigawatt hour than other forms of energy. Restrictions on population density around nuclear power stations mean that important ecosystems develop in their environs.

265. Where there is potential trade-off, it is often resolved in a way that is sub-optimal: nature benefits relatively little, relative to the costs imposed on consumers and society from development delays. We rely excessively on process over outcomes in the frameworks we use. The complexity of nuclear safety, and the huge up-front capital cost, make the nuclear estate a particularly expensive place to protect the environment. The system can turn benefit of low population density into a penalty rather than reward.

266. Where trade-offs are unavoidable, it is for government to make decisions that balance the high costs of low carbon energy and strict avoidance. Our work aims to help the Government inform that choice.

The proportionality of the Habitats Regulations Assessment Regime

267. The Habitats Regulations assessment (HRA) regime is designed to check whether new developments could harm protected natural areas, such as special wildlife sites. If there's a risk of harm, the regime looks at what steps can be taken to reduce or prevent that harm. Different regulators run overlapping assessments to judge the potential harm. For example, the relevant Secretary of State, the Environment Agency (EA), and the Marine Management Organisation (MMO) may each require assessments for a single infrastructure project. This stems from legislation. When the Habitats Regulation was transposed from European into UK law, it made any public authority involved in authorising a project a 'competent authority' who can screen for environmental effects.

268. Case law requires that assessments cannot have gaps, and must contain complete, precise, and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned.(20) A decision-maker discharging its duties under the Habitats Regulations must give the views of statutory consultees such as Natural England considerable weight.(21) There must be a "strict" application of the precautionary approach, meaning that developers mitigate any risk that has been identified, however small.(22)

269. It has been stated that the precautionary principle is cited "as justification for giving weight to hypothetical risks for which there is no credible evidence", with a specialist commenting that the test is "neither reasonable or scientific".(23) Case law indicates that there is little, if any, scope to treat an impact as de minimis, meaning that very minor impacts can have significant costs. For example, one case determined that losing 0.54% of a natural habitat constituted an adverse effect.(24)

270. The Trade and Cooperation Agreement between the UK and the EU, requires that the overall level of environmental protection (which includes the Habitats Directive) is not weakened in a manner affecting trade or investment between the parties. The UK implementation of the Habitats Directive (European Law) is more stringent than other EU Member States. The Post Implementation Review of the Habitats Regulations cited an evaluation study to support the 2016 'fitness check' of the Birds and Habitats Directives. It compared approaches to Annex IV species in the UK and EU members. That evaluation concluded that the UK has taken an inflexible approach, which has strict protection of each individual specimen. This has created onerous mitigation and compensation requirements for some species that are relatively common in the UK.(25)

271. These judgements require developers in practice to show that a range of hypothetical impacts are unlikely, rather than mitigating only the impacts that have been shown to be likely.(23)

Examples of mitigation measures that exceed the actual level of risk

Natural England designated the inshore zone of the sea from St Austell to Gribbin Head as a Special Protection Area on the basis that 15 Slavonian Grebes winter there. The boundary of the area includes waters right up to the shore, as boaters from new housing theoretically might disturb the birds. Every development proposal along this stretch of coast, including that of a single new house, must now fund a full habitat assessment, despite the risk of any one person encountering a bird being infinitesimal.

Sabellaria spinulosa worms form patchy, shifting reefs on parts of the seabed. Natural England and the Joint Nature Conservation Committee treat whole tracts of seabeds as potential reefs, requiring compensation for rock placement, even where no reef exists. Reefs tend to occur in small areas and colonies regularly disappear in one area and appear in another. Offshore wind projects like Norfolk Vanguard, Norfolk Boreas and Norfolk Vanguard East have been delayed for two years while DEFRA creates a Marine Recovery Fund.

For offshore wind farms at Dogger Bank South, Natural England argued that guillemots breeding at Flamborough and Filey Special Protection Area (103 km away) might search for food in the wind farm zone. Natural England used the maximum distance from six tracked birds, including a 338 km outlier from a year of prey collapse, and calculated a 'mean maximum plus one standard distribution' foraging range of 153 kilometres. The British Trust for Ornithology judged this as implausible. The project must provide compensation for 719 breeding pairs at an estimated cost of £173 million, through predator control, bird hotels, and measures to stop seabirds dying in fishing nets.(23)

272. Regulators must be certain that a project will not damage the integrity of a specific protected site. Developers are forced to make immediate, local solutions, even where off-site, or less localised, mitigation could have a bigger impact. In HS2's case, this led to a £100 million 'bat tunnel' to help shield a nearby population of 300 Bechstein bats.(26)

273. The Bat Conservation Trust received a £180,000 green recovery grant that covered its horseshoe bat programmes across the entire country. In the High Marks Barn SSSI, South Devon, a habitat of over 1,100 bats was safeguarded, making it at least 1,000 times more efficient per bat, assuming that every single Bechstein Bat would have been killed by HS2.(27) HS2 implicitly valued Bechstein Bat lives at above £300,000, one sixth of what HM Treasury values a human life in the Green Book.(28)

274. A £100,000 project to remove the Kentchurch Weir from the River Monnow reopened 160 kilometres of natural habitat. It led to adult salmon travelling up the river and young salmon later being found 20 kilometres upstream, suggesting spawning.(29) This compares well to the hundreds of millions spent on the Hinkley Point C fish protection systems.

Case Study: Hinkley Point C Fish Protection

Hinkley Point C will have more fish protection measures than any other power station in the world. It has spent £700 million on their design and implementation, as set out in the HPC's Development Consent Order (DCO). There will be three systems in place: Low Velocity Side Entry water intake heads (£500M), a Fish Recovery and Return System (FRR) (£150m), and an Acoustic Fish Deterrent (AFD) (£50M). The AFD is a system that emits low frequency pulses to startle and repel fish before they enter the intakes for the cooling system, a technology that has had to be adapted from the fishing industry where it is used to reduce by-catches.

Modelling and data collection by EDF has found that these measures would save 0.083 salmon per year, along with 0.028 sea trout, 6 river lamprey, 18 Allis shad, and 528 twaite shad (or possibly fewer than 100 twaite shad on more recent estimates).

The assessment to compile these numbers required EDF to catch fish, anesthetise them, inject them with a chip to follow their movements to avoid double-counting, and put 96 sensors on the intake heads.

Note: we give this example to illustrate how the current system works and the incentives and constraints it imposes. Any criticism should focus on the system rather than on EDF and regulators.

275. The 2025 Corry Review into UK environmental regulation noted criticism that regulators were "focusing too much on 'micro' site specific outcomes rather than meaningful 'macro' outcomes". It concluded that "protecting the status-quo of nature as it exists now, site by site, is unlikely to deliver the nature recovery needed linked to environmental targets, and it slows down the development of housing and infrastructure".(26)

276. This focus on 'micro' site specific outcomes is replicated in the nuclear context. Much of the information gathered in a HRA is never used and is at a level of granularity that is unlikely to affect the relevant Secretary of State's decision. For example:

a) For the piling at Sizewell C (where columns are driven into the seabed), the assessment modelled different scenarios such as 54 days of piling versus 63 days and the three-decibel difference in sound depending on which hammer would be used.

b) On radiological effects, the developers provided dose calculations to representative organisms such as freshwater insect larvae in Sizewell Marshes and polychaete worms in the Southern North Sea Special Area of Conservation.(30)

c) The developers also had to analyse marsh harrier nests that did not sit within the conservation area, in case light or noise disturbance interfered with them.(31)

277. The Planning and Infrastructure Bill currently before Parliament proposes Environmental Delivery Plans (EDPs). This supports the shift from local to broader environmental impact, as recommended in the Corry Review. Natural England will set out plans to improve the condition of specific species or habitats. Once a developer pays into the levy for an EDP, regulators do not need to account for that specific environmental impact. If an EDP does not exist for a particular impact, a Habitats Assessment is still needed.

278. EDPs cover granular, specific environmental features and impacts. Nuclear projects are large projects that often involve highly localised, specific features that Natural England will be unlikely to anticipate ahead of time. For example, there may be an EDP at a site for a loss of generic woodland or wet grassland, but not one for offshore noise or brine discharge.

279. Government amendments to the Bill make it clear that conservation actions funded through an EDP cannot be considered to compensate for the loss of 'irreplaceable habitat'.(32) At the time of writing, EDPs are also limited to water and air quality-related impacts. There is also likely to be a significant delay in proposing EDPs for the nuclear estate. EDPs are therefore unlikely to provide an avenue for unlocking new development. A more generic form of EDP could.

280. Case law has separately established that mitigation measures cannot be considered at the screening stage (Stage 1) of the Habitats Regulations assessment process.(33) This creates uncertainty and debate because it is often unclear whether a measure should be treated as part of the project itself – and therefore considered at screening – or as mitigation, which must be excluded until Stage 2. This results in more projects proceeding to Stage 2, since excluding intended mitigation makes it harder to rule out impact.

281. This problem is compounded by the need for duplicative assessments. If a developer changes the design at any point after approval, then regulators must reconsider the question of the integrity of the site (the physical and environmental soundness of its containment and pollution prevention systems) and potentially rerun an assessment. At Sizewell C, EDF changed elements of its marine construction logistics during the planning process. This required a revised HRA addendum and updated Site Integrity Plan, in case the changes affected underwater noise, forcing reassessment. This added time and cost and prevents possible improvements that could have been made.

Habitats Regulations Assessment duplication during the DCO process at Sizewell C

When the project applied for its main planning consent, the Secretary of State for the (now defunct) Department for Business, Energy and Industrial Strategy carried out a Habitats Regulations Assessment (HRA), looking at local and marine protected sites such as Minsmere–Walberswick and the Southern North Sea Special Area of Conservation.(31)

The Environment Agency (EA) conducted its own assessments before issuing operational permits for radioactive substances, water discharges and combustion. These assessments covered many of the same protected sites, relied on the same studies, and repeated the same integrity tests.(34)

Recommendation 11: Amendments to the Habitats Regulations	
Owner: DEFRA	**Delivery Timeline:** December 2027

Apply or modify the 2017 Habitats Regulations to:

a) Remove the need to prove a negative when drawing a conclusion on impacts, so that the wording of the regulation refers to the need for scientific evidence and excludes merely hypothetical or speculative risks.

b) Define 'compensatory measures' to expressly exclude the need for like-for-like compensation and instead accept that overall enhancement and measures to support the coherence of protected sites is sufficient.

c) Establish that de minimis effects do not constitute an adverse effect on integrity, including where they have a de minimis contribution to in-combination effects with other projects.

d) Legislate to remove the requirement for separate HRA assessments to be completed for each regulator at different stages, unless there has been a material change to a project. This could be achieved by "deeming" that the first assessment meets the tests of any subsequent approval unless there is a fundamental change in circumstances.

e) Modify the 2017 Habitats Regulations, to allow mitigation measures to be considered at Stage 1 of the Habitats Regulations assessment process.

282. These recommendations cumulatively could make a difference in terms of bringing down cost with little adverse effect on habitats. These procedural proposals are, in effect, restating what the law is, or reversing relatively recent precedents. There is an overriding need to do better than we currently do.

283. We do not believe this goes far enough. We are concerned that replacing existing process with new process will not achieve a radical reset. All such processes, however well designed, involve considerable time and expense. Both developers and nature could benefit if unnecessary process costs are removed from the system, allowing a larger share to be spent directly on nature instead. We need to develop a more nature positive mindset in these developments. We need proper partnership between developers, regulators and NGOs that identify and address issues at the outset. The nature recovery scheme implemented by Sizewell C in advance of construction is a useful indicator of how beneficial this approach could be.

284. Many of the concerns around process and bureaucracy are shared by those working on the frontline of conservation efforts. For example, in its latest strategy, Natural England has stated its ambition to "shift from isolated interventions to nature recovery happening at scale", along with "reduced bureaucracy and streamlined regulation". In line with the Corry Review, it emphasises the importance of staying "focused on outcomes rather than processes."(35)

285. We propose there should be an alternative route to compliance with the Habitats Directive whereby a developer can make a substantial up-front payment before a project begins and without any assessment is done.

286. The level of the payment is important.

a) First, it should be sufficiently large that it exceeds the likely cost of any harm to nature;

b) Second, it should be greater in areas of SSSI and greater still where that protection has international status; and

c) Third, it should be set at a sufficient level to comply with the Trade and Cooperation Agreement

287. The level of the payment should be fixed across the nuclear estate to avoid it becoming a separate source of litigation. A fee per acre would be an obvious approach. The fee should not be based on a site-by-site assessment like EDPs. Instead, it should be generic, and could be based on the funds spent on environmental protection from previous nuclear projects. If the fee payable were £1m per acre for the most protected environmental areas, then nuclear projects would make a substantial contribution to nature.

288. The payments should go to a new nature fund administered by Natural England. It should be free to distribute the money to organisations engaged in nature conservation and restoration such as the ones mentioned above, and to spend it on scientific research and expertise to inform its own activities. The money could not be spent on litigation.

289. We believe this proposal is proportionate. The entire nuclear estate in the UK is approximately 6,000 acres, or 0.01% of the UK. The high hazard nature of the nuclear estate makes it a very expensive location to make ameliorations compared to other sites. The high capital cost of nuclear projects means that delay is hugely costly. It has the ability materially to increase the resources going into nature restoration.

Recommendation 12: Alternative pathway to comply with the Habitats Regulations	
Owner: DEFRA	**Delivery Timeline:** December 2027
Allow developers to comply with the Habitats Regulations requirements by paying a substantial fixed contribution to Natural England at the outset. DEFRA should create a predictable, bright line procedure and set of fees based on comparable recent projects. This would reduce costs to developers and increase the environmental benefit, channelling money from surveys, assessments, and disputes directly towards nature preservation and recovery.	

The Environmental Impact Assessment Regime

290. Environmental Impact Assessments (EIA) give decision makers and the public a clear picture of a project's likely effects on the environment before consent can be given.

291. There has been a growth in the length and complexity of environmental assessments across all kinds of infrastructure projects, as developers and public bodies want to shield projects from legal risk. A 1988 review of EIA regulations found that a third of environmental assessments had fewer than 20 pages and 80% had fewer than 100 pages.(36) The EIAs for Hinkley Point C and Sizewell C ran for 31,401 and 44,260 pages respectively.(37) Changes in environmental standards alone cannot account for such significant growth in length and complexity. Instead, the increase in the volume of information indicates that further process and risk aversion are contributors.

292. There are mechanisms to reduce the need for re-assessment, such as the "Rochdale Envelope". This establishes an 'envelope' that gives developers freedom to develop within a wider set of constraints such as heights and physical parameters for development. In practice, this means that setting a 'reasonable worst-case scenario', where the developers assess the greatest possible realistic environmental impact (e.g. noise, ecology, traffic, visual impact) for a given project and then plan mitigations on this basis. If any predicted effect or change is within this 'envelope', there is no need to re-run the assessment.

293. The use of the Rochdale Envelope has a potential to overstate the adverse impacts of development. It can also have knock-on effect on the mitigation which must be secured because policy pushes towards mitigating reported impacts. In a system in which risk aversion exists, the Rochdale Envelope encourages requests for further assessment, without securing the flexibility it is intended to guarantee.

294. For example, the Examining Authority appointed to examine the Sizewell C DCO application, considered that uncertainty about a water pipeline's route meant that consent should not have been granted "without greater clarity about a sustainable water supply solution and any consequential environmental effects".(38) The Secretary of State disagreed with this conclusion, noting that assessments based on available information were included. This approach to utilising available information, based on what is known, aligns with the Rochdale Envelope, but this decision was later the subject of a judicial review.

295. Currently developers need to conduct additional environmental assessments each time they bring a new development forward, even for phased developments on single pre-approved sites. This inhibits fleet deployment. The granularity and the volume of information that has arisen in recent years goes beyond the requirements of the EIA Regulations. Courts have made clear that EIA "does not impose a standard of perfection" and that the assessment does not need to include "every conceivable scrap of environmental information about a particular project".(39) Over two decades ago, the courts warned that long EIAs risked the public and local planning authority "losing the wood for the trees".(40)

296. There is a balance between ensuring proportionate assessments, deferring surveys to the post-consent stage, and overstating impacts because of the use of the Rochdale Envelope. We consider that balance must be re-calibrated.

297. Lord Banner KC has suggested an amendment as part of the Planning and Infrastructure Bill that enshrines a "principle of proportionality" in the planning system. It would mean that the amount and type of information or evidence needed to decide on a planning application or consent must be reasonable and in line with the importance of the issues at stake. Decision-makers would have to consider what has already been decided elsewhere in the planning process and what could be dealt with later through planning conditions, obligations, or other regulations.(41)

298. Similarly, the Energy Security and Net Zero Committee of the House of Commons recommended, as part of its review of the New Nuclear National Policy Statement (EN-7), that there should be "support the use of conditional commencement mechanisms (also known as Grampian conditions)." These conditions allow the consent to be granted, and some works to be started, while restricting the start of other parts of the project until any relevant licences or authorisations are secured.(42)

299. We do not consider that on its own this will change the culture of environmental regulators, or the level of dispute as to what level of information is required. Further measures are therefore required especially to enable new reactors to be deployed rapidly in fleets.

300. The Levelling Up and Regeneration Act 2023 includes powers for Environmental Outcome Reports (EORs) to replace EIA. The timing of the implementation for EORs is uncertain, and the new regime appears to be largely the same, or worse in introducing uncertainty in the mitigation required. The measures below are therefore required, and we would encourage the future implementation of EORs to reflect these recommendations.

Recommendation 13: Proportionality in the Environmental Impact Assessment (EIA) regime	
Owner: MHCLG	**Delivery Timeline:** December 2027
EIA Regulations should be amended to: a) Include a "principle of proportionality" which requires decision-makers to, consider existing decisions (to discourage a ratcheting effect), and the extent to which outstanding matters will be addressed through other regulatory regimes. Only information necessary to determine the issue before them should be required. b) Allow relevant departments to issue binding statutory guidance requiring decisionmakers to ask only for proportionate scoping, surveys and assessments. c) Make clear, through an interpretive provision, that "likely significant effects" does not require complete, as opposed to proportionate, data about a potential impact. d) Affirm the Rochdale Envelope. It should be acceptable to grant consent while some surveys or design details are still outstanding. Worst-case assumptions should be case-specific and evidence-based, not drawn automatically from stricter precedents elsewhere. e) Where there is a dispute about the level of surveys or assessments, the Secretary of State should, as part of any DCO decision, specify the most proportionate level they consider acceptable to set expectations for future decisions and projects. The Secretary of State should, when giving such guidance, have significant regard to the potential for delay and cost on development.	

Modular Low-Carbon Acceleration Zones

301. In line with the findings of the Corry Review, a more strategic approach should be taken to assessment. This means prioritising environmental outcomes over existing processes. This would secure environmental enhancements that are proportional to each stage of development. Many European countries adopt this approach.

International comparisons

Conservation work done away from nuclear sites is often more effective than trying to fit nature measures into the limited space around a power station. Other countries already include this idea in their planning systems.

a) In Spain, the Government can ask solar developers to finance habitat development equal in scale to the area taken up by new panels.(43) The Rey I-IV solar project in Carmona, agreed to manage an offsite steppe-bird habitat on land equal to 100 percent of the area occupied by the solar plant.(44)

b) In Germany, wind farm operators that pose a collision risk to birds can pay into a national species fund, as opposed to attempting to modify their turbine designs.(45) For example, a 54-megawatt wind project in Germany agreed an annual payment of €160,680 into the species assistance programme.(46)

c) In France, they have a national market for biodiversity credits that developers buy. Credits pay for conservation work around the country.(47) For example, the developers of the Engie Green solar plant in Bouches-du-Rhône purchased credits, which were used to improve biodiversity across nine offsite hectares, as their main environmental mitigation measure.(48)

302. EIAs alone do not secure environmental enhancements. The purpose of the system should be to ensure that resources are spent on improving the environment in the most impactful way possible. This is currently not the case.

303. This new approach, based on the international comparators, could be used as part of a fleet approach, or on sites where multiple reactors would be possible; for example, where GBN is delivering three reactors on a site which could host 12 reactors. It would frontload the requirement for a more high-level strategic environmental assessment at the early stages, but this would then remove the burdens associated with project-by-project or reactor-by-reactor assessments.

Recommendation 14: Allow the development of Modular Low-Carbon Acceleration Zones	
Owner: MHCLG	**Delivery Timeline:** December 2027
MHCLG should legislate to allow the development of "Modular Low-Carbon Acceleration Zones" and utilise the approach for existing nuclear defence sites and GBE-N sites where multiple reactors are, or could be, proposed. The approach taken in Germany (noted above) in relation to wind development is useful. An approach like this could be beneficial in England. A proposed outline would be as follows: a) Assessment and Zone Creation: The promoter, developer, or government must carry out a Strategic Environmental Assessment (SEA) for areas chosen for new nuclear projects. This assessment, based on the maximum parameters, will highlight which parts of the area could be most affected by development. This defines a 'zone'. b) Plan: After the assessment and a period for public feedback, the Secretary of State will create a plan for the zone. This plan will set rules to reduce environmental harm, such as keeping development away from sensitive sites or limiting building heights. It will also decide how much developers must pay to make up for any remaining environmental impacts. Natural England will use this money for conservation or improvement projects in the area. c) Approval: The Secretary of State can only approve the plan if it clearly improves overall environmental outcomes, considering the benefits of nuclear power for Net Zero and climate change. d) Developer Contributions: Developers must pay a fee based on either the size of the development zone or the amount of energy the project will produce. e) Simplified Assessments Requirements: After the Secretary of State successfully designates a plan, developers no longer need to produce individual Environmental Impact Assessments and Habitats Regulations Assessments (if Recommendation 12) is not accepted) for any developments brought forward in the zone. Instead, individual projects must just be compliant with the plan and pay any required environmental contributions as their project progresses. f) Sensitive Sites Excluded: This system does not apply to development directly in highly sensitive areas like ancient woodlands, National Parks, or National Landscapes. g) Planning Acceptance: If a plan exists, any negative impacts from development are considered acceptable for planning purposes, unless there are highly exceptional circumstances.	

"One and Done Assessments"

304. There is a requirement for environmental assessments, both EIA and HRA, to be replicated at different stages. We have made a recommendation on the HRA element above, but this should also extend to EIA. For example, where planning applications are made to local authorities for enabling works, there is often a requirement for a separate EIA.

305. There is a further distinct issue. The Supreme Court's recent Finch judgement (2024) widened the scope of EIAs. They must now consider any indirect effects that the project might cause, or that are likely to happen because of the project, provided these effects can be reasonably estimated.(49) The judgement stemmed from a case about an onshore oil well. The court agreed

that EIAs should not just include the local effects of extracting oil, but also the wider effects – like greenhouse gas emissions – from later burning the oil.

306. The Finch judgement risks forcing developers to produce submissions covering the entire nuclear lifecycle, from mining to spent fuel disposal, even though a nuclear power station does not release greenhouse gases during normal operation. Some of these processes take place outside the UK and are regulated by foreign governments. It is difficult to estimate the impact of a single nuclear project as a result. Outside of the oil and gas context, the judgment has led to objectors arguing further assessments are required. Developers are therefore at risk of producing yet more documentation to justify the case for nuclear power and reduce legal challenges. Other forms of low carbon energy such as solar panels also have international supply chains, which generate carbon emissions, and could face similar legal challenges.

307. Some of the elements of a lifecycle will have been assessed separately but, following *Finch*, would have been considered in a previous EIA or need to be considered as part of a subsequent EIA. In his dissent in the Finch case, Lord Sales highlighted that it "would be disproportionate for [effects] to have to be assessed twice" and considered that the finding undermined the principle of proportionality.

Recommendation 15: One and done assessments and reversal of the Finch judgment for low-carbon electricity projects	
Owner: MHCLG	**Delivery Timeline:** December 2027
MHCLG should legislate so that an environmental assessment completed under one regulatory regime is accepted as sufficient for other regimes, unless there are compelling reasons to require additional information. The Government should also legislate to overturn the Finch judgment for low-carbon infrastructure. This would establish that if a later indirect effect of a development will be assessed under a separate EIA, or has previously been assessed, it does not need to be assessed as an indirect effect of the original development.	

Open Access to Environmental Assessment Data for Nuclear Sites to Reduce Developer Burden.

308. EIAs for nuclear projects must demonstrate a detailed understanding of the site and its surroundings. This typically covers geology, groundwater, ecology, hydrology, noise, air quality, background radiation and transport.

309. Each topic requires baseline data that captures existing conditions over at least one full seasonal cycle, sometimes longer. No central repository exists, so developers must gather this information themselves, from scattered sources or new fieldwork. Government agencies hold some, or all, of this data, but it is often incomplete or unpublished.

310. A 2023 report on the implementation of the EIA regime from the Office for Environmental Protection, flagged that "there is limited data sharing". It noted a study from the Irish Environmental Protection Agency which found that: "In Scotland, published monitoring data were available for only 1 SEA out of 10 reviewed. The situation in England is unknown, but there is nothing to suggest it would be dissimilar."

311. Licensing adds another layer of friction. For example, some Environment Agency datasets sit under "Approval for Access" terms rather than the Open Government Licence, meaning developers must request permission before using them in internal models. We consider there should be further sharing of the environmental assessment and survey information available.

312. Part of the challenge is that there is a lack of awareness about the cost of mitigations when they are proposed by developers. Once accepted by regulators, they are then built into early strategies, which makes it harder to change course without investing time renegotiating closed issues with regulators. For example, Hickley Point C had to develop, construct, and operate a water treatment plant to remove the naturally occurring metals and allow the groundwater to be discharged from the construction site into the estuary. The groundwater contains a naturally higher proportion of dissolved metals and other impurities than the environmental regulations permit for discharge. The operation of the plant itself requires energy and chemicals, which themselves lead to adverse environmental impacts. As further mitigation for the discharge of these trace levels of naturally occurring metals, the project was required to install a longer discharge pipe to take the groundwater 500m off-shore. These measures caused delays and added about £60 million to the project cost.

313. A greater understanding of costs would allow both the public and decisionmakers to identify disproportionate mitigation measures earlier.

Recommendation 16: Increase data-sharing, and transparency on environmental data	
Owner: DEFRA, DESNZ and NDA	**Delivery Timeline:** June 2026
DEFRA should use its existing Data Services Platform as a single home for Environmental Impact Assessment (EIA) related data. DEFRA should curate and host these datasets in line with Cabinet Office technical and metadata standards that make them interoperable. Any additional data that developers collect as part of the EIA process should be added to the repository as a condition of approval. The NDA should make available any environmental survey and data assessment to potential developers who could utilise their sites. The EIA Regulations and the Habitats Regulations should be amended so that developers are required to publish high-level cost estimates of the assessment process and any mitigations that are reasonably capable of costing more than £500,000. Where such mitigation is reported, the decisionmaker must decide whether the mitigation is proportionate and explain why the mitigation does not discourage development coming forward in the future. This will help to improve transparency about the cost of mitigations and help assess their proportionality.	

Timescales for Environmental Permitting

314. Developers are frequently faced with long delays while waiting for permitting decisions.

315. The Environmental Permitting (England and Wales) Regulations 2016, set the expectations that applications for permits should be decided within three or four months where the public is consulted. If they are not, they are deemed to have been refused, giving the applicant the opportunity to appeal. Alternatively, the regulator and applicant can mutually agree to a longer process.

316. In practice, applicants will routinely opt for delay to avoid souring their relations with regulators or embarking on a potentially lengthy appeals process. As a result, there is the potential for significant delay. In a form of nuclear exceptionalism, in practice, permitting relating to activity involving radioactive substances is typically exempt from these timescales.

317. We have heard evidence that it took two and a half years for Hinkley Point C to receive a permit for the temporary combustion plant used during construction. This was after the Environment Agency originally told EDF to expect it within six months.

318. Similarly, it required ten months of debate to settle the permit for Hinkley Point C discharging groundwater during deep excavation. Because that approval came late, the civil works contractor had to re-sequence and redesign the excavation plan, pushing work back three months and adding approximately £60 million in cost.

319. These challenges are not helped if the regulator lacks sufficient skilled expertise, an issue we address in Chapter 9 (Culture, Capacity, Capability, & Innovation). When teams at regulatory bodies are short of either staff or expertise, it lengthens the time taken to address even routine permitting tasks. Public sector pay scales make it challenging for regulators to offer salaries to candidates with nuclear expertise that are competitive with the private sector.

Recommendation 17: Implement statutory timelines for environmental permitting	
Owner: DEFRA and DESNZ	**Delivery Timeline:** December 2027
Implement statutory timelines for environmental permitting. The Environmental Permitting (England and Wales) Regulations 2016 should be amended to: a) Require all applications have a time limit for decision-making no longer than 42 days (and this should not, as is currently the case, be a basis for prolonging the pre-application stage). b) Limit mutually agreed extensions to a single extension of 56 days. If no permit has been granted in this timeframe, the applicant should have the right to appeal to the Secretary of State, who must decide within 30 days.	

Requirements Relating to Biodiversity Net Gain

320. The Environment Act 2021, introduced a mandatory Biodiversity Net Gain (BNG) requirement in England for new developments under the Town and Country Planning Act (TCPA) 1990, meaning they must deliver 10% BNG and leave habitats in a better state for wildlife than they were in before.

321. The Environment Act 2021 also provides for a statutory BNG requirement for NSIPs. The Government is proposing to introduce BNG for NSIPs in May 2026. The Government published a consultation on this introduction earlier this year.

322. There is a risk that this extension, if not considered carefully, may apply BNG to land used temporarily during construction (which is not affected permanently) and land used in connection with permanent assets (such as grid connections or private wires) where there is no permanent impact above-ground. This is problematic because land is often borrowed for access, and landowners may not be willing to restrict their land for 30 years as is required by BNG.

323. There is also a risk that retained habitats will not be automatically counted in the post-development biodiversity value metric.

324. Nuclear power plants face special complexities. The full development boundary, known as the Order Limits, includes several areas that will never be affected, but which may include cable routes. The exact territory covered varies during the project and is not known exactly at the outset.

325. This is further complicated by the existence of different BNG metrics, reflecting policy change over the last few years. Mid-project metric changes can sometimes introduce discrepancies which affect the risks for projects in the implementation phase.

326. The NDA have told the Taskforce that planning conditions relating to the need to address BNG create unintentionally perverse outcomes when applied to decommissioning projects. Many nuclear sites have become de facto nature reserves after decades behind fences. This means that when the NDA clears contamination or demolishes buildings, it can disturb those habitats. Under BNG rules, this means that biodiversity has been 'lost', even though the land is being made safer and cleaner. This is another example of an environmental gain being treated as a penalty. The NDA told us this has introduced a liability of approximately £10bn. This incentivises the NDA to delay or scale back clean-up work.

327. BNG is partly duplicative because the NDA already has a statutory duty to conserve and enhance biodiversity under the Natural Environment and Rural Communities Act 2006, which requires any public body to consider and pursue actions that conserve and enhance biodiversity. This duty is less likely to create perverse incentives, as it operates at an organisational rather than a project level. This means that the NDA can choose practical, low-cost actions that genuinely help biodiversity, as opposed to being boxed into bespoke measures designed to hit a BNG metric on a specific site.

Recommendation 18: Implementation of Biodiversity Net Gain (BNG)	
Owner: DEFRA	**Delivery Timeline:** December 2026
When BNG is extended over to the NSIP/DCO process, it should, in the case of low-carbon infrastructure: a) Exclude land used for temporary purposes. b) Cover only land actually affected, rather than the entire Order Limits. c) Include preserved habitats as a positive outcome of the end state. d) And keep to one BNG calculation throughout, even if policy changes during the approvals process. Decommissioning activities (both civil and defence) should be entirely excluded from BNG requirements.	

Duties Relating to National Landscapes

328. The UK designates certain areas 'national parks' and 'national landscapes' (formerly known as 'areas of outstanding natural beauty'). These receive additional legal protection for their natural beauty, wildlife, or cultural heritage.

329. Under the National Parks Act 1949, and Countryside and Rights of Way Act 2000, public bodies were mandated to have 'regard' for the impact of their decisions on these protected landscapes. The 2023 Levelling Up and Regeneration Act strengthened this, obliging them to 'seek to further the purposes' of the site. The phrase 'seek to further' isn't clearly defined in planning law.

It encourages decision makers to go beyond just considering harm to protected land but doesn't require them to achieve specific conservation results.

330. This new legal duty also appears to overlap with the protection built into the National Policy Statements, which make it clear that these landscapes enjoy the highest possible status of safeguarding. For example, EN1, the National Policy Statement for Energy states that: "National Parks, the Broads and AONBs have been confirmed by the government as having the highest status of protection in relation to landscape and natural beauty."(50) These statements already restrict development, requiring any harm to be justified and mitigated. The additional duty adds legal and procedural ambiguity without delivering stronger protection.

331. Despite the new duty being in force for less than two years, there have been at least four court cases about what the duty requires in practice. In some of these cases, objectors have argued the new duty requires refusals of permissions. Even with clear guidance, the duty could significantly delay projects. This stems primarily from its ambiguous drafting, the language of which is not used in any other context.

332. This duty has been a source of contention between developers and environmental organisations outside of court cases. For example, during the process for the Lower Thames Crossing, the local national landscape group argued that the new legal duty required £38 million in compensation, while the developer argued no fund, or at most one of £3 million, was sufficient to meet the new duty.(51) Similarly, in the Gatwick Airport DCO decision, the disparity between the financial contribution the developer was offering and that requested by environmental groups was large; the Surrey Hills National Landscape Board argued it necessitated a refusal of consent for the project.(52) This shows the potential for this duty to act as indirect tax on development, discouraging projects from coming forward.

333. In those two cases, the Secretary of State for Transport acknowledged the disagreement in the level of contribution and added a provision to the DCO requiring the final amount to be agreed by all parties before the project could commence.(53) The provision therefore not just discourages development, but also prevents those with permissions from implementing the projects until agreement, or protracted arbitration, is concluded. This is another example where process and delay imposes huge cost without commensurate benefit to those opposing.

334. Nuclear projects tend to be sited in coastal or rural locations, to ensure distance from large population centres and provide easy access to water for cooling. Many of these areas coincide with, or border, protected landscapes. We noted this point in relation to habitats. This means that this duty risks acting as a particular constraint on the Government's stated ambition of building out the UK's nuclear capacity. There have been a significant number of judicial reviews on this point, even following guidance issued by Natural England. There is a risk of this ambiguous wording complicating, or delaying, decisions on nuclear going forward. Guidance, or regulations, cannot solve these issues.

Recommendation 19: Remove or constrain the National Park Duty in Levelling Up and Regeneration Act 2023 (LURA)	
Owner: DEFRA	**Delivery Timeline:** December 2027
Amend LURA to remove or constrain the duty for local authorities to 'seek and further' national parks and landscapes by restoring the previous 'have regard to' language.	

Legal Risk and Challenge Create Unnecessary Burdens and Delays

335. The risk of legal challenge is a key contributor to the risk aversion displayed by regulators and developers. The risk is heightened by the ability of claimants to contest the same set of facts at multiple stages, for example at DCO, marine licensing, and at the original granting of a site licence.

336. Hinkley Point C and Sizewell C have faced seven separate legal challenges between them; all but one (an unsuccessful claim brought by the German and Austrian Governments in the European courts regarding state aid) related to planning or environmental questions. Six of these have been unsuccessful and one is ongoing. Most such judicial reviews fail. Sometimes developers keep working through the court case, but often they stop, at high cost, to avoid problems in case the courts rule against them, even where that outcome is unlikely.

Table 1: Judicial Review Cases and their Durations

Project	Case	Duration	Summary
Hinkley Point C	An Taisce v SoS (DCO JR)	625	The claimant argued that transboundary EIA consultation with Ireland was required. The claim was unsuccessful in the High Court and Court of Appeal, and the Supreme Court refused permission to appeal. (54)
Hinkley Point C	Greenpeace (DCO JR)	150	Greenpeace brought a judicial review against the DCO, but the claim was withdrawn.(55)
Hinkley Point C	Tarian Hafren v MMO (marine licence variation JR)	91	The claimant challenged the MMO's power to vary the licence to allow disposal at Portishead, and the claim was dismissed.(56)
Sizewell C	Together Against Sizewell C v SoS (DCO JR)	617	TASC brought multiple grounds including potable water and habitats. Permission was refused at a rolled-up High Court hearing, the Court of Appeal dismissed the appeal, and the Supreme Court refused permission to appeal.(57)
Sizewell C	Stop Sizewell C v ONR (site licence JR)	210	The claimant sought to quash the ONR's nuclear site licence on a sea defences point, and the claim was dismissed as "totally without merit."(58)
Sizewell C	TASC v SoS (seek DCO review/variation for coastal flood defences)	Ongoing	TASC has brought a judicial review over additional coastal flood defence works said to be omitted from the DCO, and the case is pending.(59)

337. The direct costs associated with judicial reviews have been estimated as between £60m to £120m for some significant highways projects.(60) The indirect costs can be significantly higher. Indirect costs come from investors bearing risks such as supply chain disruptions, decommissioning shortfalls, and higher financing costs.

338. An assessment by the Department for Energy Security and Net Zero concluded that "an adverse Supreme Court ruling by April 2026" would have the potential to expose "up to £2bn for NZT [Net Zero Teesside] and £1.7bn for NEP [Northern Endurance Partnership]... [and] a highly unlikely scenario of prolonged court proceedings, with project developers maintaining current schedules and spending, maximum exposure was assessed to be £6bn".(61)

339. These figures don't include harder-to-measure costs, like missed investment opportunities or creating obstacles which destroy the 'critical path' for the delivery of an infrastructure project. In the nuclear context, one developer told us that judicial review posed an 'existential' risk to the £40bn project. This was because of the potential delay it introduced, rather than the developer fearing that the claim may be successful.

340. The issues in this section are compounded by court backlogs, and expertise. Lord Banner, in his review(60), highlighted that there were instances where "non-specialist judges in NSIP cases reached what were considered to be surprising decisions (including at the permission stage), and about the impact on stakeholder confidence in the judiciary from instances where important cases in a highly specialist field were determined by judges with little or no experience of that area". This means there is a need for additional resilience and resourcing in the courts.

Case Study: Impact of Judicial Reviews on Operators

Sizewell C has been involved in multiple judicial reviews following the grant of its Development Consent Order by the Secretary of State for Energy Security and Net Zero and the ONR's licencing decision since July 2022. There have been subsequent requests for appeal after claimants were denied permission. Sizewell C notes that these judicial review applications were made at the time it was undertaking archaeology investigation work (total value of over £100 million) necessary to protect regional and national heritage. The direct cost of the judicial reviews, which include considerable staff and legal fees, were several million pounds. Whilst not negligible, these costs were not substantial when compared with schedule and cost implication of delays, standstill and re-mobilisation that could have materialised, amounting to tens of millions of pounds. Sizewell C chose to proceed at risk due to significant cost implications of delaying the project during each determination period, and considers that had it not done so, these repeated applications would have posed an existential risk to the project.

Access to Justice

341. The UK is a signatory to the Aarhus Convention. This is an international agreement that aims to ensure public participation in government decision-making on environmental questions. A key principle of the Convention is public access to justice.

342. While several responses to our consultation raised the UK's ongoing membership of the Convention, whether the UK should continue to be a signatory sits outside the scope of the Taskforce.

343. The UK's application of the Aarhus Convention, caps claimants' costs in judicial review proceedings at £5,000 for individuals and £10,000 for organisations. A cost cap does not affect strong legal challenges, but may encourage weaker ones. In effect, the "subsidy" it provides is greatest the weaker the basis for appeal.

344. The UK's application appears to be more rigid than many other signatories though there are difficulties in making comparisons given differences in legal aid regimes.

Interpretation of the Aarhus Convention

Other signatories of the Aarhus Convention do not apply a system of caps. This means that the loser in a case will often have to cover a significant portion of the winner's costs. Their own costs are sometimes, but not always, supported by the country's legal aid system.

a) In German environmental cases, court and legal fees are capped via a formula focused on the financial 'value' of the project being disputed. Claimants who lose in court are obliged to cover the costs of any expert opinions commissioned by the developers, without an upper limit.(62)

b) In 2018, Norwegian courts compelled Greenpeace and other environmental organisations to pay the Norwegian Government 580,000 NOK (then worth around £50,000) after these organisations lost their case that the Government had violated the constitution in awarding oil drilling licenses in the Arctic.(63)

c) The Italian Council of State has ruled that the Aarhus Convention does not override the country's general legal principle that the loser should cover court costs, after accusers had argued that being ordered to pay €16,000 in costs violated this rule.(64) The Italian courts have the ability to impose damages on claimants if the judge believes that a trivial claim has been brought.

345. The UK set its cost cap in 2013, and it has not been adjusted in line with inflation. It does not reflect how many of these challenges, while technically fronted by individuals, are often backed by well-resourced crowd-funded initiatives.

346. Claimants get 'three bites of the cherry' to be granted permission to challenge a project: through written submissions, an oral hearing, and then at the Court of Appeal. The Banner Review of legal challenges against NSIPs concluded that: "The current three bites of the cherry to obtain permission to apply for judicial review is excessive and should be reduced to either two or one."(60)

347. Access to justice, as set out by the Supreme Court, "is not restricted to the ability to bring claims which are successful. Many people, even if their claims ultimately fail, have arguable claims which they have a right to present for adjudication."

348. While it's important for the public to be able to challenge public bodies when they make mistakes, disputes over government policy on low-carbon infrastructure should be handled in the political arena, not the courts.

349. Claimants should face penalties if a judge deems that the judicial review process is being misused. No element of the Aarhus Convention protects the misuse of the judicial process. Courts have determined in the past that there has been a misuse of judicial review in this area.(65)

350. To remove the costs caps altogether could lead to a position where costs do become prohibitively expensive. We believe the levels are too low and incentivise claims which have no prospect of success and which delay development. We believe the Government should take a more robust approach to challenging advisory findings of the Aarhus Convention Compliance Committee which in many cases are not binding, or enforceable against the UK.

Recommendation 20: Amend the cost cap for judicial reviews and limit legal challenges to Nationally Strategic Infrastructure Projects (NSIPs) to a 'single bite of the cherry'	
Owner: DEFRA and MOJ	**Delivery Timeline:** December 2027
Following consultation with the Lord Chancellor, enact the following changes to the operation of the existing cost caps: a) Where the court determines, in any part of the proceedings, that there has been a "misuse of judicial review", there should be an automatic removal of the costs protection. This should be coupled with a requirement that the counsel and solicitors certify, as part of a claim, that the grounds have a more likely than not chance of success. b) The cost cap is raised to take account of inflation since 2013 and linked to inflation going forward. Courts should, in addition, be issued guidance which encourages them to set higher caps, or maximally utilise their discretion, where there is a misuse of the process or where it is clear the intent is to delay development. c) The cost cap be cascaded, being doubled for each stage of a challenge (e.g. from £10,000 at the first instance to £20,000 at the Court of Appeal). d) Where crowd funding is utilised, the cap should be set at 70% of total funds raised (e.g. £70,000 if a campaigning group has raised £100,000 for a legal action). We consider that 70% represents a figure which balances access to justice, and the need for nuclear development without delay. e) The costs cap for the decision-maker being challenged should always be set at a level which is at least 5 times the claimant's cap in order to balance the relationship between a challenger and the decision-maker. If necessary, prior to the enactment of the above, amend the Aarhus Convention under Article 14 of the Convention which endorse the principle of the measures above. If the principle of these measures is not endorsed, the UK should dispute any findings against it. Ongoing membership to the Convention is a matter for the UK Government. The principle of a 'single bite of the cherry', and the above measures, should be extended beyond just NSIPs to nuclear site licensing and permitting decisions. If claimants lose on an issue relating to the DCO, they should not be able to re-run the same dispute at the site licensing or environmental permitting stages.	

Further Measures on Judicial Review

351. The measures above will not, by themselves, be sufficient. We have considered two further measures.

352. First, there has been a suggestion of new parliamentary processes which seek to prevent judicial reviews by following a confirmation order process that is likely to add at least an additional 6 months to overall delivery of projects.[1] (66) No respondents to our consultation supported this approach. This proposal should be avoided in trying to reduce the potential impact of judicial review on the development of nuclear. These are unlikely to reduce the timescales and risk politicising decision-making.

353. Second, the Government could provide protection for developers in respect of planning decisions on nuclear reactors and decommissioning sites unless exceptional circumstances apply. This would mean development could proceed during any judicial review. It would also reduce the incentive to bring spurious challenges purely as a delaying tactic.

354. The Government does this in other areas outside of the nuclear context. In some cases, the Government has stepped in to protect planning decisions when legal claims are still unresolved. For instance, it has agreed to providing cover for a series of 'contingent liabilities' for a carbon capture project, even if a court overturns a planning decision.

355. One issue with this approach is that challengers may seek to obtain interim injunctions that would counteract the indemnity by mandating a pause in development. This is not a strong argument against indemnity, as interim injunctions would likely be limited to irreversible works and the specific matter before a court (e.g. flood defences, or a marine licence).

Recommendation 21: The Government should commit to indemnifying nuclear developers against any damages they incur as a result of proceeding with their project while a judicial review is being decided	
Owner: HM Treasury	**Delivery Timeline:** June 2026
This would mean indemnifying nuclear developers against any damages they incur as a result of proceeding with their project while a judicial review is being decided. The Civil Procedure Rules should be amended so that any interim injunctions would be limited to irreversible works which relate to the grounds of challenge.	

Issues Relating to Decommissioning, End-State Designations and Proportionate Regulatory Control

356. The end state of a site is the condition of an entire nuclear site (including the land, structures and infrastructures) once decommissioning and remediation activities have ceased. Assumptions on the preferred end states are reviewed regularly as policy, technology and expectations change.

357. Options range from return to 'greenfield' and opportunities for unrestricted further use, through release as 'brownfield' with more restricted re-use, to maintaining a robust storage regime and institutional control for many years to come.2

358. Secondary legislation to enable proportionate arrangements and earlier delicensing (known as the Proportionality Regulatory Control (PRC) regime) was laid on the statute books for never progressed. PRC would signal where more proportionate arrangements should apply and enable earlier site delicensing.

1 For example, see Amendment No. 52 to the Planning and Infrastructure Bill in the Marshalled List of Amendments dated 15 July

2 Greenfield land is undeveloped land such as agricultural fields or open countryside that has not previously been built on. Brownfield land denotes previously developed land, such as former industrial sites, now available for redevelopment.

359. The site end-states work is key to ensuring all decommissioning and remediation activities are focused on delivering safe and sustainable outcomes in completing the NDA's mission. Significant opportunities exist to improve the ability to do this, but the benefit will not be realised if the PRC regime is not implemented and if the NDA is unduly constrained in the ability to consider alternative options. Continued government and regulatory support is essential to finalise the legislative requirements for PRC, enable consideration of a broader range of options for site end states, and secure a more appropriate regulatory regime for the NDA mission.

360. Exploration of broader options for end states would also help ease the nation's decommissioning burden from a cost, schedule, and risk perspective, whilst maintaining acceptable safety and environmental performance.

361. The Nuclear Installations Act 1965 provides the framework for licensing nuclear sites and for the third-party nuclear liability regime in the UK, as required by international law. International recommendations set out a procedure for excluding sites from the nuclear liability regime when hazards and risks fall below specified levels. In the absence of that exclusion, nuclear sites in the final stages of decommissioning and clean-up are currently subject to dual regulation by the Office for Nuclear Regulation (ONR) and the environment agencies.

362. These sites remain under dual regulation until the ONR notifies the licensee that the site has met the "no danger" criterion. In practice this means removing virtually all the lightly contaminated foundations and substructures from a site and transporting them to disposal facilities elsewhere. For a typical Magnox site, this can be thousands of cubic meters of lightly contaminated waste.

363. During the final stages of decommissioning and clean-up, hazards and risks fall to levels comparable to those on non-nuclear industrial sites. At this stage, the focus is on waste management and land remediation.

364. Both duty holders and regulators have failed in many instances to apply proportionality to decisions, especially those associated with non-nuclear risks albeit on nuclear licensed sites. For instance:

a) At the Bradwell site, rather than take the disconnected boilers down to a horizontal position which would been safer but would have designated them waste, the decision was made to install significant steel reinforcement to retain them in the vertical position as a result of conflicting regulations.

b) It is expected to take ~£5m to knock down and manage the blowers and turbines at the Cottam coal powered site. It would be at least an order of magnitude more on a nuclear site unless normal Construction Design and Management (CDM) regulations are permitted for activities such as demolition. Graded licensing or applying non-nuclear "normal" CDM rules should be used when the issue is non-nuclear.

365. Under current rules, implementation of on-site disposal of wastes, under the Guidance on Requirements for Release from Radioactive Substances Regulation, is undertaken 'at risk', meaning that the regulator may force the operator to dig it back out and ship it off site.

366. The Government has accepted the case for streamlining in this area, including proposals for earlier delicensing(67), following an October 2018 consultation. The Energy Act 2023 updated the legal tests for varying or revoking a nuclear site licence and makes it easier to treat low-risk disposal sites independently of the nuclear third-party liability regime.

367. Secondary legislation is required to make these changes operational. This includes amendments to the Environmental Permitting Regulations to clarify when, and how, a site should be transferred from the nuclear site licence regime to the environment agencies. Implementing this secondary legislation would give a signal for more proportionate arrangements to be applied on nuclear licensed sites. It would also enable earlier delicensing of sites by allowing non-radiological clean-up work to be managed under normal environmental permitting, health and safety, contaminated land, and CDM regulations rather than the nuclear site licensing or authorising frameworks.

368. Once activities are removed from the nuclear site licensing regime, clean up becomes much quicker. For example, teams can produce the kinds of safety assessments normally seen in the construction industry, rather than full nuclear safety cases. It also reduces the number of approval steps and allows for quicker and cheaper onsite activity.

369. This could have a huge impact. The NDA confirmed to the Taskforce that the potential savings for their Winfrith site alone were re-estimated in 2024 at £45 million, up from £32 million in 2016 and it would eliminate around 10,000 HGV movements to and from site, while reducing the time to end-state by over two years. Given a similar escalation of costs across the current Nuclear Restoration Services (NRS) decommissioning sites, the total cost savings would be £6 billion.

Recommendation 22: Proportionate regulatory control of radioactively contaminated structures and infrastructure	
Owner: DESNZ	**Delivery Timeline:** December 2026
DESNZ to commence sections 303 and 304 of the Energy Act 2023 and propose additional secondary legislation amending the Environmental Permitting Regulations so that the legislation is in place by December 2026. Given the statutory and long-term nature of the NDA and its mission, government should mandate the NDA to undertake work with the regulators to propose a more suitable and flexible policy, and a more proportionate legislative and regulatory regime with respect to site end-states.	

370. These recommendations alone will not address the significant overlap and disproportionality in processes in the decommissioning context:

a) **Planning permission:** Many decommissioning activities, including radioactive waste management activities, require planning permission under the TCPA 1990. Each of these consents involve separate planning applications which take time for review and permission. Unlike certain statutory undertakers such as electricity, water or transport bodies, the NDA does not benefit from permitted development rights. These rights allow bodies to carry out certain kinds of development without submitting a separate planning application each time, provided the works meet specified limits and conditions.

b) **The application of EIA:** Under the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations (EIADR), reactors commencing decommissioning after 1999 require ONR consent. EIADR covers the entire multi-decade decommissioning lifecycle and detailed impacts cannot be fixed at the outset. When the programme changes (scope or timescales), NRS must seek an ONR determination on whether further EIA is required.

c) **EIA duplication specific to decommissioning:** Some activities will need to comply with the EIA Regulations under the TCPA. This can lead to multiple EIAs being prepared for the same site, with potentially differing scopes. This creates additional workload for regulators and means local communities may be consulted more than once about activities on the same site.

d) **Permitting requirements:** The NDA and its subsidiaries manage significant stockpiles of materials during the course of their work. This includes accumulations of rubble and concrete arising from the demolition of facilities. These materials have potential use in the future on the NDA sites. Currently any plan to stockpile for a period of longer than three years requires an application to the relevant environment agency for a Landfill Permit. This disincentivises the storage of materials, resulting in off-site waste. This can have adverse impacts for the environment and increase cost. When a permit is modified, there is a requirement for an updated Environmental Safety Case. We have heard that this process involves disproportionate requirements imposed by the EA for little or no safety benefit. The Taskforce expects these to be proportionate as set out in Chapter 6, Risk Management and Proportionality.

e) **Inconsistent regulation and guidance:** the Taskforce has been made aware of numerous instances of conflicting regulations as highlighted in the Winfrith case study in Chapter 5, Simplification.

f) **Moving targets in guidance:** The update to the Guidance on the Requirements for Authorisation of Disposal Facilities on Land for Solid Radioactive Waste (GRA) overlaps with the timescale for the preparation of the Low-Level Waste Repository Environmental Safety Case (LLWR ESC), which NWS must submit by May 2026. The revised GRA will not be published until March 2026. NWS will need to undertake a gap analysis after submission to assess its implications. The EA should enable NWS constructively to deliver their programme and take a proportionate approach to this gap analysis. The principle that updates to guidance should not create abortive work, or delay development, applies generally in this context.

371. There is a strong case for a single, and more proportionate, decision-making function in this context. The Cunliffe Review, an independent report into the water industry, endorsed the concept of “constrained discretion.”(68) This means a framework that grants regulators greater flexibility to determine how best to deliver statutory outcomes in a local place or context, in line with a set of constraints or guardrails.

Recommendation 23: Proportionality in permitting for decommissioning activities	
Owner: DEFRA, DESNZ, MHCLG, NDA and EA	**Delivery Timeline:** December 2026

a) DEFRA to amend the Environmental Permitting (England and Wales) Regulations 2016 (EPRs) to create an exemption for stockpiling materials on an existing nuclear site subject to generic conditions. This should be agreed between the NDA, and the Secretary of State. This system should be in place by end of December 2026.

b) DESNZ legislates for "constrained discretion" in the context of decommissioning activities (covering the EPRs, CDM and other legislation). Should there be a circumstance in which an activity concerns multiple regulators, a single lead regulator should be designated to make a decision. Using their constrained discretion, a lead regulator should be able to grant approvals where inconsistencies across regulations apply, taking into account overarching outcomes.

c) Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations be amended to avoid the need for duplicative assessments. Government must legislate to ensure there is no more than one Environmental Impact Assessment. In tandem, the Government should seek an amendment to the Aarhus Convention to ensure that there can be no finding against the UK in respect of this change.

d) Going forward, there should only be a requirement to comply with guidance that existed at the outset of an assessment unless otherwise exceptionally specified. More specifically, the EA should not require the application of an updated GRA for LLWRs in relation to the ESC prepared for the GRA and that a proportionate and enabling approach is taken to reviewing updates to the ESC.

e) MHCLG should amend the Town and Country Planning (General Permitted Development) (England) Order 2015 to include Permitted Development Rights which are granted to the NDA. These rights should be equivalent to powers granted to statutory undertakers.

372. Many of the issues analysed in this chapter affect all large infrastructure projects and other development. Our recommendations have focused on solutions in relation to nuclear, but the Government should consider the merit of applying these more broadly to drive productivity growth.

Chapter 8

The Planning System

This chapter identifies ways in which the planning regime could be reformed to better enable new nuclear, decommissioning and defence operations to thrive.

Summary

The Nationally Significant Infrastructure Project regime is inefficient. Nuclear projects face up-to four or five year approval timelines, mainly due to prolonged pre-application and decision phases.

The system treats every project as novel. This leads to the duplication of paperwork and regulatory engagement, along with unnecessarily bespoke DCO terms. This undermines the "one-stop-shop" purpose of the Planning Act for individual projects. It is an obstacle to a 'fleet' approach to nuclear power. Current siting criteria, such as the Semi-Urban Population Density Criterion, are flawed, and risk disqualifying optimal sites, and conflict with government policy on co-locating power with industry.

Fragmented regulation across planning, environmental, and nuclear domains leads to extensive duplication, such as overlapping Environmental Impact Assessments, the need for multiple permits for a single issue, and inconsistent interpretation between regulators.

Many of the challenges that apply to licensing, including duplication, regulatory fragmentation, and a lack of proportionality, also apply to decommissioning activities.

Application of the "Critical National Priority" Policy Designation

373. The energy National Policy Statement (NPS) states that low-carbon infrastructure is a "Critical National Priority" (CNP). This is contained in EN-1 and draft EN-7. In EN-1 it states that the need for this infrastructure will 'in general' outweigh impacts that cannot be addressed through the mitigation hierarchy.(50) There is no clear answer to where the phrase 'in general' applies. This phrase should be removed, or it should only apply in exceptional circumstances.

374. The NPS applies to NSIPs. Outside the NSIP regime, projects are judged against local development plans and the National Planning Policy Framework (NPPF). These documents do not need to apply the same CNP policy. The absence of the CNP in conventional planning has led to decisions in which the Secretary of State has said that "as the proposal does not fall within the scope of the Planning Act 2008 as Critical National Priority infrastructure, she does not attribute weight to EN-1 in this decision."(69) This means that applications for enabling works, for nuclear development below 50 MWe, and for nuclear-adjacent development like factories and plants do not enjoy the benefits of CNP.

375. The Levelling Up and Regeneration Act 2023 legislated for "National Development Management Policies" (NDMPs). These plans are nationally set planning rules that have statutory force in decision-making and usually override local planning where they conflict. This would potentially allow small nuclear developments and enabling works to avoid the local planning system. So far, no NDMPs have been issued.

Recommendation 24: Improving the application of Critical National Priority (CNP)	
Owner: DESNZ	**Delivery Timeline:** June 2026
The CNP (as contained in EN-1 and draft EN-7) should be updated by DESNZ to strengthen the policy presumption by removing the words "in general", and "it is likely" (which we understand is now being proposed) and replacing the words "as a starting point" with stronger language which reflects the need for new low-carbon infrastructure. The Secretary of State for Housing, Communities & Local Government should update the NPPF to contain the same CNP presumption. In due course, the Government should issue a statutory National Development Management Policy for low carbon infrastructure, including for or nuclear development below 50 MWe and non-generating supporting infrastructure which contains the same CNP, and policy tests contained in EN-7.	

Reducing delays in the process for Nationally Significant Infrastructure Projects

376. Under the Nationally Significant Infrastructure Projects (NSIP) regime, in England, reactors over 50 MWe are classified as NSIPs and must go through the process to obtain a Development Consent Order (DCO). A DCO consolidates multiple permits and consents into a single application process.

377. The DCO process typically takes two and a half years but has in recent years often taken as many as four and a half.(70) Delays are largely caused by the pre-application and decision-making stages but the entire process is slow.

378. The pre-application period for NSIPs lasts for an average of two years.(71) For nuclear projects, it can be longer: between 2014 and 2022, seven public consultations were held for the proposed Sizewell C Nuclear Power Station.(72) There were eight years between Sizewell C's first consultation and the application being submitted. Delays were partly due to uncertainty over financing, but environmental and legal requirements relating to an application for development consent were also a significant cause.

379. In April 2025, the Government proposed to remove statutory consultation.(73) The Taskforce endorses government proposals to remove the requirement for statutory consultation. The Government must avoid creating new guidance that reinstates many of the same consultation expectations.

380. When an application is submitted, the Planning Inspectorate has to determine whether it is of a "satisfactory" quality. The process has become more demanding, meaning that small problems that used to be accepted now often cause applications to be withdrawn and resubmitted. In the first ten years of the regime, there were only seven instances of a project withdrawing at this stage. In the last five, there have been almost double. In most of these decisions, applications are re-submitted and accepted in short order. One recent example had an application re-submitted after 11 days of a withdrawal.(69) These decisions do not take into account the urgent need for new low-carbon development, cause delays, overlook the opportunity to address issues during the pre-examination period, and ultimately damage the predictability of the regime.

381. The examination stage has become more burdensome for developers, local authorities, and statutory consultees. Nearly every measure (from the number of hearings, to the number of written questions) shows an increase even between Hinkley Point C and Sizewell C.(74) (37)

Table 2: Metrics of Planning Examinations

	Hinkley Point C (2012)	Wylfa Newydd (2018)	Sizewell C (2022)
Written Questions	17	1,006	2,229
Hearings	13	15	25
Documents	1,001	1,829	4,378

382. Nuclear is not the only area seeing this increase in complexity. The Government has noted that "some applications have generated more than 90,000 pages of documentation" on the Planning Inspectorate website. If a planning officer spent every minute of a 37.5 hour working week reading a 90,000 page application, it would take roughly 395 working days to read it all.(75)

383. This is driven by two factors.

384. First, there is a lack of consideration of precedented approaches endorsed by the Secretary of State. Each project is treated afresh, and asked to justify each aspect. Risk aversion exacerbates this issue, with the effect of adding further time and cost. For example, contrary to several established precedents, one Examining Authority (ExA) considered it necessary to recommend a decommissioning fund on a recent solar project(76); another ExA considered it necessary to ask for further agricultural surveys during examination(77); and in dozens of applications, ExA's have asked for promoters to justify why it is appropriate for a requirement for a plan to be "substantially in accordance with" an outline plan even though the Secretary of State has consistently used this terminology.

385. This is also, in part, driven by disparate views on national policy. The number of times the ExA appointed on projects has recommended refusals for NSIPs has radically increased over time. In all but a few cases, the Secretary of State overturns these recommendations for refusal.(78) The ExA on the Wylfa Newydd Nuclear Power Station recommended refusal based on impacts on terns and protected sites, and the socio-economic and cultural effects of a large construction workforce on the local area. It is highly unlikely that the Secretary of State would have agreed with these conclusions given the benefits of the new nuclear plant.

386. Second, objectors will submit the same information with little new substance. In some cases, it is clear there is "copying and pasting" of the same submissions.(79) This leads to a "ping-pong" of responses, which triggers further responses, driving additional burdens in examinations.

387. There have been modest improvements in the post-application phase for project timescales. New measures are therefore required to prevent applications for critical infrastructure from being continually delayed.

Recommendation 25: Guidance issued by MHCLG is updated to streamline the Development Consent Order (DCO) regime	
Owner: MHCLG	**Delivery Timeline:** June 2026

MHCLG should issue guidance that:

a) Requires consideration of project importance when deciding on acceptance;

b) Secures the benefits of removing statutory consultation; and

c) Encourages continuous improvement in examination timescales and proportionality.

Statutory guidance should:

a) Expressly confirm that consultation and engagement should not be assessed during the acceptance phase; the scope and approach to consultation should be left to the developer's discretion. There should be no obligation to provide a draft EIA as part of consultation. Guidance may recognise the benefits of consultation but it should not create an expectation that it must always occur;

b) Establish a strong presumption that pre-examination periods are expected to finish in under four months. For projects designated as critical national priorities, rejection at the acceptance stage should only occur if there is strong evidence that any deficiencies identified at the application submission stage cannot be remedied within that presumptive pre-examination period;

c) Affirm the test on whether an application is accepted for examination should simply act as a validation exercise, whereby the Inspectorate should consider whether the required application documents have been submitted. The test on whether those application documents are "satisfactory" must require fundamental issues with the application documents;

d) Establish that where a project is designated as a critical national priority, a decision on whether to refuse an application for development consent at the acceptance stage can only be made by the Secretary of State of the relevant department. Where the Planning Inspectorate suggests a project should be refused, it must communicate the basis of its conclusions to the applicant, providing a reasonable period for the applicant to respond. That information alone should be provided to the relevant Secretary of State who will take a decision on whether to refuse the application;

e) Affirm there must be compelling evidence to re-examine an issue or approach where that particular issue or approach has a precedent in a previous DCO application and that has been approved by the Secretary of State;

f) Establish the examination period should be shorter if a technology has previously been consented unless there are significant issues. The examining authority should seek approval from the relevant Secretary of State where an examination is proposed to be longer than the same technology as compared to the shortest precedent; and

g) Provide that an interested party should be liable for costs where it raises the same matter, with no new substance (excluding signposting).

MHCLG should update the Planning Inspectorate's Framework Document to reflect the above.

388. This may not be sufficient to create proportionality in the process, as objectors to development may repeat previous representations, and risk aversion on the part of both regulators and developers could cause further delay. The introduction of an "Interim Recommendation Report" early in the examination process might enable a clear articulation of the preliminary views of the ExA, helping the developer fix weaknesses, opponents focus their arguments, and the process to run more quickly.

Recommendation 26: Interim Development Consent Order (DCO) Recommendation Report	
Owner: MHCLG	**Delivery Timeline:** December 2027
Government should legislate a requirement that each examining authority publishes an "Interim Recommendation Report" prior to the first deadline in an examination. This should set out the main areas to be examined, and representations may be disregarded save to the extent that the Examining Authority considers them important or relevant. This should mirror a final recommendation report as closely as possible, and replace the current list of "Initial Assessment of Principal Issues" which lacks detail.	

389. The Secretary of State must decide on a DCO application within three months. They have the power to extend this deadline provided they make a statement to Parliament announcing the new deadline. Extensions are used routinely, adding delay and uncertainty into the DCO process. This is the primary driver of delays post-application.

390. Where a decision cannot be made within the statutory timescale, "minded to letters" ensure that promoters can close any remaining evidential or mitigation gaps quickly, while reducing the risk of judicial review by maintaining procedural fairness. For the Gatwick Airport Northern Runway, the delay was accompanied by a "minded to letter", which signalled the Secretary of State's intention to approve. This provided an opportunity for the promoter and consultees to comment on the outstanding matters.

Recommendation 27: An amendment to the Planning Act 2008 to require "minded to" letters	
Owner: MHCLG	**Delivery Timeline:** December 2027
MHCLG should legislate, in the event of a delay, a requirement for the Secretary of State to issue a "minded to" letter which sets out the statement of reasons, outlining matters which have been determined, and those areas where the Secretary of State requires further information. Delays should be exceptional, and where a delay is sought, the relevant Secretary of State should seek the Prime Minister's approval to any such delay.	

Model Provisions

391. Many of the problems identified above, stem from examining authorities treating every project as if it were entirely novel. This causes duplication.

392. The enactment of the Planning Act 2008 was accompanied by the Infrastructure Planning (Model Provisions) (England and Wales) Order 2009 which contained 'model provisions', a set of standardised template clauses, for use in DCOs. The 2009 Order created an implied presumption that provisions drafted in line with these 'model provisions' were acceptable. This Order was later revoked. There are benefits to having model provisions for use in DCOs to ensure proportionality in the examination phase. They can also be reinstated to tackle the following problems, common across DCOs:

a) **Enabling changes that are better for the environment:** Many DCOs do not allow for design or construction variations, even when these would improve environmental outcomes. There are frequent questions about established terminology e.g., whether a plan needs to be "substantially in accordance" with some parameters.

b) **Avoiding issues with overlapping planning permissions:** The Supreme Court's Hillside Parks ruling means that if a site has overlapping permissions that physically conflict, the older permission becomes unusable, risking enforcement action for developers.(80) This is a particular concern for NSIPs, which often combine a main DCO with smaller local permissions, leading to unintended enforcement and delays. Some newer DCOs already have features intended to address this, with endorsement from the Secretary of State, and the problem is widely accepted.

c) **Repeated negotiations with statutory undertakers:** Developers must negotiate project-specific "protective provisions" with statutory undertakers (organisations responsible for critical national infrastructure like railways and sewers). These usually cover the same issues as previous DCOs but are treated as completely fresh and bespoke, leading to protracted negotiations.

d) **Time periods and deemed consents:** The Planning Inspectorate frequently adjusts standard time limits for procedural stages of a DCO. Deemed consents are often removed, and "deemed refusals" inserted.

e) **Dealing with uncertainty in utility connections:** Developers often lack precise information about the location of underground utilities. When utilities extend beyond the development boundary, fresh consents are typically required.

Recommendation 28: Reinstatement of the Infrastructure Planning (Model Provisions) (England and Wales) Order 2009	
Owner: MHCLG	**Delivery Timeline:** December 2027

MHCLG should legislate to reinstate the Model Provisions. These Model Provisions, in addition to standard provisions, should include:

a) A series of standard Requirements which ensure that management plans are required to be "substantially in accordance" with an outline document to preserve flexibility;

b) Provisions which enable the compulsory acquisition of rights required in connection with further utility works (see, for example, Schedule 18 to the Sizewell C Nuclear Power Station Order 2022);

c) A provision allowing variations that deliver environmentally better solutions. (see, for example, article 1(10) of the Lower Thames Crossing Development Consent Order 2025);

d) A provision which ensures that overlapping consents do not lead to enforcement action being taken (see, for example, article 55(2)-(3) of the Lower Thames Crossing Order 2025);

e) Time periods for consultation, decision-making, and notice periods across all provisions, should not exceed 28 days, and for protective provisions, this period should be 42 days (with deemed consent applying at the end of these periods);

f) Acceptable protective provisions for statutory undertakers which do not, in accordance with government guidance, negate other provisions of the Development Consent Order (DCO); and

g) Where a dispute exists, the default provisions should be utilised.

Statutory guidance should say these provisions should be accepted unless there fundamental and compelling reason not to.

Reinforcing the "one-stop-shop"

393. The Planning Act 2008 was intended to provide a "one-stop shop" for consents. Under section 150, there are some consents and approvals that the DESNZ or MOD Secretary of State can only disapply when the 'discharging authority' consents. For example, the requirement for an environmental permit cannot be disapplied without the consent of the EA. Many responses to our consultation highlight this as an issue.

394. Regulators expressed the view that repealing section 150 of the Planning Act 2008 would not be beneficial. There is a worry that it would make applications more complex as evidence would be required to justify disapplication. It would demand a level of information that is not available to developers at the point of application. Demand is unclear: few requests are made under section 150, and most are granted.

395. We believe we should make this change despite these arguments. Risk aversion and in-principle positions by regulators mean that the Secretary of State could reach a different conclusion on the level of information required to justify the disapplication, and disapplication itself. In relation to demand, developers are often reluctant to make requests that they know will be refused. Removing the requirement for their consent would therefore lead to better use of DCOs as a 'one stop shop.'

Recommendation 29: Consider repeal of section 150 of the Planning Act	
Owner: MHCLG	**Delivery Timeline:** December 2027
MHCLG should implement a 'one stop shop' for permits, potentially through repeal section 150 of the Planning Act 2008, or alternatively remove all of the consents caught by that provision using secondary legislation.	

Establishment of Central Government Discharging Function for DCOs

396. Requirements in DCOs are the equivalent of planning conditions. They are discharged by the local planning authority (or other discharging authority named in the DCO), following an application by the developer that submits the necessary information for approval. Local authorities are chosen for their local knowledge, but they are often resource-constrained and may object in principle to certain kinds of development.

397. There are exceptions to this that illustrate how an alternative system could operate. For DCOs promoted by National Highways, the Department for Transport (DfT) discharges these requirements. The DfTs National Case Unit ensures that applications are considered expeditiously (with some DCOs being discharged in short order). For example, it took the DfT less than 2 weeks to discharge the requirements for the A19 Testo's project and 56 days to discharge the conditions required for junction nine of the M3. By contrast, it took 150 days for the local authority to discharge one of the conditions for Hornsea 3. A centralised discharge unit also builds specialised knowledge, and ensures consistent decision-making across individual projects but also across different projects of a similar nature. This removes the burden from local authorities, which are resource constrained and where they lack experience with similar projects in other areas.-

Recommendation 30: Establish a unit to discharge Development Consent Order (DCO) requirements	
Owner: DESNZ, MOD and MHCLG	**Delivery Timeline:** June 2026
DESNZ and MOD should establish a unit which discharges DCO Requirements. Guidance issued by MHCLG should be updated to endorse the use of this unit as the discharging authority for DCOs relating to nuclear development. Local authority involvement in the discharge of conditions can be secured through a requirement for consultation prior to submission to the Department.	

Use of Special Development Orders

398. Projects under 50MW require an application to a local authority for planning permission under the Town and Country Planning Act (TCPA) 1990, as does development alongside energy projects that does not itself relate to generating electricity. That process has no fixed timescales, and in the event of a refusal, an appeal can take 2 years.

399. The length of the process depends on the local council. The TCPA 1990 allows the Government to grant Special Development Orders (SDOs), without placing burdens on local authorities to grant planning permissions. Historically, they have been used for complex development (e.g., large regeneration projects such as the Cardiff Bay Regeneration) but also in relation to nuclear site investigations.

400. SDOs give central government a fast, legally robust way of granting planning permission. They avoid the need for multiple local applications and avoid local authorities that object to a

specific development, in principle, blocking the construction of priority infrastructure.

401. In recent years, the power has been used to grant permission for Inland Border Facilities, and accommodation units on military sites. SDOs could provide a mechanism for nuclear development, decommissioning activities, and some military activities to speed up processes. The process outlined in the Levelling Up and Regeneration Act 2023 for Crown Land Development is unlikely to be as impactful as using SDOs for nuclear power.

Recommendation 31: Streamlining the conventional planning regime via Special Development Orders for nuclear power and automatic approvals	
Owner: DESNZ, MOD and MHCLG	**Delivery Timeline:** June 2026
MHCLG should allow developers of nuclear development and decommissioning projects to apply for a Special Development Order. This route should be optional, with a fixed government decision deadline of six months from application submission. Government should legislate that there should be an automatic grant of planning permission if no decision is made within 8 weeks for applications which continue to be made to local authorities. It should, using powers under the Planning and Infrastructure Bill, restrict the refusal of planning applications for nuclear and nuclear-related development (including generation, defence, decommissioning and nuclear manufacturing development) which continue to be made to local authorities.	

Amending EN-7 to enable a fleet approach

402. The current approach to new nuclear build treats each project (though not necessarily each reactor) as a standalone effort. This means separate regulatory approvals, design documentation, procurement processes and workforce planning. Constant re-invention of something replicable is inefficient and costly. Standardisation, across planning and regulatory regimes, does not appear to be sufficiently recognised. The Taskforce has been told that this is common across UK infrastructure, is not unique to the nuclear sector, and pervades the entire supply chain.

403. There are significant benefits associated with adopting a fleet approach. International evidence demonstrates that building in fleets can be quicker and cheaper than considering each project individually. It is also more likely to build robust high quality supply chains.

404. The policy should not require every project to follow previous designs exactly. Consent should only be refused in exceptional cases if an adverse effect arises from the fleet approach, especially where the Secretary of State has already endorsed the design and construction method.

405. The ideal approach would allow for improvements and consistency while minimising unnecessary changes that could slow down delivery. Without it, rapid deployment of new nuclear is unlikely.

406. Instead of endorsing a fleet approach in this way, one suggestion we have considered is for EN-7 to establish a specific set of steps ('known satisfactory practices') to mitigate particular impacts. Where those 'known practices' are followed, the Secretary of State could presume in favour of granting consent, especially where similar mitigation has been accepted before. This approach is unlikely to enable a fleet approach or significantly alter the adverse effects of project-by-project considerations. A strong policy which supports a fleet approach is therefore required.

Recommendation 32: Encouraging fleet approaches in EN-7	
Owner: DESNZ and MHCLG	**Delivery Timeline:** December 2026
DESNZ should amend EN-7 to include a statement that where adverse effects arise as a result of the adoption of a fleet approach, the adverse impact will not be a basis for refusal unless exceptional circumstances apply. It is critical that this position is not diluted through additional hurdles. The policy should expressly state that there is very large weight to be attached to the policy of standardisation. The test should make clear that if an adverse impact results from an approach already accepted in a previous application the "starting points" in relation to the CNP should also apply.	

Amending the Semi-Urban Population Density (SUPDC) criteria in EN-7

407. The Semi-Urban Population Density Criteria (SUPDC) is a test of whether a potential site is acceptable for a nuclear facility based on how many people live around it and their distance from the site.

408. The test is based on a 1967 paper modelling an iodine plume in the event of a radioactive release. The test draws a 30-kilometre circle around a proposed reactor and splits it into 30-degree sectors. Inspectors then count the population in one-kilometre rings within each sector, giving more weight to people who live close to the plant than to those further away.

409. The methodology is flawed for two main reasons.

a) It produces identical risk scores for a 10 MWe micro-reactor and a 3,000 MWe dual-unit pressurised water reactor with the same local demographics; and

b) The model of how radionuclides escape in a release does not reflect current reactor design.

410. The SUPDC restricts the UK from choosing nuclear sites that may be highly desirable. Heysham, for example, already hosts two advanced gas-cooled reactor (AGR) stations with a long record of safe operation. It has grid connections, cooling water, a skilled workforce, and strong local support. EN-6 identifies it as suitable for a potential new build. A new reactor at Heysham would likely fail the SUPDC because new housing has been built nearby over the years.

411. New developments should not be confined to remote areas. The original rationale for locating the second generation of AGRs in semi-urban areas was to reduce unnecessary transmission infrastructure. This is still an important consideration; Ofgem is currently planning £80 billion in upgrades over the next five years to enable the transmission of energy from renewable sources, which are often located in remote areas(81). A key advantage of nuclear is its transmission costs, which can be five to ten times lower per gigawatt than those of an offshore wind project.(82) (83) The Government has expressed support for co-location, so SMRs and AMRs can supply power and heat to industry. This is possible with new reactors. Many are designed with new passive safety mechanisms and many use newer fuels, designed to make releases of radioactive material even less likely than with conventional gigawatt power plants.

412. The majority of respondents working with new technologies confirmed that they could not bring forward new technology in some suitable locations, as well as existing nuclear sites, because of the methodology.

413. Other countries do not apply a separate population density rule as part of their planning process in the way that EN-7 mandates. We have carefully considered three potential solutions to this issue:

a) Removal of the site criterion for all nuclear installations, with no substitute;

b) Removal of the site criterion for LWRs, with a substitute process and revision for non-LWRs; or

c) Revision of the underlying methodology for all nuclear installations.

414. The last of these options entails accepting a significant delay, and ongoing uncertainty. We have been told that the shortest time for that option would be approximately three years. That is too slow and creates a serious risk of the UK being left behind because this is a critical early stage in the development process. The first proposal would remove some certainty provided to existing developers. There is also less familiarity with non-LWRs, giving rise to safety concerns which makes this first option difficult for government to accept.

415. The second solution balances these countervailing considerations. The removal of the criteria does not undermine safety because of other safeguards such as nuclear site licensing process, legal dose limits, and REPPIR19. Government may want to use siting criteria for first of a kind advanced nuclear technologies.

Recommendation 33: Creating a new pathway to allow semi-urban power stations	
Owner: DESNZ	**Delivery Timeline:** December 2026
DESNZ should amend EN-7 so that is provides two routes open to LWRs for complying with SUPDC: either compliance with the methodology, or via a new 28-day process culminating in an approval from the Secretary of State or the Commission (if established). This process should oblige the Government (or, if established, the Commission) to confirm that it has no objections in principle to a given proposal, in light of the safety which can be assured via the nuclear site licensing, and REPPIR19. The ONR should revise SUPDC to account for scientific and technological progress since the original system was created.	

Amend REPPIR to remove default distances

416. UK legislation introduced REPPIR in 2001. It replaced earlier radiation emergency rules. It was updated in 2019. It ensures organisations with radiation risks assess hazards, prepare emergency plans and ensure the public is informed. Local authorities develop and test emergency arrangements.

417. Outline Planning Zones (OPZ) are areas where high-level planning is required for early emergency preparedness. Default OPZ distances are based on older reactor assumptions. They do not account for modern designs like SMRs and AMRs. This guidance has led to extremely conservative planning zones, which then have knock-on effects for public perception and acceptability, as well as planning and emergency exercises, when in fact new reactor designs will be demonstrably safer. Implementation can also vary between sites, leading to inconsistency. This restricts siting opportunities. Operators can propose smaller OPZs, but none have done so to date, likely to avoid the perception that they are trying to weaken safety.

418. The Taskforce has heard unanimous evidence that the current methodology for calculating OPZs under REPPIR19 is outdated and requires revision. REPPIR should provide flexible, science-based frameworks that adapt to evolving nuclear designs, ensuing proportionate and consistent protection for the public. The OPZ should rely primarily on site-specific hazard assessments that reflect new reactor technologies, realistic accident scenarios and modern safety features.

419. We have considered two proposed solutions: that there are no default distances for OPZs, instead a requirement for case-by-case evaluation, or alternatively that there be default distances based on technology type or thermal power. On balance, we consider the latter would provide certainty on the starting point.

420. Detailed Emergency Planning Zones (DEPZ) are separate from OPZs. DEPZs are site-specific, refined zones determined from detailed hazard and consequence assessments. The DEPZ identifies the area where protective actions may be required in a radiation emergency. Local councils are legally responsible for setting the DEPZ.

421. The DEPZ is already based on detailed, site-specific calculations and remains appropriate. There is a potential for DEPZs to be used to impose onerous burdens on new nuclear development. REPPIR19 does not have an appeals process nor fixed timescales. These are all capable of adding further time and delay into the delivery of new nuclear development.

Recommendation 34: Proportionate Outline Planning Zones and Detailed Emergency Planning Zones under REPPIR19	
Owner: DESNZ, ONR and UKHSA	Delivery Timeline: December 2026
ONR and UKHSA should be asked to calculate revised default Outline Planning Zones (OPZs) for reactors of differing types and sizes, based on best scientific information. These would not prevent developers from proposing smaller OPZs if warranted. This should, in turn, be used to amend the default distances in Schedule 5 of REPPIR19. Regulations should further be amended that distances in excess of the new defaults cannot be imposed without the consent of the Secretary of State or Commission (if established). Government should amend the regulations to allow for an appeals process to the Secretary of State or the Commission (if established) in the event of local authority determinations on DEPZs which are disputed. In addition, regulation 8 of REPPIR19 should be amended to impose a fixed time limit of 12 weeks for determination and only allow re-determination with the consent of the ONR, or the Commission (if established).	

Regulatory justification

422. Justification is one of the core principles of international radiation safety. According to the International Commission on Radiological Protection, which formulated the principle, it means that 'any decision that alters the radiation exposure situation should do more good than harm'.(15)

423. Regulatory justification is incorporated into UK law through The Justification of Practices Involving Ionising Radiation Regulations 2004 (commonly abbreviated to JOPIIRR) as a transposition of EU law. If a developer wishes to build a new reactor design in the UK, justification is an early step. The guidance, issued by DESNZ, sets out that 'it is in the interests of the applicant to make an application at the earliest practicable opportunity and before significant expenditure has been made'.

424. Every application must in practice describe the technology and appraise the benefits and drawbacks, covering issues like the economic, society, environmental, health, safety, waste, and decommissioning benefits and costs. The Secretary of State for Environment, Food and Rural Affairs is responsible for assessing applications concerning nuclear power and must run a statutory consultation, involving both the public and regulators, such as the ONR, EA, the Food Standards Agency, UK Health Security Agency, and regulators from devolved nations. They publish a decision, along with any conditions limiting its scope.

425. Three designs have achieved justification in the UK to date: the European Pressurised Reactor, the AP1000 Pressurised Water Reactor, and the UK Advanced Boiling Water Reactor. The Nuclear Industry Association (NIA) applied for a justification decision for the Rolls-Royce Small Modular Reactor design in July 2024. This is pending. The NIA also applied justification for newcleo's lead-cooled fast reactor in March 2024, but newcleo has since announced its intention to scale back its UK operations.

426. The justification process frequently results in the duplication of work that is conducted later during other nuclear regulatory processes, adding up to two years of work without any apparent upside. The issues raised during justification are revisited in greater technical detail by the ONR, EA, and the Planning Inspectorate as part of the site licensing, environmental permitting, Generic Design Assessment (GDA) and Development Consent Order (DCO) processes. The public is also consulted as part of the GDA and before the Secretary of State issues the DCO.

427. The ONR, in its response to the justification application from Rolls Royce SMR, recommended that DEFRA as the Justifying Authority request significant amounts of detail that were already provided, or were due to be provided, as part of the GDA process. One developer reported that they were asked to provide 'information regarding water abstraction and cooling temperature rises', and a 'disposability assessment'. These aspects are already adequately managed under different regulatory regimes and are not available at earlier stages of project development.

428. DESNZ guidance notes that: "Although justification decisions and Environment Impact Assessments (EIA) and Strategic Environment Assessments (SEA) require some consideration of the same factors (environmental, economic etc.) the consideration is for different purposes and factors might well have different weights. For these reasons, it would not be appropriate for a decision under one to be conclusive as to the outcome under the other."(84)

429. We do not consider that this is sufficient justification to maintain regulatory justification as a separate process. If a project has obtained planning permission in accordance with the policy tests in the National Policy Statements and received a nuclear site licence, it seems implausible that it could then fail the key questions asked in the context of the justification process.

430. Justification decisions are often high-level summaries of the benefits of nuclear power, along with boilerplate text about the law and reactor designs. Despite this, we have heard compelling evidence that the level of information requested by regulators as part of this process is unduly burdensome.

431. Most countries with nuclear power, including the US, Canada, France and Japan, do not operate separate justification processes at all. If a design meets their licensing and environmental standards, it is considered justified.

432. The vast majority of respondents to both the Call for Evidence and the Interim Report were of the view that regulatory justification did not protect any aspect of human health that was not covered under a different regulatory regime.

433. The Government has already declared that it considers nuclear power to be clean energy that is necessary for our energy security in EN-1.(50) Every design to have secured justification in the UK, as well as the Rolls-Royce design under assessment, is a form of light water reactor (LWR).

434. Applying justification reactor-by-reactor is not how the justification process is applied to any other technology. As noted in the guidance, "the underlying principle that justification is to be applied generically rather than at the level of individual uses of a practice".(84) For example, the manufacturer of a new CT scanner needs only to demonstrate compliance with existing technical and safety standards, but do not need prove that medical imaging itself is a worthwhile activity.

435. The difference in treatment does not stem directly from the law but instead from a 2009 determination by the Secretary of State for Energy and Climate Change which determined that the ACR-100, the AP1000, the EPR and the ESBWR were sufficiently different that it was unlikely that they could be covered by a single regulatory justification decision.(85)

436. Stephen Tromans KC has provided a legal opinion noting that this approach is not mandated. His opinion sets out that the level of information required in relation to justification of a broad class need not require consideration of individual reactor technologies.(86)

437. There are significant costs involved in the existing process. The cost to DEFRA for each application is approximately £750,000. Eight consultant companies have recently been awarded places on the DEFRA Nuclear Energy Regulatory Justification Services Framework. That framework is valued at £8.7m.(87) The cost to developers can be up to £750,000.

438. Respondents who favoured the removal of regulatory justification presented three options:

a) issue a general regulatory justification for all nuclear energy generation as a new practice; or

b) issue a regulatory justification determination determining light water reactors fall within an existing practice; and/or

c) deem via legislative amendment that a nuclear project has been justified where that project has obtained a planning permission, or it has advanced through the GDA process, or it has obtained a nuclear site licence.

439. The first of these would take a significant amount of time without addressing the overlap between the regulatory regimes. Either of the second or third options would address this.

440. Whilst DEFRA told us that this could not be a quick decision, existing information and assessments in the application documents from 2009 form an adequate basis on which light water-cooled reactors could be deemed to be justified as an existing practice.(88) There is adequate information available for a prompt decision. Government had already confirmed nuclear energy generation was justified.

Recommendation 35: Streamlining regulatory justification	
Owner: DESNZ and DEFRA	**Delivery Timeline:** December 2027
Propose legislation that would deem the grant of a planning permission, the completion of Stage 2 of the GDA, or the grant of a nuclear site licence for a nuclear installation to be a justified practice. The Secretary of State for Environment, Food and Rural Affairs should issue a Regulation 12 determination that 'the use of ionising radiation for the generation of electricity from nuclear energy using uranium oxide fuel of low enrichment in fissile content in light water cooled, water moderated thermal reactors' is justified. Given we are not persuaded that there is a legal impediment to this route, in the event this target is not met, Government should propose amending the regulations via primary legislation, deeming that light-water reactors are deemed to be justified.	

Requirements Relating to Community Benefits

441. The concept of "community benefit" is that local communities should see immediate upside from low-carbon development, reducing potential objections. This can either take the form of financial contributions toward bills for those near development, or measures designed to provide local people with new amenity, such as sports and recreation facilities or community centres. Developers already deliver community benefits voluntarily.

442. The Independent Review of Net Zero published in 2022 concluded that "there must be improved efforts to involve communities and show the benefits of net zero action" and that "one way of doing this is through direct community benefit".(89)

443. Development often provides financial contributions under section 106 of the TCPA 1990, separate from any formal community benefit arrangement. These contributions must be: (a) necessary to make the development acceptable in planning terms; (b) directly related to the development; and (c) fairly and reasonably related in scale and kind to the development.

444. The equivalent of a Section 106 agreement for the Sizewell C nuclear power station secures £30 million in investment for housing, economic development and tourism schemes, a £23 million community fund, and £12 million towards the natural environment.(90)

445. The Government is currently consulting on a mandatory regime for community benefits. The Government's consultation states that "community benefits are legally immaterial to planning decisions and cannot be considered when deciding whether to grant planning consent". This follows case law which establishes that such schemes are not relevant to planning. This means that community benefits will be ignored in the planning context.

446. There is a potential for confusion between wider community benefits and measures secured under section 106. This may lead to additional costs for developers that make development commercially unviable. The proposed mandatory limit should therefore be set at a level which does not preclude new nuclear development, and this may require regional variations.

Recommendation 36: Proposals in relation to community benefits	
Owner: MHCLG	**Delivery Timeline:** December 2027
The Government should legislate to confirm the provision of community benefits is a material consideration in planning decisions. This will require primary legislation given the existing case law on the consideration of community benefits. MHCLG should issue clearer guidance on what matters are to be included as part of community benefits, and which should be excluded from section 106 agreement.	

Issues Relating to the Geological Disposal Facility

447. In 2006, the Committee on Radioactive Waste Management (CoRWM) recommended that a geological disposal facility be built. In 2008, the Government published "Managing Radioactive Waste Safely" which endorsed "an approach based on voluntarism and partnership as a means of siting of a geological disposal facility is the right way forward". This was followed in 2014 with the "Implementing Geological Disposal" framework, then a "Working with communities: implementing geological disposal" document in 2018 (updated in 2024) and a National Policy Statement in 2019.

448. The National Policy Statement concludes that "There is a technical, ethical and legal need to manage higher activity radioactive waste in the long term by disposing of this waste in a geological disposal facility." CoRWM is currently undertaking further work in the consideration of alternatives to a geological disposal facility. This is vital and needs to be embraced by dutyholders and the NDA and afforded priority given the impact it could have on current decommissioning operations and waste management.

449. The Taskforce has not re-examined the need for the GDF. It does however suggest that if not already within CoRWM's envisaged work that matters such as medium-term interim solutions and a fundamental review of the safety case for the GDF and the assumptions within it are challenged to ensure they are realistic and not driving over-engineering and excessive complexity given the impact on current decommissioning operations such as sentencing and packaging of waste.

450. The Taskforce has engaged extensively with the NDA, and Nuclear Waste Services (a subsidiary of the NDA), which is responsible for the delivery of the GDF. The GDF will require a DCO. Prior to the implementation of the GDF, extensive borehole investigations will be required to determine whether the site is suitable.

451. These boreholes, under the current framework, require DCOs under the Planning Act 2008. CoRWM told the Taskforce that they strongly consider the need for a DCO for the boreholes to be disproportionate. Nuclear Waste Services (NWS) does not have the benefit of compulsory purchase powers in a way that other utility undertakers, local authorities and even airport operators do. This impedes its ability to use an alternative consenting route.

452. An historic comparison of the site investigations for low-level waste repositories is instructive, even though the GDF, and associated boreholes, are greater in scale and complexity. Nuclear Industry Radioactive Waste Executive (NIREX) was established in 1982 to identify waste disposal sites. Elstow in Bedfordshire had originally been identified in 1983 as the potential site for a shallow repository, but in 1986 NIREX's investigations were widened to include three other locations in the clay geology of Eastern England. The site investigations (including boreholes) for approximately

1,080 hectares of land at Bradwell, Fullbeck, Elstow and Killinghome in connection with waste disposal were subsequently permitted under the Town and Country Planning (NIREX) Special Development Order 1986. This process took, on a conservative basis, 2-4 years.

453. By contrast, the DCO application for the borehole investigations for the GDF, is due to be submitted in 2028, 22 years after the identification of the need. The works could realistically start on the boreholes alone only in 2030 at the earliest. In August 2025, NISTA published a report which looked at major projects. The GDF was given a "red" rating, meaning that: "Successful delivery of the project appears to be unachievable. There are major issues with project definition, schedule, budget, quality and/or benefits delivery, which at this stage do not appear to be manageable or resolvable".

454. The Taskforce accepts that the relative complexity, policy stability and financing decisions have played a role in the long timescales associated with the development of the GDF. It accepts that the need for a DCO for boreholes has been driven by the lack of policy support and compulsory purchase powers for the NDA and NWS. The NDA ought to have the same compulsory purchase and safeguard powers as other utility undertakers , given that it provides nationally important infrastructure.

455. With these powers in place, the Taskforce is minded to agree with CoRWM that a DCO for boreholes is disproportionate. The process should be closer to that adopted for authorising site investigations for waste depositories in 1986. Given NISTA's determination that the GDF falls into the category of projects where there is a need for "re-scoping and/or its overall viability reassessed", the Taskforce considers that a significant shift in strategy is required.

Recommendation 37: Equalising the position of the NDA for the benefit of the GDF	
Owner: MHCLG and DESNZ	**Delivery Timeline:** December 2027
The GDF, and associated site investigation development, is given "Critical National Priority" status by MHCLG in both the National Policy Statement, and either the NPPF or National Development Management Policy. Government propose primary legislation which grants the NDA (and any member of the NDA group) the ability to promote a Compulsory Purchase Order and that the NDA (and any member of the NDA group) is deemed to have statutory undertaker status. MHCLG amends the GDPO to grant a permitted development right to the Nuclear Decommissioning Authority (and any member of the NDA group) to carry out surveys similar to the survey powers found in Part 17 Class J and K of Sch 2 of the GPDO. If the Government accepts the above recommendations DESNZ should, following consultation with Nuclear Waste Services and seeking independent advice, confirm that an alternative planning route for the borehole investigations does provide value for money. Our strong expectation is that a DCO is not proportionate for boreholes and the Government should propose secondary legislation to remove the requirement for a DCO for boreholes.	

456. Many of the issues analysed in this chapter affect all large infrastructure projects and other developments. Our recommendations have focused on solutions in relation to nuclear, and in some cases low-carbon infrastructure, but the Government should consider the merit of applying these more broadly to drive productivity growth.

Chapter 9

Culture, Capacity, Capability, & Innovation

This chapter sets out the transformation of the nuclear sector's culture and skills needed to unlock the innovation in technology and practice that are essential for growth.

Summary

Any misalignment of organisational culture from what is needed to deliver the nuclear mission is a strategic risk. The leadership of companies and regulators must understand their organisational culture and act to align values and behaviours with the mission.

Safety culture is a core component of an organisation's overall culture. The ONR Nuclear Industry Safety Culture Inventory should become the industry standard to quantify and develop safety culture across the sector.

The Clean Energy Jobs Plan, aligned with the Nuclear Skills Plan, sets out a clear strategy to build a diverse workforce of Suitably Qualified and Experienced Personnel (SQEP). Immediate action to grow capacity is critical to deliver the UK's nuclear ambitions and avoid workforce shortfalls that could delay progress.

Greater focus is needed to build workforce experience for sound decisions that balance safety, time, and cost. This requires a new approach that captures knowledge from retirees, enables secondments between regulators and industry, and adopts innovative methods to strengthen decision-making.

The sector must strengthen non-technical skills alongside technical capability. Enhanced leadership, communications, decision-making, resilience, team working, situational awareness, and emotional intelligence will enhance safety, improve regulatory engagement, and enable innovation.

The sector must adopt innovative technologies and new ways of working to improve delivery. Priorities include digitising safety cases for regulatory review, applying data-centric engineering for whole-life plant management, leveraging AI for decision-making, and deploying autonomous robotics for inspection.

Culture

457. Organisational culture is the shared system of values, beliefs, and behaviours that shapes how people in an organisation think, act, and make decisions. It defines "how things are done around here" influencing conduct and risk management at every level.

458. Nuclear organisations and supply chains recognise the importance of safety culture and the refrain "Safety is our number one priority" has been embedded over decades. This misses the broader cultural behaviours that affect delivery. The ALARP principle prioritises safety, but not at any cost and this narrow focus solely on safety obscures what is reasonably practicable. This has created a culture of excessive caution, complex safety arguments, and an over-reliance on bureaucracy; factors that delay programmes, increase costs, and have the potential to undermine safety.

459. Managing risks to ALARP requires a change in mindset. Safety should not be pursued in isolation, but integrated with outcomes, for example safe manufacture, operations, decommissioning, and waste management. Delivering projects safely on time and within budget is crucial to maintain both public trust and strategic success.

460. A balanced organisational culture must promote safety alongside efficiency and cost effectiveness. Broader organisational culture will dictate whether improvements are implemented successfully. A poor organisational culture will create strategic risk to delivery through multiple, interacting pathways including:

a) **Misdirected simplification:** A drive to simplify without an understanding of risk could become a pretext for unchecked shortcuts or ever more complex and bureaucratic processes to overcome a lack of Suitably Qualified and Experienced Personnel (SQEP);

b) **Programme pressure:** When leaders emphasise schedule and cost targets without prioritising safety, employees can behave in a way that favours short-term delivery at the expense of fully understanding and controlling the hazard;

c) **Slavish compliance:** Strongly procedural organisations can lead employees to slavishly comply with complex processes and procedures without understanding the desired outcomes. Excessive bureaucracy can mask poor risk awareness;

d) **Fear of challenge:** A culture that penalises dissent suppresses the early reporting of potential hazards. Problems can surface late, when remedial action is costly and disruptive;

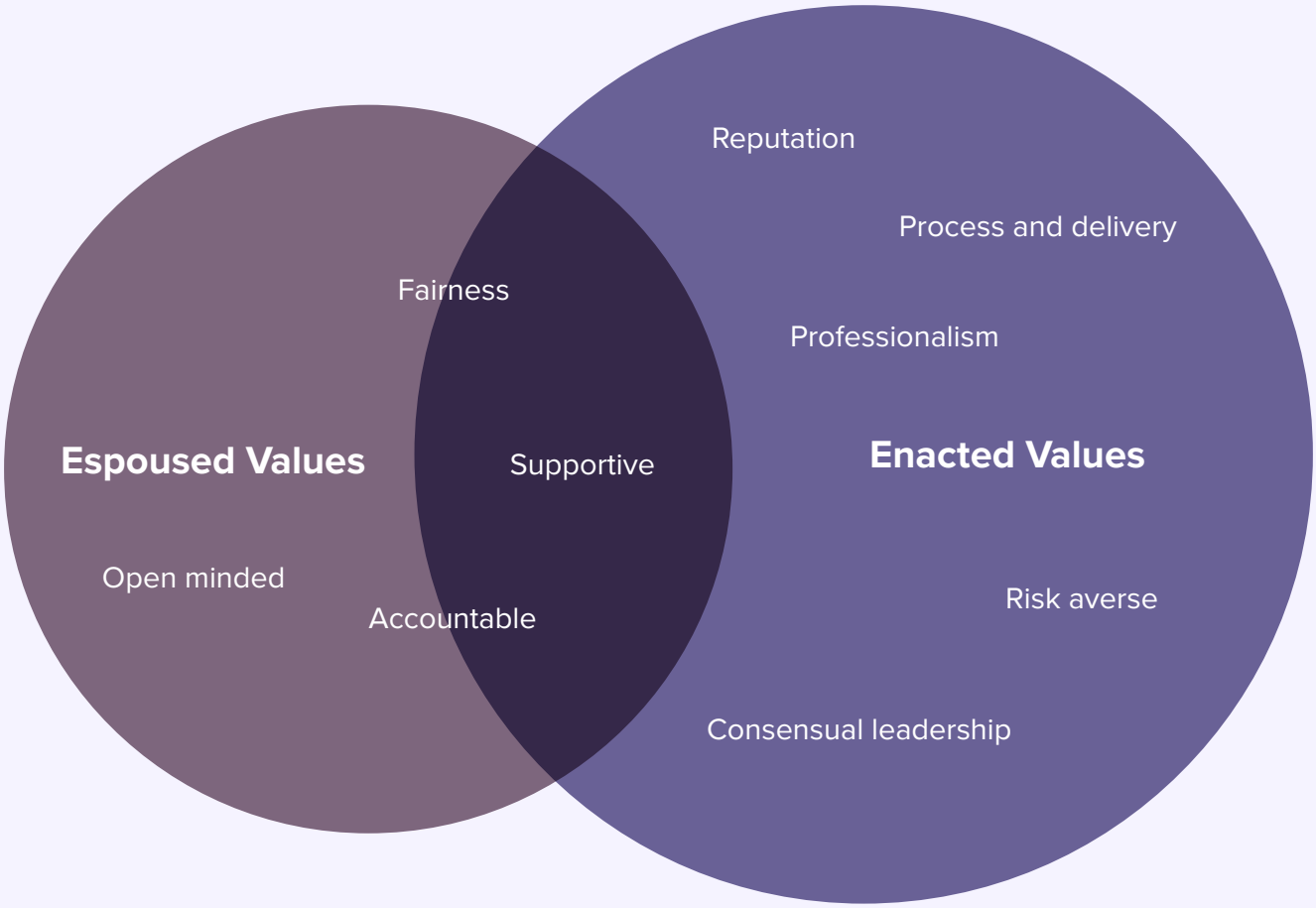
e) **Risk aversion:** When the regulator or dutyholder defaults to maximum caution rather than proportionate controls, both timescales and cost effectiveness suffer; and

f) **Capability loss:** Long schedules combined with poor workforce planning erodes critical capability. The loss of experienced staff increases the likelihood of rework, slower or excessively conservative decision making, and greater reliance on overly prescriptive approaches.

461. Organisations promote their values publicly, but the values experienced by employees day-to-day often differ. An independent assessment of the Office for Nuclear Regulation (ONR) found gaps between their espoused values and those enacted - see Case Study. We expect that many organisations in the sector would find similar gaps.

Case Study – An Independent Culture Assessment of the ONR

A recent independent study of ONR's organisational culture identified important differences between their espoused values and those enacted by the workforce. While seeking to be fair, open-minded, supportive and accountable, employees enacted different values associated with protection of reputation, professionalism, process and delivery, risk aversion, and consensual leadership – see figure. This mismatch between the stated and unstated values risked undermining ONR's approach to enabling regulation, directly affecting regulatory decision-making and therefore the operating environment for dutyholders. Understanding ONR's values together with the cultural threats and tensions identified by this study, provided new insights for the Board to take positive action and drive cultural change.(91)



462. A recent National Audit Office Report(92) on Sellafield decommissioning found a gap between the stated 'One NDA' values of respect, inclusion, openness, and transparency, and the actual behaviours. Issues included insufficient accountability, over-optimism about performance, and a lack of decisive action on serious problems.

463. International nuclear projects including Olkiluoto(93), Flamanville(94), and Vogtle(95) have faced huge cost overruns and delays due to technical complexity, fragmented accountability, resistance to change, and rigid processes. Reviews of these projects highlight the critical role of organisational and safety culture in successful nuclear new build.

464. The ONR Nuclear Industry Safety Culture Inventory (NISCI)(96) is a proven tool for measuring and improving safety culture across the sector. Alongside guidance and an online tool for its use, the NISCI should become the industry standard. This will provide an evidence-based framework for benchmarking, align practices with regulatory expectations, and enable data-driven targeted improvements.

ONR Nuclear Industry Safety Culture Inventory (NISCI)

The NISCI is a safety culture model developed for the UK nuclear sector. The model provides a consistent framework to quantify safety culture under six dimensions:

- The Leadership Imperative:
  - Senior Leadership – Setting the organisational compass.
  - Line Management – Translating vision into daily reality.
- The Human Experience:
  - Immersion – Cultivating a valued and engaged workforce.
  - Accountability – Engineering a fair and just culture.
- The Proactive Stance:
  - Challenge – Fostering a questioning and vigilant mindset.
  - Reporting – Building confidence in organisational learning.

With strong academic credibility, supporting guidance, and an online assessment tool available from ONR, there is benefit in all UK nuclear organisations using this approach to benchmark their safety culture against others and focus targeted action to address weaknesses.(115)

465. Section D of the UK Government Orange Book(97) and MOD's JSP 815(98) outline risk management processes and emphasise leadership, governance, and culture, including safety culture. Boards must treat misaligned organisational culture as a strategic risk to ensure safe and efficient nuclear programme delivery.

466. Culture shapes outcomes, and to deliver the radical reset this report calls for, organisational culture must be managed as an explicit Board-owned risk with clear metrics, independent assurance, and executive accountability. Boards must take decisive action to manage cultural risks, protecting safety and enabling more efficient, cost-effective nuclear programme delivery. This change is necessary in regulators, government departments, dutyholders, and throughout the supply chain to help drive the efficiency needed. This reset should centre on simplification and can be enabled through:

a) Dutyholder leaders engaging early with regulators to simplify safety risk management and make simplicity a shared goal;

b) Leaders empowering teams to simplify processes and encourage practical problem-solving, moving away from compliance for its own sake;

c) Those closest to hazards leading efforts to reduce unnecessary complexity and remove redundant procedures, driving cultural change; and

d) Regulators enabling and expecting simplicity, challenging unnecessary complexity as the sector learns and innovates.

Recommendation 38: Boards should assess their organisation's culture, including safety culture, and take decisive steps to align it with delivering their strategic objectives with radical efficiency and effectiveness.	
Owner: DESNZ, MOD, industry, regulators and dutyholders	**Delivery Timeline:** June 2026 then ongoing
Regulators, dutyholders, and their supply chain companies should specify 'organisational culture' as a risk at Board level and implement the ownership, management, and monitoring needed to drive the cultural behaviours to deliver strategic objectives safely and efficiently. This should include, but not be limited to safety culture, using the ONR NISCI. Boards might apply a mixture of leading and lagging indicators, updated quarterly, with actions including a periodic independent culture assessment, and development of interventions to ensure leaders, the workforce, and supply chain companies understand and are recognised for positive cultural behaviours.	

Capacity and Capability

467. The UK nuclear sector faces a substantial skills challenge. It needs more workers with the technical competence and relevant experience needed to deliver future programmes effectively.

468. The sector values Equality, Diversity and Inclusion (ED&I) for broadening perspectives, driving innovation, attracting top talent, and addressing cultural challenges. Many organisations publish ED&I strategies and metrics, while groups like Women in Nuclear, the Nuclear Institute's Young Generation Network, Inclusion & Diversity in Nuclear, and unions offer practical support to help deliver these values.

469. The latest employer-based assessment shows a current workforce of around 96,000 but the forward programmes require around 120,000 people by the early 2030s.(99) Taking retention and retirement into account means that about 40,000 new employees must be recruited and trained over the next five years.

470. There are several challenges to achieving this workforce growth:

a) **Rapid expansion:** Civil and defence nuclear ambition requires an acceleration of recruitment, targeted training, and personal development;

b) **Ageing workforce:** Many nuclear professionals are nearing retirement and the experience-base risks being lost faster than it can be replaced;

c) **Regional variation:** Various parts of the UK have differing demands for nuclear skills, for example depending on sites for new build or decommissioning;

d) **Niche skills:** Critical shortages are projected in high integrity trades, nuclear engineers, safety case experts, and in programme management;

e) **Regulatory bottlenecks:** Timely regulation requires sufficient SQEP to engage effectively with dutyholders and exercise sound judgement, including sufficient scientific expertise in regulatory bodies to engage with technical issues; and

f) **Terms and Conditions:** The remuneration and benefits offered by several regulatory bodies are insufficient to attract and retain the talent needed.

471. A nuclear skills strategy that creates a diverse a workforce of exceptional capability, creativity, and commitment is necessary to deliver the growth ambition.

Nuclear Skills Strategy

472. The National Nuclear Strategic Plan for Skills published in 2024 addresses the workforce challenges through collaboration between government, academia, and industry.(100) The Nuclear Skills Taskforce, now the Nuclear Skills Delivery Board, is delivering this strategy with support from the CEO-led Nuclear Skills Executive Council. A Nuclear Skills Charter, signed by government, industry, and skills bodies, formalises efforts to build a diverse and highly skilled workforce.

473. The 2025 Clean Energy Jobs Plan incorporates this Skills Plan, setting out a national strategy to create hundreds of thousands of skilled jobs across the clean energy sector. The Plan spans multiple technologies, including an explicit focus on nuclear energy as a cornerstone of the clean energy mission.

474. The Nuclear Skills Plan identifies four key themes, each encompassing projects to enhance workforce capabilities:

a) **Collaborate:** partnerships across the sector, establishing regional hubs, and launching a national communications campaign to attract talent;

b) **Deepen:** recruitment through mid-career entrants, apprenticeships and graduate placements, and increases subject matter experts;

c) **Invest:** training and retaining the existing workforce, fostering community engagement, and improving employee experience; and

d) **Lead:** develop future leaders, promote ED&I and ensure long-term stewardship of the nuclear sector.

475. The Plan supports the expansion of regional Nuclear Skills Hubs to deliver tailored training and workforce development aligned with local needs. It extends the “clean energy skills passport” to enable a smoother transition into nuclear roles from other sectors. It aims to double the number of nuclear apprentices and graduates and quadruple the number of specialist PhDs flowing into the sector.

476. Effective delivery of the plan relies on sustained commitment from government and industry, with shared ownership. While the existing work goes some way to address the skills challenges, further action is needed to strengthen several critical areas.

Building Relevant Knowledge and Experience

477. Developing SQEP requires more than knowledge-based training; it demands practical understanding, personal development, and the relevant experience needed to build judgment, especially for safety risk and ALARP decisions. This requires additional action to strengthen and expand the Nuclear Skills Plan.

478. Government and industry initiatives such as the Nuclear Skills Delivery Board, the Nuclear Skills Strategy Group (NSSG), National College for Nuclear (NCfN), and the National Skills Academy for Nuclear (NSAN) are fragmented, reducing their impact. Providing the effective leadership and enabling greater collaboration between these organisations will be essential to build the nuclear workforce of the future.

Tolerability of Risk and ALARP

479. The sector needs a consistent understanding of risk tolerability and the practical application of ALARP. While ALARP underpins UK nuclear safety, its use often prioritises risk reduction over and above what is reasonably practicable in terms of cost, time, and effort. This results in inconsistent decisions, regulatory delays, and barriers to innovation.

480. Training should be developed on risk tolerability and ALARP in practice to equip staff with the understanding to make balanced, evidence-based decisions and distinguish between those risks requiring further action and those already reduced to acceptable levels. Embedding this understanding will foster a more confident, innovative workforce empowered to challenge norms and adopt new approaches. This should build on existing NSAN safety and regulatory compliance training by incorporating case studies, such as those used in this report, to demonstrate how an improved understanding of ALARP will enhance safe and affordable outcomes.

National Skills Academy Nuclear (NSAN)

NSAN is a UK-based, employer-led, not for profit organisation dedicated to developing a skilled workforce for the nuclear sector. NSAN collaborates with industry partners to deliver training and development to address current and future skills needs. This includes:

a) **Safety & Regulatory Compliance:** Training on nuclear safety, safety cases, risk management, and regulatory frameworks to maintain high safety standards;

b) **Technical Knowledge:** Courses like Growing Awareness in Nuclear (GAIN) and the Award for Nuclear Industry Awareness (ANIA) introduce nuclear science, technology, waste management, and decommissioning to new entrants;

c) **Competence Assessment:** Tools for verifying workforce competence and qualifications via the Skills Assured platform;

d) **Workforce Development:** Programmes for apprentices, graduates, and career switchers, including engineers transitioning from other sectors; and

e) **Leadership & Innovation:** Training to build leadership skills and drive innovation, ensuring adaptability to emerging technologies such as SMRs.

Digital tools for experts

481. The rapid advances in digital technologies offer the sector opportunities to drive efficiency, improve operations, and simplify safety. Powerful tools such as digitised safety cases, data-centric engineering, AI, and autonomous systems can transform current practices in the hands of experts. The sector's conservative approach means capturing these benefits requires strategic action and the skills to deliver them.

482. The sector must build the digital skills needed to understand how technologies can improve operational efficiency and regulatory effectiveness and to deliver the benefits. Existing programmes should include digital training, with access to the digital tools needed under appropriate security controls.

Non-Technical Skills

483. Experience in high-hazard sectors shows that technical skills alone are insufficient to deliver a safe programme.(101) Non-technical skills such as leadership, communication, teamwork, decision-making, situational awareness, resilience, and emotional intelligence are equally important.

484. Professional Institutes are beginning to acknowledge the role non-technical skills play in demonstrating the competencies needed. The Nuclear Institute's "Nuclear Professionalism Standard" includes personal behaviours that reflects non-technical skills such as leadership, communication, situational awareness, decision-making, and teamwork.

485. Training and development in the sector is heavily focused on technical programmes. For the nuclear industry to thrive, professionals must also build strong non-technical skills. There needs to be embedded training that recognises, values, and develops such skills to create a more adaptable, resilient, and effective workforce.

Human Factors

486. The Human Factors Learning Pathway, led by the ONR and developed with the Chartered Institute of Ergonomics and Human Factors addresses the sector's shortage of Human Factors expertise. It provides a scalable, vocational, online training model focused on three domains: Safety Case, Design, and Operations.

487. We support this approach to ensure that Human Factors are treated as a core element of safety culture and operational excellence, and not an afterthought. Embedding this will help to build a workforce skilled in managing human behaviour, interface design, and organisational culture reducing errors and improving safety performance.

Effective Resourcing and scientific knowledge

488. The remuneration and benefits offered by some regulatory bodies including the Environment Agency (EA), Natural England, and Defence Nuclear Safety Regulator (DNSR) are often insufficient to attract and retain the quality and numbers of SQEP needed to deliver sound, scientifically based judgements on risk. This leads to delays and risk-averse decisions that increase cost with little risk benefit.

489. The terms and conditions offered are often not sufficiently competitive to attract and retain those with the necessary scientific capability. Lack of investment in this resource drives rework and delay, creating a false economy. This could be addressed using the Levelling Up and Regeneration Act 2023, which allows certain statutory bodies to charge for their time.

490. This change should not be extended to local authorities. While they play a vital role in nuclear development, cost recovery in this context leads to perverse incentives in which local authorities, and their consultants, can protract disagreements. The Government has announced measures such as the Innovation and Capacity Fund, which aims to improve how councils engage with the Nationally Significant Infrastructure Project (NSIP) process. This is not linked to a single project. Measures such as this build longer-term knowledge and understanding without causing these disbenefits.

A Proactive Approach to Secondments

491. Secondments between industry and regulators provide a valuable tool for improving regulatory understanding. They help staff navigate complex regulatory frameworks, help regulators understand the challenges of nuclear operations, and help dutyholders gain a regulatory perspective. This can help address over conservatism, risk aversion, and resolve regulatory inconsistencies and barriers to innovation.

492. The 'Interchange' programme, created under the Nuclear Skills Plan, enables secondments across the sector to broaden knowledge, experience, and networks. While some view it as a recruitment tool, expanding the programme would strengthen experience development in SQEP. Restricting mobility risks making the sector less attractive to new entrants, impacting all organisations.

Widening Mentoring and Coaching

493. The nuclear sector has a wealth of experienced professionals, and sustaining the knowledge and experience base within a growing workforce requires a strategic approach.

494. Strengthening mentoring and coaching, supported by existing experts and retirees, is key and should be encouraged across the sector and within regulators. The Nuclear Skills Strategy Group prioritises intergenerational knowledge transfer to close knowledge gaps and maintain standards. A structured retiree engagement programme, including co-working, mentoring, and advisory roles, would accelerate junior staff development and foster continuous learning.

495. Outdated methods and overly cautious mindsets should be avoided. Building on initiatives like the Nuclear Institute's mentoring programme, government departments, companies and regulators should enable willing retiring staff to take up coaching, mentoring, or advisory roles within their organisations.

Recommendation 39: The Nuclear Skills Delivery Board should accelerate efforts to build knowledge and experience into a diverse workforce with greater focus on non-technical skills, alongside technical expertise, to meet future needs.	
Owner: DESNZ, MOD and Nuclear Skills Delivery Board working with NSAN and other skills bodies	**Delivery Timeline:** September 2026
We support the Nuclear Skills Plan but urge greater focus on key skills and relevant experience. Effective leadership and greater collaboration are needed across government and industrial skills bodies to maximise the development of nuclear skills for the future. Technical training should include specific focus on tolerability of risk and on digital skills. This must be augmented with the development of non-technical skills for all staff and a greater priority given to human factors. Workforce experience should be broadened, including regulatory and dutyholder roles, through secondments and mentoring programmes. This could be delivered by strengthening the 'Interchange' programme and by establishing a strategic approach to engaging senior workers and willing retirees in mentoring, coaching, and advising early career staff.	

Recommendation 40: Enhance the terms and conditions for regulatory roles that require strong technical judgment so that skilled professionals are attracted and retained.	
Owner: Regulators, DESNZ and MOD	**Delivery Timeline:** December 2026
Regulators should have the flexibility to improve pay and conditions for roles requiring technical expertise and data-driven decision-making, ensuring they can attract and retain essential scientific talent.	

Innovation

496. Innovation in technology and practice is critical to the sector's competitiveness, yet it often lags other industries in adopting modern approaches. In 2015, the Nuclear Innovation Research Advisory Board (NIRAB) summarised the following priorities for research and innovation:(102)

a) **The UK's Strategic Toolkit:** Develop tools and analysis to guide decisions on which emerging nuclear technologies should be prioritised for maximum economic and strategic benefit;

b) **Future Fuels:** Research and develop safer, more efficient nuclear fuels for current and next-generation reactors;

c) **21st Century Nuclear Manufacture:** Advance materials science, modular construction techniques, and manufacturing innovations to enable cost-effective and rapid deployment of nuclear plants;

d) **Reactor Design:** Build capability in design processes, tools, and skills to position the UK as a global leader in Small Modular Reactors (SMRs) and Generation IV reactors; and

e) **Recycling Fuel for Future Reactors:** Develop cost-effective technologies for fuel recycling to ensure a secure, sustainable, and low-carbon fuel supply for future reactors.

497. Developments in digital technologies have accelerated since then, offering new opportunities for transforming how we work and improving safety, efficiency, and delivery. Realising these benefits will require new digital skills and targeted investment in R&D and innovation.

498. We highlight the following digital technologies above and beyond the previous NIRAB recommendations that have the potential to transform the safe, efficient, and cost-effective delivery of nuclear programmes:

a) **Digital Engineering:** Design, develop, operate, and maintain nuclear systems through life. It integrates data-driven methods, modelling and simulation, and collaborative platforms to improve efficiency, accuracy, and decision-making;

b) **Data Analytics:** Harness large-scale data and advanced analytics to provide valuable insights for optimising plant operations, supporting predictive maintenance, and improving risk management;

c) **Safety Case Digitisation:** Digitise nuclear safety cases to ensure they are practical, accessible, and integrated with operations. This will reduce unnecessary complexity, support innovation, and enhance safety and efficiency;

d) **AI Applications for Safety Assurance:** Equip the workforce with AI tools to improve hazard identification, risk assessment, and safety assurance so that safety cases and regulatory submissions are improved;

e) **Predictive Maintenance:** Develop AI-powered predictive maintenance to reduce downtime, extend asset life, and minimise unplanned outages, to enhance operational efficiency;

f) **Regulatory Decision-Support:** Develop digital tools that improve decision-making to enable more informed, transparent, and timely regulatory decisions, streamlining the licensing process;

g) **Process Automation:** Implement process automation to reduce administrative burdens, improve consistency, and accelerate project management cycles; and

h) **Robotics and autonomous systems:** Develop the robotic and control systems to undertake remote inspection and characterisation, for example in operating plant, decommissioning and waste management.

499. AI technologies offer a powerful tool to improve the safety, timeliness, and cost-effectiveness of nuclear programmes. In the hands of the UK's subject matter experts, AI has the potential to simplify safety cases, reduce bureaucratic delays, and identify delivery risks. We welcome ONR's regulatory sandbox work (see case study) and NDA's exploration of AI for decommissioning and expect to see AI used more widely including in defence.

Case Study – ONR Sandbox

The current regulatory framework allows for innovation and has had some key successes in decommissioning. The sandbox approach used by the ONR and EA has been beneficial on the use of robotics and AI. The approach enables a controlled environment for regulators and industry collaboratively to test and explore how innovations can be safety deployed and regulated. This demonstrates regulators' openness to innovation, despite the challenges new technology may pose to the regulatory regime. The NDA Group and specifically Sellafield have been a key part of the development of an AI-based, computer vision system, for high hazard and risk reduction. This has the potential to generate cost efficiencies of more than £100m.

500. Given the transformative potential of such digital technologies, we propose a dedicated digital strategy. Jointly funded by industry and government and linked to nuclear Centres for Doctoral Training, this investment will embed digital innovation into the sector's R&D agenda and accelerate the impact of digital innovation in both technology and practice, subject to security considerations.

Recommendation 41: Government and industry should establish a nuclear digital programme to accelerate the take up of digital technologies, including AI, as tools for experts to modernise approaches to whole-life safety and regulation.	
Owner: MOD, DESNZ and UKRI working with industry	**Delivery Timeline:** September 2026
Establish a jointly funded Government-Industry nuclear digital programme to systematically develop and deploy digital innovation in areas such as data-centric engineering, machine learning, and AI within the sector. This should provide a structured approach to develop and capture the considerable benefits of digital technologies as tools for experts that deliver nuclear programmes, enabling the radical reset this report calls for.	

Chapter 10

International Harmonisation

This chapter discusses the global nature of nuclear energy, diverse national regulatory frameworks, and the UK's role in advancing international harmonisation and collaboration in nuclear regulation.

Summary

Global nuclear energy is experiencing a resurgence, with many countries expanding or restarting programmes and reforming regulatory frameworks to accelerate deployment.

National approaches to nuclear regulation remain diverse, creating challenges for standardisation and mutual recognition of design approvals. The UK's experience with Hinkley Point C illustrates the complexity and cost of adapting designs to meet unique national requirements.

The UK is actively engaged in international collaboration, participating in joint reviews, aligning safety standards, and supporting harmonisation through partnerships with other regulators and international bodies.

Export controls are central to enabling responsible international collaboration and supply chain participation, but lengthy and complex licensing processes can hinder innovation and competitiveness, especially for new entrants.

The UK can support global nuclear ambitions and strengthen its leadership role by advancing harmonisation and leveraging international partnerships.

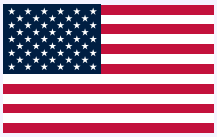
Global Resurgence of Nuclear Energy

501. As part of the global energy transition, many countries are expanding or planning to expand their nuclear energy capacity. There are currently 438 operating civil nuclear reactors globally, 70 under construction, 116 planned, and 320 proposed.(103) New and planned reactors are over 40% of the existing stock.

502. France has committed to building at least six new reactors, while China has 29 under construction. Hungary is developing two new reactors, and Poland is constructing its first-ever nuclear power plant. In the United States, the first new reactor in over three decades was completed last year. Japan, which previously shut down its nuclear programme, now aims for nuclear to supply 20% of its electricity mix by 2040. India is building six new reactors.(104)

503. Other countries are reconsidering previous policies against including nuclear in the energy mix, with Belgium delaying its nuclear phaseout plan and Denmark considering ending its ban on nuclear power.(105) There are also changes being considered in to reintroduce nuclear power in Italy(106) and Switzerland(107). It is not just the UK that is seeing cost overruns and delays in its nuclear projects. Countries worldwide are struggling to realise ambitious plans for nuclear technology roll-out. As a result, substantial reviews and changes are being made to regulatory regimes in many countries.

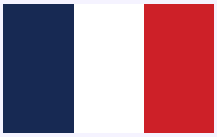
Figure 7: International Regulatory Changes



US Executive Order to Reform the Nuclear Regulatory Commission

On the 23 May 2025, The White House ordered the reform of the Nuclear Regulatory Commission. The order aims to accelerate and expand the nuclear energy industry in the US by reforming the structure, regulatory framework, and basic operations to facilitate the deployment of new reactor technologies.

The move is to reduce dependence on 'geopolitical rivals' as well as cement the US energy security and 'dispatchable power generation'.



French law to accelerate deployment and regulatory merger

In May 2023, the French government, through the Nuclear Acceleration Act, simplified permitting procedures to speed up the construction of new reactors. Their ambitious plan for 6 EPR2 reactors is a result of a drive for net zero and energy sovereignty after changes geopolitically. Key reforms include the separation of nuclear permits from land development approvals, streamlined environmental assessments, and shorter litigation timelines.

In January 2025, ASN and IRSN were merged into a single authority called the Nuclear Safety and Radiological Protection Authority (ASNR) to oversee civil nuclear activities and streamline regulation, research, expertise, and public information.

Finnish legislative reform to streamline regulation and licensing

Legislative reform in Finland is currently under review, looking at revision of the Nuclear Energy Act and the Radiation and Nuclear Safety Authority (STUK). The objectives are far reaching, taking account of new technologies, changes in the energy market, and cost challenges in the nuclear sector. The draft proposal for the new legislation has just undergone a round of comments closing late August 2025.

Following consideration by Parliament, the Act is intended to enter force on 1 January 2027.

Czech amendment to increase efficiency of regulation

On 10 March 2025, the Czech President signed an amendment to the Atomic Energy Act which came into force on the 1 July 2025.

The amendments aim to increase the efficiency of regulation and strengthen safety standards in the construction or operation of nuclear facilities.

The State Office for Nuclear Safety is now in the process of implementation for the amendment.

504. There is global acknowledgement that for countries to achieve net zero and cement energy security requirements, a rethink of how nuclear regulatory systems work is required. This aims to enable new nuclear power, drive down time and cost, and gain sovereignty over energy systems in an increasingly unstable geopolitical environment.

505. The resurgence of nuclear is also seen in the abundance of small and advanced modular reactor designs in progress globally. These projects bring into focus the global nature of the nuclear industry not least through their inherent exportability.

506. It is essential that the UK can take advantage of international expertise and collaboration in pursuit of efficiencies and the delivery of its own nuclear goals. A key enabler to this will be harmonised regulatory approaches across national regulators. Better standardisation of global designs and approaches can also bring safety benefits through sharing expertise and good practice as well as creating more direct transferability of safety improvements identified through operational experience.

507. In defence applications, there is a long and enduring system of collaboration and exchange with the United States dating from agreements struck in the 1950's. The UK and France have collaborated on new testing facilities in France through the Teutates Treaty. The AUKUS programme presents a rich opportunity to evolve as the US, UK and emerging Australian systems meld in a new generation of submarine propulsion systems.

International Approaches to Regulation and Design Assessment

508. Regulatory regimes in the UK and other nations have developed independently. All adhere to the International Atomic Energy Agency (IAEA) fundamental safety principles and safety requirements as the foundation. ONR has benchmarked its Safety Assessment Principles (SAPs) with the IAEA Safety Standards. Nuclear safety remains a national responsibility and interpretation and implementation differs. These differing legal frameworks and regulatory approaches can make standardisation across national borders challenging, with the information and process required to gain acceptance in one country likely significantly different when seeking acceptance in another.

Case Study - HPC Analogue Secondary System

The reference plant for Hinkley Point C was the Flamanville 3 EPR design in France. This plant has two distinct Control & Instrumentation (C&I) protection systems with enough diversity between the two to satisfy French safety regulations. To meet UK regulatory expectations, this design had to be modified to add a third C&I system, an analogue back up Non-Computerised Safety System (NCSS). This change required an additional 76 equipment cabinets in each of the power station's two units which required a redesign of the auxiliary "safeguard" buildings. The size of the control panels in the main control room had to be doubled. In addition, to meet UK requirements, the safety classification of the air conditioning systems used to cool the C&I equipment is higher at HPC than Flamanville 3. This higher classification and the inclusion of the NCSS required the provision of additional air conditioning equipment – this in turn needed two additional floors in the safeguard buildings. Design of the NCSS took over a decade, and the additional equipment and increased size of the safeguards buildings added hundreds of millions to the project cost.

509. Several countries have separately developed pre-licensing design review processes, such as the UK's Generic Design Assessment (GDA). In Canada, the Vendor Design Review (VDR) process evaluates reactor designs at an earlier stage of development compared to the GDA. This distinction is relevant when a reactor design that has completed VDR subsequently enters the UK GDA process, whether through a two-step or three-step pathway. As illustrated in Figure X, successful completion of GDA (Step 2 or Step 3) in the UK requires a more mature and detailed design than VDR in Canada.

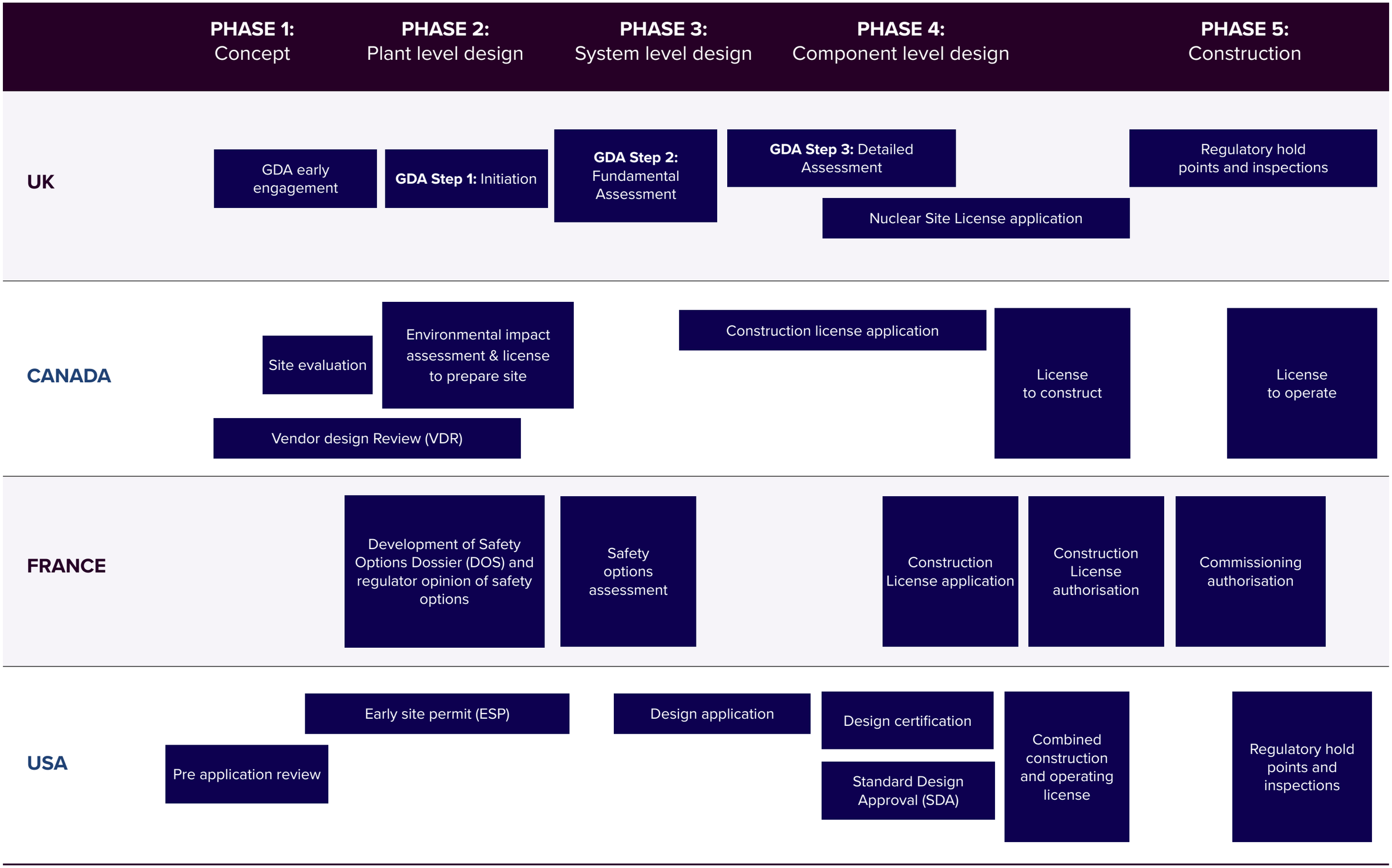


Figure 8 - Phases of design assessment

510. The Design Certification and Standard Design Approval processes used by the US Nuclear Regulatory Commission (NRC) is a more comparable benchmark to the UK's GDA in terms of design maturity. The NRC states that a design certification application must contain sufficient information for the Commission to reach a final determination on all safety-related aspects of the design. This means the application should present an essentially complete nuclear plant design, excluding only site-specific features.

511. A US design certification application is currently not directly transferable to the UK's GDA or Nuclear Site Licence application processes. This is due to differences in regulatory philosophy, particularly between rules-based regulation in the US and goal-based regulation in the UK, as well as variations in environmental and waste management requirements.

Existing Agreements and International Collaboration

512. There are many areas where the UK's regulatory expectations broadly align with other countries such as the US, Canada and France which enables collaboration between regulators. ONR has contributed to the work of Western European Nuclear Regulators' Association (WENRA) and International Nuclear Regulators Association (INRA).

513. ONR and the EA have signed MOUs with various countries with the intention to harbour more direct collaboration including on the areas below. However, they have been constrained in their ability to deliver these elements:

a) Joint reviews of reactor design to reduce duplication;

b) Coordinating licensing timelines to accelerate deployment;

c) Aligning safety and environmental standards for consistency across jurisdictions;

d) Observing each other's regulatory processes to build transparency and trust; and

e) Participating in shared technical workshops and research initiatives to support innovation and harmonisation in nuclear regulation.

514. The US NRC, ONR and the Canadian Nuclear Safety Commission are collaborating on the assessment of reactor designs such as the BWRX-300.

515. We welcome the recent announcement between the US and UK regulators to work much closer together with the strategic aim of accelerating new nuclear. They aim to shorten timescales for reactor design assessments and take maximum account of each other's regulatory assessments, while ensuring appropriate due diligence and retaining independence of regulatory decision-making.

516. There are other collaborations such as between France, Finland and Czechia on assessing the NUWARD reactor.

517. There are international initiatives being undertaken by IAEA, Nuclear Energy Agency (NEA), and World Nuclear Association (WNA). The IAEA Nuclear Harmonisation and Standardisation Initiative (NHSI) aims to allow for the effective global deployment of advanced nuclear reactors, and identifies and gives guidance on how to undertake different types of cooperation:

a) **Collaborative reviews** where countries undertake independent assessments against national requirements, while discussing with other regulatory bodies, but potentially reaching different decisions;

b) **Joint reviews** where a team of regulatory bodies jointly assess a design against common requirements and reaches a joint decision; and

c) **Leveraging of regulatory reviews** where assessments against national requirements make use of those of other regulatory bodies'.

Next Steps

518. The UK should take full advantage of this global ambition and activity, to deploy safe, secure, speedy, and cost-effective nuclear facilities in the UK, and to support the export of UK technology.

519. If other recommendations in this report are implemented, the UK's goal-based system, sampling approach to regulatory assessment, and existing regulatory expertise, is suited to take advantage of these international developments.

520. The UK regulators have taken a collaborative approach when working with other regulators. This is not enough. We should move towards greater use of joint reviews with other trusted regulators such as those in INRA that have signed a regulatory cooperation agreement with the UK, along with much greater leverage of existing regulatory reviews.

521. This must be achieved without introducing additional regulatory steps or increasing the duration of national licensing processes, while still considering site-specific aspects. Transparency, clear criteria, and robust challenge mechanisms are also needed to ensure harmonisation does not come at the expense of safety or public trust, or regulatory independence.

522. The greater accountability envisaged through the Commission for Nuclear Regulation we propose will allow improved scrutiny and challenge of any UK specific regulatory approaches giving rise to substantial changes to designs approved in other countries. These differing approaches may be justifiable, but proposed changes will be much more transparent and allow the Commission to make appropriate and proportionate regulatory decisions.

523. The UK should be at the forefront of continuing international developments in nuclear standardisation and harmonisation for more advanced designs in the longer term.

524. This would help the UK play its part in meeting the COP28 declaration to triple global nuclear energy capacity by 2050, taking a greater international leadership role and regaining that stature the UK once had as a key global nuclear leader.

Recommendation 42: Develop and fund a joint Government and Regulator International Strategy and Action Plan	
Owner: DESNZ, ONR and EA	**Delivery Timeline:** June 2026

Government and Regulators should develop an international regulatory strategy and delivery plan with clear timelines and deliverables with the aim to:

- Accelerate the assessment of new reactor designs with the expectation that decisions of acceptability of design will be given within two years and subsequent licensing within one year through;
  - Maximising the ability to undertake joint reviews on new designs with other trusted international regulators; and
  - Maximising the leveraging of existing regulatory reviews approved by other trusted national regulators; and
- Enhance engagement with international bodies and take a leading role in nuclear regulatory standardisation and harmonisation for the benefit of the UK and global deployment of new nuclear power.

Government should provide dedicated funding to regulators to enable them to implement these ambitious international engagement strategies.

Government should make a direction under the Energy Act 2013 to the ONR that it should maximise the leverage of existing regulatory reviews approved by other trusted national regulators. This should establish that the ONR is justified in relying on the approvals from states where there are formal working arrangements, such as Memoranda of Understanding. The direction should establish a strong presumption, without prejudice to regulatory independence, that regulatory attention is focused on national or site-specific risks or issues.

Export Controls

International Export Control Regime and the UK Framework

525. The international export control regime encompasses a set of agreements, conventions, and national laws designed to regulate the transfer of sensitive goods, technologies, and knowledge across borders. These controls are particularly relevant to sectors such as nuclear energy and defence, with dual-use technologies, where the potential for misuse or proliferation poses substantial risks to national security. Central to this regime are multilateral arrangements such as the Nuclear Suppliers Group (NSG), the Wassenaar Arrangement, and the Zangger Committee, which set guidelines for responsible export and work to harmonise standards among participating nations.

526. Within the UK, export controls are administered principally by the Export Control Joint Unit (ECJU), which brings together expertise from the Department for Business and Trade, the Foreign, Commonwealth & Development Office, the Ministry of Defence, and other key advisors as required. The UK has a long-established export control regime which includes the implementation of relevant European Union regulations. Following the UK's exit from the EU, the export control system retains elements of the previous EU system but has allowed further flexibility and processes tailored to UK strategic priorities. The UK remains committed to upholding its international non-proliferation obligations and continues to work closely with trusted partner countries.

527. There are two types of export licences relevant to this review.

a) Open individual export licences (OIEL), issued by ECJU, allow a named exporter to export multiple shipments of specific licensable items to named destinations. These licences typically last for 3-5 years.

b) Open general export licences (OGEL) allow any exporter that registers to use the licence to export multiple shipments of specific licensable items to named destinations subject to the terms and conditions set out in the specific licence. There is no duration on these licences. They are typically for the least sensitive items to the least sensitive destinations.

International Collaboration and Supply Chains

528. Export controls play a vital role in facilitating responsible international collaboration, as global supply chains become increasingly interconnected. The ability to engage seamlessly with overseas partners, share expertise, and transfer materials is instrumental for advancing nuclear innovation and maintaining competitiveness.

529. The ease with which products or services can be approved for overseas use has become a crucial consideration for UK firms seeking to participate in international projects and supply chains. For regulators and industry alike, navigating these requirements is essential for successful project delivery and global deployment of new nuclear technologies.

Timelines and Complexity

530. There are concerns over the timelines and complexity associated with securing the necessary licences. New entrants and smaller companies have been beset by lengthy processes and intricate requirements. The administrative burden can be disproportionate compared to other countries. This creates the risk that the UK supply chain is de-prioritised in favour of overseas companies for all export opportunities. Reapplying for identical or similar licences involves full resubmission, creating unnecessary duplication. Support for streamlined pathways and proportionality in the level of information required is essential.

531. We have seen inconsistent evidence of timescales for export licences. One vendor told us they waited 241 days for a licence to Norway, and 203 days for Canada. Some of these longer timescales have resulted from new arrangements following the UK's withdrawal from the European Union. The ONR told us that it took them two years to obtain a licence with the US regulator (NRC); more than 12 months with the Canadian regulator; and collaboration with the French regulator regarding export-controlled technology was also subject to lengthy delay. More recent evidence from government indicated improvements for more general licences.

532. ECJU has ambitious targets for the processing of standard export licence applications, aiming to reach decisions within 20 working days. This commitment to efficiency is encouraging but more needs to be done to ensure the regime can keep pace with the expected demand.

Recommendation 43: Government should ensure risk-based proportionality in export licences and establish a dedicated point of contact for nuclear export licensing issues	
Owner: ONR, EA, DESNZ, DBT and FCDO	**Delivery Timeline:** June 2026

The duration of export licences containing nuclear-related items should be increased to five years as standard, and consideration given to increasing this to ten years. There should be an adoption of a risk-based, proportionate approach to the level of information required as part of any application and record-keeping. This could mirror the risk-based approach adopted under the Money Laundering, Terrorist Financing and Transfer of Funds Regulations 2017. The overall aim of this should be to operate on a more generic basis, based on the actual risks involved.

Applications for exports of the same items to any entity which has previously been granted an export licence should be decided within 28 days. If amendments to the Export Control Order 2008 are needed to give effect to these recommendations, that should be considered at the earliest opportunity.

The ONR and EA should be granted ten year open licences which cover their regulatory activities in relation to its functions in collaborating with regulators.

The Export Controls Joint Unit (ECJU) should establish a dedicated point of contact for nuclear companies and government teams involved in strategic nuclear export licensing. This resource should have the capability to engage meaningfully with nuclear specific matters in order to efficiently process licences in this area.

Chapter 11

Additional Recommendations and Issues

This chapter covers important issues that do not neatly fit into any other chapter.

Summary

The current ONR charging model results in substantial overheads, inefficiencies and operational constraints. Its charging powers means it can only bill what it spends. Complex legislation means it cannot carry reserves and reinvest into the organisation. A more proportionate charging model should be considered.

A review of the Nuclear Installations Act should be considered to enable more dynamic nuclear growth, including applications such as maritime deployment. This should be done in five years or so from now when the recommendations in this report have bedded in and when it does not risk additional uncertainty for investors.

The regulatory environment encourages 'gold plating' by duty holders and supply chains, driven by cost-plus defence contracts and weak financial pressures in the civil sector, ultimately increasing consumer costs. Contractual mechanisms should incentivise reducing excessive regulatory measures while maintaining ALARP standards, shifting costs back to duty holders, and aligning their interests with the public good.

UK nuclear operators must insure against third-party liability under international conventions that cap exposure and provide government backstop, but these do not cover countries which are not signatories such as Ireland, creating potential unlimited liability for cross-border claims. This risk threatens investment and insurance availability for new projects; the government's approach for Sizewell C should be extended to future developments.

Suitable sites for new nuclear projects are scarce due to strict technical, environmental, and community requirements, and uncertainty over land use creates delays and deters investment. Despite progress for SMRs at Wylfa, a clear, time-bound process for releasing sites is needed to provide certainty, reduce costs, and accelerate deployment.

Novel nuclear applications, like maritime propulsion and transportable reactors, could decarbonise shipping and boost energy resilience, but require international agreements and regulatory frameworks. The UK is well placed to lead in this area. Other nuclear applications in medicine and space exploration are being developed. The UK should consider the potential value of radioisotopes in existing nuclear waste stockpiles when making decisions on long-term storage, subject to sound business cases.

Modularisation in nuclear projects, using prefabricated modules, can cut costs, speed construction, and simplify decommissioning. While SMRs already leverage this, wider adoption is needed. The sector must also curb unnecessary over-engineered and bespoke solutions, which drive complexity and cost.

The UK nuclear sector faces a pivotal moment. Transformational change is essential to meet national prosperity, security, and low-carbon goals while delivering critical projects. Many issues flagged by Haddon-Cave in his review of the Nimrod disaster persist, including complex safety cases, regulatory failures, cultural gaps, and underinvestment. As was the case in implementing recommendations from his review successfully, we propose a Nuclear Regulatory Implementation Panel (NRIP), reporting to the PM, to drive reform, remove blockages, and deliver an implementation plan within three months, with all work completed by December 2027.

ONR Charging Models

533. The ONR operates a cost-recovery model, charging the nuclear industry and government departments for its services(108). Its charging powers mean it can only bill what it spends. ONR operate within a complex legislative and rules-based framework which does not allow it to carry reserves or reinvest in innovation, international engagement, and continuous improvement. This model is not in line with other domestic and international comparator organisations.

What is the current ONR funding model?

ONR can recover charges for safety, civil nuclear security, safeguards, and transport of radioactive materials. Operational costs such as payroll for regulatory resource are charged to industry. ONR also recovers passthrough costs. These costs are for services provided specifically to one organisation or department. Instead of being shared out based on time spent, they are billed directly 'at cost' to the recipient of the service. Examples include technical support contracts, research costs, and security vetting costs. Dutyholders pay proportionally, so sites requiring more regulatory attention face higher bills. Most of its funding comes from duty holders, with limited government support.

534. The current charging model and internal cost allocation results in substantial overheads, inefficiencies, and operational constraints for the ONR. Inspectors are charged at a uniform rate regardless of their experience or seniority. There are uncertainties in monthly charging to dutyholders making it difficult for them to anticipate annual regulatory charges. This has an impact on dutyholders being able to budget reliably and is more of an issue for smaller companies.

535. The ONR could allocate regulatory budget and resources against specific programmes. It would have to establish fixed price costs where possible, rather than the more 'open-ended' charging of time and materials with no limit of liability. This would enable the ONR to be more flexible in how it uses its resources and enable dutyholders to budget their annual regulatory costs.

536. The ONR can receive core grants from DESNZ, MOD, and DWP. These tend to be small and require considerable work within the departments to secure through spending reviews. Funding should be available for the ONR to be able to fulfil its mission, stay abreast of emerging international developments in reactor systems, lead developments in international harmonisation, and maintain expertise in systems deployed elsewhere but not in the UK. This could be through either an increased core grant or broader change to its own charging model.

Recommendation 44: ONR should revise its charging model to give dutyholders greater cost certainty and support self-investment in capability and international engagement	
Owner: DESNZ, DWP, MOD and ONR	**Delivery Timeline:** September 2026 (for implementation from March 2027)
Charging levels should be proportionate to inspector experience. There must be transparency around costs with narratives provided to licence applicants. There should be an allowance for the generation of surplus and for that to be reinvested into wider regulatory activities, including R&D and international engagement, that develop ONR capability and benefit the sector. Government should increase ONR's core grant to support international engagement in regulatory harmonisation and expertise in international nuclear technology and its regulation.	

Revising the Nuclear Installations Act (NIA) 1965

537. The Nuclear Installations Act 1965 was most recently amended by the Energy Act 2023. Further changes were made by secondary legislation in late 2023 and early 2024, with some alterations set to come into effect in 2025. The Act continues to be amended to keep pace with evolving international conventions and UK policy.

538. A detailed revision of the NIA 1965 should be considered in 2030 once the recommendations of this Review have been implemented. This should include a review of the standard conditions in a nuclear site licence. This would enable it to be modernised in the light of revised practice, and could take account of international developments, such as maritime applications, which are developing rapidly.

Measures to Improve Business Incentives

539. The current approach to contracting and investment by Government is one of the causes of high cost in the sector. This applies in different ways to DESNZ and the MOD, and in different ways to each of defence, decommissioning and new build.

540. The most serious aspect is the lack of sharp financial incentives to keep cost under control while delivering projects with risks reduced ALARP. This interacts with the regulatory system in that there can be limited incentives to push back against disproportionate regulatory decisions or suggestions. It makes it more difficult to address cultural challenges.

541. A second aspect, particular to defence, relates to fragmented governance, short-term contracts, and inconsistent complex oversight. These impact long-term planning and infrastructure renewal and impair mission delivery. They lead to undercapitalisation and increase regulatory compliance costs.

542. The DNE is managed in silos rather than via a system which takes account of strategic factors and delivery of the overall mission. This restricts the ability to prioritise and adjust requirements and demands on and between the different sites. The current process is very inefficient and burdensome on the site dutyholders. Project and programme control is exercised at the individual project level with very detailed budget oversight and control within silos, on what are very complex sites with multiple missions to maintain the current assets, decommission legacy assets and engage in large capital programmes associated with future assets.

543. We recommend that the MOD introduce the concept of a 'super dutyholder' at a very senior level able to make these priority calls and with clear accountability for the risk at a portfolio level.

544. The desire to control costs on an annualised basis and to change allocation due to financial pressures in the MOD, even though capital programmes in the defence nuclear sector are of many years duration, results in stop/defer/restart actions all of which incur regulatory attention. These cause uncertainty in the supply chains which serve the sector, and inefficiencies and delays across the board. All of this adds to cost and delay.

545. In decommissioning, legislative gaps have delayed waste disposition at Magnox sites and increased costs. The NDA's reduced budget limits strategic investment, while R&D remains short-term and reactive. Ringfenced funding is needed to support long-term innovation, in line with the NDA's statutory obligations.

546. DESNZ's slow and inconsistent approach to attracting SMR and AMR investment has caused vendor frustration and wasted resources, as noted in a recent select committee report(109). Policy uncertainty continues to delay deployment of advanced nuclear technologies.

547. Many contracts in the nuclear sector follow a cost-plus model or similar, where contractors are reimbursed for all allowable expenses plus an additional profit margin. While this approach can support complex or uncertain projects, it offers limited incentive for cost-efficiency and has historically resulted in poor value for money.

548. Alternative contracting models should be considered. Without reform to contracting practices, the financial burden of regulatory changes will fall on the public, who will bear the costs but see none of the savings.

549. We believe that the myriad operators across the defence and civil space need to demonstrate better risk management and address the cultural behaviours that flow from the lack of sharp financial incentives to deliver proportionate ALARP solutions.

550. We recommend the Chancellor writes to the chairs of these organisations and asks them to report within six months on their plans to address the cultural issues identified in this report that lead to risk aversion and 'gold-plating', both in their organisations and in their supply chains, and what measures they plan to implement that ensure a more vigorous debate with regulators. We suggest this comes from the Chancellor as it relates to public money. We believe six months gives the organisations sufficient time to consider our recommendations and the Government's implementation of them.

Recommendation 45: Public and private efforts to reduce gold-plating and risk aversion	
Owner: HM Treasury	**Delivery Timeline:** March 2026
The government should explore contracting mechanisms that incentivise more proportionate solutions for delivering nuclear projects to ALARP. This should include financial incentives that place greater focus on the time, cost and trouble element of delivering ALARP. The Chancellor should write a letter to all to regulators and industry operators to: • address the issues of gold-plating and commitments on how this can be remedied both in their own organisations and in their supply chains; • identify measures which can increase their risk appetite within the law; • what measures they are taking to communicate and drive the necessary culture change within their organisations; and • where relevant, how contractual arrangements can be modified to ensure incentives are aligned with the expeditious delivery of new nuclear. Responses should be provided within 6 months (i.e. September 2026).	

Third Party Liability Insurance

551. Nuclear operators (licence holders) must satisfy their strict liability requirements by obtaining insurance or providing alternative financial security for nuclear third-party liability (NTPL) risks. This is 'approved' by the government department responsible for nuclear liability. This ensures that in the event of an incident, a person who suffers damage or personal injury is able to obtain adequate compensation. The Paris and Brussels Conventions on NTPL and, from January 2026, the Convention of Supplementary Compensation, seek to provide a framework of strict channelling of liability to the operator, exclusive 'channelling' of jurisdiction and caps for liability.

552. The Conventions do not apply to countries who are not signatories, and this includes the Republic of Ireland. If there was a nuclear incident in the UK which caused damage in Ireland, there is a risk of unlimited liability if claims were brought in the Irish courts for 'unchanneled liability'

553. This affects investment decisions given corporate entities are unlikely to accept this level of potential liability. This will be an issue for new entrants, and new plants coming forward. It is not clear that there will be insurance policies available on the market to meet the prospective demand.

554. In the public financing documentation for Sizewell C, it appears that the Government has accepted the NTPL risks above a certain level in circumstances where the Brussels Convention does not apply.

555. We encourage the government to consider similar arrangements for future nuclear projects.

Expediting Siting Decisions

556. Suitable sites for new nuclear build are limited, as they must combine geological stability, environmental compliance, flood resilience, robust grid connectivity, and community acceptance among other factors.

557. New entrants have faced difficulties obtaining confirmation on potential land use, which discourages investment and delays the deployment of new nuclear installations.

558. Much of the nuclear estate remains under the ownership of the NDA and EDF. While progress has been made on siting for Rolls-Royce SMRs following the Wylfa announcement, this challenge is likely to persist for future new-build projects.

559. To build certainty for developers and help unlock investment, a clear process must be established to expedite the release of sites for use by the nuclear sector. This process should include firm time limits for confirmations. Implementation of this new process will prevent the completion of work when approvals are unlikely to be provided and therefore reduce costs.

560. When making siting decisions, it is essential to consider the fleet approach. If a site has sufficient space for multiple reactors and meets suitability criteria, planning should address the entire site on the assumption that the full fleet will be developed.

Recommendation 46: Government should reduce uncertainty on the release of sites for future nuclear projects	
Owner: DESNZ, NDA and EDF	**Delivery Timeline:** June 2026
There should be a clear process for releasing new sites for potential use. DESNZ should within a fixed 28 day period confirm whether it has any objections to the use of any site. The landowner (e.g. EDF or NDA) should then confirm within a 28 day period whether they will make the land available for use (subject to any necessary private agreements). If the approval is not provided, this should be clearly articulated to avoid abortive work. Approval should be automatic if a decision is not made within the time limit.	

Novel Nuclear Applications

561. A key theme in the global resurgence of nuclear technologies is their application in novel contexts, such as transportable reactors and civil maritime nuclear propulsion.

562. Commercial shipping requires vast energy reserves for long-distance voyages, yet current low-carbon alternatives such as batteries or hydrogen lack sufficient energy density and would necessitate a complete overhaul of global fuelling infrastructure. As a result, the sector remains one of the hardest to decarbonise, despite its reliance on poor-quality fuels making the need for change particularly urgent.

563. Advances in reactor design and safety have made nuclear-powered commercial shipping a viable option. Such vessels would require no refuelling, involve minimal infrastructure changes, and use reactors designed for low-maintenance operation by the ship's crew.

564. Realising this opportunity will require robust international agreement, the resolution of some engineering challenges, and new security measures. The nuclear sector, including government, regulators, and dutyholders, must remain receptive to innovation and progress.

565. There is growing interest in transportable nuclear reactors to replace diesel generators, supply power to remote areas, support ports from floating barges, and provide energy in disaster relief scenarios.

566. These technologies offer significant potential to decarbonise shipping and strengthen energy resilience, but they also raise complex regulatory and jurisdictional challenges. This is particularly relevant for the defence sector, where new rules for nuclear-powered commercial shipping could disrupt existing arrangements for the submarine fleet.

567. The UK is well positioned to capitalise on these emerging applications of nuclear technology, given its status as one of the world's ten largest shipping fleets by asset value and its role as an International Maritime Organisation Council Member. This opportunity is reinforced by the UK-US agreement to cooperate on civil nuclear shipping under the Atlantic Partnership.

568. We encourage the government and nuclear regulators to engage constructively with the civil shipping industry and the Maritime and Coastguard Agency on civil nuclear propulsion. This could include a joint initiative between nuclear regulators and the MCA, followed in due course by legislation and amendments to relevant acts to bring civil marine propulsion reactors under the ONR's statutory remit. This must include a statement to protect defence Reactors Comprised in a Means of Transport (RCiMT) disapplication in the Nuclear Installations Act.

569. Civil nuclear maritime assets are imminent, and preparation is essential. To retain the benefits of UK-flagged vessels, the ONR must initiate international coordination with countries already ahead in this area. Ships equipped with nuclear-powered propulsion will arrive at UK ports, whether UK-flagged or not.

570. The sector should also remain open to new applications of nuclear technologies in medicine and space exploration. There are potentially valuable radioisotopes stored within the country's inventories of nuclear waste. The NDA should consider the value of these radioisotopes, both in the present and the future, when making decisions on long-term storage, to ensure that, subject to sound business cases, opportunities for their use are not lost.

Modularity & Over-specialisation

571. Modularisation in nuclear projects refers to breaking down large, complex systems into smaller, prefabricated modules that can be manufactured off-site and then assembled on-site. This approach promotes design standardisation, accelerates construction, reduces costs, and enables more efficient decommissioning. Applying modern design for modular manufacture and assembly in construction can move 70% of work off-site, cut on-site workforce requirements by 60%, and shorten schedules by 30%.

572. While these benefits are being captured in SMR projects, the wider sector would benefit from more general adoption of modern manufacturing and modularity in construction of new nuclear power stations and infrastructure on nuclear sites.

573. The taskforce has observed many examples of unnecessary over-specialisation for solutions, ranging from simple components like bolts to complex structures such as cranes, where commercial-off-the-shelf items could have been used instead. This over-specialisation subsequently leads to designs which are expensive and difficult to operate and maintain.

574. The sector must ensure that over-specialisation is avoided wherever possible, and that the rigour necessary for safety critical nuclear systems does not erroneously extend to simple, basic, engineering requirements. Commercial-off-the-shelf solutions should be used wherever possible subject to safety considerations and maintaining ALARP.

Implementation

575. This report comes at a key moment for the UK nuclear sector. Without transformational change in the way the sector operates, it will be unable to make the contributions that are vitally needed for the UK's prosperity, security, and low carbon future.

576. The recommendations set out in this report will deliver this change, but success depends on government, regulators, industry, and supply chains aligning and taking the collective action necessary to implement them. The nuclear sector must transform while continuing to deliver nationally critical projects in civil power generation, defence, and decommissioning. A big risk with any such review is that the enthusiasm that greets its publication may not transfer into persistent energy that ensures its full implementation.

577. The 2009 Haddon-Cave report(110) into the Nimrod accident exposed systemic weaknesses, safety case complexity, failures by dutyholders and regulators, outsourcing risks, cultural and capability gaps, weak board oversight, MOD contracting shortcomings, and chronic under-investment in infrastructure.

578. In response to Haddon-Cave, an implementation team was formed immediately after publication, reflecting his commitment to see change at a departmental level. This small team, partly drawn from the review group, was tasked with driving urgent action across the department. This implementation team was successful, and the Haddon-Cave recommendations have been implemented effectively. The lessons were not transferred to the nuclear sector where many of the same issues remain unresolved and have been identified in this report.

579. Delivering the necessary sector transformation, both unlocking delivery and removing the over-complexity that risks undermining safety, will require strong senior leadership and full engagement from government, industry, and regulators. We propose there should be a small Nuclear Regulatory Implementation Panel (NRIP), chaired by an independent person to lead this effort.

580. We acknowledge that when reviewing the recommendations in detail and in considering implementation, government will conclude that some recommended outcomes could be better achieved by alternative means, or that delivery timescales must necessarily be adjusted. We therefore recommend that Taskforce members remain engaged as part of the Implementation Panel to review progress and support delivery.

581. Reporting to the PM, alongside Secretaries of State for DESNZ and MOD, key elements of the NRIP's mandate will be:

a) To oversee an implementation plan and delivery mechanism for recommendations within three months;

b) Periodic review, at six-month intervals of the delivery of these recommendations,

c) Identification of blockages and rapid resolution; and

d) Assessment of the impact and efficacy of the recommendations against the intended outcomes.

582. We expect the government's response to this report to set out plans promptly, including a firm commitment to implementation timelines. Given the indicative timelines for each recommendation, work should commence immediately and be completed by December 2027.

Recommendation 47: Government should establish a delivery plan and corresponding oversight to ensure timely delivery of the recommendations set out in this report	
Owner: All of Government	**Delivery Timeline:** March 2026
Following the government response to this report, a Nuclear Regulatory Implementation Panel (NRIP) should be convened to oversee the delivery of these recommendations. It should report regularly to the PM, alongside SOS DESNZ and SOS MOD, on progress against a published delivery plan.	

Part 4

The Way Forward

Chapter 12

What Success Looks Like

583. The UK stands at a critical juncture. Once a global leader in nuclear energy, it is now the most expensive country in the world to deliver nuclear projects. Existing power stations are approaching the end of their lives, while replacements are delayed and over budget. To meet the UK's growing energy demands, to drive down carbon emissions, and to sustain our strategic nuclear deterrent, along with the high-value jobs and economic growth these will bring, the sector needs an urgent transformational reset.

584. The UK has some of the best nuclear scientists and engineers anywhere in the world. The whole sector supports almost 100,000 high value jobs with an increasingly diverse workforce committed to delivering safe clean energy, national security, and environmental restoration. However, their full contribution to national prosperity is limited by the current regulatory system.

585. The sector must maintain its excellent safety record, but nuclear regulation and the way it is interpreted in the UK are trapped in a vicious cycle. With multiple regulators, the industry faces complex, duplicative, and often excessive regulation. This leads to high costs, long delays, and disproportionate 'gold-plated' solutions. The costs are enormous and borne by the taxpayer and consumer.

586. The complexity has grown over time, like a one-way ratchet, as no single actor has the agency needed to reduce it. The system forces operators to use tried and tested methods, rather than encouraging innovation. It incentivises costly bespoke and over-engineered solutions when simpler modular or standardised ones would be better and more cost effective. These issues are not unique to nuclear energy, but seen in other areas too, as identified in both the Haddon-Cave and Corry reviews.

587. This is counterproductive. Safety cases and environmental impact assessments have become so long and complicated that they may fail to achieve their primary purpose as no single person can read and understand them. Enormous sums of money are spent on site-specific environmental and habitat interventions that are many times less effective than spending it on environmental protection elsewhere. Much of the detailed assessment work is not as impactful as spending the money and time directly on protection.

588. This self-reinforcing cycle has created a culture of resignation among dutyholders and regulators who simply accept that nuclear projects must be slow and expensive. Nowhere is perfect. Yet examples from South Korea and the UAE today, along with France and Britain's historical experience, show that it is possible to build safe nuclear power plants both affordably and quickly. We cannot accept that delays, cost overruns, and unnecessary 'gold plating' are inevitable. These issues must be recognised and actively addressed, rather than tolerated as business-as-usual.

589. The public is worse off as a result: we pay more than we need to, and our regulatory outcomes are poorer than they should be. Three drivers of this approach are worth highlighting.

590. First, is that a culture of risk-aversion arises where the system cannot reward success but can punish failure. This can be made worse by inconsistent political risk appetite whereby politicians may say they want a better risk-reward trade-off (e.g., more productivity growth) but are unable to commit to not penalising failure when risks don't pay off. The system needs to develop better mechanisms to assess performance based on ex ante information rather than realised ex post outcomes.

591. Second, is the priority given to process, including the volume of paper, over safe outcomes. This is related to the risk averse culture: a more elaborate process is a protective mechanism. Process reduces the need for judgement and clear accountability, as responsibility is dispersed among myriad influencers. Poor outcomes can be justified by the excuse that the process was "excellent" and "safety is our number one priority".

592. Third, incentives are not aligned with the public interest. It is difficult to rely on competitive market incentives to drive efficiency in nuclear energy and its supply chain because nuclear projects are both gigantic and bespoke. Existing contracts and other arrangements have done a poor job at replicating those incentives. This has incubated and embedded a culture of costly compliance with regulation.

593. We have proposed a Commission for Nuclear Regulation that would clarify accountability and ensure the use of expert judgment on the most challenging issues. While it is critical in a democracy that Ministers take decisions, it may be important that they also put in place binding mechanisms that will make it possible to take brave decisions and not kick the can down the road. These might include strict time limits for ministerial decision, with default approval if decision is not made; restrictions on further consultation; and presumptions in favour of recommendations that come from expert, independent bodies that have run a thorough process.

594. Many of our proposals focus on reforming the system so that it prioritises outcomes over process and making a sound judgement quickly over getting the perfect answer slowly. Our proposals seek to act on all of the actors in the system: government, regulators, dutyholders and their supply chains, with the incentives, and structures operating in a coordinated manner to bring about a fundamental system reset in how regulation is done. This fundamental system change has the potential to replace the high cost doom loop we are in with a virtuous cycle of lower cost and better outcomes.

595. We will know the change is working when we see proportionate safety cases that mitigate risks to the public and workers, without embedding unnecessary complexity into every detail. Compliance will be a means of achieving safe outcomes, not safety as an end in itself. The system will focus on credible risks and scientifically realistic estimates of the harms of radiation; it will integrate evidence from international regulators; and it will adapt as the UK's operating experience grows, supply chains deepen, and expertise develops.

596. This will enable adaptive innovation in which regulatory effort is proportionate to risk, and design changes can be evaluated and integrated without triggering years-long delays. Developers can refine systems, incorporate new technology, and improve efficiency without being penalised for deviating from legacy reference designs or ways of working.

597. Instead of being locked into a pattern of redundant surveys and mitigations, nuclear projects will make an important strategic contribution to natural restoration and enhancement. Conservation experts will receive an unprecedented financial boost, with the freedom to use the money where they believe it will have the most impact.

598. These changes will unlock immediate real-world improvements in ongoing projects and open the door to new ones.

599. Sizewell C may find it can avoid some of the most expensive and lowest impact radiological and environmental mitigations, and that it does not need to ask for approval to make small changes that have immaterial impacts on the natural world. When asking for permissions or approvals, they will come more quickly. Together, this could save the project, partially owned by the UK government, billions of pounds, and years of time before connection.

600. Work will shortly begin on the first Rolls-Royce SMRs. These will be built through a fleet approach, as opposed to going through bespoke approvals processes. If Rolls-Royce is able to deploy more quickly and cheaply than it expected, then others will follow. Many of our recommendations, such as those on the revision of dose targets, are urgent because it is crucial that they take effect before the final design of what will be a multi-year project.

601. Existing operations will benefit too from simplifying safety. There will be greater opportunity to drive innovation into maintaining the operation of the existing fleet, as long as it is safe to do so at proportionate cost. The UK's nuclear experts will increasingly use methods like data-centric engineering for whole life plant management, and tools like AI to enhance understanding, develop robust safety arguments, and implement safer solutions.

What does success look like?

What we see happening:

- Regulatory guidance is revised to ensure safety and environment outcomes are proportionate;
- Dutyholders challenge and escalate novel and contentious issues to achieve better faster and cheaper solutions;
- The Commission for Nuclear Regulation makes rapid and clear decisions;
- The government tracks delivery relentlessly, removes unnecessary blockages in a timely manner, and ensures policy prioritises good outcomes;
- Dutyholders better employ modular and standardised techniques that avoid gold-plating;
- More money goes directly to nature protection and enhancement;
- Our nuclear deterrent and decommissioning programmes are accelerated; and
- The construction of the Rolls Royce SMRs comes in on or ahead of time and below the cost of SMRs in other countries.

What improved outcomes we observe:

- Consumers experience lower energy prices helping with cost of living;
- Industrial users have an adequate supply of baseload energy at internationally competitive prices;
- The UK's path to Net Zero by 2050 becomes more realistic and sustainable;
- Investment in nuclear energy in the UK accelerates;
- Investment in the AI and other technology sectors increases on the expectation of better nuclear energy solutions;
- Confidence in future supply arrangements for nuclear energy spurs hyperscale tech companies and others to invest in the UK;
- The UK becomes a global centre for excellence and innovation in nuclear, and our related industries export the latest technology around the world; and
- The UK is safer and more secure.

602. Our recommendations will enable legacy decommissioning programmes to take a more proportionate, risk-based approach that delivers significantly better value for money. This will end practices like the tens of thousands of lorry journeys carrying lightly contaminated material around the country and drive savings of perhaps £30 billion into the decommissioning programme over its lifetime.

603. Our proposals will enable substantial cost reduction and acceleration of the nuclear deterrent programme. There is an urgent need to decommission our retired fleet of submarines to make space for the next generation. A more proportionate approach to safety will reduce this cost. Improvements to the planning and environmental regulations will enable the MOD to fund the necessary infrastructure more affordably. The next generation of submarines, including AUKUS, will benefit from the changes we have recommended.

604. Some of the benefits of fixing nuclear regulation come in only over time. Making Sizewell C, Dreadnought, AUKUS and decommissioning cheaper will mean a stronger government balance sheet over the next five to ten years. Faster timelines, more certainty, and lower build costs will mean cheaper and more reliable power, but again with benefits after five or ten years. Yet some benefits will be seen almost immediately.

605. Financial markets price in future expectations today. If cheaper power, lower decommissioning and military costs, and a credible Sizewell C and SMR fleet are anticipated, gilt markets will reflect this immediately, reducing government borrowing costs now, not just years later.

606. As a society, the main benefit of power stations is the electricity they provide. But many communities benefit also from the investment and jobs created along the way. Stronger investor confidence will mean an immediate increase in UK nuclear projects, and faster planning pipelines will mean shovels hitting the ground within a handful of years rather than a decade. We benefit also from the investments that core infrastructure such as cheap, reliable energy make possible – in chemicals, cars, datacentres, steel, and even healthcare.

607. The most important consequence of this work should be the UK reclaiming its position as a nuclear leader. This is not simply a point of pride. Every country that has aspirations of leadership or sovereignty in technology is also a leader in energy. At present it is difficult to see how a country can be a technological powerhouse if it is not an energy powerhouse.

608. South Korea produced in the first half of 2025 more electricity per capita from nuclear power than the UK produced across every source, yet fission produces just a third of South Korean electricity. The US, China, and France all anchor their technology and industrial sectors in low-cost domestic energy. Without sufficient reliable energy, Britain will miss out on the largest capital boom in decades, with $500 billion invested in a single year, 2025, all in countries with deep, reliable supplies of electricity.

609. Today's energy transition is both a huge challenge and a huge opportunity. Making the most of it means restoring common sense to our nuclear regulatory system. The UK pioneered this technology. The deep reservoir of technical skills, the eye for detail, and our innovative spirit are all still there, ready to activate. We need to empower the system to deliver it.

Chapter 13

Recommendations

This chapter is a summary of all the recommendations.

These recommendations apply to civil and defence nuclear sectors. Their full implementation is essential to deliver the UK's nuclear ambitions safely, on time, and within budget.

Proposals

The Taskforce's recommendations sit under five core proposals. These cover planning, environmental, and nuclear regulation.

1	Government to provide clearer leadership and direction for the nuclear sector
This is addressed through recommendation 1.	
2	Government and regulators to work together to simplify the regulatory approval process for nuclear projects
This is addressed through recommendations 2-4, 15 and 35.	
3	Nuclear sector and government to focus on reducing risk aversion and ensuring regulatory and sector decisions are proportionate
This is addressed through recommendations 5-10, 13, 22-23, 43 and 45.	
4	Nuclear sector and government to address cultural, capability and financial incentives that block progress/delivery
This is addressed through recommendations 16, 21, 36, 38-42 and 44.	
5	Nuclear sector and government to enable acceleration of delivery and innovation
This is addressed through recommendations 11-12, 14, 17-21, 24-37, 46 and 47.	

Full List of Recommendations

Recommendation	Owner	Delivery timeline
Chapter 5: Simplification		
Recommendation 1: Provide HMG Strategic Steer to the Nuclear Sector	All of Government	End of January 2026
Recommendation 2: Establish a collective decision-making body for nuclear regulatory (Commission for Nuclear Regulation)	Cabinet Office	End of 2027
Recommendation 3: Establish a lead regulator model for any instance where multiple regulators are involved, with the Office for Nuclear Regulation as the default lead regulator for the nuclear sector, pending enactment of recommendation 2.	ONR, EA and other regulators	March 2026
Recommendation 4: Simplify the nuclear regulatory landscape by consolidating the majority of nuclear safety regulatory functions within a single organisation	Multiple government departments including Cabinet Office, MOD and DESNZ	March 2026
Recommendation 5: Reset safety case development to eliminate duplication and embed simplicity	Dutyholders and regulators	March 2026
Chapter 6: Risk Management & Proportionality		
Recommendation 6: Define the tolerability of risk for nuclear	DESNZ, DWP and MOD	June 2026
Recommendation 7: Review nuclear regulator guidance in line with revised tolerability of risk	ONR and EA	June 2026
Recommendation 8: Define the meaning of proportionality in the Health & Safety at Work Act	ONR, EA, HSE, DESNZ, MOD, DEFRA and DWP	June 2026
Recommendation 9: Establish an enterprise-wide system of portfolio risk management across defence and decommissioning sectors	MOD and NDA	December 2027
Recommendation 10: Review arrangements to prevent conflation of nuclear and conventional risks	Dutyholders and regulators	December 2026
Chapter 7: Environmental Assessment & Permitting		
Recommendation 11: Apply or modify the Habitats Regulations to reduce costs whilst protecting the environment	DEFRA	December 2027
Recommendation 12: Create alternative pathway to comply with the Habitats Regulations	DEFRA	December 2027

Recommendation	Owner	Delivery timeline
Recommendation 13: Create more proportionality in the Environmental Impact Assessment (EIA) regime	MHCLG	December 2027
Recommendation 14: Allow the development of Modular Low-Carbon Acceleration Zones	MHCLG	December 2027
Recommendation 15: Enable ”one and done” assessments and reverse the Finch judgment for low-carbon electricity projects	MHCLG	December 2027
Recommendation 16: Increase data-sharing, and transparency, on environmental data	DEFRA, DESNZ and NDA	June 2026
Recommendation 17: Implement statutory timelines for environmental permitting	DEFRA and DESNZ	December 2027
Recommendation 18: Modify the implementation of Biodiversity Net Gain (BNG)	DEFRA	December 2026
Recommendation 19: Remove or constrain the National Park Duty in Levelling Up and Regeneration Act 2023 (LURA)	DEFRA	December 2027
Recommendation 20: Amend the cost cap for judicial reviews and limit legal challenges to Nationally Strategic Infrastructure Projects (NSIPs) to a ‘single bite of the cherry’	DEFRA and MOJ	December 2027
Recommendation 21: Indemnify nuclear developers against any damages they incur as a result of proceeding with their project while a judicial review is being decided	HM Treasury	June 2026
Recommendation 22: Commence proportionate regulatory control of radioactively contaminated structures and infrastructure	DESNZ	December 2026
Recommendation 23: Create proportionality in permitting for decommissioning activities	DEFRA, DESNZ, MHCLG, NDA and EA	December 2026
Chapter 8: The Planning System		
Recommendation 24: Improve the application of Critical National Priority (CNP)	DESNZ	June 2026
Recommendation 25: Update guidance from MHCLG to streamline the Development Consent Order (DCO) regime	MHCLG	June 2026
Recommendation 26: Create Interim Development Consent Order (DCO) Recommendation Reports	MHCLG	December 2027
Recommendation 27: Amend the Planning Act 2008 to require “minded to” letters	MHCLG	December 2027

Recommendation	Owner	Delivery timeline
Recommendation 28: Reinstate the Infrastructure Planning (Model Provisions) (England and Wales) Order 2009	MHCLG	December 2027
Recommendation 29: Consider repeal of section 150 of the Planning Act	MHCLG	December 2027
Recommendation 30: Establish a unit to discharge Development Consent Order (DCO) requirements	DESNZ, MOD, and MHCLG	June 2026
Recommendation 31: Streamline the conventional planning regime via Special Development Orders for nuclear power and automatic approvals	DESNZ, MOD, and MHCLG	June 2026
Recommendation 32: Encourage fleet approaches in National Policy Statement EN-7	DESNZ and MHCLG	December 2026
Recommendation 33: Create a new pathway to allow semi-urban power stations	DESNZ	December 2026
Recommendation 34: Define proportionate Outline Planning Zones (OPZs) and Detailed Emergency Planning Zones (DEPZs) under REPPIR19	DESNZ, ONR and UKHSA	December 2026
Recommendation 35: Streamline regulatory justification	DESNZ and DEFRA	December 2027
Recommendation 36: Confirm consideration of proposals in relation to community benefits	MHCLG	December 2027
Recommendation 37: Equalise the position of the NDA for the benefit of the Geological Disposal Facility (GDF)	MHCLG and DESNZ	December 2027
Chapter 9: Culture, Capacity, Capability & Innovation		
Recommendation 38: Boards should assess their organisation's culture, including safety culture, and take decisive steps to align it with delivering their strategic objectives with radical efficiency and effectiveness	DESNZ, MOD, industry, regulators and dutyholders	June 2026 then ongoing
Recommendation 39: The Nuclear Skills Delivery Board should accelerate efforts to build knowledge and experience into a diverse workforce with greater focus on non-technical skills, alongside technical expertise, to meet future needs	DESNZ, MOD and Nuclear Skills Delivery Board working with NSAN and other skills bodies	September 2026
Recommendation 40: Enhance the terms and conditions for regulatory roles that require strong technical judgment so that skilled professionals are attracted and retained	Regulators, DESNZ and MOD	December 2026

Recommendation	Owner	Delivery timeline
Recommendation 41: Establish a nuclear digital strategy to accelerate the take up of digital technologies, including AI, to modernise approaches to whole-life safety and regulation	MOD, DESNZ and UKRI working with industry	September 2026
Chapter 10: International Harmonisation		
Recommendation 42: Develop and fund a joint Government and Regulator International Strategy and Action Plan	DESNZ, ONR and EA	June 2026
Recommendation 43: Ensure risk-based proportionality in export licences and establish a dedicated point of contact for nuclear export licensing issues	ONR, EA, DESNZ, DBT and FCDO	June 2026
Chapter 11: Additional Recommendations and Issues		
Recommendation 44: Revise ONR's charging model to give dutyholders greater cost certainty and support self-investment in capability and international engagement	DESNZ, DWP, MOD and ONR	September 2026 (for implementation from March 2027)
Recommendation 45: Enable public and private efforts to reduce gold-plating and risk aversion	HM Treasury	March 2026
Recommendations 46: Government should reduce uncertainty on the release of sites for future nuclear projects	DESNZ, NDA and EDF	June 2026
Recommendation 47: Government should establish a delivery plan and corresponding oversight to ensure timely delivery of the recommendations set out in this report	All of Government	March 2026

Bibliography

1 **Department for Energy Security and Net Zero.** *Nuclear Regulatory Taskforce: Interim Report.* London : HM Government, 2025.

2 **Climate Change Committee.** *The Seventh Carbon Budget.* London: Climate Change Committee, 2025.

3 **Aurora Energy Research.** *Decarbonising Hydrogen in a Net Zero Economy.* Oxford: s.n., 2021.

4 **United Kingdom, Ministry of Defence.** *UK Strategic Defence Review 2025.* London: HM Government, 2025.

5 **Department for Business, Energy & Industrial Strategy (BEIS).** *Goals-based and rules-based approaches to regulation BEIS Research Paper Number 8.* London: Department for Business, Energy & Industrial Strategy, 2020.

6 **Office for Nuclear Regulation.** Safety Assessment Principles for Nuclear Facilities. 2014 Edition, Revision 1 Bootle: Office for Nuclear Regulation, 2020.

7 **Office for Nuclear Regulation.** *Enforcement Policy Statement.* Bootle: Office for Nuclear Regulation, 2020.

8 **Corry, Dan.** *Delivering economic growth and nature recovery: an independent review of Defra's regulatory landscape.* Department for Environment, Food & Rural Affairs, GOV.UK, 2 April 2025. Available at: https://www.gov.uk.

9 **Mondaq Editorial Team.** One-stop shop model for environmental matters to be introduced at the beginning of 2026 – this is how the permitting process will change. *Mondaq.* [Online] 3 April 2024. [Cited: 23 October 2025.] https://www.mondaq.com/environmental-law/1652506/one-stop-shop-model-for-environmental-matters-to-be-introduced-at-the-beginning-of-2026-this-is-how-the-permitting-process-will-change

10 **Parliamentary Office of Science and Technology.** *Carbon footprint of electricity generation.* s.l.: UK Parliament, 2011.

11 *Electricity generation and health.* **Markandya, Anil and Wilkinson, Paul.** 9591, 2007, The Lancet, Vol. 370, pp. 979–990.

12 **Health and Safety Executive.** *Reducing risks, protecting people: HSE's decision-making process.* Sudbury: HSE Books, 2001.

13 **Health and Safety Executive.** *The Tolerability of Risk from Nuclear Power Stations.* London: Her Majesty's Stationery Office (HMSO), 1992.

14 **The White House.** *Ordering the Reform of the Nuclear Regulatory Commission. The White House.* [Online] 10 May 2025. [Cited: 7 October 2025.] https://www.whitehouse.gov/presidential-actions/2025/05/ordering-the-reform-of-the-nuclear-regulatory-commission/

15 *The 2007 Recommendations of the International Commission on Radiological Protection.* **International Commission on Radiological Protection.** 2-4, Oxford : Elsevier, 2007, Annals of the ICRP, Vol. 37. 978-0-7020-3048-2.

16 **Department for Business, Innovation & Skills.** *Regulators' Code.* London: Department for Business, Innovation & Skills, 2014.

17 **House of Lords.** *Marshall v Gotham Co Ltd.* [1954] AC 360, s.l. : House of Lords, 1954.

18 **Court of Appeal.** *Edwards v National Coal Board.* [1949] 1 All ER 743, s.l.: Court of Appeal, 1949.

19 **UK Supreme Court.** *Baker v Quantum Clothing Group and Others (No 3).* [2011] UKSC 17, s.l.: Supreme Court, 2011.

20 **Fareham Borough Council.** *Ronald Wyatt Judgement - 15 July 2022.* Fareham: Fareham Borough Council, 2022.

21 **High Court of Justice.** *Ashdown Forest Economic Development LLP v Secretary of State for Communities and Local Government, Wealden District Council.* [2014] EWHC 406 (Admin), s.l. : England and Wales High Court (Administrative Court), 2014.

22 **Court of Appeal.** *Smyth v Secretary of State for Communities and Local Government.* [2015] EWCA Civ 174, s.l. : England and Wales Court of Appeal, 2015.

23 **HSF Kramer.** Project Nutcracker: The Secret Ecologists Speak. [Online] 2025. https://www.hsfkramer.com/notes/energy-and-infra-consenting/2025-posts/project-nutcracker-the-secret-ecologists-speak

24 **Court of Justice of the European Union.** *Sweetman and others v An Bord Pleanála.* Case C-258/11, s.l. : Court of Justice of the European Union, 2013.

25 **UK Government.** *UK Impact Assessment No. 2025/155.* London: HM Governmnet, 2025.

26 **Corry, Dan.** *Review of the DEFRA Regulatory Landscape.* London: Department for Environment, Food & Rural Affairs, 2025.

27 **Bat Conservation Trust.** High Marks Barn. [Online] 2023. https://www.bats.org.uk/our-work/buildings-planning-and-development/roost-replacement-and-enhancement/case-studies/high-marks-barn-4

28 **Richard Layard, Andrew E. Clark, Christian Krekel, and Marta Serra-Garcia.** *Estimating the monetary value of the deaths prevented from the UK Covid-19 lockdown when it was decided upon and the value of flattening the curve.* London: London School of Economics and Political Science (LSE), 2020.

29 **River Restoration Centre.** *River Monnow Weir Removal.* Cranfield: River Restoration Centre, 2011.

30 **Environment Agency.** *Book 1: Radioactive Substances Activity Operational Permit – Habitats Regulations Assessment Report.* s.l.: Environment Agency, 2022.

31 **The Planning Inspectorate.** *Sizewell C Habitats Regulation Assessment.* Bristol: The Planning Inspectorate, 2022.

32 **Department for Levelling Up, Housing and Communities.** Summary: Planning and Infrastructure Bill – Government Amendments to Part 3 (Lords Committee Stage). [Online] 2024. https://www.gov.uk/government/publications/the-planning-and-infrastructure-bill/summary-planning-and-infrastructure-bill-government-amendments-to-part-3-lords-committee-stage

33 **Court of Justice of the European Union.** *People Over Wind and Peter Sweetman v Coillte Teoranta.* C 323/17, s.l. : Court of Justice of the European Union, 2018.

34 **UK Government.** Sizewell C: environmental permits for a new nuclear power station. [Online] 2022. https://www.gov.uk/government/consultations/sizewell-c-environmental-permits-for-a-new-nuclear-power-station

35 **Natural England.** Natural England's strategy: recovering nature for growth, health and security. *GOV.UK.* [Online] 2023. https://www.gov.uk/government/publications/natural-englands-strategy-recovering-nature-for-growth-health-and-security/natural-englands-strategy-recovering-nature-for-growth-health-and-security

36 **Institute of Environmental Management and Assessment (IEMA).** *Delivering Proportionate EIA.* Lincoln: IEMA, 2017.

37 **Nuclear Industry Association.** *Environmental Outcomes Report Consultation: NIA Response.* London: Nuclear Industry Association, 2023.

38 **The Planning Inspectorate.** *Sizewell C - Decision Letter.* Bristol: The Planning Inspectorate, 2022.

39 **Harrison, J.** *R v Cornwall County Council ex parte Hardy.* [2001] Env LR 26, s.l.: England and Wales High Court, 2001.

40 **England and Wales High Court.** *R v Rochdale Metropolitan Borough Council, ex parte Milne.* (2000) 81 P & CR 365, s.l.: England and Wales High Court, 2000.

41 **UK Parliament.** Planning and Infrastructure Bill – House of Lords Debate, 11 September 2025. [Online] 2025. https://hansard.parliament.uk/Lords/2025-09-11/debates/DAD66E9D-A163-4EF4-BF8A-C2C819A7A35A/PlanningAndInfrastructureBill#contribution-0242A963-0ED2-4C46-9767-FC70D6752A8E

42 **The new National Policy Statement for nuclear energy generation.** *UK Parliament Committees.* [Online] 24 October 2025. https://committees.parliament.uk/publications/49898/documents/267987/default/

43 **Ministerio para la Transición Ecológica y el Reto Demográfico (MITECO).** *Guía sobre instalaciones fotovoltaicas y aves esteparias.* Madrid: MITECO, 2023.

44 **Gobierno de España.** Real Decreto 142/2023, de 7 de marzo, por el que se establece la estructura orgánica básica del Ministerio para la Transición Ecológica y el Reto Demográfico. [Online] 2023. https://www.boe.es/diario_boe/txt.php?id=BOE-A-2023-3088.

45 **Natur und Erneuerbare.** Wind Energy Ramp-Up and Species Protection Laws. [Online] 2023. https://www.natur-und-erneuerbare.de/en/project-database/wind-energy-ramp-up-and-species-protection-laws/.

46 **Kreis Düren – Amt 66.** REA NID-Berg Bescheid – *Windpark Müddersheim.* Düren : Kreis Düren, 2024.

47 **Ministère de la Transition écologique.** Sites naturels : compensation, restauration, renaturation. [Online] 2023. https://www.ecologie.gouv.fr/politiques-publiques/sites-naturels-compensation-restauration-renaturation.

48 **Conseil National de la Protection de la Nature (CNPN).** *Avis sur la centrale photovoltaïque – Parc d'artillerie Istres (13).* Paris : Ministère de la Transition écologique, 2021.

49 **UK Supreme Court.** *Case UKSC 2022/0064.* UKSC 2022/0064, London : UK Supreme Court, 2022.

50 **Department for Energy Security and Net Zero.** *Overarching National Policy Statement for Energy (EN-1).* London : HM Government, 2023.

51 **National Highways.** *Applicant's Response to Secretary of State Letter dated 26 July 2024.* 2024.

52 **Surrey Hills AONB Planning Adviser.** *Surrey Hills AONB Board Submission.* 2024.

53 **The Planning Inspectorate.** *Gatwick Airport Northern Runway DCO – Decision Letter.* s.l. : The Planning Inspectorate, 2025.

54 **High Court of Ireland.** *An Taisce v An Bord Pleanála.* s.l. : High Court of Ireland, 2022.

55 **Practical Law.** *Hinkley Point C Judicial Review. Practical Law Thomson Reuters.* [Online] 2013. https://uk.practicallaw.thomsonreuters.com/9-529-7893?transitionType=Default&contextData=%28sc.Default%29.

56 **Tarian Hafren v Marine Management Organisation.** *CO/3440/2021 ,* s.l. : High Court of Justice, 2022.

57 **High Court of Justice (England and Wales).** *Together Against Sizewell C v Secretary of State for Business, Energy and Industrial Strategy.* CO/3147/2022 , s.l. : High Court of Justice (England and Wales), 2023.

58 **ITV News.** *Campaign group loses High Court fight to block Sizewell C.* [Online] 2024. https://www.itv.com/news/anglia/2024-12-03/campaign-group-loses-high-court-fight-to-block-sizewell-c.

59 **BBC News.** *Sizewell C campaigners lose legal challenge over nuclear power station.* [Online] 2024. https://www.bbc.co.uk/news/articles/cvgqdxrlqd5o.

60 **UK Government.** *Independent review into legal challenges against nationally significant infrastructure projects.* [Online] 2023. https://www.gov.uk/government/publications/independent-review-into-legal-challenges-against-nationally-significant-infrastructure-projects/independent-review-into-legal-challenges-against-nationally-significant-infrastructure-projects#part-2-is-there-a-ca.

61 **Department for Energy Security & Net Zero.** *Re: Contingent liabilities on carbon capture projects - following the committee's inquiry on 12 December 2024.* London : HM Government, 2025.

62 **dejure.org. § 162 VwGO – Kosten.** [Online] 2023.

63 **Solsvik, Terje.** *Norway's government wins Arctic oil lawsuit, greens lose.* Reuters. [Online] 2018. https://www.reuters.com/article/world/norway-s-government-wins-arctic-oil-lawsuit-greens-lose-idUSKBN1ET20C.

64 **Lexambiente.** *Danno ambientale: spese di lite nelle controversie in materia ambientale alla luce del diritto europeo.* [Online] 2023. https://lexambiente.it/index.php/materie/danno-ambientale/consiglio-di-stato67/danno-ambientale-spese-di-lite-nelle-controversie-in-materia-ambientale-alla-luce-del-diritto-europeo.

65 **Court of Appeal.** *Boswell v Secretary of State for Energy Security and Net Zero.* CA-2024-002002, London : Court of Appeal, 2025.

66 **UK Parliament.** *Planning and Infrastructure Bill Marshalled List of Amendments to be Moved in Committee of the Whole House.* London : UK Parliament, 2025.

67 **Department for Business, Energy & Industrial Strategy.** *Amending the Framework for the Final Stages of Nuclear Decommissioning and Clean-Up.* London : HM Government, 2018.

68 **Independent Water Commission.** *Independent Water Commission: Review of the Water Sector.* s.l. : HM Government, 2025.

69 **The Planning Inspectorate.** *National Infrastructure Consenting Portal – Project EN010148 Documents.* [Online] 2025. https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010148/documents.

70 **UK Government.** *Nationally Significant Infrastructure: Action Plan for Reforms to the Planning Process.* [Online] 2023. https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-nsip-reforms-action-plan/nationally-significant-infrastructure-action-plan-for-reforms-to-the-planning-process.

71 **Planning Act 2008: pre-application stage for nationally significant infrastructure projects.** [Online] 2024. https://www.gov.uk/guidance/planning-act-2008-pre-application-stage-for-nationally-significant-infrastructure-projects.

72 **Sizewell C.** *Consultations – About Sizewell C.* [Online] https://www.sizewellc.com/about-sizewell-c/consultations/.

73 **UK Government.** Consultation on streamlining infrastructure planning. [Online] 2023. https://www.gov.uk/government/consultations/consultation-on-streamlining-infrastructure-planning/consultation-on-streamlining-infrastructure-planning.

74 **The Planning Inspectorate.** *Sizewel C Examination Timetable: EN010012. gov.uk.* [Online] 2025. https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010012/examination-timetable.

75 **UK Government.** *Getting Great Britain Building Again: Speeding Up Infrastructure Delivery.* [Online] 2023. https://www.gov.uk/government/publications/getting-great-britain-building-again-speeding-up-infrastructure-delivery/getting-great-britain-building-again-speeding-up-infrastructure-delivery.

76 **Department for Energy Security and Net Zero.** *Secretary of State's Decision Letter – Oaklands Farm Solar Park.* London : s.n., 2025.

77 **TLT LLP.** *Infrastructure Planning Blog 9 – Sweet Infrastructure Treats.* TLT. [Online] 23 June 2025. https://www.tlt.com/insights-and-events/insight/infrastructure-planning-blog-9---sweet-infrastructure-treats/

78 **Walker, Angus.** *Why the Number of DCO Refusal Recommendations is Increasing – and How to Solve It.* Planning Resource. [Online] 2023. https://www.planningresource.co.uk/article/1705655/why-number-dco-refusal-recommendations-increasing-%E2%80%93-solve-it-angus-walker.

79 **Stonestreet Green Solar.** *Stonestreet Green Solar Closing Statement.* 2025.

80 **UK Supreme Court.** *Hillside Parks Ltd v Snowdonia National Park Authority.* UKSC/2020/0211, s.l. : UK Surpeme Court, 2020.

81 **Ofgem.** *Ofgem approves initial £24 billion to operate and maintain critical gas networks and upgrade Britain's electricity supergrid.* [Online] 2024. https://www.ofgem.gov.uk/press-release/ofgem-approves-initial-ps24-billion-operate-and-maintain-critical-gas-networks-and-upgrade-britains-electricity-supergrid.

82 **Ofgem.** *Hornsea 2 Initial Transfer Value (Signed).* 2023.

83 **Ofgem.** *£60 million savings from new Hinkley Point C grid link.* [Online] 2024. https://www.ofgem.gov.uk/press-release/ps60-million-savings-new-hinkley-point-c-grid-link.

84 **UK Government.** *The Justification of Practices Involving Ionising Radiation Regulations 2004.* London : UK Government, 2025.

85 **Department of Energy and Climate Change.** *Regulatory Justification.* [Online] 2012. https://webarchive.nationalarchives.gov.uk/ukgwa/20121217153645/http:/www.decc.gov.uk/en/content/cms/meeting_energy/nuclear/new/reg_just/reg_just.aspx.

86 **Broadfield Law.** *Last Energy UK Ltd – Legal Opinion.* 2024.

87 **New Civil Engineer.** *Companies confirmed on Defra's £8.7m nuclear advisory framework.* New Civil Engineer. [Online] 2025. https://www.newcivilengineer.com/latest/companies-confirmed-on-defras-8-7m-nuclear-advisory-framework-27-10-2025/.

88 **Department for Business, Enterprise and Regulatory Reform.** *Justification – Actions from the Nuclear White Paper.* [Online] 2009. https://webarchive.nationalarchives.gov.uk/ukgwa/20090504205535/http://www.berr.gov.uk/whatwedo/energy/sources/nuclear/whitepaper/actions/justification/page45386.html.

89 **Skidmore, C.** *Mission Zero: Independent Review of Net Zero.* London : Department for Business, Energy & Industrial Strategy, 2023.

90 **East Suffolk Council.** *East Suffolk Council – Sizewell C Funding Announcement Response.* [Online] 2024. https://www.eastsuffolk.gov.uk/news/east-suffolk-council-sizewell-c-funding-announcement-response/

91 **Clarke, Sharon, Holman, David and Siegl, Lina.** *An Independent Culture Assessment of the Office for Nuclear Regulation.* 2023.

92 **National Audit Office.** *Decommissioning Sellafield: Managing Risks from the Nuclear Legacy.* London : National Audit Office, 2024.

93 **Von Hein, Alexander.** *The investigation at OL3: How the Finnish safety authority STUK discovered that the welders did their normal construction jobs.* Nuclear accidents: Investigations, prevention and mitigation. Paris : Presses des Mines, 2017.

94 **International Atomic Energy Agency.** *Pre-OSART Mission to Flamanville 3 Nuclear Power Plant, France: Final Report.* Vienna : IAEA, 2009.

95 **Schneider, David and Sadiq, Arjun.** *Southern Company's Troubled Vogtle Nuclear Project.* Cleveland : Institute for Energy Economics and Financial Analysis, 2022.

96 **Office for Nuclear Regulation.** *Nuclear Industry Safety Culture Inventory (NISCI).* Office for Nuclear Regulation. [Online] 14 October 2025. https://www.onr.org.uk/our-expertise/nuclear-industry-safety-culture-inventory-nisci.

97 **HM Treasury.** *The Orange Book: Management of Risk - Principles and Concepts.* London : HM Government, 2023.

98 **Ministry of Defence.** *Defence Safety Management System (JSP 815).* [Online] 12 September 2024. https://www.gov.uk/government/collections/defence-safety-management-system-jsp-815.

99 **Cogent Skills.** *2024 Nuclear Workforce Assessment. Warrington* : Cogent Skills, 2025.

100 **Nuclear Skills Taskforce.** *National Nuclear Strategic Plan for Skills: Building Skills for the Nation's Nuclear Capability.* s.l. : Nuclear Skills Delivery Group, 2024.

101 **Flin, Rhona, O'Connor, Patrick and Crichton, Margaret.** *Safety at the Sharp End: A Guide to Non-Technical Skills.* Boca Raton : CRC Press, 2013. 9781409404851.

102 **Nuclear Innovation and Research Advisory Board.** *Overview of Impact of Nuclear Innovation Programme 2016–2022.* 2022.

103 **World Nuclear Association.** *Plans for new reactors worldwide.* [Online] 29 October 2025. https://world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.

104 **Tirone, Jonathan.** *Nuclear Power Makes Comeback Driven by Climate Change, AI Energy Demands. Bloomberg.* [Online] 24 July 2025. https://www.bloomberg.com/news/articles/2025-07-24/nuclear-power-makes-comeback-driven-by-climate-change-ai-energy-demands.

105 **Pipe, Warwick.** *Belgium reverses phase-out policy as Denmark reconsiders nuclear. World Nuclear News.* [Online] 16 May 2025. https://www.world-nuclear-news.org/articles/belgium-reverses-phase-out-policy-as-denmark-reconsiders-nuclear.

106 **World Nuclear News.** *Italian government introduces draft bill on nuclear energy.* [Online] 3 October 2025. https://www.world-nuclear-news.org/articles/italian-government-introduces-draft-bill-on-nuclear-energy.

107 **World Nuclear News.** *Legislative changes proposed to remove Swiss new reactor ban.* [Online] 15 August 2025. https://www.world-nuclear-news.org/articles/legislative-changes-proposed-to-remove-swiss-new-reactor-ban.

108 **Office for Nuclear Regulation.** *Our Regulatory Charges.* [Online] ONR. https://www.onr.org.uk/our-work/how-we-regulate/our-regulatory-charges.

109 **UK Parliament.** *House of Commons. Science, Innovation and Technology Committee. Delivering Nuclear Power: Third Report of Session 2023–24.* London : The Stationery Office, 2023.

110 **Lord Haddon Cave.** *The Nimrod Review: an independent review into the broader issues surrounding the loss of the RAF Nimrod MR2 aircraft XV230 in Afghanistan in 2006.* London : UK Government, 2009.

111. **Office for Nuclear Regulation; Environment Agency.** *Memorandum of Understanding between the Office for Nuclear Regulation and the Environment Agency.* London : Office for Nuclear Regulation and Environment Agency, 2021.

112. **UK Health Security Agency. Ionising radiation dose comparisons.** [Online] 2023. [Cited: 7 October 2025.] https://www.gov.uk/government/publications/ionising-radiation-dose-comparisons/ionising-radiation-dose-comparisons.

113. **Canadian Nuclear Safety Commission.** *Environmental Assessment Report for the Darlington New Nuclear Power Plant Project.* Ottawa : Canadian Nuclear Safety Commission, 2011.

114. **1990 Recommendations of the International Commission on Radiological Protection.** *International Commission on Radiological Protection.* 1-3, Oxford : Pergamon Press, 1991, Annals of the ICRP, Vol. 21. 0-08-041144-4.

115 **Siegl, L, et al.** *Development of a Nuclear Industry Safety Culture Inventory.* Manchester : The University of Manchester Alliance Manchester Business School, 2023

Annexe A

Organisations Consulted

- Autorité de Sûreté Nucléaire et de Radioprotection – French Nuclear Safety and Radiation Protection Authority
- Atomic Weapons Establishment
- Babcock
- BAE Systems
- Committee on Radioactive Waste Management
- Defence Nuclear Organisation
- Defence Nuclear Safety Regulator
- Defence Safety Authority
- Department for Environment, Food & Rural Affairs
- Department for Energy Security and Net Zero
- EDF Energy
- Environment Agency
- Great British Energy - Nuclear
- Health and Safety Executive
- Herbert Smith Freehills Kramer
- Hitachi
- Lloyds Register
- Natural England
- Newcleo
- Nuclear Decommissioning Authority
- Nuclear Industry Association
- Nuclear Innovation and Research Office
- Nuclear Institute Young Generation Network
- Nuclear Liabilities Fund
- Nuclear Restoration Services
- Nuclear Skills Delivery Group
- Nuclear Transport Services
- Office for Nuclear Regulation
- Regulatory Innovation Office (part of DSIT)
- Rolls-Royce
- Royal Navy
- Royal Society for the Protection of Birds
- Submarine Delivery Agency
- Urenco
- Wildlife Trust
- World Nuclear Transport Institute
- Wylfa

Sites visited

- Atomic Weapons Establishment
- BAE Systems Submarines
- EDF
- Hinkley Point C
- His Majesty's Naval Base Devonport
- Rolls-Royce Submarines
- Sellafield
- Winfrith

Annexe B:

Nuclear Regulatory Taskforce Members

John Fingleton – Taskforce Lead

John is an Irish and British economist and former CEO of the Office of Fair Trading, he was a Senior Independent Member of the Council of Innovate UK until 2024, as well as a Member of Board for UK Research and Innovation (UKRI) from 2021 to 2024. John runs a company advising and supporting clients to successful resolution of complex and novel regulatory problems. He has a profile across a wide range of business sectors and is considered an expert in business, government and regulation, with a reputation for innovative thinking.

Andrew Sherry

Andrew is Professor of Materials and Structures at the Henry Royce Institute for Advanced Materials at the University of Manchester. He has experience leading science and innovation, skills development, and infrastructure programmes across industry, national laboratories and academia. He was previously Chief Scientist and Special Advisor at the UK's National Nuclear Laboratory. He was also previously Chair of the Defence Nuclear Safety Committee, providing independent advice to the Secretary of State for Defence. In that role he was known for his ability to offer clear and pragmatic solutions to complex problems.

Mark Bassett

Mark is a member of the International Nuclear Safety Advisory Group (INSAG) and recently retired from the IAEA (International Atomic Energy Agency) after 8 years where he was a Director and the Special Assistant to the Director General (DG) for Nuclear Safety, Security and Safeguards. His role included dealing with, and providing advice to the DG on, a wide range of complex technical, diplomatic, and political matters in these areas. He has held senior leadership roles in the nuclear sector in the UK public and private sectors, as well as the international civil service, and was DCI (Deputy Chief Nuclear Inspector) at the Office for Nuclear Regulation (ONR) for a number of years with over two decades in ONR where he held a wide range of roles across all nuclear sectors, both civil and defence.

Sue Ion

Sue is a British engineer and an expert advisor on the nuclear power industry with a career spanning 45 years. She was elected a member of the US National Academy of Engineering in 2012 for contributions to nuclear fuel development and is a Fellow of the UK's Royal Academy of Engineering and the Royal Society. She is a strong advocate for nuclear power and has a background advising government about nuclear reactors and countering the negativity caused by incidents such as at Three Mile Island and Chernobyl. She represented the UK at the IAEA as a member of the Standing Advisory Group on Nuclear Energy and Chaired the EU Euratom Science and Technology Committee. She Chaired the UK's Nuclear Innovation and Research Advisory Board, is a Member of the ONR Independent Advisory Panel and is the current Honorary President of the National Skills Academy for Nuclear.

Mustafa Latif-Aramesh

Mustafa is a leading infrastructure planning lawyer at TLT LLP, and Parliamentary Agent. He has advised on numerous small modular and advanced nuclear developments in the UK (including in relation to regulatory justification, siting and consenting), advised on over 25 nationally significant infrastructure projects (including the Lower Thames Crossing and the Hinkley Point C Connection) and has advised central government on infrastructure planning and regulatory reforms, including on the recent Infrastructure Planning Bill. Mustafa's work spans working for developers, central government and regulators, particularly on Development Consent Orders. He is authorised by Parliament to draft and promote legislation, and is also a Visiting Fellow at King's College London.

Annexe C:

Abbreviations and Acronyms

AC	Authorisation Condition
AGR	Advanced Gas-cooled Reactor
ALARA	As Low As Reasonably Achievable
ALARP	As Low As Reasonably Practicable
AMR	Advanced Modular Reactor
BAT	Best Available Technique
BNG	Biodiversity Net Gain
BSL	Basic Safety Level
BSO	Basic Safety Objective
CASD	Continuous At Sea Deterrent
CBA	Cost Benefit Analysis
CDM	Construction and Design Management
CNI	Chief Nuclear Inspector
CNP	Critical National Policy
CoRWM	Committee on Radioactive Waste Management
DAC	Design Acceptance Certificate
DCO	Development Consent Order
DEDs	Derogations, Exemptions and Dis-applications
DEPZ	Detailed Emergency Planning Zone
DESNZ	Department for Energy Security and Net Zero
DNE	Defence Nuclear Enterprise
DNSEC	Defence Nuclear Safety Expert Committee
DNSR	Defence Nuclear Safety Regulator
DNSyR	Defence Nuclear Security Regulator
DSA	Defence Safety Authority
DWP	Department for Work and Pensions
EA	Environment Agency
ExA	Examining Authority
EDF	Electricité De France
EIA	Environmental Impact Assessment

EPR	Environmental Permitting (England and Wales) Regulations 2016
FAC	Further Authorisation Condition
FNPP	Floating Nuclear Power Plant
GDA	Generic Design Assessment
GDF	Geological Disposal Facility
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
HSEP	Health, Safety and Environmental Protection
HSWA	Health and Safety at Work Act 1974
IAEA	International Atomic Energy Authority
ICRP	International Committee for Radiological Protection
IRR17	Ionising Radiation Regulations 2017
JOPIIRR	Justification of Practices Involving Ionising Radiation Regulations 2004
LC	Licence Condition
LNT	Linear No Threshold
LWR	Light Water Reactor
MMO	Marine Management Organisation
MOD	Ministry of Defence
MoU	Memorandum of Understanding
NATO	North Atlantic Treaty Organisation
NDA	Nuclear Decommissioning Authority
NDMP	National Development Management Policy
NGO	Non-Governmental Organisation
NIA65	Nuclear Installations Act 1965
NIRO	Nuclear Innovation and Research Office
NISCI	Nuclear Industry Safety Culture Inventory
NLF	Nuclear Liabilities Fund
NPPF	National Policy Planning Framework
NPS	National Policy Statement
NRW	Natural Resources Wales
NSIP	Nationally Strategic Infrastructure Project
NTPL	Nuclear Third Party Liability
NWS	Nuclear Waste Services
ONR	Office for Nuclear Regulation
OPZ	Outline Planning Zones

PINS	Planning Inspectorate
PRC	Proportionate Regulatory Control
PWR	Pressurised Water Reactor
REPPIR19	Radiation (Emergency Preparedness and Protection) Regulations 2019
RGP	Relevant Good Practice
RCiMT	Reactors Comprised in a Means of Transport
R2P2	Reducing Risk, Protecting People
SAP	Safety Assessment Principle
SEPA	Scottish Environmental Protection Agency
SFAIRP	So Far As Is Reasonably Practicable
SMR	Small Modular Reactor
SQEP	Suitably Qualified and Experienced People
SUPDC	Semi-Urban Population Density Criteria
TAG	Technical Assessment Guide
TC	Transport Condition
TCPA	Town and Country Planning Act
TIG	Technical Inspection Guide
TOR	Tolerability of Risk
UKAEA	United Kingdom Atomic Energy Authority
USNRC	United States Nuclear Regulatory Commission
3LoD	Three Lines of Defence