




Nuclear Waste
Services



Permanently safe, sooner.
Our Corporate Strategy.

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We have a clear purpose to make nuclear waste permanently safe, sooner

Introduction



Adrienne Kelbie CBE
Independent Chair
Nuclear Waste Services

The UK has been producing and managing radioactive waste for many decades and will continue to do so for many more. New nuclear plants are viewed by UK Government as essential to the green energy mix and a secure energy supply for all. And so the ability to safely manage nuclear waste from generation to final resting place is essential for the UK.

Nuclear Waste Services is proud to bring together the UK's leading nuclear waste management capabilities, to protect people and the environment by managing waste effectively and seizing the opportunities this presents to secure a sustainable future for domestic clean energy security.



Corhyn Parr
Chief Executive
Nuclear Waste Services

And our work affects everyone – the nuclear sector and its workers, supply chain partners, transporters, industrial users of radioactivity, hospitals, local communities, and the public at home and abroad.

The Nuclear Waste Services Board sets our strategic direction, striving to ensure value for the UK through effective and efficient deployment of resources to manage nuclear waste at the national scale. We are proud to be thought leaders for Integrated Waste Management, Geological Disposal Facility, and Waste Operations and Services. As part of the Nuclear Decommissioning Authority (NDA) group, we are also active in promoting more coherent working across the group, with Sellafield Ltd, Magnox Ltd, DRSL and Nuclear Transport Solutions, to improve our value on behalf of the public as our success is reliant on nuclear sites sending waste to us.

This strategy sets our direction, objectives, key milestones and the transformation needed to succeed by 2030.

Our purpose is clear: to make nuclear waste permanently safe, sooner. And we want to become the 'one-stop shop' for nuclear waste management and disposal solutions in the UK. This is a big ambition, but it's the right thing to do for the public.

At NWS, we have three strategic objectives to ensure all our operations are safe and secure. To do this, we focus on doing the right thing for our people, partners, customers, and communities where we operate. Our strategic objectives are as follows:

- **We will be global leaders in the application of the nuclear waste hierarchy to ensure that the right waste form is in the right package and is disposed of at the right facility.**
- **We will support accelerated decommissioning through innovation with waste streams managed in the most sustainable and efficient way, supported by technology development and expertise, setting worldwide standards.**
- **And we will add value for the UK taxpayer.**

Our strategy objectives are built to be enduring and responsive to influences from the global and nuclear landscape as it evolves and changes.

And we want our business to be a great place to work, where diverse people and inclusive teams are action-orientated, ambitious, collaborative and act with integrity. We are extremely proud of our people and thank them for their efforts and enthusiasm as we change for the better.

We hope you enjoy reading our strategy and continue to support the mission ahead of us.

"Publication of the first Nuclear Waste Services strategy is a welcome and positive step for the NDA group. Managing waste is fundamental to our decommissioning mission and the creation of a single, waste focused organisation has been an important part of reshaping the group to deliver our commitments.

A year after launching the business, the strategy shows how the team is developing its thinking and providing safe, sustainable and cost-effective solutions to help achieve our nationally important work. I'm looking forward to seeing the results, with nuclear waste being made permanently safe, sooner."

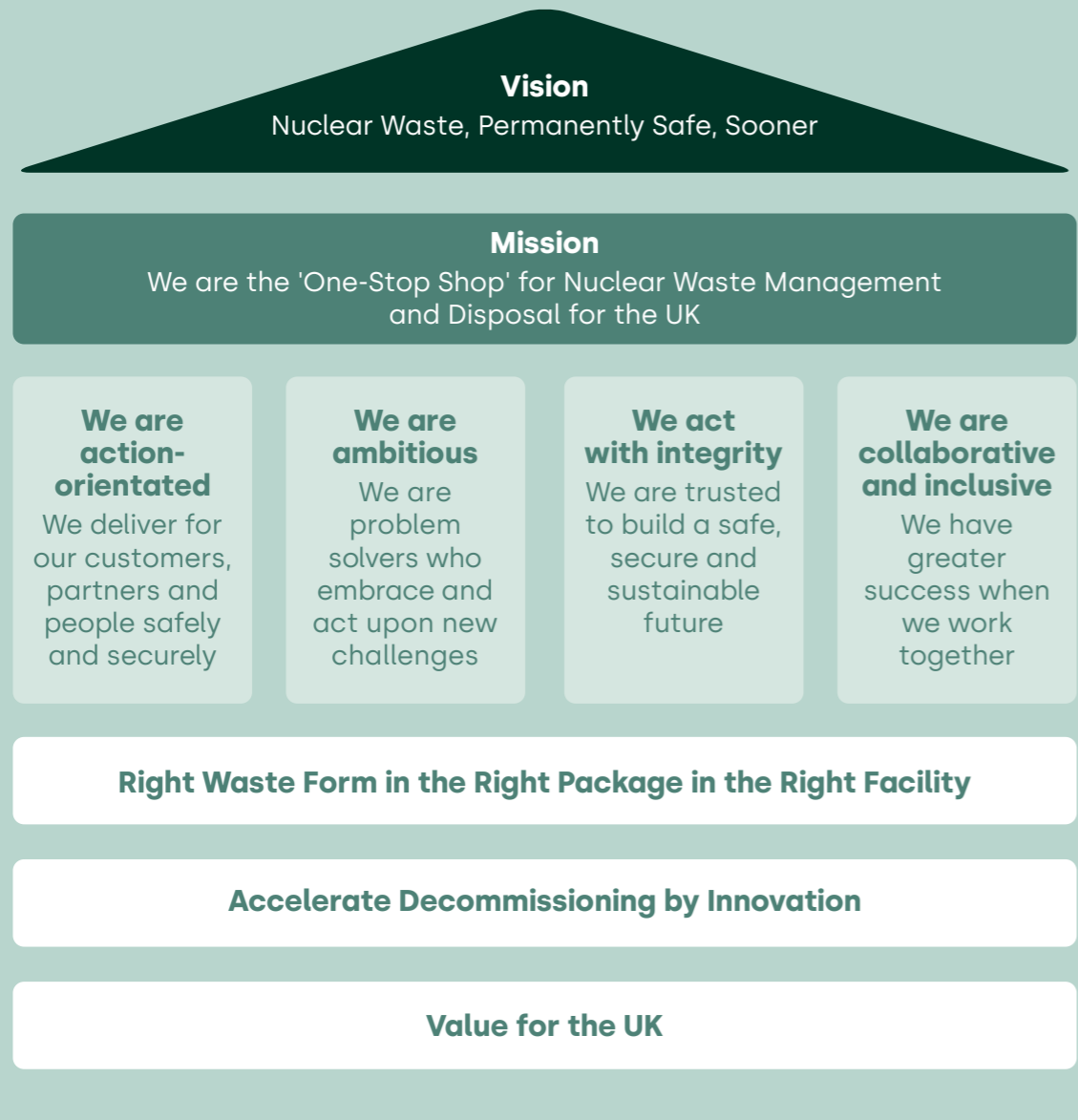
*David Peattie CEng, HonFNUcl
Group Chief Executive Officer,
NDA group*

Our Vision, Mission and Values

Nuclear Waste Services was created with the vision and purpose to make nuclear waste permanently safe, sooner.

Our mission is to be the 'one-stop shop' for all radioactive waste management and disposal solutions for the UK.

We have a clear picture of the organisation we will become by 2030 and Our Values set out who we want to be as a world-leading organisation.



Our strategy is focused on three key strategic objectives to ensure that the **right waste form**, in the **right package**, is managed or disposed of at the right facility. **We support accelerated decommissioning through innovation**, with legacy and future waste streams managed in the most sustainable and efficient way through technology development, expertise and setting worldwide standards to **provide value for the UK**. We aim to ensure that waste management options are always available and do not hinder decommissioning progress.

Nuclear Waste Services will build on work delivered over many decades with the nuclear decommissioning industry, while adding more essential services for our owner NDA, our customers in the nuclear energy, defence, industrial, medical, and research sectors. This is done in partnership with our workforce, our customers, regulators, supply chain and the communities where we work, to make sure our operations are safe, sustainable and secure.



Waste Away

Permanently Safe, Sooner

The UK creates a wide range of hazardous wastes generated by the nuclear industry, ranging from Very Low Level Waste (VLLW), for example lightly contaminated rubble, all the way up to High Level Waste (HLW), that originates from reprocessing of spent nuclear fuel, which concentrates most of the highly radioactive waste products into a smaller volume for disposal.

All of this hazardous waste needs to be managed safely and securely, both now and for the very long-term future. Nuclear Waste Services now brings together UK expertise and dedicated radioactive waste management facilities to support the whole of the country, from the nuclear energy industry to defence, industrial users of radioactivity and even the public health sector.

Today's approach and capabilities for nuclear waste management need to adapt to keep pace with the NDA's decommissioning ambitions. Success for the UK nuclear sector is reliant on the ability to safely and reliably manage waste. Nuclear Waste Services is an essential part of the system and pivotal in ensuring we can safely put the **waste away**.

The decommissioning landscape is constantly evolving due to the generation of more and different types of waste and the increased need to recycle as much waste as possible from decommissioning. We need to reduce secondary wastes, achieving final end states for the nuclear estate and minimising impacts on future generations. This includes the aspiration to recycle 50% of waste from decommissioning and reduce secondary wastes by around 70% by 2030.

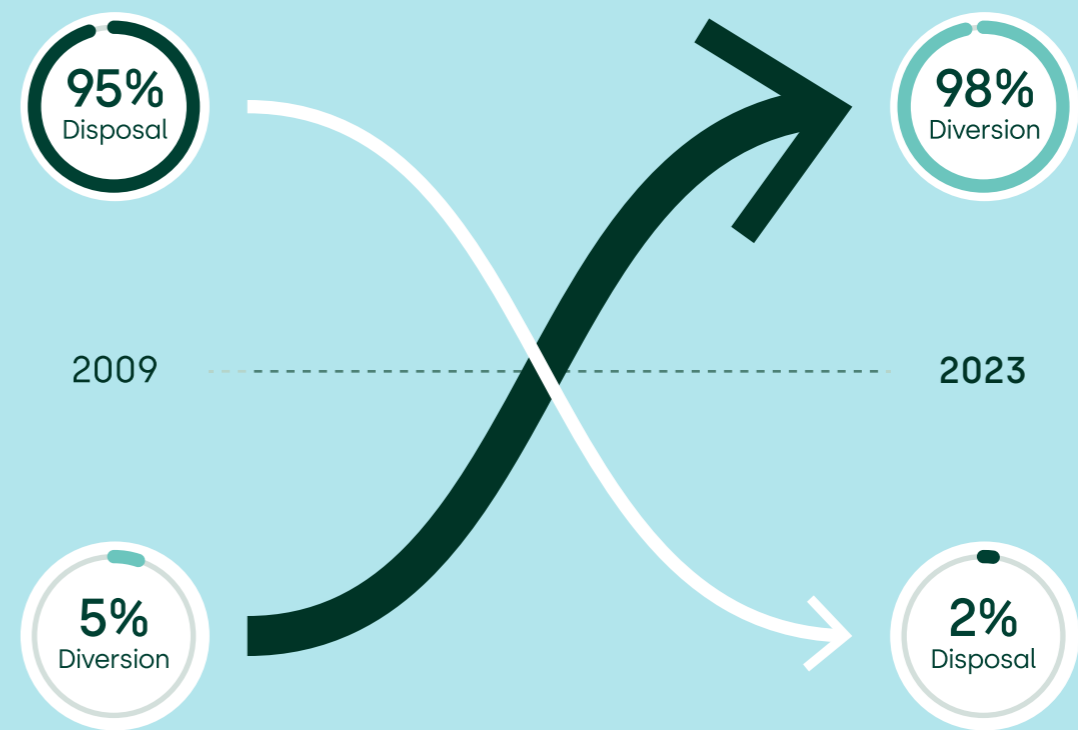
We aim to continue to deplete the legacy wastes, remove any excess that could be treated, recycled, or disposed to current repository sites, so that we expedite waste to be disposed sooner, leaving only that which is essential to be stored and sent to a deep geological disposal facility.

4 million m³

More than 4 million cubic metres of waste is still to be recovered and treated to complete the UK's decommissioning programme

1,324

1,324 different streams of radioactive waste exist within the UK



In 2009, 95% of low activity waste was disposed and 5% was diverted. By 2021, this trend was reversed with 2% being disposed and 98% being diverted.

Today's approach and capabilities for nuclear waste management need to adapt to keep pace with the NDA's decommissioning ambitions. Success for UK nuclear is reliant on the ability to safely and reliably manage waste.

Most radioactive waste arising in the UK is Low Level (LLW) or Very Low Level (VLLW). Nuclear Waste Services delivers solutions for this waste, including at the Low Level Waste Repository (LLWR), which has been operating for decades in West Cumbria as a valuable but finite resource for low level waste disposal.

The volumes of this waste going to disposal in the UK have been driven down greatly over the years through more effective application of the waste hierarchy (Figure 1) to identify ways to avoid creating waste, to better characterise materials, identify new opportunities to re-use or recycle

materials and physically reduce the volume of the remaining waste.

Between 2009 and 2021 this saw a remarkable shift from 95% of waste arising in 2009 going straight to disposal at the Low Level Waste Repository, to only 2% of waste arising in 2021 going to disposal. The rest has been successfully diverted. Our National Waste Programme has led the way in developing and offering services to the industry to take advantage of alternative waste management routes that have demonstrated real application of the waste hierarchy, processing wastes sooner into their final safe state.

Figure 1: The Nuclear Waste Management Hierarchy



Mission Readiness

In 2022 Nuclear Waste Services was created. The organisation acts as the single UK waste business for the Nuclear Decommissioning Authority (NDA), through the integration of Radioactive Waste Management (RWM), Low Level Waste Repository (LLWR Ltd) and incorporating the NDA Integrated Waste Management Programme. Coming together as a single business provides an integrated way of tackling the waste of the past, and an optimisation of assets, while offering more sustainable and efficient services to waste producers, now and in the future.

As a single integrated business we will add value by:

- Becoming a centre for expertise with an integrated solution mindset, providing greater influence and reputation with stakeholders, NDA and UK, Welsh and Scottish Governments, in support of both the decommissioning and the new nuclear agenda (in England and Wales).
- Providing a more effective service to meet stakeholder requirements through flexible and holistic decision making.
- Optimising and minimising waste – greater collective ability to select and deliver the right solution, more reliably and consistently, while reducing risk to delivery and interim storage use.
- Creating better value for money – simplified decision making and governance to aligned business initiatives, prioritise spend and reduce duplication in effort.

- Stimulating innovation – providing a greater range of waste management solutions, delivering solutions quicker through a stronger supply chain capability.
- Integrating capabilities, leveraging shared knowledge and expertise to develop and grow our capability through a single more diverse organisation.

Nuclear waste management is a unique and demanding challenge, requiring considerable expertise supported by innovation, technical and engineering know-how. We must transform our working environment to retain and develop the diverse waste expertise that we rely on to deliver our waste services and build a sustainable and thriving capability for the next generations. Nuclear Waste Services' mission is delivering an integrated waste programme that will drive changes in waste management behaviour and culture. This gives waste producers more options to flexibly and efficiently manage their waste with access to a broader range of waste management solutions.

We will take the necessary steps to create and support a culture of real solutions, innovation and value that will focus on key activities as part of our Transformation programme, which is a company-wide programme of change to enable our integration as a single entity, build on good practice and streamline our approaches. The transformation programme will deliver enablers to support the key strategy milestones as laid out in this brochure and is driving to deliver efficiency commitments by 2024 (Strategy Key Milestone 03: Efficiency).

Our Context and Influences

We are part of the NDA group, which is undertaking an important environmental programme, protecting people and the planet. Responsible for keeping the UK's former nuclear sites and facilities safe and secure, as we decommission them. Nuclear Waste Services is integral to this environmental mission, as we work to provide permanent solutions to our country's nuclear waste challenge. We will also be proactive in responding to new opportunities, such as those created by new nuclear build and those within the emerging clean energy and industrial strategies, to ensure that nuclear waste management supports energy security for the future.

There are a number of significant fluctuations in global trends and UK Government and devolved administration policies that might influence our strategy up until 2030; hence why the key milestones have been selected in those timeframes. We will need to be more agile and flexible, allowing us to respond to any future economy adjustments.

We will respond to new opportunities, such as those created by new nuclear build, and those within the emerging clean energy and industrial strategies, to ensure nuclear waste management supports energy security for the future.

At the time of writing this corporate strategy, the UK policy framework for managing radioactive substances and nuclear decommissioning policy is going through review and public consultation. The update aims to connect changes since 1995 into a single UK-wide policy framework to give a clearer and more consistent direction to those using radioactive substances and those responsible for decommissioning and managing radioactive waste. This includes new proposals around near-surface disposal in England and Wales and the risk-informed approach to radioactive waste management. Near-surface disposal already forms part of Scottish Government policy on Higher Activity Waste. The update also includes change to the scale of new nuclear build ambition for inclusion in waste management planning from 16 GWe to 24GWe. The formation of the Great British Nuclear department has also been announced that will lead clean nuclear energy for the future.

Our strategy to 2030 is presented without prejudice recognising the ongoing consultation, and as such this strategy will remain live and flexible should this context change and need to be updated accordingly. Updating the policies could allow us to implement new management options for some of our higher activity waste inventory while ensuring that waste minimisation activities are being pursued throughout the lifecycle. It would also allow for the introduction of a wider range of disposal facilities than those already in place or planned for. Greater flexibility in disposal options could lead to earlier and more cost-effective decommissioning of nuclear facilities.

A key element of infrastructure that we now need to put in place to enable disposal of higher activity waste is a Geological Disposal facility (GDF). Nuclear Waste Services is currently delivering UK and Welsh Government policy to site such a facility in England or Wales with a willing host community and location that has a suitable geology to assure long-term safety and host the engineering structures required to build the facility. In doing this we are actively engaging with and building on the learning from international colleagues around the

globe making progress on similar GDF programmes, such as Finland, where the first GDF for spent nuclear fuel is already under construction. In Sweden a site has been selected following many years of technical investigations and the engagement of a supportive community. Switzerland and Canada are also part way along the path already, having narrowed down their choice of sites and put a great deal of effort into engaging positively with the communities around those sites. The USA has been operating a GDF for defence wastes for several decades.

Some of these countries have separate waste management organisations, some have private sector operators, and some have public sector bodies looking to manage all or just part of their nations' waste inventories. Like the UK now, France also has a single organisation delivering across the spectrum of waste types and we are both globally leading the way to becoming self-sufficient, sustainable countries for end-to-end nuclear waste lifecycle management. France has also selected their preferred site for a GDF and are now looking to deliver a

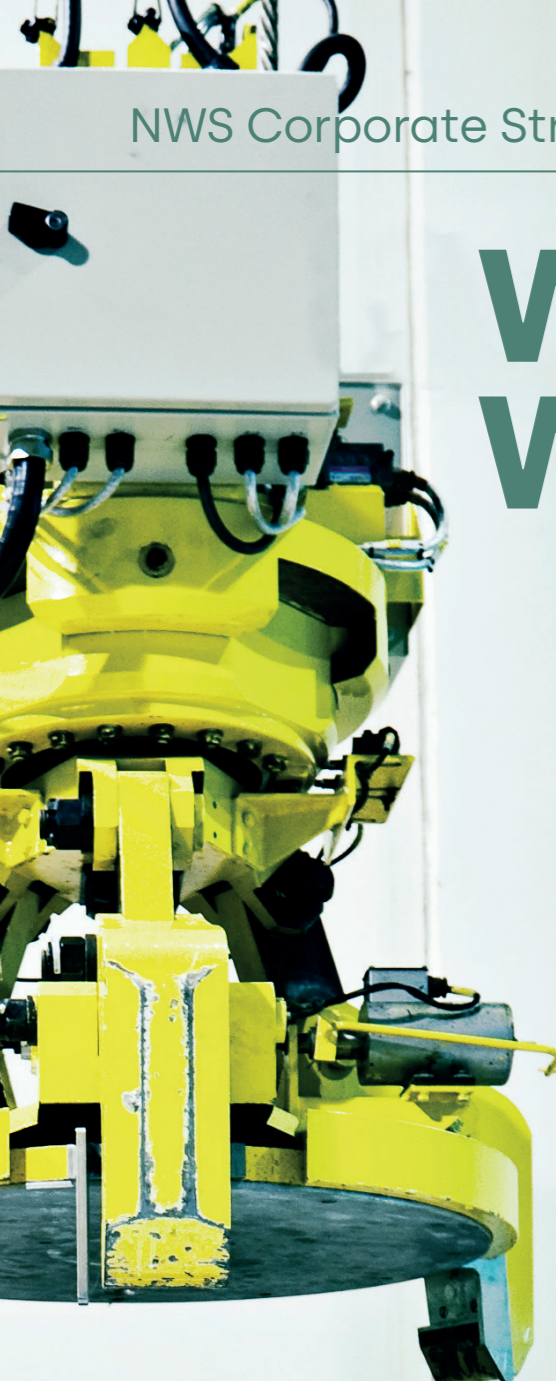
facility that can work alongside their existing surface disposal facilities for VLLW, LLW and some ILW. The UK is both a source of learning for others and a beneficiary of the learning from other programmes – both their successes and challenges. We will continue to lead and support collaborative international projects to develop the evidence and technology required to enable and deliver the long-term safety of geological disposal, including research in international underground rock laboratories.



Waste not, Want not

What We Do

We are specialists in the treatment and disposal of nuclear waste and offer a full range of skills and solutions including waste characterisation, treatment, recycling, volume reduction, waste packaging and permanent disposal, such as our low-level waste repository site in West Cumbria and the development of a Geological Disposal Facility (GDF). We also look to the future of developing further waste solutions and disposal facilities to support the UK's decommissioning needs. Our goal is to ensure that waste is managed in a way that is sustainable and protects people and the environment, now and in the future, whilst optimising the lifetime of the current repository and future sites. Waste is only disposed as the last resort if it cannot be diverted for alternative treatment. We strongly promote the use of the waste hierarchy in all of our operational activities. We are also passionate about developing a thriving national workforce of nuclear waste specialists to support our long-term mission.



Maintenance of Package Fleets

Site Characterisation & Investigations

Waste Specialist Career Pathways

Develop Strategy & Opportunities

Repository Capping & Development

Waste Specialist Career Pathways

Recycle & Re-use

Deep Geological Disposal Facility

New Technologies

Safe, Secure

Waste Lifecycle Solutions

Environmental Stewardship

Low Level Waste Repository

Characterisation Design, Environmental & Nuclear Safety Cases

Manage Radioactive Waste Inventory

Emergency Arrangements

Waste Management Frameworks

Nuclear Waste Expertise & Skills

Nuclear Site Licence Operator

Community Partnerships

Integrated Waste Management

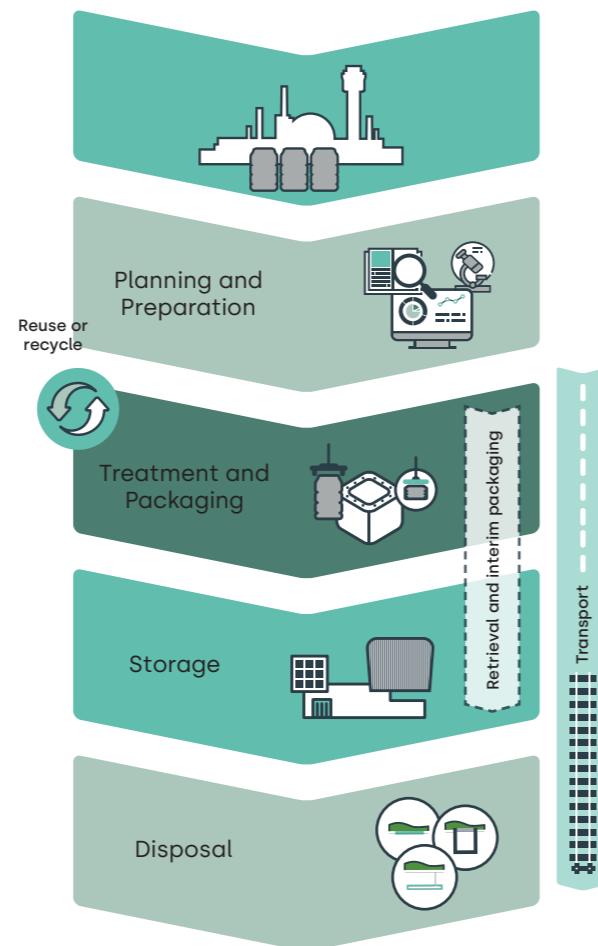
The UK has been producing and managing radioactive waste for many decades and will continue to do so for the foreseeable future. A single radioactive waste strategy was developed by the Nuclear Decommissioning Authority (NDA) in 2019 to ensure that wastes are managed in a manner that protects people and the environment, now and in the future, and in ways that comply with government policies and provide value for money.

The single waste strategy promotes opportunities for managing waste according to the nature of the waste (radiological, physical and chemical properties) and embeds integrated waste management principles, such as the application of the waste hierarchy and sharing treatment and storage assets.

The integrated waste management programme incorporating national waste programme was initiated to deliver the single waste strategy, to drive changes in behaviour and culture, and allow waste producers flexibility in managing their radioactive waste effectively, as well as developing proportionate solutions. The programme aims to deliver the benefits of greater integration, reduce and divert waste, a more proportionate risk-informed approach, better coordination across the industry and reduced costs over the full lifecycle (Figure 2).

Our success as Nuclear Waste Services does rely on the other NDA group waste producers and nuclear sector waste producers to provide a flow of waste for us to process, treat and dispose. We aim to collaborate with a system-thinking approach to ensure we add value for the NDA group.

Figure 2: The Nuclear Waste Management Lifecycle Stages



A single radioactive waste strategy was developed by the NDA in 2019 to ensure that wastes are managed in a manner that protects people and the environment, now and in the future.



Sustainable Development

Our strategy is to make nuclear waste permanently safe, sooner by providing nuclear waste management and disposal lifecycle solutions in support of nuclear decommissioning, whilst ensuring intergenerational equity. We want to offer a unique full system thinking approach to managing waste in a sustainable way.

Our aspiration is to promote a circular economy mindset by treating nuclear waste as a valuable asset whilst developing skills and national infrastructure. Then as a country we can become self-sufficient in the full lifecycle management of nuclear waste, which will support future clean energy security for UK prosperity.

We will contribute to the NDA sustainability legacies (decommissioning; social-economic; cultural; environment and net zero) and support the United Nations 2030 Agenda for Sustainable development goals. We will be developing our integrated sustainability strategy for Nuclear Waste Services and sharing more on this at the end of 2023. We have developed the following policy principles that will flow through everything we do at Nuclear Waste Services:

We want to offer a unique full system thinking approach to managing waste in a sustainable way with an aspiration to promote a circular economy mindset. We will achieve this by treating nuclear waste as a valuable asset.



Sustainable delivery of our mission

We will transform how we consider waste and treat it as a valuable asset with a circular economy mindset where applicable. We will be responsible nuclear operators and ensure innovative, safe and compliant application of the waste hierarchy. We will build and maintain public and regulatory confidence to operate, ensuring sustainable, safe operations and infrastructure resilience (investing for the long-term).



Engage, support and deliver for our local communities

We will operate our sites responsibly whilst respecting our neighbours and local communities. We will ensure our local communities benefit from the delivery of our mission by listening, engaging and enhancing the community through social value and economic action.



Responsible management of our environment

We will protect and enhance our environment through long-term investment. We will reduce our consumption of energy and resources through lifecycle considerations and aim for zero waste. We will drive innovation and minimise our carbon footprint, achieve net zero and ensure our operations lead to a net gain in natural capital.



Sustainable supply chain and responsible procurement

We encourage a thriving, diverse and respected base of suppliers by being a good client. We promote social value through local enterprise and community benefits. We will focus on sourcing goods and services in a way that minimises damage to resources and the environment.



People focused

We care for our people and our supply chain colleagues and ensure everyone can perform in a safe environment. We will invest in well-being, training and opportunities for employment and career development for all backgrounds to ensure a diverse and sustainable nuclear workforce now and in the future and will develop a waste professionals career pathway. We will promote and develop a culture of sustainability leadership with all those with whom we work.



Transparent

We will publish our sustainability commitments and report on our achievements and challenges.

Strategic Objectives

1 Right Waste Form, in the Right Package, in the Right Facility

We are committed to ensuring that the waste hierarchy is applied throughout the radioactive waste management lifecycle and will continue to drive waste prevention, recycling and the minimising of overall volumes. We will set standards and provide specialist advice and services so that the waste form is assigned to the right package and right facility. We will achieve this by using a risk-informed decision-making approach to ensure protection of people and environment, whilst promoting sustainable practises and treating waste as a valuable asset.



We will:

- 1 Apply the waste hierarchy to maximise re-use, recycle and minimise waste disposal supported by improved characterisation services.
- 2 Standardise waste containers to give waste providers optimised solutions with a resilient cost-effective supply on demand.
- 3 Be recognised as the Centre of Excellence for radioactive waste management, providing specialist advice across the NDA group.
- 4 Optimise the low level waste repository disposal site(s) usage.
- 5 Agree NDA group wide waste and inventory assumptions so that we can develop optimised and integrated solutions, with shared benefits.
- 6 Invest and embed the Group Waste Model to identify new opportunities to improve our value and baseline plans.
- 7 Influence national and global standards for nuclear waste management.

2 Accelerate Decommissioning by Innovation

Our second objective is to work with waste producers to overcome a range of waste challenges and to capitalise on new opportunities. We will do this by thinking differently about waste, innovating in everything we do and enabling a flexible approach to long-term waste management. Innovation is everyone's role. The NDA have charged us with this work, creating and developing new approaches and defining the appropriate implementation of waste routes to support the overall nuclear decommissioning mission.



We will:

- 1 Innovate and problem solve for waste challenges across the nuclear industry to deliver value for the UK.
- 2 Develop new solutions to plug waste treatment gaps and increase our service offering to the UK.
- 3 Innovate in partnership with the UK supply chain to meet future waste challenges and solve complex problems together.
- 4 Promote skills, capability and technology transfer from analogous industries.
- 5 Embed an innovative and sustainable mindset into our company culture to treat waste as a valuable asset.
- 6 Expand the application of our current waste service offerings and build new capabilities for future waste challenges.
- 7 Identify cross NDA group challenges through the integrated waste management programme and bring optimised solutions.



3 Value for the UK

Our third objective is to ensure that we bring integration across the NDA group and the supply chain and seek opportunities to deliver the overall mission in an optimised way by providing industry wide solutions to our radioactive waste challenges. Integrated waste solutions will allow us to build and share sustainable capabilities to assess make versus buy options, deliver timely solutions efficiencies, and overall value to the taxpayer.

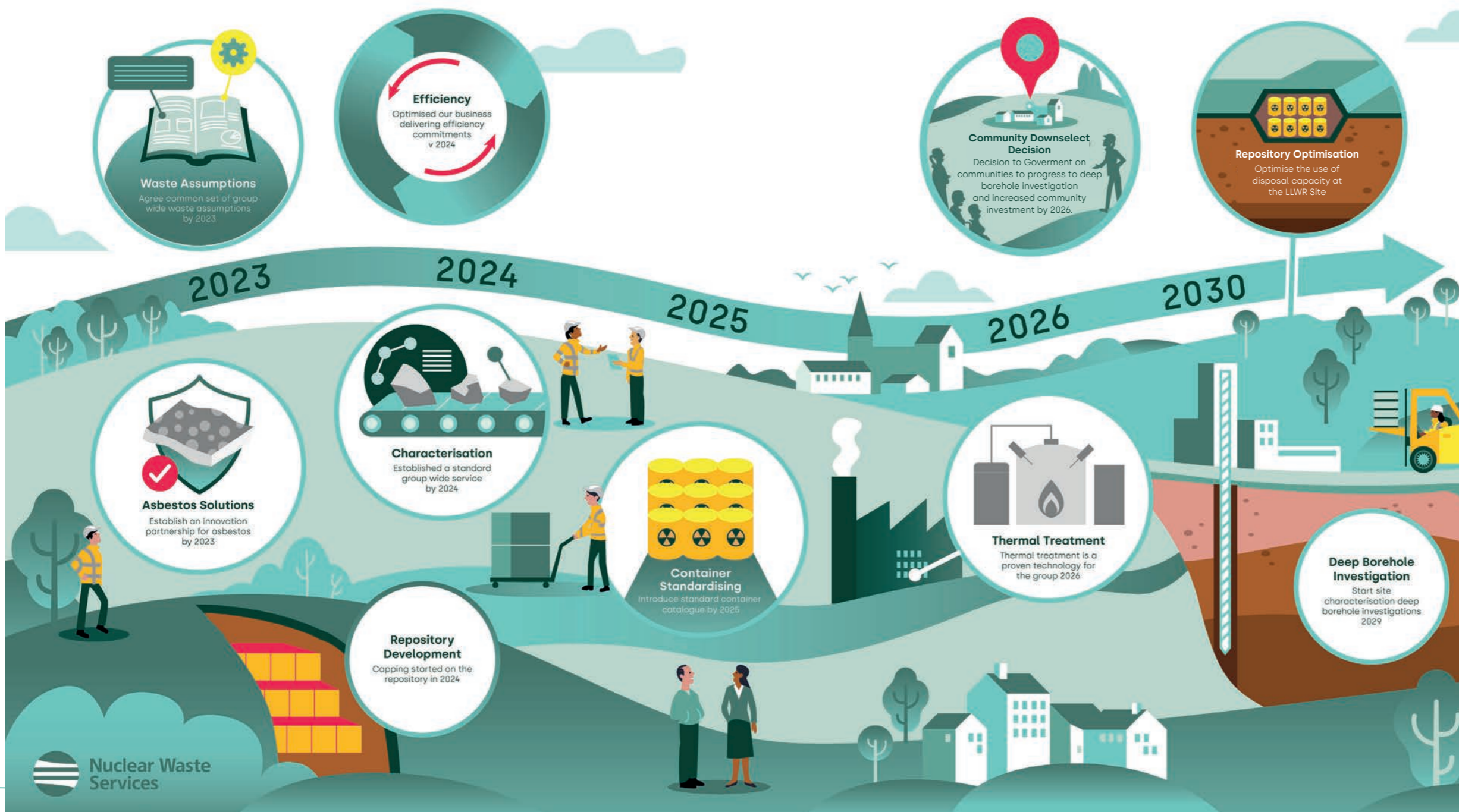


We will:

- 1 Deliver cost effective waste treatment and disposal facilities for the UK's radioactive waste.
- 2 Deliver the efficiencies committed to when forming Nuclear Waste Services and deliver value for the taxpayer.
- 3 Ensure upper quartile benchmark for safety, operational, and project performance.
- 4 Deliver core business effectively and generate opportunities to grow our range of services to national and international customers.
- 5 Thread sustainability through all our waste activities.
- 6 Provide UK core waste skills, develop and maintain a talent pipeline for UK waste professionals and leaders, creating jobs for the future.
- 7 Create momentum and deliver early milestones by 2030 to demonstrate the value of a single waste organisation.

Key Strategy Milestones: 10 by 2030 Road Map

Our success in delivering this strategy will be measured against the '10 by 2030'. This will be done in parallel with our nationally important mission, to operate our current national low-level repository and waste services in a safe, secure manner with environmentally compliant responsible stewardship. We will use our operating plan, annual targets and performance measures to demonstrate and evidence our strategy implementation. Our targets will evolve as our strategy implementation matures and be set out in future iterations of our corporate strategy and operating plans.



S01 Asbestos Solutions:

Establish an innovation partnership for managing asbestos waste by 2023-24

S02 Waste Assumptions:

Agree a common set of group-wide waste assumptions by 2023-24 to improve decision making across the waste management lifecycle

S03 Efficiency:

Optimise our business delivering efficiency commitments by 2024-25

S04 Repository Development:

Capping will start on the LLWR repository in 2024-25

S05 Waste Characterisation:

Establish a group wide service by 2024-25

S06 Container Standardisation:

Introduce a standard container catalogue by 2025-26

S07 Thermal Treatment:

Thermal treatment is a proven technology for the group by 2026-27

S08 GDF Community downselect decision:

Decision to government on communities to progress to deep borehole investigation and increased community investment by 2026-27

S09 GDF Borehole drilling:

Start site characterisation deep sub-surface borehole investigations 2029-30

S10 Repository Optimisation:

Optimise the use of disposal capacity at the LLWR Site

Strategy Themes and Priorities



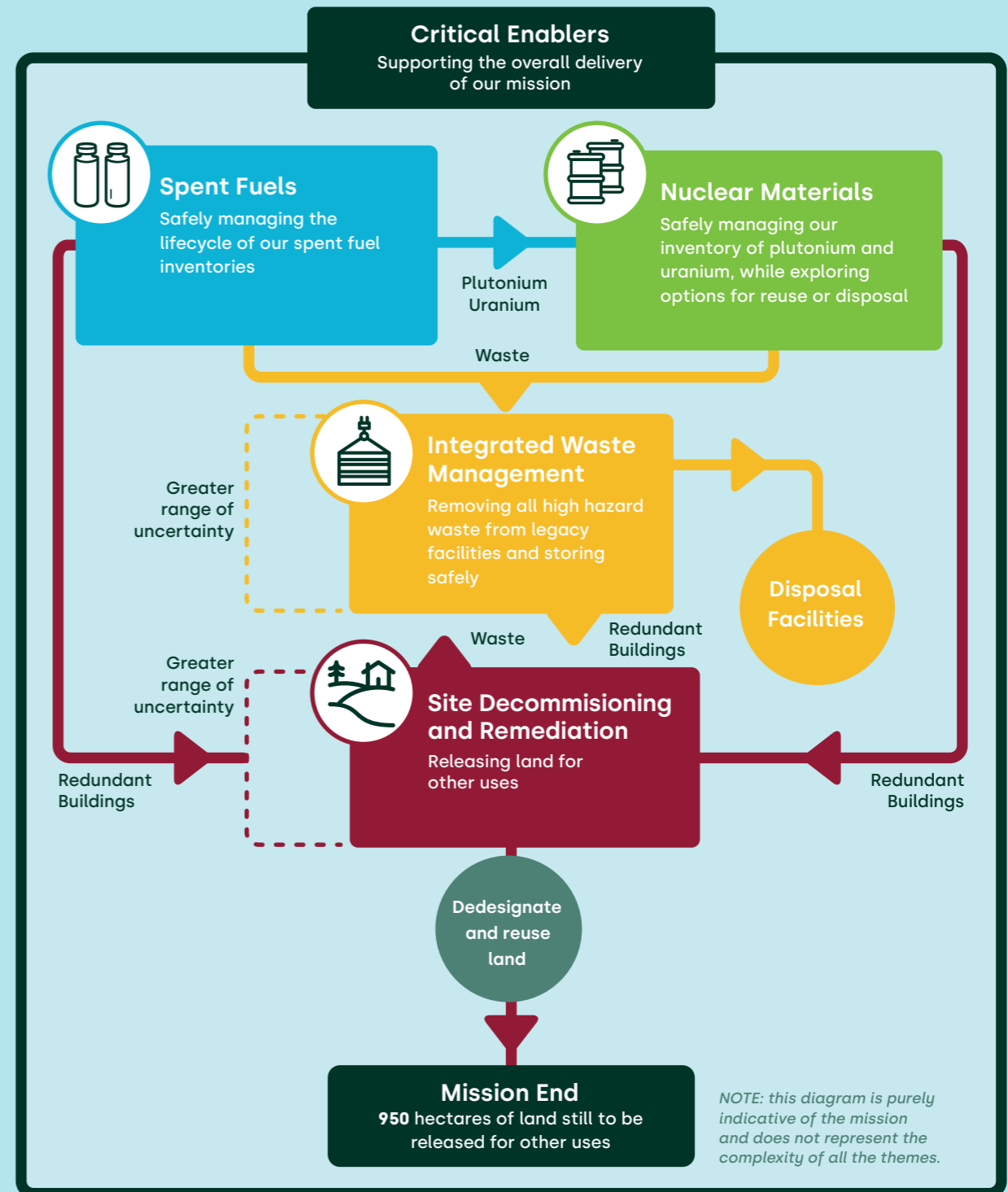
Figure 3: Flow of NDA Strategy 4 into our Nuclear Waste Services local strategies and delivery plans

This is our first corporate strategy as the newly formed single waste business and as a wholly owned subsidiary of the Nuclear Decommissioning Authority. Government policy and the NDA strategy define our purpose and we deliver the outcomes defined in the NDA Strategy Outcome Specification for Nuclear Waste Services, through the effective and efficient deployment of our resources.

Links with other plans

At the heart of the rationale for bringing core capabilities in nuclear waste management into a single business, are the benefits associated with centralising and standardising the response to the NDA Strategy 4, which embodies and builds on the 2019 Radioactive Waste Strategy. NDA Strategy 4 points to a single strategy to promote opportunities for managing across waste categories. It embeds integrated waste management principles, such as the application of the waste hierarchy and sharing treatment and storage assets. These strategies cascade into the NDA businesses and are implemented into our local strategies and delivery plans (Figure 3).

Figure 4: NDA Strategic Themes



The NDA's Strategy 4 sets out the strategic outcomes that are required to be delivered by the NDA and its subsidiaries. The NDA breaks down this strategy into five strategic themes which group all the activities that support delivery of the overall mission (Figure 4). Nuclear Waste Services carry out work in support of all strategic themes as required and specific requirements are captured in the Nuclear Waste Services strategy outcome specification document.

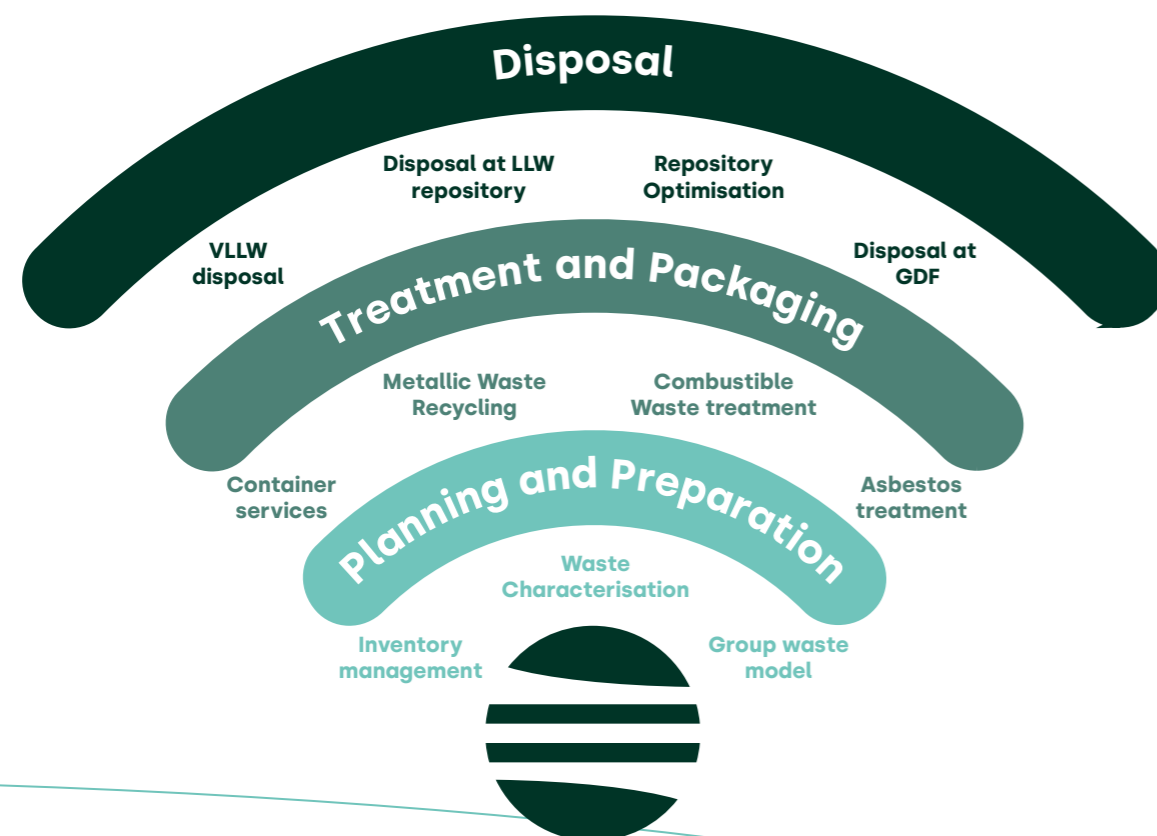
In terms of our strategy priorities to 2030 we will be focused on Integrated Waste Management and prioritising activities in the key waste management lifecycle stages. We will focus our key business activities under the following themes:

- **Planning & Preparation**
- **Treatment & Packaging**
- **Disposal**

In the short-term we will focus on developing our characterisation services; standardising containers; developing new treatment technologies and services; whilst progressing permanent disposal solutions (Figure 5).

Storage and Transport will not be a specific near-term focus area for Nuclear Waste Services, as a considerable amount of interim storage activities are currently being carried out by waste producers at the nuclear license sites. Future transport strategy will be led by Nuclear Transport Solutions (NTS). We will continue to identify cross group opportunities and carry out strategic studies and assessments including where our repository site(s) may support future integrated storage, transport needs and optimisation. There is also a range of important activities as part of the Critical Enablers that we will need to deliver to support the strategy.

Figure 5: Short-term strategic priorities



Planning and Preparation

Planning and preparation are the foundation of successful waste management and is an ongoing process throughout all of the waste lifecycle stages, with the application of the waste hierarchy at the core of our strategy. Key activities that take place at this stage include waste characterisation, defining and managing radioactive waste inventory, developing safety cases and integrated waste management planning.

To improve our waste planning across the NDA group we will be collaborating with the other waste producers to develop a group wide set of waste assumptions to support developing integrated waste management opportunities and leverage economies of scale where possible, along with improving long-term decision making across the waste management lifecycle (S02 Waste Assumptions).

We will continue to develop and embed our Group Waste Model capability that supports waste scenario planning and identification of optimisation and efficiencies. On behalf of the NDA group, we are custodians of the UK Radioactive Waste Inventory (UKRWI).

Waste Characterisation

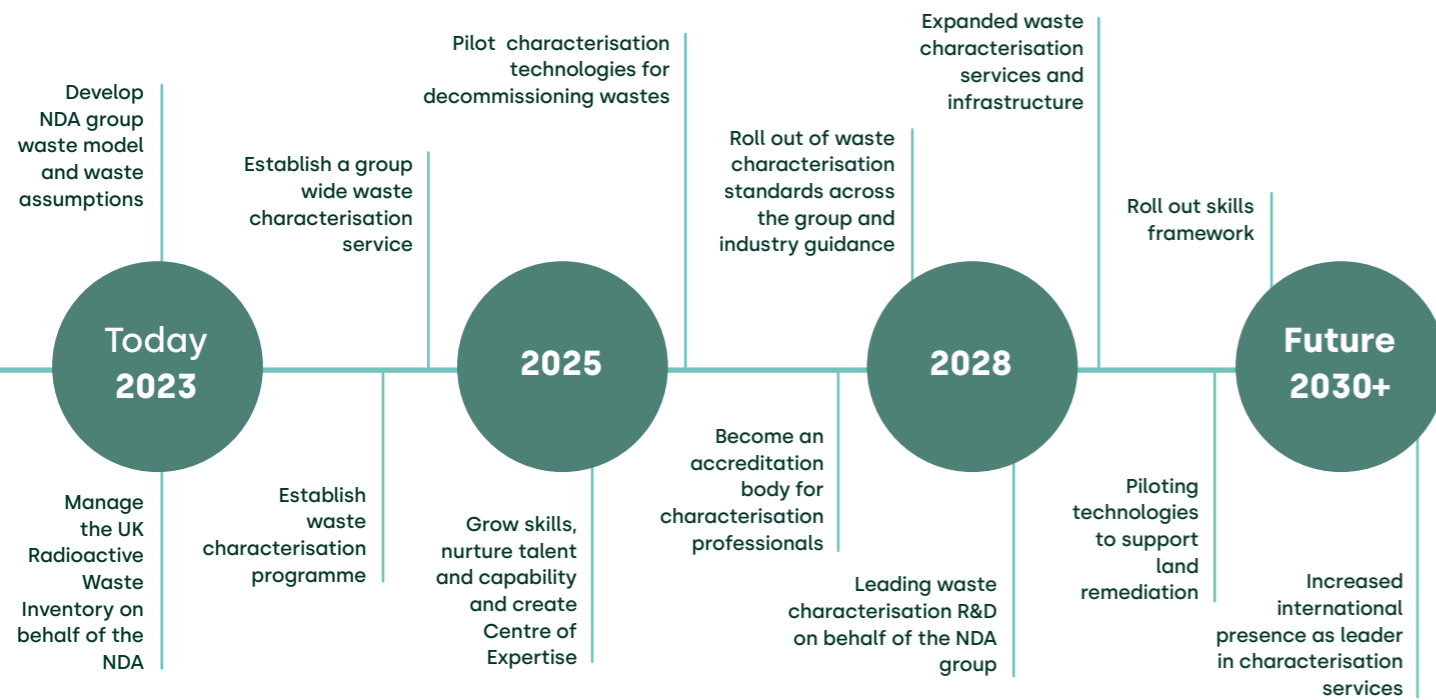
There are numerous decision points throughout the lifecycle of radioactive waste management. To support these decisions, a full understanding of the properties of waste is required. Waste Characterisation describes all the steps taken to collect information on the physical, chemical, and radiological properties of a material. It may determine the way in which facilities are decommissioned and materials are sorted to segregate different waste types or categories to facilitate their onward management, underpin the decisions on waste routing and selection of suitable disposal container types.

Waste Characterisation includes a wide range of activities, from a desk-based review of records to the application of highly specialised and cutting-edge technologies to obtain new data on the properties of the waste. Waste Characterisation requires both the right equipment, technologies and infrastructure, and the people with the skills, knowledge and experience to operate them.

There is significant benefit in conducting more detailed characterisation to allow waste to be more accurately characterised. For example there are large amounts of boundary waste that has the potential to be reclassified from Intermediate Level Waste to Low Level Waste. This could mean significantly lower costs, environmental benefits and the potential to divert to a permanent disposal facility sooner (e.g. the LLW Repository) rather than interim storage until a geological disposal facility is available.

The ambition for the waste characterisation strategy is for Nuclear Waste Services to provide an efficient, professional and responsive Waste characterisation service to the NDA group and wider UK nuclear industry. We will become the UK's central body for characterisation expertise, along with access to technology and provision of services, which will boost confidence with our waste producers and regulators. Nuclear Waste Services would lead the implementation of cutting-edge technologies, act as a centre for expertise and train the experts of the futures (S05 Waste Characterisation).

Roadmap for Planning and Preparation



Planning and Preparation

Strategy Milestone (S02)

Waste Assumptions: Agree a common set of group-wide waste assumptions by 2023-24 to improve the group waste model and decision making across the waste management lifecycle

Strategy Milestone (S05)

Waste Characterisation: Establish a group-wide service by 2024-25



Case Study

Reclassification of Plutonium Contaminated Material drums to low level waste due to deployment of more accurate characterisation techniques has led to diversion away from GDF and into final disposal at the LLWR repository, many years ahead of schedule and with savings of £9m

Treatment and Packaging

The effective treatment and packaging of radioactive waste allows us to achieve our strategic objective to reduce overall waste volumes and maximise package performance. We require a toolkit of waste treatment options to allow optimisation and the efficient use of waste management routes.

Our waste services team provides a range of existing services to help waste producers manage their waste throughout the lifecycle. We wish to expand our service offerings and our strategy to 2030 will focus on an approach to standardise waste containers in support of future broad front decommissioning, develop innovative ways to treat bulk or problematic wastes like Asbestos and Metals, and develop new technologies such as Thermal treatment for higher active waste.

Treatment

Nuclear Waste Services will support the acceleration of decommissioning programmes by providing a sustainable enhanced radioactive waste treatment service, aligned with the waste management hierarchy, to drive more value and sustainable options to allow each waste producer to focus on their core mission.

Areas of strategy development will include a review of contracting models to provide the required future capability on a resilient and sustainable basis, considering benefits of bulk management of wastes, developing new innovation partnerships with the supply chain starting with exploring technologies for treatment and recycling of Asbestos (S01 Asbestos Solutions), development of new treatment technologies and the development of new or optimised routes for all wastes generated across the NDA estate.

Thermal treatment technologies apply high temperatures to waste to pacify reactive materials, reduce volumes and produce a stable waste form for final disposal. We are working closely with Sellafield Ltd who are leading the trials programme to understand waste applicability and technology maturity in order to develop Thermal Treatment into a proven technology solution (S07 Thermal Treatment).

Treatment and Packaging

Strategy Milestone (S01)
Asbestos Solutions: Establish an innovation partnership for managing asbestos waste by 2023-24

Strategy Milestone (S06)
Container Standardisation: Introduce a standard container catalogue by 2026-27

Strategy Milestone (S07)
Thermal Treatment: Thermal treatment is a proven technology for the group by 2026-27

Case Study

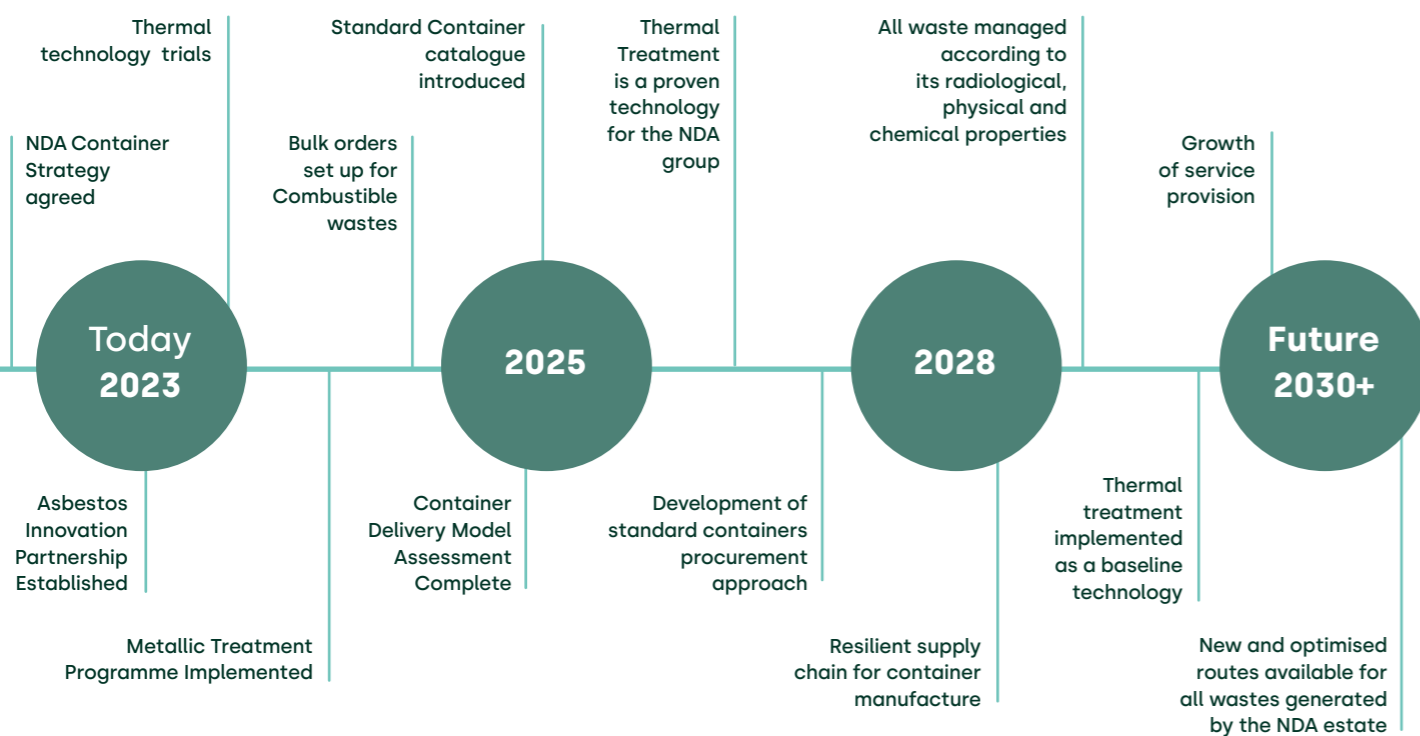
Thermal treatment could be the most exciting technological innovation at Sellafield in a generation. The programme is currently at the stage of exploring a range of thermal technologies and carrying out research trials by melting a range of different ILW wastes to test the way the waste will behave during treatment.

Containers

Radioactive waste containers are designed to provide containment through all phases of the waste management lifecycle. The design or selection process is underpinned by government policy, legislation and strategy, and is influenced by a variety of factors including the radiological, chemical and physical characteristics of the waste, as well as the proposed approach to waste treatment, storage and disposal.

Our ambition is to drive value for money and strategic risk reduction through co-ordination and standardisation of design, procurement, manufacture and storage (pending fill) of a fleet of innovative waste container solutions for the NDA group and wider UK nuclear industry. Standardised container design will ensure a range of benefits: reduce supply chain manufacture complexity and tooling, promote continuous improvement, simplify group handling equipment, enable on-time delivery of waste containers to customers to meet demand. Long-term group level contracts will unlock supply chain investment in capability and advanced manufacturing technology (S06 Container standardisation). The standardised catalogue will not result in disruption of any extant waste container plans which are currently in flight by NDA operating companies. It will be future looking to broad front decommissioning applications.

Roadmap for Treatment and Packaging



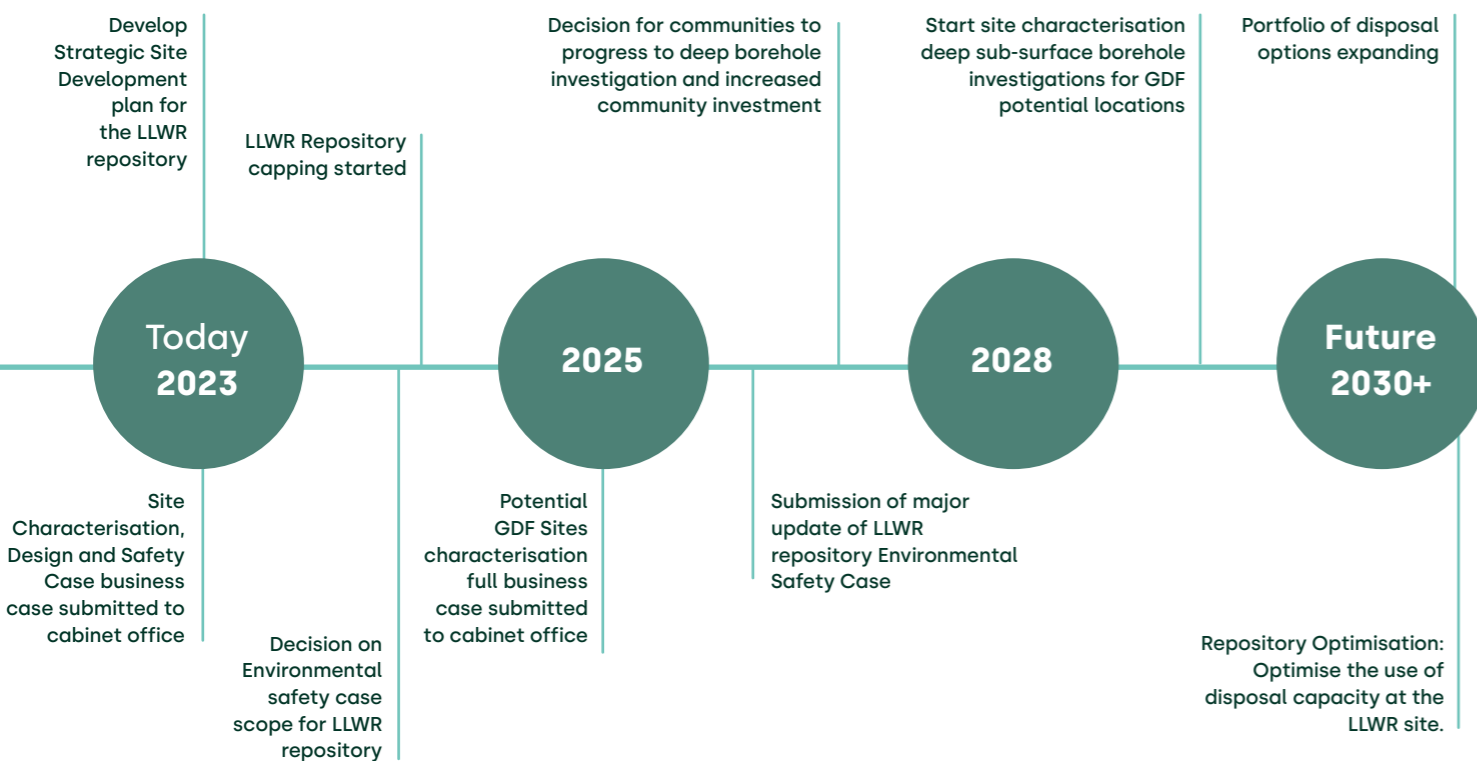
Disposal

Our ambition is to provide the full range of waste disposal capabilities in line with the needs of the UK nuclear industry, enabling permanent disposal of waste in the right disposal solution at the right time for the best value to the taxpayer. The Radioactive Waste Inventory includes some 4,560,000 m³ of radioactive waste which will require management. This includes approximately 2,830,000 m³ of VLLW and 1,480,000 m³ of LLW waste destined for management through the Nuclear Waste Services waste management services framework or disposal at the Low Level Waste Repository. The 2019 Inventory for Geological Disposal shows that the estimated packaged volume of waste and materials totals approximately 750,000 m³. This is equivalent to around 70% of the volume of Wembley Stadium.

The Low Level Waste Repository is important to delivering the Nuclear Waste Services mission, and we will continue to operate this site in a safe, sustainable and secure manner. The Repository development programme to complete the capping of vaults is a key strategic milestone to ensure that the site continues to be managed effectively (S04: Repository Development).

The strategy is to enhance the current baseline of planned disposal capability.

Roadmap for Disposal



What is a GDF?

We welcome your views, comments and questions

- A nationwide search has started to find a suitable site and a willing community to build a Geological Disposal Facility (GDF) for the UK's radioactive waste.
- A Community Partnership has formed to continue the conversation about whether Mid Copeland is the right place to build a GDF.
- A GDF, deep underground, uses multiple layers of manmade barriers to keep radioactive waste away from people and the environment.



Disposal

Strategy Milestone (S04)

Repository Development:
Capping starts on the repository in 2024-25

Strategy Milestone (S08)

GDF Community down-select decision: Decision to government on communities to progress to deep borehole investigation and increased community investment by 2026-27

Strategy Milestone (S09)

GDF borehole drilling: Start site characterisation deep sub-surface borehole investigations in 2029-30

Repository Optimisation (S10)

Optimise the use of disposal capacity at the LLWR site

Case Study: community partnership schemes

The Mid Copeland GDF Community Partnership awarded £1 million in Community Investment Funding to local community projects in 2022 – its first year, issuing a total of 28 awards.



Specifically, through the development of repository capabilities and increasing opportunities around disposal of waste at the Low Level Waste Repository (S10 Repository Optimisation) enabling a better matching of wastes to disposal solutions.

Developing a GDF for the permanent disposal of higher activity radioactive wastes is a national strategic imperative and represents one of the UK's largest environmental and infrastructure programmes. The search for a suitable site in England and Wales is, uniquely, based on consent on a suitable site with a willing community (S08: GDF community downselect decision). Our next key milestone is to start the deep sub-surface borehole investigations in 2029 as a key part of delivering a GDF (S09: GDF borehole drilling).

Critical Enablers

Enabling functions at Nuclear Waste Services are important to the success of the corporate strategy and include departments such as technical, operations, commercial, stakeholder relations, environmental, health, safety, security and quality (EHSSQ), finance, IT, human resources, transformation and legal. The functions put in place enable us to maintain our high standards and ensure the business has the right resources and processes to deliver effectively and efficiently. Functional and technical strategies will be developed to underpin the corporate strategy and implemented to align with the '10 by 2030' key strategy milestones.

Developing a GDF for the permanent disposal of higher activity radioactive wastes is a national strategic imperative and represents one of the UK's largest environmental and infrastructure programmes.

Strategy Development & Evolution

The Corporate Strategy and underpinning functional and technical strategies will be part of the Nuclear Waste Services Strategy Management System. The strategies will remain live and will be reviewed regularly or when there is a change in our context (e.g. new government policy is released). We will continue to work closely with the NDA group, government departments and regulators on all relevant waste policy and strategy implementation. The NWS corporate strategy will continue to evolve and we will be developing this in collaboration with the NDA Strategy 5 revision that will take place on the run up to publication in 2026.

If you would like to keep up with our mission progress please follow us at:

 **website:** [gov.uk/government/organisations/nuclear-waste-services](https://www.gov.uk/government/organisations/nuclear-waste-services)

 **twitter:** twitter.com/nuclear_ws

 **linkedin:** [linkedin.com/company/nuclearwasteservices/](https://www.linkedin.com/company/nuclearwasteservices/)





www.nuclearwasteservices.uk

Nuclear Waste Services is a joint trading name of LLW Repository Limited (Company Registration No. 05608448) and Radioactive Waste Management Limited (Company Registration No. 08920190). Both of these companies are registered in England and Wales with their registered office located at Pelham House, Pelham Drive, Calderbridge, Cumbria CA20 1DB.

Part of the NDA group

