



# Magnox plan summary

Magnox lifetime plan 2013

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Magnox, owned by EnergySolutions, is the management and operations contractor responsible for ten nuclear sites and one hydroelectric plant in the UK working for the sites' owner, the Nuclear Decommissioning Authority (NDA).

## The plan

This document summarises the key activities outlined in the lifetime plan (LTP), this includes timescales, costs, scope and the resources required to deliver all Magnox Limited sites to the agreed end state.

The 2012 plan was the first since Magnox North and Magnox South combined to form Magnox Ltd. It was a transformational period for the organisation which saw a move towards arranging the way we plan and deliver our work through a series of programmes. The 2013 plan continues this focus and demonstrates how Magnox has built on these arrangements to realise further significant value and savings for the UK taxpayer.



3,291

..... Total number of current  
..... Magnox employees

# Overview

## Who we are and how we work

An introduction to Magnox, The NDA and EnergySolutions, including a review of our mission, our achievements and our goals for the future.

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# Phases

## What we are working towards

The LTP describes how Magnox will manage its sites through five stages, these are: generation, defuelling, care and maintenance (C&M) preparations, C&M and final site clearance (FSC).

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# Delivery

## How we intend to deliver the plan

How Magnox delivers its work by programming consistent approaches common across several sites: fuel element debris (FED), ponds, intermediate level waste (ILW), plant and structures, waste management and the Magnox Operating Programme (MOP).

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# The sites

## How the plan relates to each of the ten sites

A review of each of the ten sites and how the work will be delivered over the coming years, including: current status of the site, a summary of key achievements and costs.

Berkeley	60
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Trawsfynydd	108
Wylfa	114

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# Managing Director's report

In Magnox, our mission is clear. We have outlined a number of strategic goals which will mark our progress along the route towards safely delivering our sites into C&M.

Our work is as diverse as it is challenging, ranging from electricity generation at Wylfa, through defuelling sites at the end of generation, to the introduction of innovative techniques to accelerate decommissioning and clean-up at Bradwell and Trawsfynydd.



**Neil Baldwin**  
Managing Director

We estimate that, through a combination of new technical solutions, different ways of working and the introduction of Strategic Programmes, the MODP, and the C&M Hub, £1.8 billion has been saved since 2010.

A key focus for the coming year will be continued safe delivery of the MODP against the backdrop of the NDA's competition to award a new contract for the operation of Magnox Ltd from 2014.

*Further information on MODP can be found on pages 12 and 13.*

*Further information on the Magnox Ltd competition can be found on the NDA website.*

## The Magnox mission

The mission of Magnox over the next five years is:

- To build on Magnox's excellent safety and environmental performance
- To maximise the value from the remaining generating site, and safely bring to an end over 50 years of Magnox electricity generation in the UK
- To complete the programme for dealing with the remaining spent fuel, the MOP, and in so doing avoid leaving behind any legacy of this material
- To reduce risk and cost by delivering the MODP
- To deliver a C&M state on at least one Magnox site
- To pioneer innovative and transformational solutions, and ways of working
- To reshape and reduce our workforce in line with the MODP, whilst providing strong and responsive support to our people
- To deliver in partnership with our workforce and the trade unions

and finally, recognising that the future beyond five years is all about decommissioning:

- To progressively transform Magnox into a world class, high performing decommissioning organisation

## Overview



Generation



Defuelling



Decommissioning



#### Magnox sites

1. Berkeley
2. Bradwell
3. Chapelcross
4. Dungeness A
5. Hinkley Point A
6. Hunterston A
7. Oldbury
8. Sizewell A
9. Trawsfynydd
10. Wylfa

#### Magnox support offices (MSO)

Berkeley  
Daresbury  
Oldbury Technical Centre

#### The sites are in one of three states:

Generation, a site which is still generating electricity

Defuelling, sites which have finished generating and are in the process of removing the spent nuclear fuel (which accounts for more than 99% of the radioactive inventory)

Decommissioning, the process of reducing the higher hazards and delivering the site into C&M

# Focus on safety

Safety remains our priority as we continuously strive to achieve industry leading levels of nuclear and conventional safety.



**Keith Spooner**  
EHSS&Q Director

Underlying performance measures have remained strong in Environment, Health Safety, Security and Quality (EHSS&Q) for the company. However, towards the end of the year we saw a disappointing increase in Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) reportable injuries. This has been, and will remain, the subject of vigorous management action. Our focus will be on regaining and exceeding our previous performance levels in this area.

Each year, we set ourselves improvement targets via our 4P Plan. This groups EHSS&Q improvements under the broad headings of people, plant, process and performance. We will continue to emphasise the use of behavioural safety and human performance tools to support performance improvements across the whole business.

## Nuclear safety

Improvements in nuclear safety activities are driven through a nuclear safety improvement planning process under the direction of the Chief Nuclear Officer. Our process safety indicators (PSIs) have remained strong throughout the year and we continue with our programme of audits and internal challenges.

## Conventional safety

Our improvement objectives for safety in 2012/13 focused around control and management of our high hazards at sites, through a programme of quarterly campaigns, aimed at our major hazards of working at height, electrical safety, fire safety, chemical safety, confined spaces and radiological safety. These campaigns were developed and promulgated through a lead site within the group, and have been fundamental in maintaining our focus on these key topics during the period.

We also targeted improvements in contractor management and the enhancement of our arrangements for event investigation.

For 2013/14 we will be putting further emphasis on campaigns to raise conventional safety standards.

## Environment

We have continued our drive to manage wastes responsibly while maximising value to our customer. In particular, we have looked to maximise recycling opportunities for appropriate waste streams.

In the forthcoming year, we will be looking at opportunities to improve our performance by rationalising some of our monitoring and reporting arrangements, and by placing sustainability as a primary focus for our business. We will also be working with stakeholders to maximise the potential benefits of existing waste treatment and storage facilities.

## Quality and security

As part of ongoing work to improve consistency we are moving to business wide accreditation under ISO 9001:2008; 14001:2004 and Occupational Health and Safety Advisory Services 18001:2007, rather than site-by-site as in previous years.

From a security perspective, we have continued to work closely with our regulator in developing fit-for-purpose arrangements for our sites at each stage of their lifecycle, ensuring our operations and activities remain secure and compliant. Reviews have been undertaken at several Magnox sites during the year as part of this process.



Radiation protection



Quality assurance



Emergency preparedness



Safe use of procedures

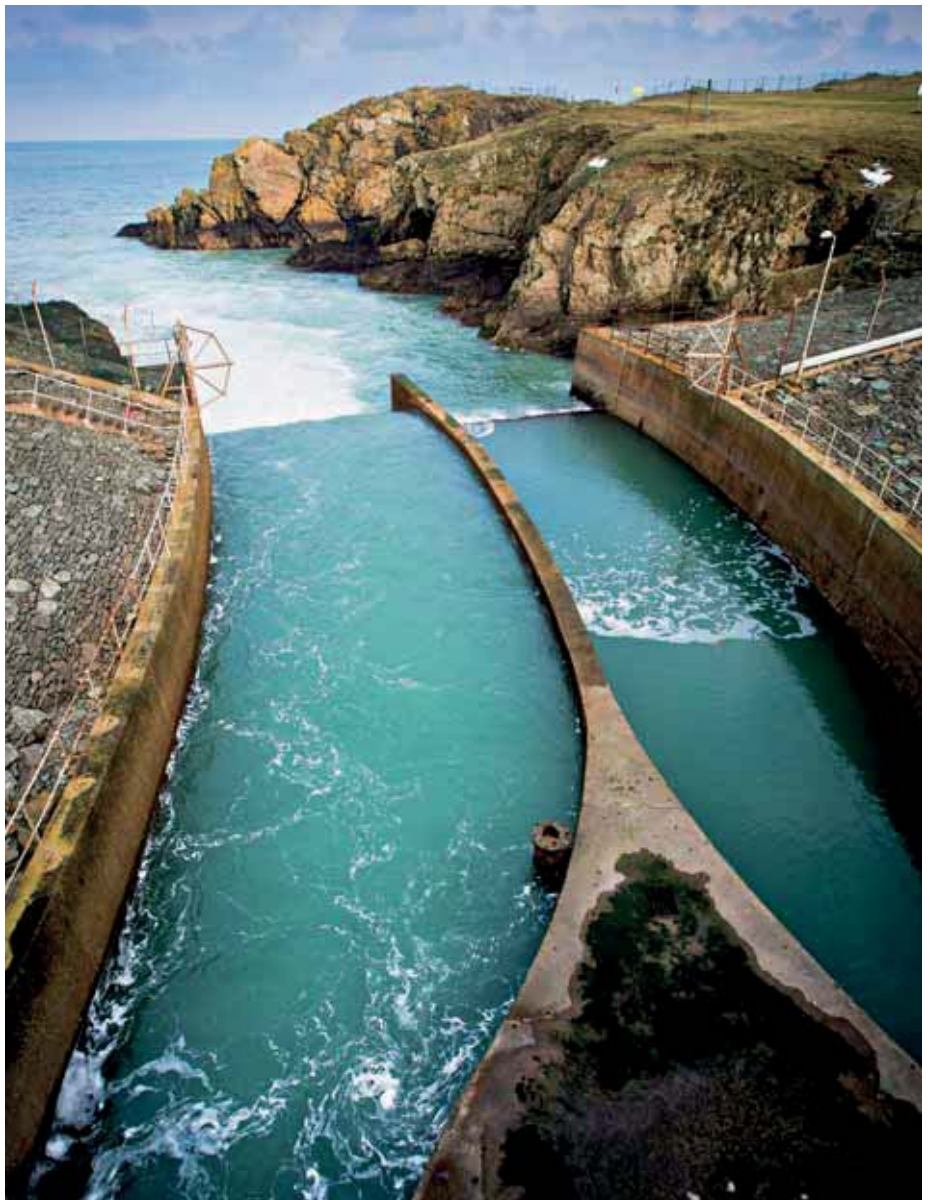


Security

Our focus for the coming period will be to concentrate on further improvements to fundamental EHSS&Q management processes, such as risk assessment and streamlining other processes to deliver proportionate arrangements as our lead sites work towards entry to C&M. In security, we will look to raise the profile of information security across the business and utilise new systems to support and streamline our sites' access management arrangements, with the clear aim of delivering safe, secure and fit-for-purpose arrangements at each location.

**The future**

Looking forward Magnox has developed a high level vision for management of EHSS&Q to be the best performing company within the nuclear sector in the UK. All other companies will aspire to match our performance, with a commitment from the executive that: "The health and safety of our workforce, the public and the protection of our sites' environment are our highest priorities." A number of pledges have been signed on to by the executive in support of the vision and this commitment.



Looking after the environment



Conventional safety

# NDA foreword

The NDA takes responsibility, on behalf of the Government and taxpayers, for overseeing the clean-up and decommissioning of the UK's first generation nuclear sites, which date back as far as the 1940s. The historic Magnox sites were built between the 1950s and 1960s, representing some of the world's earliest nuclear power stations, and are an important part of our mission.



**John Clarke**  
Chief Executive Officer

The ten sites operated by Magnox present unique and diverse challenges, a legacy of the ongoing design modifications which meant that each newly constructed power station was slightly more refined, and different, than the previous model.

Today, the Magnox programme accounts for more than 20 per cent of our budget, the second largest chunk of expenditure after Sellafield, which houses the estate's highest-hazard facilities and must therefore be prioritised. Working with Magnox, the task is to deliver the safe clean-up of all ten sites, safely and cost-effectively, while working with neighbouring communities to ensure the future is sustainable once site activities come to an end.

Over the coming year, one of the NDA's major activities will be to progress the competition to appoint a new parent body organisation (PBO) for both Magnox and the two research sites at Harwell and Winfrith, currently operated by Research Sites Restoration Ltd (RSRL). Competition is central to the NDA's strategy for securing world-class experience across its estate and providing taxpayers with value for money. Worth around £7 billion in total over a period of 14 years, the contract represents one of the UK's largest public procurements. The incoming PBO is expected to be appointed in 2014 and will take ownership of shares in both site licence companies (SLCs) to oversee management of decommissioning activities at all 12 sites. We are confident this process will stimulate innovation and generate new ideas for delivering faster, cost-effective clean-up.

The incoming PBO will benefit from the now well-established 'lead and learn' concept embodied by the MODP, developed by EnergySolutions, Magnox and the NDA. MODP, organised into four strategic programmes, has already reduced the timeframes for the ten Magnox sites to reach

C&M by more than 30 years collectively and saved more than £1.8 billion in costs. The learning and expertise gained during the process, meanwhile, have been hugely valuable and promise to reduce uncertainty and potentially yield further benefits as the lessons are applied across all sites.

Under MODP, two Magnox sites will be safely delivered into C&M in the next few years, while two others will follow into interim care and maintenance (IC&M) soon afterwards. The task nevertheless remains a complex one and we continue to need the support of a range of key stakeholders: government, regulators, the workforce and the community.

The last few years have brought in a range of innovations that are now embedded in the MODP, including the use of MiniStores, the self-shielding ductile cast-iron containers (DCICs) for ILW that will avoid requirements for highly engineered stores, and enable greater flexibility. Other innovations are being introduced to empty and clean the fuel ponds, deal with FED, manage ILW and demolish plant and structures.

The NDA has been particularly pleased to find almost £13 million of additional funding to speed up demolition work at Dungeness A, allowing clearance of the south side, including demolition of the turbine hall in three years instead of 15 as originally planned.

We welcome the completion of fuel removal from Dungeness A and Chapelcross, as well as continued generation at Wylfa until 2014, where the additional revenue will further support our decommissioning mission. Publication of MOP9 (see pages 50-51), a joint achievement between Magnox, Sellafield and the NDA, has been a major milestone that builds in some flexibility to take account of the ageing infrastructure and the likelihood of performance variability.

Of course, programmes can change to reflect new circumstances, whether that be adopting lessons learned, changes in policy, resource allocation, PBO-led innovation or other external events.

Otherwise, it is business as usual, part of which will be the continued efficiency drive to reduce overhead and support costs, an initiative being implemented by all the SLCs and the NDA. Magnox has already achieved significant reductions in 2011/12, as well as in 2012/13, and we look forward to further progress in 2013/14.

I am confident, however, that the MODP will continue to be a credible plan for the Magnox sites, delivering both visible progress and value for money. I look forward to building on the foundations laid by EnergySolutions, Magnox and our stakeholders to oversee delivery and continue building confidence that the nuclear legacy is being dealt with effectively, safely and responsibly.

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"The workforce at all levels within Magnox continue to demonstrate enthusiasm and commitment to the task of decommissioning, and to sharing the lessons learned through MODP. Their professional approach is producing very tangible progress across all sites and I look forward to continued good performance as we all play our part in the shared drive towards excellence."

**Dr Brian Burnett**  
NDA Head of Programmes  
(Magnox and RSRL)





# EnergySolutions foreword

With the MODP, aiming to deliver significant time and cost savings for the NDA and UK taxpayers, fully incorporated into the LTP at the end of 2011, the focus for 2012 turned firmly to putting words into action.



**Tim Joyce**  
Executive Vice President,  
Finance, UK and Europe

As is made clear throughout this plan, this same focus on safe delivery will carry over into 2013, when Magnox will be undertaking its biggest ever work programme. As the PBO for Magnox, we will continue to offer our full support in delivering this programme through leadership, our people, and access to our wider global corporate expertise.

There is a tremendous amount of work to do in the next 12 months and the pages that follow set out what and where our focus will be. First, however, it is right to pause and reflect briefly on some of the key achievements of the last year and to congratulate Neil Baldwin, his executive and senior management team, and the whole workforce on these successes.

What is striking in reviewing them is how they reflect accomplishments right across the breadth of the Magnox mission. From continued generation at Wylfa, to the completion of defuelling at Dungeness A and Chapelcross; from the removal of the remaining ten iconic Berkeley boilers, through to the huge programme of work at Bradwell as it heads towards its C&M state.

It is also particularly gratifying to see Magnox's successes recognised by third parties, with key achievements including the Engineering and Construction Sector Award from the Royal Society for the Prevention of Accidents (RoSPA) and overall national winner at the Personnel Today Awards.

These successes represent the two most crucial elements of our work, delivering the mission and clean-up safely and, alongside the reduction in workforce made inevitable by the nature of our work, at all times looking to take care of our people in every way we can. They also accord with the values that EnergySolutions applies to its work, across all its projects and all the countries where it operates.

Crucially, as well as the obvious advancements they make towards achieving the Magnox mission, these successes also matter in a wider UK context. The acceleration put in place through the MODP means we are now only two years away from the first UK site, Bradwell in Essex, entering into C&M, where all the high hazards have been dealt with and the site is put into a quiescent state. This places us at the forefront of demonstrating clearly that nuclear clean-up can be achieved and, as new nuclear stations are planned, that the legacy of the first generation stations is being safely dealt with.

In looking to deliver on this goal, we will continue to work as we have always done, achieving success through tri-partite cooperation between the NDA, Magnox and ourselves, and always moving forwards in a spirit of partnership with our stakeholders and the communities in which we operate.

# Operational review

Magnox is focused on safe delivery in all areas of our operation. It has made great strides forward in decommissioning and hazard reduction activities using innovation and technology, placing it at the leading edge of the nuclear industry.



**Peter Roach**  
Strategic Programmes Director

## Achievements

The ending for Magnox's generation chapter was re-written in 2012 as regulatory approval was given to optimise generation on reactor one at Wylfa, via inter-reactor fuel transfer (IRX). IRX is a process where the remaining working reactor is powered by a small amount of new fuel, and supplemented by partly-used fuel from the redundant reactor's core. Using this technique, electricity production could carry on until 2014, almost four years beyond the original closure date.

Moving forward with defuelling, this financial year Magnox has delivered more than 350 tonnes of spent nuclear fuel to Sellafield and seen both Dungeness A and Chapelcross complete their respective defuelling programmes. A further achievement has been the successful coordination of the transport of Dounreay fast reactor breeder material to Sellafield for reprocessing.

The last of the nuclear fuel was removed from Chapelcross in March 2013, while the final flask of spent fuel left Dungeness A in 2012 with the site given fuel-free verification

by its regulators shortly afterwards. This is a significant reduction in hazard as it marks the removal of 99 per cent of the radioactivity from site.

After defuelling is completed, ILW is one of the most significant forms of waste to be managed during the decommissioning process.

Strategic Programmes has focused on dealing with ILW and other legacy wastes across Magnox and achieved numerous successes. The first vault containing FED was emptied at Bradwell with more than 17 tonnes of FED removed, marking a major step forward in managing the site's radioactive waste streams.

At Hunterston A, the ILW store is ready to receive the first active package, kick-starting the retrieval of the site's wet ILW. The store, key to delivering the long term ILW strategy for the site, provides a secure facility until the arrangements for long-term storage are in place.

In the Plant and Structures Programme, decommissioning progress is highly visible across the sites. At Berkeley the ten remaining redundant boilers were removed and each one, weighing 310 tonnes, was transported to Sweden to be cut up and smelted. In total, 95 per cent of metal was recycled with remaining secondary waste returning to the Low Level Waste Repository (LLWR).

In addition, Chapelcross completed Europe's largest known asbestos removal project, stripping more than 2,000 tonnes of asbestos and man-made mineral fibres from plant, while Hinkley Point A removed all bulk asbestos from the site.

The Ponds Programme at sites continues to move forward, with approximately 1,700m<sup>3</sup> of water drained from Hinkley Point A's main pond. Additionally, half of the pond volume at Hunterston A has been drained and almost 1,000m<sup>2</sup> of the pond walls successfully decontaminated.



The remaining ten Berkeley boilers removed from site



The last flask of fuel leaves Dungeness A



Asbestos removed from Chapelcross' turbine hall



**John Vlietstra**  
Chief Operating Officer,  
Accelerated Sites



**Joe Lamonby**  
Chief Nuclear Officer,  
Generating and Fuelled Sites



**Gary Voorheis**  
Chief Operating Officer,  
Decommissioning Sites

### Improvements

As part of the robust Magnox baseline improvement process, a revised C&M strategy has been developed which outlines delivery of £544 million of savings and provides Magnox with a more accurate baseline for the C&M period. In addition, Magnox has introduced the concept of the Hub, a remote organisation that will manage sites once they are in C&M, until they reach the FSC phase.

A collaborative agreement has been put in place to increase project management resources and build on Magnox's relationship with the supply chain. VELA is a partnership between Magnox, AMEC and Jacobs which aims to deliver a strategic resourcing capability in the short and long term and retain skills within the industry.

Further to this, Magnox awarded a framework contract worth around £300 million over ten years for the delivery of construction, infrastructure and maintenance projects across all ten sites. Costain Group and Balfour Beatty were awarded the contract which runs initially for five years with the potential for a further five years.



FED retrieval at Bradwell

Magnox received two awards for demolition work with the supply chain at its sites in the south east; the Constructing Excellence East of England Client of the Year Award and the Collaboration Award for its work with Erith at the World Demolition Summit.

The business' Human Resources (HR) team was recognised for talent management and was crowned overall winner of the Personnel Today Awards.

A new route was opened up to enable Magnox to dispose of very low level waste (VLLW). In a trial at Trawsfynydd, a shipment of VLLW was disposed of at a specialist landfill site. VLLW at other sites is now being disposed of in this manner, saving valuable space at LLWR and demonstrating Magnox's commitment to the lead and learn technique.

Also at Trawsfynydd, a hydraulic manipulator is being used to deploy inspection cameras as part of a detailed survey of its reactor pressure vessels.

The FED dissolution plant at Dungeness A is being used to treat FED from Bradwell, a significant step towards reducing this type of waste across Magnox.



Trawsfynydd's ROV retrieving sludge from resin vault one

### New technology

Continually pioneering new ways of working and innovative solutions, Magnox continues to embrace new technologies to support its programme of work. Four off-the-shelf remotely operated vehicles (ROVs), made in Sweden, are supporting the retrieval of FED from the vaults at Trawsfynydd and a specially-designed ROV is assisting the retrieval of residual sludge waste from within resin vault one. Trawsfynydd also completed recovery of all bulk resins from resin vault two following a lengthy retrievals programme, using a rotary deployment arm connected to existing equipment. The encapsulated waste has been lidded and sealed in 72 shielded drums and placed in temporary storage ready for transportation to the ILW store.

Additionally, positive steps have been made to deal with a high hazard legacy at Berkeley. Gravel was removed from the chute silo in the active waste building using full production equipment, including a refurbished chute silo manipulator (CSM). A petal grab on the end of the CSM, manoeuvred remotely using cameras inside the chute silo, picked up the gravel and deposited it in a drum inside a gravel basket.



Extended generation at Wylfa

# MODP

The MODP represents the culmination of a five year period of joint work for the NDA and EnergySolutions, and covers the entire Magnox Ltd fleet.

Following its formal acceptance in October 2011, it is the official programme of work that is being delivered by EnergySolutions and Magnox on behalf of the NDA.

The MODP programme saved more than £1.3 billion from the overall lifetime plan that was being delivered in 2010, and removes 34 site years from the total required to place all the sites into C&M.

This was achieved through a combination of new technical solutions and different working arrangements with the introduction of Strategic Programmes, in addition to extended generation at the remaining operating site.

Building on the savings made, Magnox has worked since 2011 on an 'exceed MODP' programme with the primary change being the introduction of the C&M Hub which has realised further savings of £0.5 billion.

This is the biggest change that Magnox has made since it became a contractor to the NDA, and is recognised as the biggest revision to a work programme within the estate. Below the major headline changes, every single project has had a scope, schedule and cost produced to underpin the MODP. The culmination of these changes is the ability to deliver work quicker and cheaper, bringing forward C&M entry dates at Bradwell and Trawsfynydd and progressing decommissioning work at other Magnox sites.

#### The key elements of the MODP are:

- To maximise the value from the remaining operating site at Wylfa (Oldbury was also covered by this aim but has now ceased generation)
- To complete the programme for dealing with the remaining spent fuel – the MOP
- To deliver an early C&M state at Bradwell and Trawsfynydd
- To deliver a safe IC&M state at Chapelcross and Dungeness
- To pioneer innovative and transformational solutions and ways of working through the introduction of strategic programme delivery, with a view to minimising lifetime costs
- Safe implementation of the Berkeley active waste vaults retrieval project to address one of our highest hazards
- To reshape and reduce our workforce in line with the MODP whilst providing strong and responsive support to our people

#### Extended generation

Generation at Wylfa has now been extended using a technique pioneered at Oldbury prior to its closure. Generation is now expected to continue into 2014.

#### MOP

The objective of the MOP is to ensure that all spent Magnox fuel is sent to Sellafield in accordance with nationally agreed deadlines and that no fuel legacy is left at our sites. Magnox is leading this programme on behalf of the whole industry.

#### Two sites into early C&M

Bradwell and Trawsfynydd have been identified as the lead sites. Accelerating work at Bradwell offers the opportunity to implement innovative techniques, while at Trawsfynydd there is an opportunity to speed up existing projects to reach an earlier entry into C&M. The experience gained at these two sites will be passed on to other sites using the lead and learn principle before they are required to tackle similar challenges.

#### Two sites to IC&M

Dungeness A and Chapelcross are unique in that they have low volumes of ILW. This, coupled with bulk asbestos removal, the use of MiniStores, and a programmes approach to cooling pond draining and sealing means that the sites can be taken into a low cost, interim safe and secure state. This releases funding to undertake higher hazard reduction projects elsewhere.

#### Implement programmisation

Common decommissioning projects have been established across the company in the following programme areas: Ponds; FED Treatment; ILW Management and Plant and Structures.



The MODP



Two sites into early C&M

Programmisation makes use of the lead and learn principle to provide consistent solutions, makes more effective use of the supply chain and allows us to manage sites in the most effective sequence. This realises substantial cost benefits and enables some C&M dates to be brought forward.

**Berkeley active waste vaults**

This project represents one of the highest hazard activities to be undertaken in Magnox. Retrieving the waste and placing it in MiniStores provides a safe and flexible solution which will allow us to bring forward the entry into C&M by five years.

**Workforce restructuring**

The key objective of the workforce restructuring programme is to allow Magnox to reshape and reduce the workforce in a manner which maintains our ability to deliver the work programme, and manage the sites safely. This will involve managing the sites through a number of transitions, operating to defuelling; defuelling to decommissioning; decommissioning to C&M, while ensuring we keep core skills and competencies.

This will be delivered in partnership with the workforce and the trade unions.



# LTP phases

1959 – The first Magnox Ltd site operational 1980

2000

2013

2020

## Generation



1959-2015

The first Magnox Ltd nuclear power station came online in 1959 at Chapelcross. Since then the fleet of ten nuclear power stations has generated over 1,000 terawatt hours (TWh) of electricity.

During 2012/13 Wylfa and Maentwrog generated over three TWh of electricity, worth over £145m to the NDA.

Wylfa is still generating electricity and during 2012 successfully obtained regulatory agreement to continue generation until 2014.

## Defuelling



1989-2018

Defuel all reactors, empty cooling ponds and cells containing fuel and transfer all spent fuel off-site to Sellafield for reprocessing.

## C&M preparations



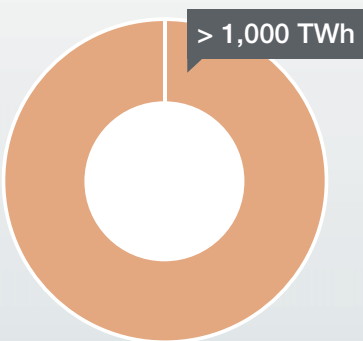
1992-2028

Dismantling work will be undertaken to remove both radioactive and non-radioactive plant and buildings where radiological benefit cannot be achieved from deferral. Structures remaining during C&M will be put into a passively safe and secure state.

A programme approach to decommissioning has identified four workstreams common across all Magnox sites, which have been grouped together, maximising efficiency and innovation. Bradwell and Trawsfynydd have been identified as sites which will be accelerated into C&M.

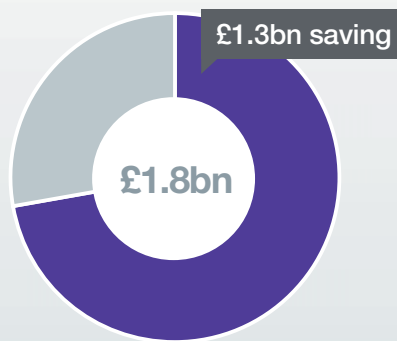
## Generation results

Lifetime output across all Magnox sites

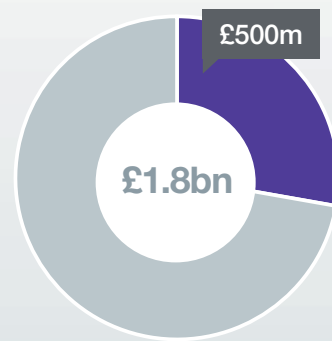


## Lifecycle saving

MODP 2011/12

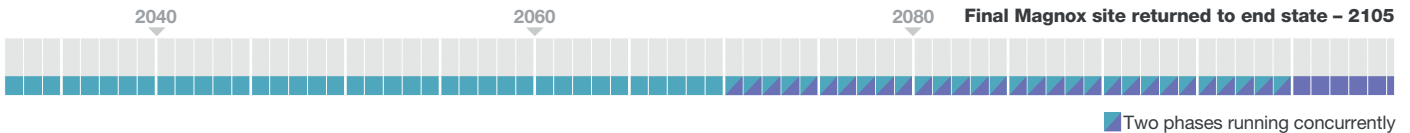


Exceed MODP 2012/13



# Phases

The LTP describes how Magnox will manage its sites through five stages: generation, defuelling, C&M preparations, C&M and FSC.



**2015-2100**

During this period the sites will remain in a quiescent state that will provide the time for radiation levels in the reactor cores to decay naturally, this will allow safer and more efficient decommissioning during FSC.

In 2015 Bradwell will be the first site in the Magnox fleet to enter C&M.



**2070-2105**

This phase takes the reactor site through its final stages of decommissioning with the removal of the reactor buildings and vessels.

The first stage of FSC is the installation of facilities to house personnel and manage their welfare. Waste processing facilities are also installed to characterise, segregate, treat and dispatch the waste materials to its final destination. Reactor vessel dismantling facilities are constructed on top of the reactor pile cap to allow safe access to the vessel and removal of the materials contained within it.

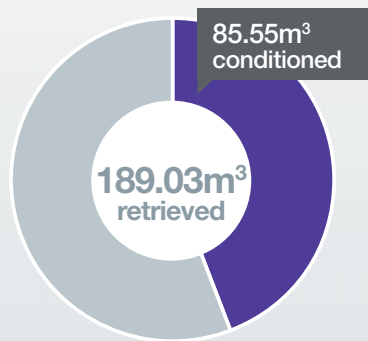
For the next three years Magnox will manage its sites in these areas:

- Generation – Wylfa
- Defuelling – Chapelcross (*defuelled but not yet declared fuel-free by the regulators*), Sizewell A, Oldbury
- C&M preparations – Berkeley, Bradwell (*will enter C&M in 2015*), Dungeness A, Hinkley Point A, Hunterston A, Trawsfynydd (*will enter C&M in 2016*)

The reactor core and building are systematically dismantled and the waste arisings are treated and disposed of through appropriate discharge routes. Land contamination has been monitored and managed throughout the site's lifecycle and will be treated during the final stages of site clearance. At this point the site will be deemed as suitable for declassification as a nuclear licensed site and following work with regulators will be delicensed and after final landscaping, will be released for alternative use.

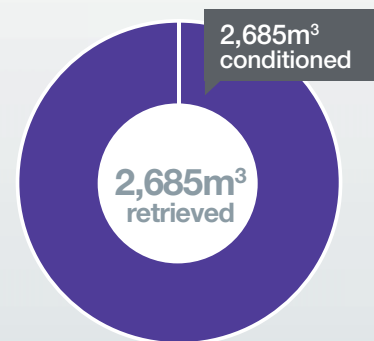
**Waste volumes**

ILW m<sup>3</sup> retrieved and conditioned



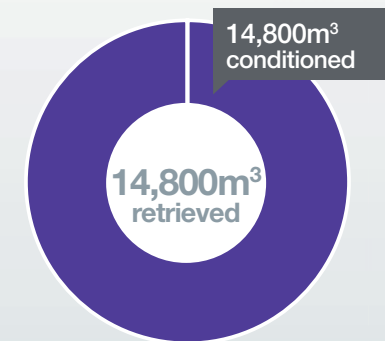
Totals as of April 2012: 8,758m<sup>3</sup>

LLW m<sup>3</sup> retrieved and conditioned



Totals as of April 2012: 41,119m<sup>3</sup>

Non-radiological m<sup>3</sup> retrieved and conditioned



Totals as of April 2012: 885,408m<sup>3</sup>

# Generation



## Generation summary work programme

◆ Key milestone ◇ Regulatory milestone

Sites and key work programmes		Generation									
		2013/14				2014/15					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Wylfa	Generation operations								Reactor shut down ◆		
	Functional support										
	Maentwrog production operations	2013/14-2085/86									End of generation ◇

## Generation phase costs

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
10 Wylfa	98.51	81.11	2.28	2.01	2.34	1.52	2.04	2.10	1.44	1.12	1.43
<b>Total</b>	<b>98.51</b>	<b>81.11</b>	<b>2.28</b>	<b>2.01</b>	<b>2.34</b>	<b>1.52</b>	<b>2.04</b>	<b>2.10</b>	<b>1.44</b>	<b>1.12</b>	<b>1.43</b>





Rotator exchangers at Wylfa



Wylfa turbine hall



Power station control room

**Aim:**

To maximise generation while ensuring nuclear safety.

**Goals:**

- Continue excellent performance in nuclear safety and operations
- Maintain excellent standards of safety and environmental performance
- Maintain refuelling regimes to maximise reactor output
- Maintain the generation safety cases

**Achieved by:**

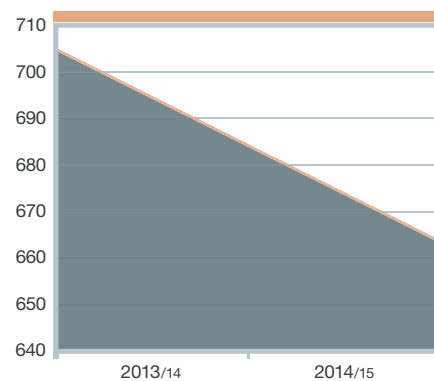
- Maintaining focus on nuclear safety and operations whilst delivering excellent environmental standards
- Maintaining plant to ensure systems remain fully available, safe and compliant
- Maintaining spent fuel shipments in accordance with the MOP

Magnox's aim is to continue generating electricity at Wylfa until 2014 subject to regulatory approval. The key value adding activities delivered by Magnox are derived from engineering and technical support underpinning continued safe operations, the MOP and benchmarking across the industry.

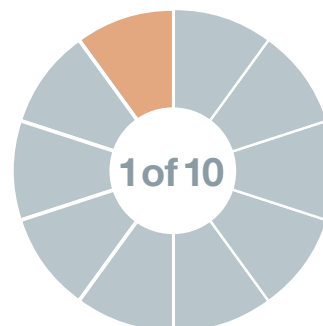
Continuous improvement is an essential enabler to safe operation of the nuclear plant and the sites will receive support on maintaining standards, operational experience feedback and inputs from the World Association of Nuclear Operators (WANO).

Hydro-electricity will continue to be generated at Maentwrog until 2087.

**Resource profile through generation**

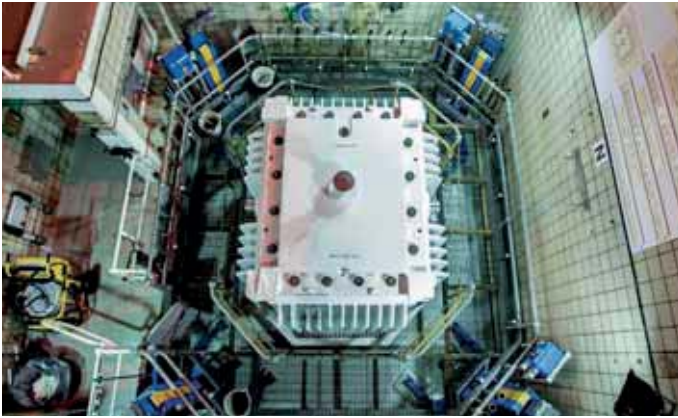


**Magnox sites still generating**



2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
1.67	0.94	1.23	1.26	201.01	109.55	310.56
1.67	0.94	1.23	1.26	201.01	109.55	310.56

# Defuelling



Flask testing bay



Oldbury cartridge cooling ponds

## Defuelling summary work programme

◆ Key milestone ◇ Regulatory milestone

Sites and key work programmes		Defuelling					
		2013/14	2014/15	2015/16	2016/17	2017/18	2018
Chapelcross	Defuelling operations	◆ Fuel-free verification					
	Functional support						
Oldbury	Defuelling operations				◆ Fuel-free verification		
	Functional support						
Sizewell A	Defuelling operations				◆ Fuel-free verification		
	Functional support						
Wylfa	Defuelling operations				◆ Last fuel off-site		◆ Fuel-free verification
	Functional support						

## Defuelling phase costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	-	-	-	-	-	-	-	-	-	-	-
2 Bradwell	-	-	-	-	-	-	-	-	-	-	-
3 Chapelcross	17.01	-	-	-	-	-	-	-	-	-	-
4 Dungeness A	-	-	-	-	-	-	-	-	-	-	-
5 Hinkley Point A	-	-	-	-	-	-	-	-	-	-	-
6 Hunterston A	-	-	-	-	-	-	-	-	-	-	-
7 Oldbury	58.79	38.60	38.31	-	-	-	-	-	-	-	-
8 Sizewell A	28.69	25.79	-	-	-	-	-	-	-	-	-
9 Trawsfynydd	-	-	-	-	-	-	-	-	-	-	-
10 Wylfa	-	17.03	68.62	76.50	86.51	14.79	0.03	-	-	-	-
<b>Total</b>	<b>104.50</b>	<b>81.42</b>	<b>106.93</b>	<b>76.50</b>	<b>86.51</b>	<b>14.79</b>	<b>0.03</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**Aim:**

To defuel all reactors, empty cooling ponds and cells containing fuel and transfer all spent fuel off-site.

**Goals:**

- Continue excellent performance in nuclear safety and operations
- Maintain excellent standards of safety and environmental performance
- Defuel reactors (in accordance with the schedule described in the latest revision of the MOP)
- Dispatch all spent fuel to Sellafield for reprocessing and remove redundant plant, once safe to do so

**Achieved by:**

- Maintaining focus on nuclear safety and operations whilst delivering excellent environmental standards
- Maintaining plant to ensure systems remain fully available, safe and compliant
- Defuelling reactors in accordance with the MOP schedule and dispatch spent fuel to Sellafield for reprocessing
- Maintaining plant and systems to support the defuelling process and remove redundant plant, once safe to do so

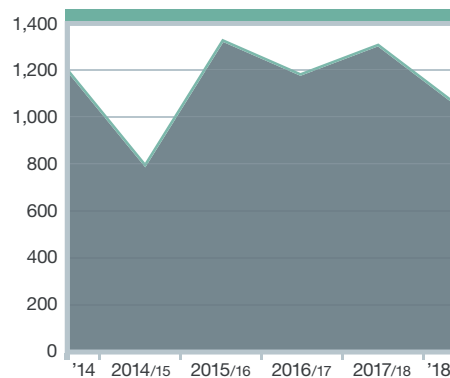


Defuelling activities at Magnox sites



Fuel flask ready to leave site for reprocessing

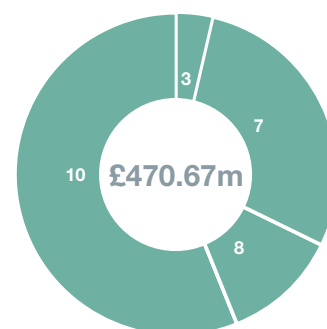
**Resource profile through defuelling**



Oldbury and Sizewell A sites have commenced defuelling. Chapelcross has completed defuelling and is awaiting fuel-free verification. Learning will continue to be shared across the sites as each progresses to the next phase whilst delivering its key enablers.

2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	17.01	-	17.01
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	135.70	-	135.70
-	-	-	-	54.48	-	54.48
-	-	-	-	-	-	-
-	-	-	-	263.47	-	263.47
-	-	-	-	470.67	-	470.67

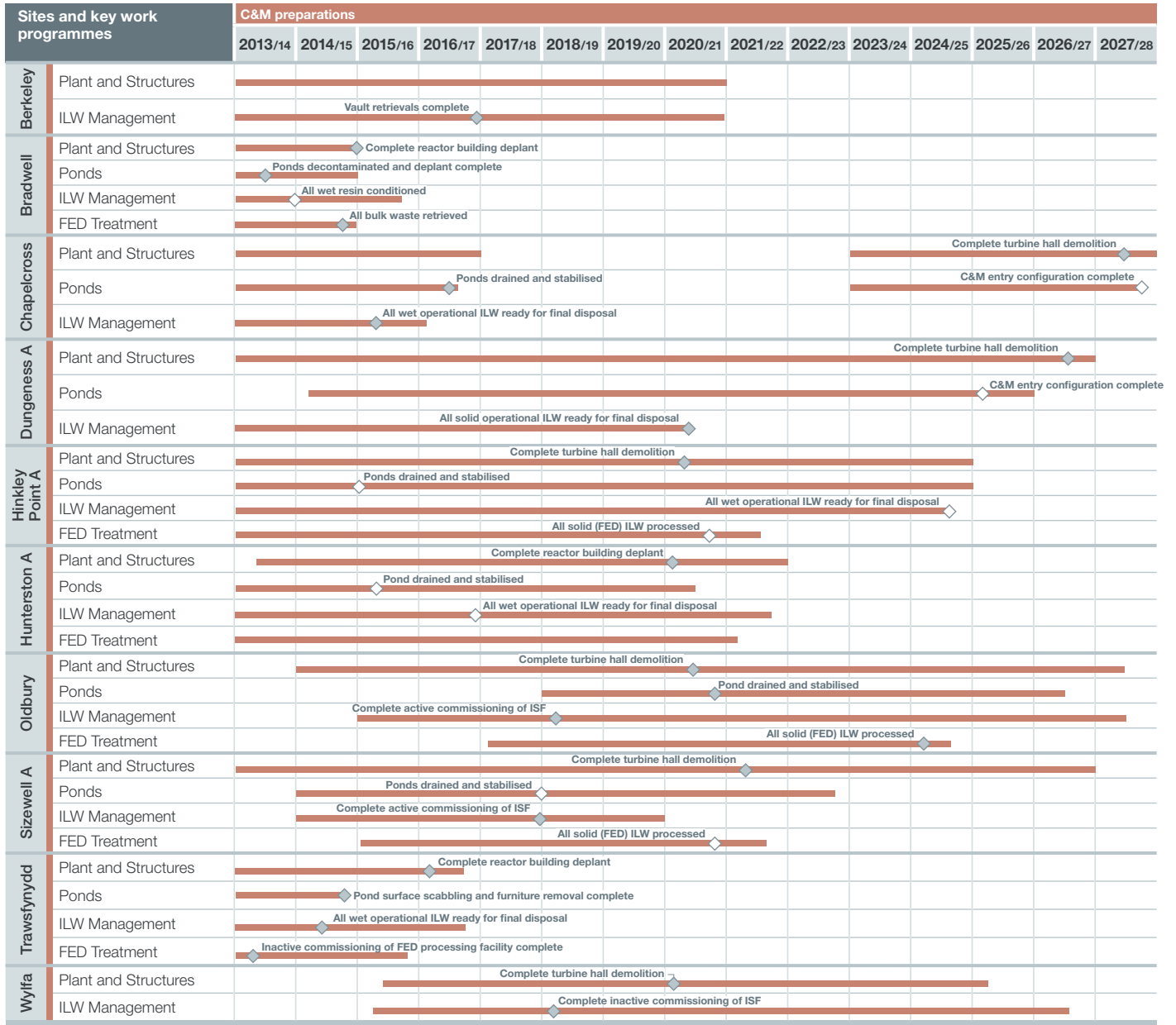
**Proportional split of the defuelling phase costs by site**



# C&M preparations

## C&M preparations summary work programme

◆ Key milestone ◇ Regulatory milestone



## C&M preparations phase costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	73.82	63.33	68.90	70.65	32.32	33.47	29.69	26.80	-	-	-
2 Bradwell	129.83	92.79	12.48	-	-	-	-	-	-	-	-
3 Chapelcross	38.67	66.75	78.99	40.27	10.69	10.58	10.49	10.38	10.38	13.32	31.63
4 Dungeness A	38.82	47.49	50.98	44.56	48.68	37.23	9.15	9.12	8.51	17.69	48.82
5 Hinkley Point A	47.38	70.21	34.30	34.33	44.12	57.89	61.65	48.71	31.21	48.39	22.04
6 Hunterston A	34.96	51.29	61.49	60.67	61.89	66.80	62.18	32.92	23.45	-	-
7 Oldbury	3.33	31.52	33.99	63.76	77.86	74.22	54.89	47.45	78.24	56.87	77.96
8 Sizewell A	9.46	20.32	43.48	67.84	54.19	46.90	55.95	65.48	63.13	54.91	48.50
9 Trawsfynydd	67.40	60.42	58.94	29.09	-	-	-	-	-	-	-
10 Wylfa	0.05	0.23	0.24	2.44	6.66	70.41	55.42	48.12	52.85	46.65	43.03
<b>Total</b>	<b>443.72</b>	<b>504.35</b>	<b>443.80</b>	<b>413.61</b>	<b>336.42</b>	<b>397.50</b>	<b>339.44</b>	<b>288.98</b>	<b>267.78</b>	<b>237.83</b>	<b>271.98</b>

**Aim:**

To make the site safe and to minimise the amount of maintenance required during C&M.

**Goals:**

- Maintain excellent standards of safety and environmental performance
- Reduce hazards
- Promote, share and implement best practice (across the NDA estate) to deliver value to the UK taxpayer

**Achieved by:**

- Delivering excellent safety and environmental standards
- Delivering a schedule of work focused around hazard reduction
- Identifying and communicating best practices to other NDA sites

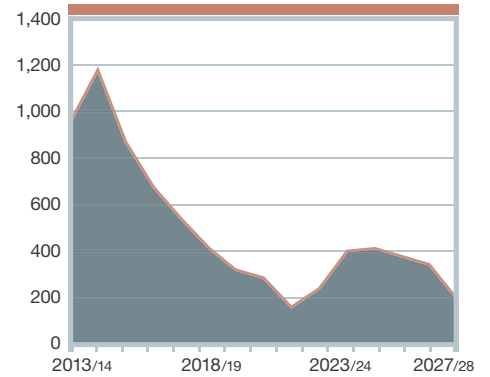


Deplanting work at Hunterston A



Construction of Bradwell ISF

**Resource profile through C&M preparations**

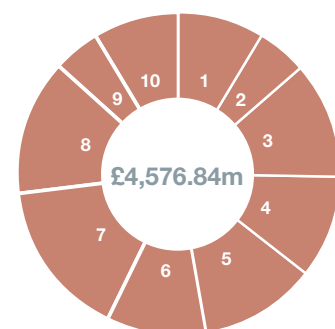


C&M preparation work at Bradwell and Trawsfynydd has been accelerated in-line with the MODP. Berkeley, Dungeness A, Hinkley Point A and Hunterston A sites have been optimised as part of the MODP to make best use of available funding whilst taking on board the lessons and experience gained at the two accelerated sites. The remaining sites will all move into C&M preparations in due course.

Due to the unique configurations at Dungeness A and Chapelcross, there are low volumes of ILW on site. As such these sites are in a position to move into a low cost, interim safe and secure state, releasing mid-term funding to tackle high hazard reduction in other areas of the estate. As a result these sites have sub-divided the C&M preparation phase of the work into two additional phases: IC&M and FSC.

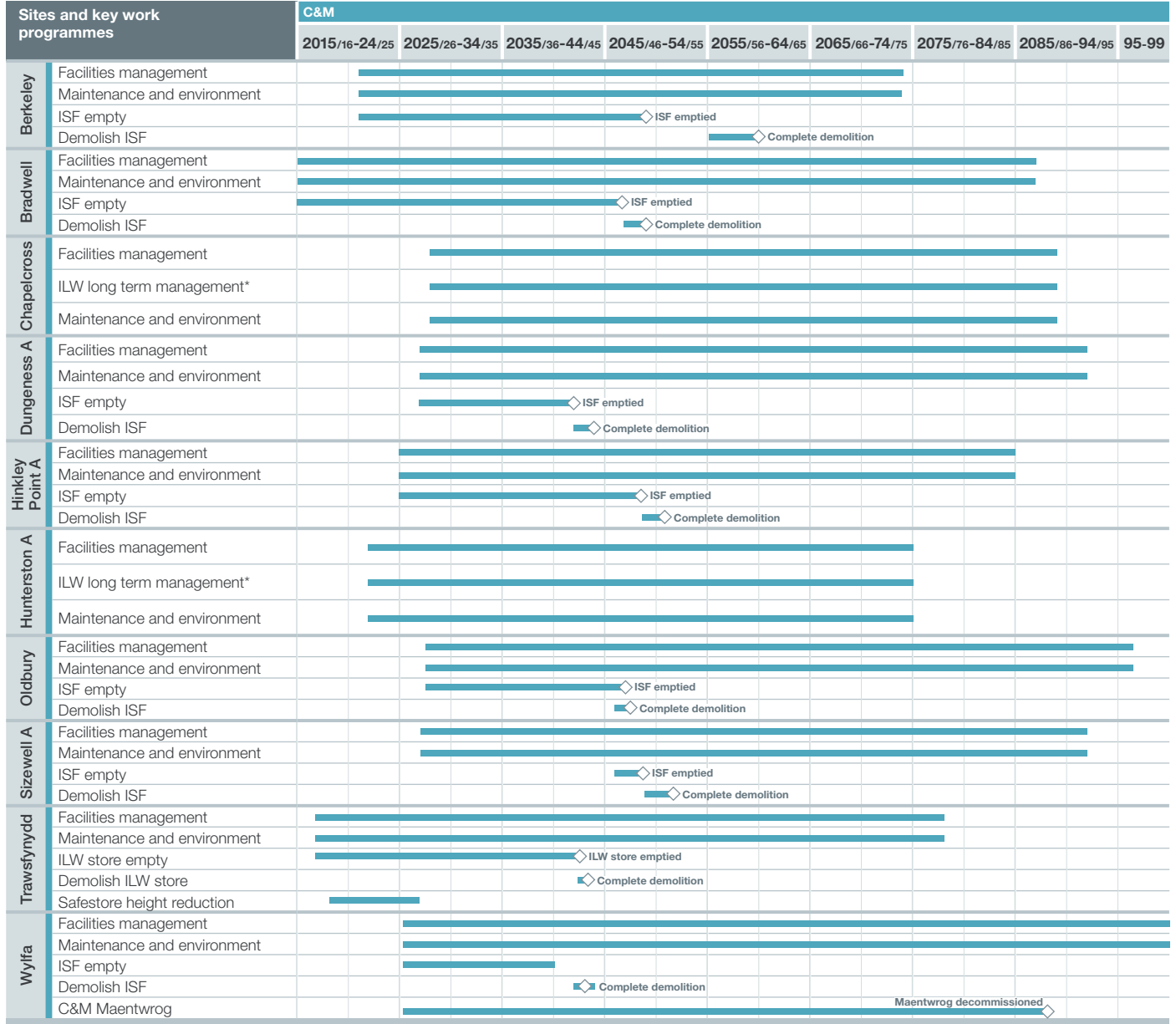
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	398.99	-	398.99
-	-	-	-	235.09	-	235.09
31.98	40.64	65.84	71.09	531.70	-	531.70
50.45	32.03	29.68	-	473.21	-	473.21
28.71	-	-	-	528.94	-	528.94
-	-	-	-	455.66	-	455.66
54.87	40.27	28.16	9.33	732.71	-	732.71
31.53	24.52	36.17	-	622.39	-	622.39
-	-	-	-	215.85	-	215.85
50.60	5.51	0.07	-	382.29	-	382.29
248.14	142.97	159.93	80.42	4,576.84	-	4,576.84

**Proportional split of the C&M preparations phase costs by site**



## C&M summary work programme

◆ Key milestone ◇ Regulatory milestone



\* Long term management of Chapelcross and Hunterston A ILW will be compliant with Scottish policy and emerging strategy

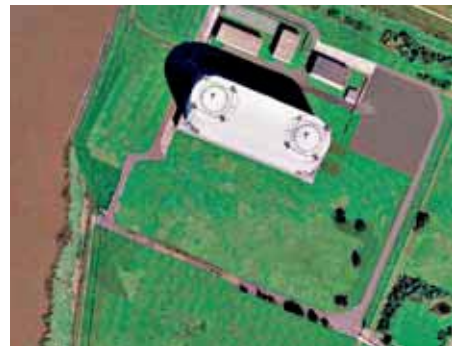
## C&M phase costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	-	-	-	-	-	-	-	-	0.47	0.47	0.46
2 Bradwell	-	-	0.58	0.58	0.57	0.58	0.58	0.58	0.58	0.58	0.57
3 Chapelcross	-	-	-	-	-	-	-	-	-	-	-
4 Dungeness A	-	-	-	-	-	-	-	-	-	-	-
5 Hinkley Point A	-	-	-	-	-	-	-	-	-	-	-
6 Hunterston A	-	-	-	-	-	-	-	-	-	0.44	0.44
7 Oldbury	-	-	-	-	-	-	-	-	-	-	-
8 Sizewell A	-	-	-	-	-	-	-	-	-	-	-
9 Trawsfynydd	-	-	-	0.12	0.44	2.20	2.83	16.77	28.83	26.48	40.08
10 Wylfa	-	-	-	-	-	-	-	-	-	-	-
11 C&M Hub	7.08	9.37	10.57	10.75	6.06	7.12	6.92	6.89	5.86	7.91	8.25
<b>Total</b>	<b>7.08</b>	<b>9.37</b>	<b>11.15</b>	<b>11.45</b>	<b>7.07</b>	<b>9.90</b>	<b>10.32</b>	<b>24.23</b>	<b>35.73</b>	<b>35.88</b>	<b>49.81</b>

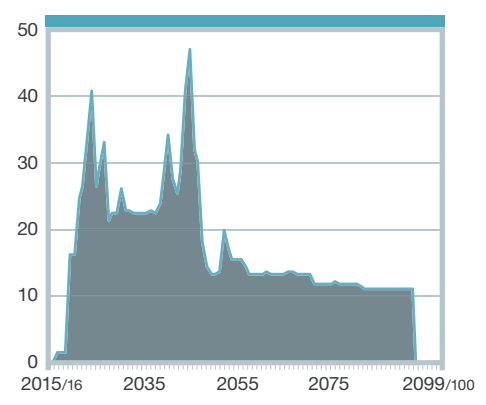
**Aim:**  
To allow radiation levels to decay naturally, thus enabling simpler and more cost-effective decommissioning at FSC.

- Goals:**
- To maintain the site in a passively safe and secure state through the period of C&M
  - Maintain excellent standards of safety and environmental performance
  - Share and implement best practice (across the NDA estate) through the lead and learn approach

- Achieved by:**
- Management through a single set of simplified arrangements
  - Storage of ILW in accordance with appropriate long term management requirements and UK Government strategy
  - Responsible stewardship of sites during C&M



Resource profile through C&M



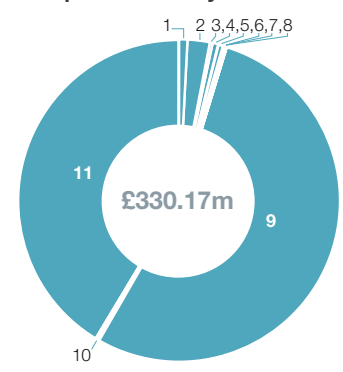
C&M preparations will ensure that all structures which have not been removed from site will be put into a passively safe and secure state. This will typically include reactor safestores, ILW store, ISF (where applicable) plus any additional structures which will be cleared at FSC.

The newly formed C&M Hub will remotely manage all sites from completion of the C&M preparations phase up to, but not including, FSC. Under the current MODP the accelerated decommissioning sites, Bradwell and Trawsfynydd, will be the first to enter this C&M phase in 2015 and 2016 respectively, with the remaining eight sites entering by the financial year 2027/28.

In addition, Trawsfynydd's safestore height reduction programme of work and the operation and decommissioning of Maentwrog hydro-electric power station near Trawsfynydd are included in this scope of work.

2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
0.47	0.47	0.46	0.47	3.26	39.48	42.74
0.58	0.58	0.57	0.58	7.49	30.04	37.53
-	-	-	-	-	27.98	27.98
-	-	-	0.41	0.41	21.98	22.39
-	0.56	0.56	0.57	1.68	32.57	34.26
0.45	0.44	0.44	0.45	2.67	36.26	38.93
-	-	-	0.19	0.19	24.29	24.48
-	-	-	0.43	0.43	21.97	22.40
24.60	21.59	12.29	1.09	177.31	61.85	239.16
-	0.25	0.32	0.33	0.90	17.50	18.40
12.54	13.11	12.76	10.63	135.83	644.28	780.11
<b>38.63</b>	<b>37.00</b>	<b>27.40</b>	<b>15.15</b>	<b>330.17</b>	<b>958.21</b>	<b>1,288.38</b>

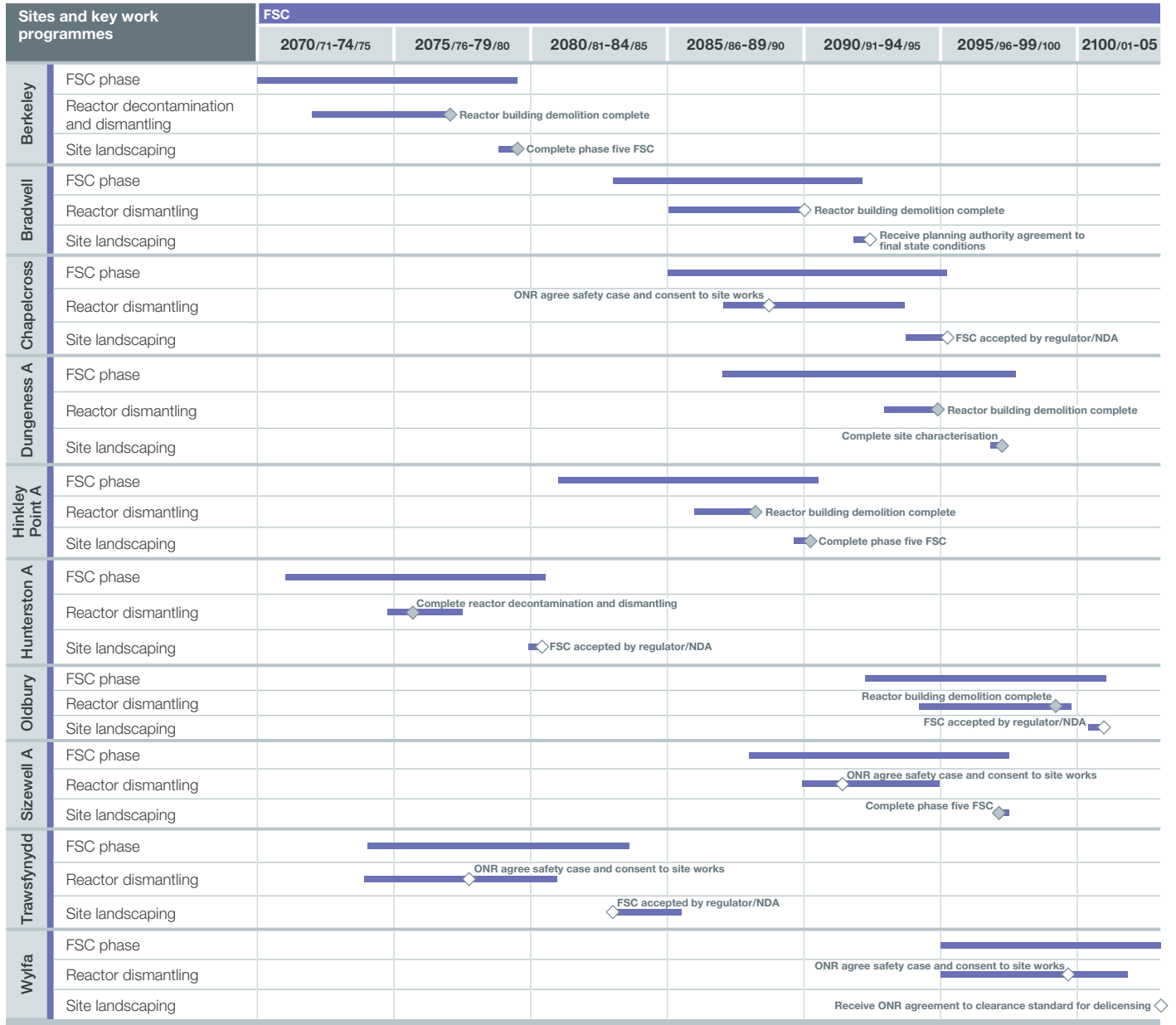
Proportional split of the C&M phase costs by site



# FSC

## FSC summary work programme

◆ Key milestone ◇ Regulatory milestone



## FSC phase costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	-	-	-	-	-	-	-	-	-	-	-
2 Bradwell	-	-	-	-	-	-	-	-	-	-	-
3 Chapelcross	-	-	-	-	-	-	-	-	-	-	-
4 Dungeness A	-	-	-	-	-	-	-	-	-	-	-
5 Hinkley Point A	-	-	-	-	-	-	-	-	-	-	-
6 Hunterston A	-	-	-	-	-	-	-	-	-	-	-
7 Oldbury	-	-	-	-	-	-	-	-	-	-	-
8 Sizewell A	-	-	-	-	-	-	-	-	-	-	-
9 Trawsfynydd	-	-	-	-	-	-	-	-	-	-	-
10 Wylfa	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-



**Aim:**

To take all sites through the last stage of decommissioning with the removal of reactor vessels and building demolition.

**Goals:**

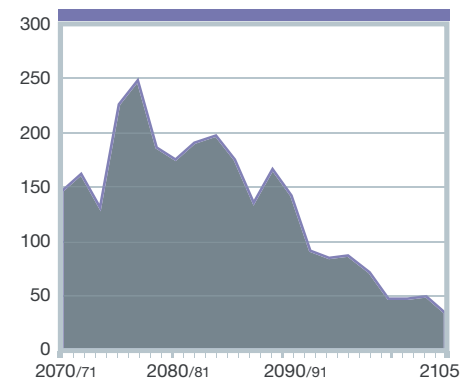
- Maintain excellent standards of safety and environmental performance
- Reestablish the workforce and management capability to discharge the work programme
- Reach the desired end state

**Achieved by:**

- Delivering excellent safety and environmental standards
- Removing remaining structures and hazards on sites
- Remediating any contaminated land and delicensing the sites



Resource profile through FSC



FSC is the last phase of the lifecycle. As each site enters FSC, facilities to house personnel and welfare facilities are installed to allow for characterisation and segregation of waste treatment and dispatch to its final destination. Reactor vessel dismantling facilities are constructed on top of the reactor pile cap to allow safe access to the vessel and removal of materials.

The reactor core consisting of irradiated graphite will be packaged and stored in accordance with appropriate long term management requirements.

Land remediation will be required at some of the sites and where necessary soil will be excavated for shipping to the LLWR. The end state for the sites will see them declassified as nuclear licensed sites and after final landscaping released for a new use.

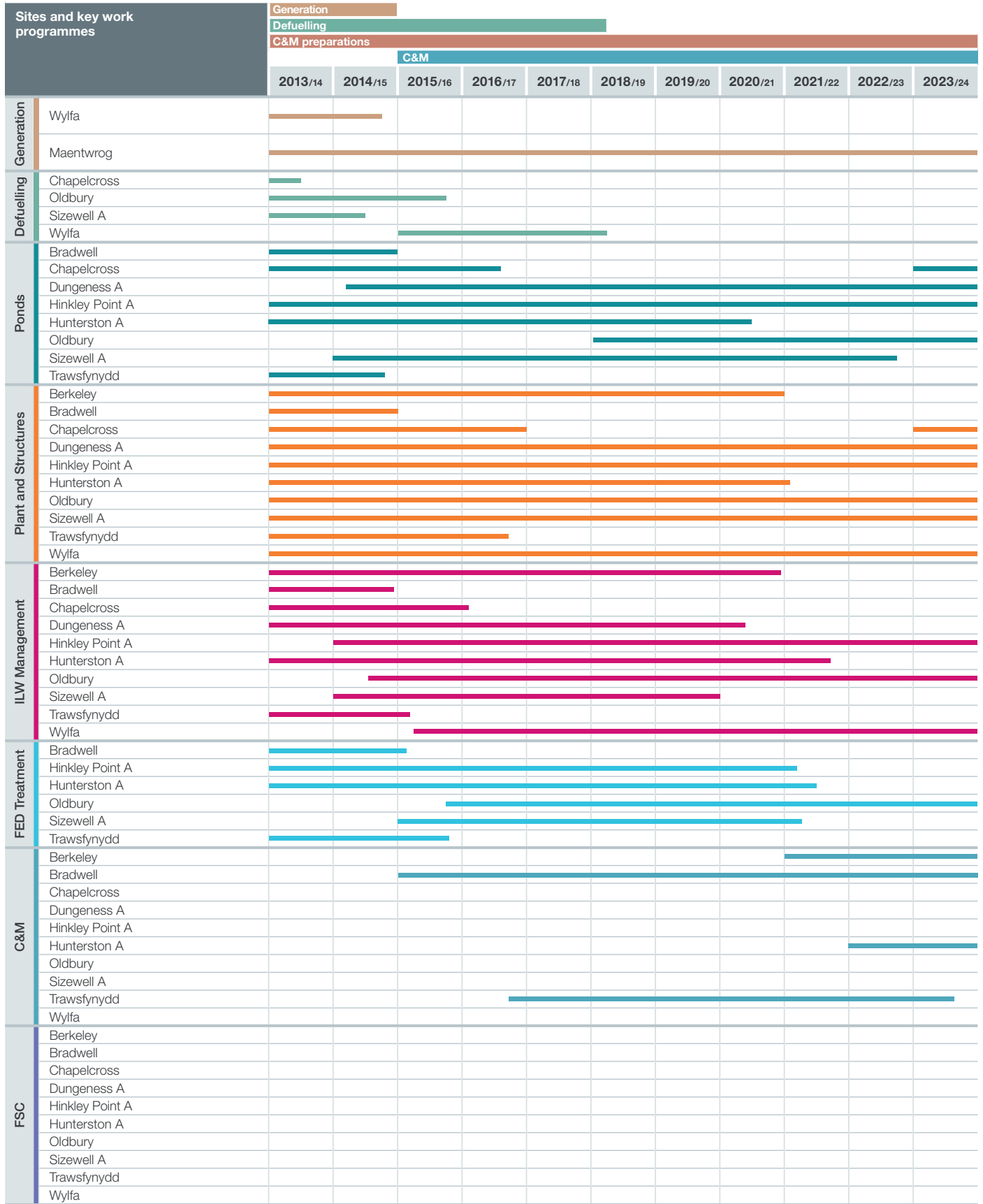
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	837.72	837.72
-	-	-	-	-	864.88	864.88
-	-	-	-	-	1,204.52	1,204.52
-	-	-	-	-	906.96	906.96
-	-	-	-	-	888.60	888.60
-	-	-	-	-	863.76	863.76
-	-	-	-	-	842.37	842.37
-	-	-	-	-	860.76	860.76
-	-	-	-	-	799.56	799.56
-	-	-	-	-	943.90	943.90
-	-	-	-	-	9,013.02	9,013.02

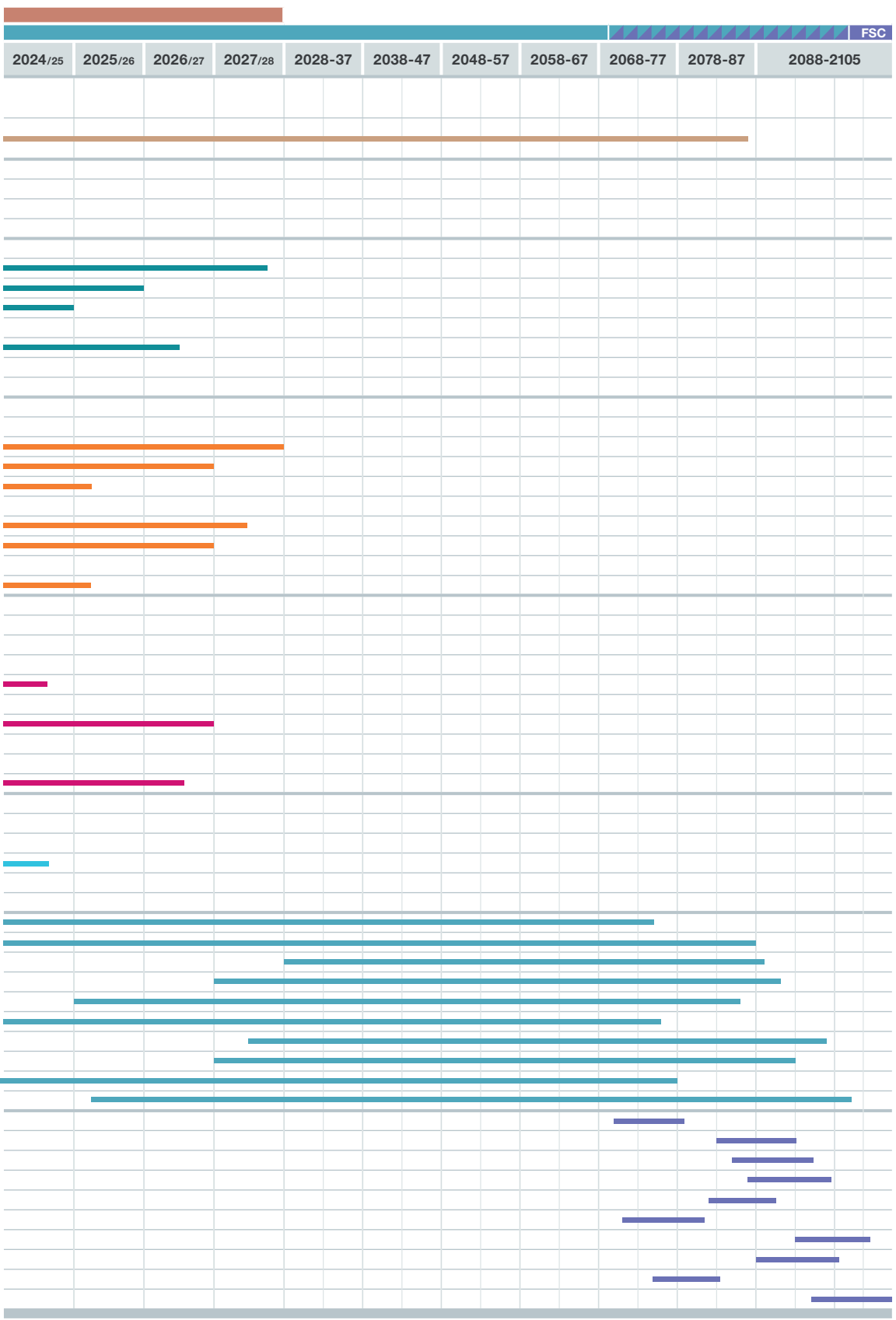
Proportional split of the FSC phase costs by site



# Key activity sequence chart

Magnox's key activity sequence chart by phase





The key activities are shown grouped by the key phases of the site, with the C&M preparations activities further split by strategic programme.

# Strategic Programmes

All of the common decommissioning projects across ten sites have been grouped into Strategic Programmes. Although every site is different, the core challenges are the same, so tackling work consistently helps drive value and innovation.

Four programmes, Ponds, ILW Management, FED Treatment and Plant and Structures, together with the Waste Management and Project Management functions, have been established and grouped together to create a one-stop decommissioning service for the sites.



**Peter Roach**  
Strategic Programmes Director

## Progress

Lead and learn is a key principle for Strategic Programmes. The ability to take the learning from one project and apply it to a different location, reducing cost and improving the effectiveness of the job, is the cornerstone of the MODP.

Contract partners have now demonstrated this principle, moving from one site to another and taking the learning with them. Erith, having successfully demolished the Bradwell turbine hall in 2011, moved to Dungeness A in the last year to demolish a range of buildings including the redundant administration complex.

## ILW

One of the main decommissioning challenges for Magnox is the retrieval of ILW from ageing underground vaults, sorting and packaging it into fit-for-purpose containers and placing it in suitable interim storage.

This year saw ILW retrieved and packaged at Berkeley, Bradwell and Trawsfynydd. Waste was continued to be placed into the Trawsfynydd store, while progress was made with the ISFs at Bradwell and Berkeley.

## Waste success

It has been a year of success for the Waste Management function providing a company-wide approach to the management and removal of several waste streams. The award winning team, which recently won a National Recycling Award for its approach to recycling at Bradwell, has secured a number of new disposal routes for waste from Magnox sites.

Trawsfynydd has been able to demonstrate a new disposal route for VLLW, where the material is moved to a registered landfill site. This technique is now being rolled out to a number of other sites.

FED Treatment



Ponds



ILW Management



# Delivery



FED Treatment

The FED Treatment Programme is responsible for the retrieval and processing of FED to make it ready for final disposal, significantly reducing hazard at sites.



Ponds

The Ponds Programme is principally responsible for the decommissioning of the fuel storage ponds at sites, and the commissioning and decommissioning of active effluent treatment plants (AETPs).



ILW Management

The ILW Management Programme is responsible for the retrieval and packaging of operational solid and wet ILW for final disposal.



Plant and Structures

The Plant and Structures Programme is responsible for deplanting, demolishing and remediating structures, buildings and land so that the sites are ready to enter C&M.



Waste Management

The Waste Management function has responsibility for maintaining waste inventories, developing disposal routes and maintaining the company decommissioning strategy, including strategic regulatory engagement.

#### Benefits are realised by:

- Deploying new and innovative techniques and methods, such as MiniStores to manage ILW and dissolution for FED
- Managing a sequenced approach to work programmes and mobile teams using a lead and learn philosophy
- Adopting a commercial strategy with innovative supply chain solutions and frameworks

#### The principles of Strategic Programmes:

- Consistent solutions
- Mobile teams that vertically integrate with sites enabling hands on cross-site and cross-disciplinary learning
- Single points of accountability
- Consolidated supply chain solutions
- Sites managed in an optimised sequence
- Affordability
- Improved flexibility

Plant and Structures

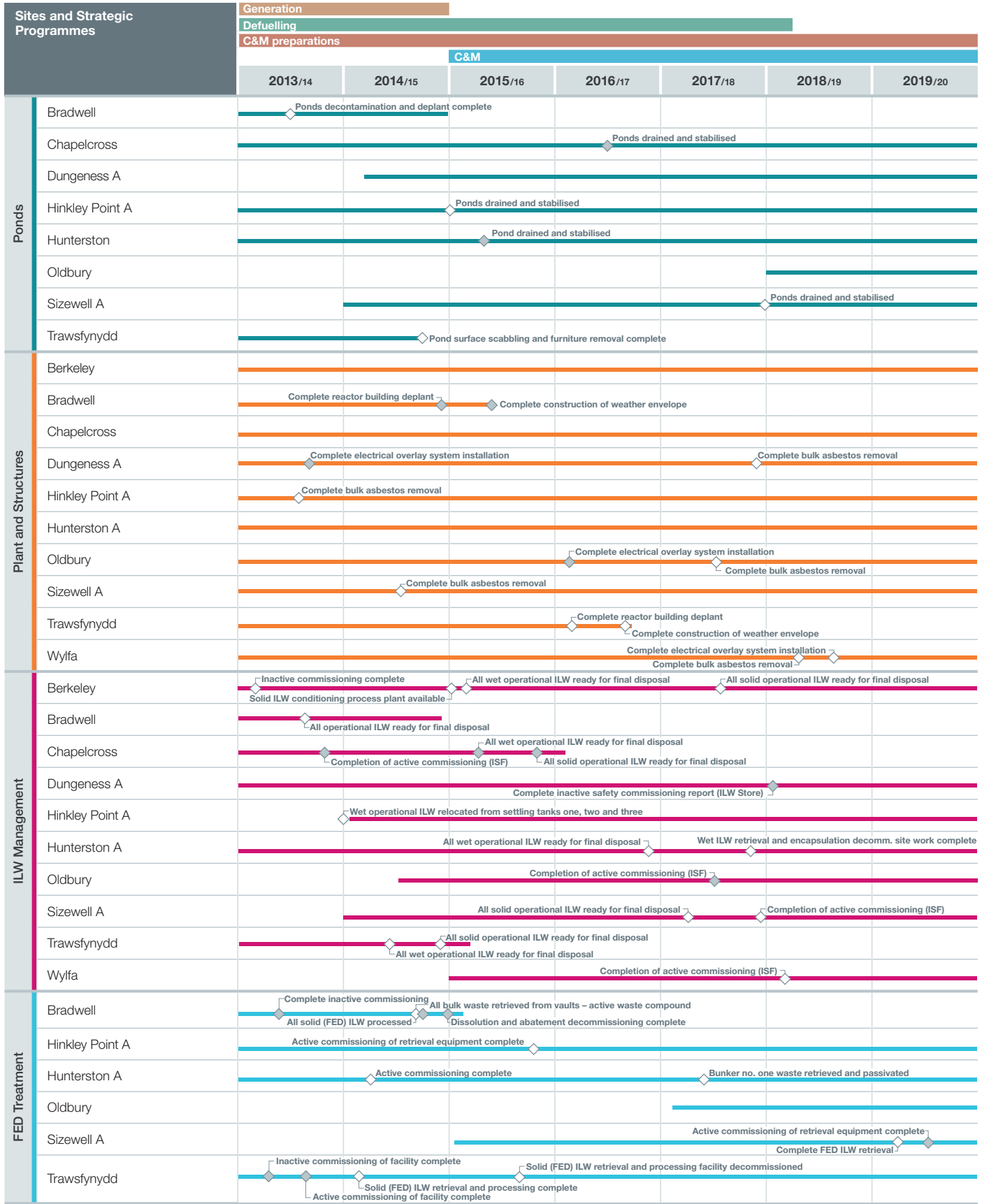


Waste Management

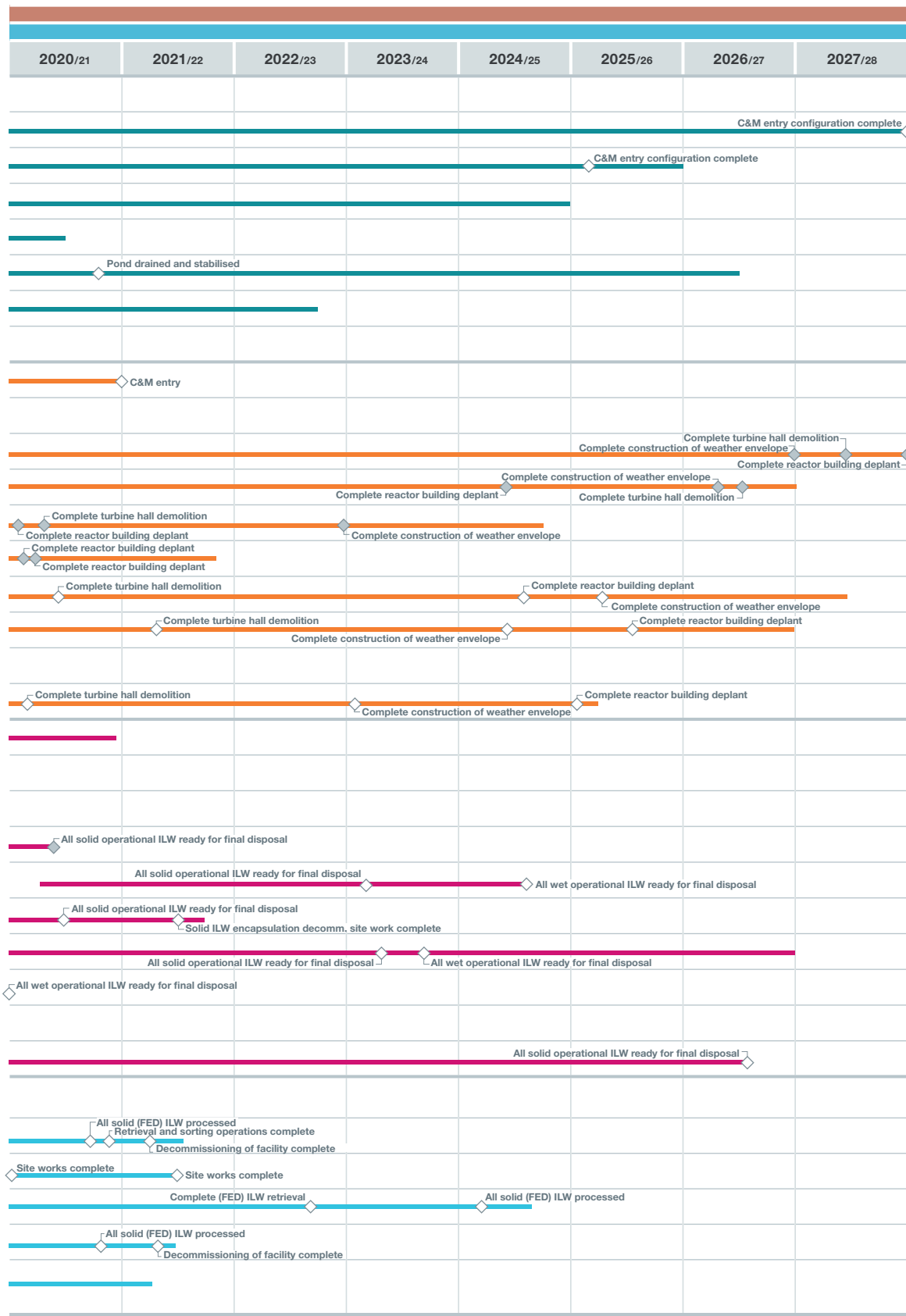


# Strategic Programmes

## Strategic Programmes – summary milestones schedule of work



◆ Key milestone ◇ Regulatory milestone



The projects carried out during C&M preparations are grouped by site and strategic programme to demonstrate the relationship between the various programmes.

# FED Treatment Programme

The FED Treatment Programme is responsible for the retrieval and processing of FED to make it ready for final disposal, significantly reducing hazard at sites.

FED mainly consists of parts of the magnesium alloy cladding that surrounds the nuclear fuel which, at some sites, was removed before the spent fuel was sent to Sellafield. Quantities of FED remain at the sites and need to be retrieved and placed into a safe shielded storage container following treatment.

The objective of FED dissolution is to separate radioactive material from inert waste. Harmless magnesium metal comprises the bulk of the fuel cladding. FED dissolution separates this material and avoids the unnecessary permanent disposal of harmless waste.

## Key achievements

### FED retrieval at Bradwell

A total of 290 drums have been filled with FED and gravel from vault 1A at Bradwell, the first vault to be completely emptied of this waste at the site.

The work was not without significant challenge due to the unknown physical condition of the waste which had been stored for several years. Final retrieval of gravel from the bottom of the vault was achieved by worker access to the area. The team, operating in a difficult environment, registered a lower dose rate than forecast thanks to the way in which the project was managed.

More than 250 drums of FED have also now been removed from a second vault, 1B, as the retrieval project continues.

### The heart of the operation

A new dissolution facility at Bradwell is taking shape thanks to the arrival of two reaction vessels in early 2013. The vessels, which form the heart of the facility, will be where the actual dissolution of the waste, currently being removed from vaults, will be undertaken.

Shield walls have also been poured, stainless steel cladding installed and an overhead crane lifted into place as part of the construction project which is due to be completed in the next year.

At Dungeness A, Magnox has pioneered the FED dissolution approach, dissolving FED in an acid solution, reducing the volume by more than 90 per cent. The remaining effluent is treated and discharged, within permitted levels, and the items of higher activity are packaged and stored appropriately.



FED vault 1A at Bradwell



Construction of the FED dissolution facility at Bradwell



FED retrieval





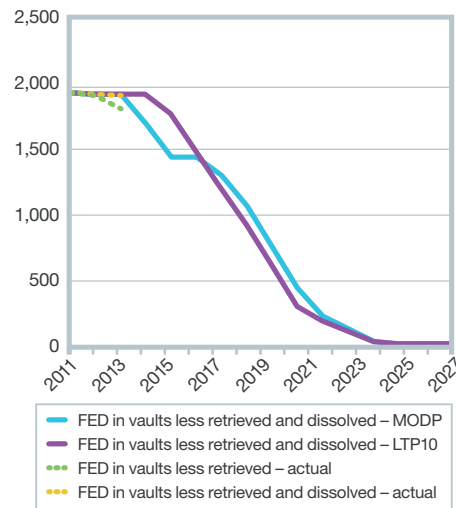
Deployment of dissolution is under way at Bradwell and planned for Hinkley Point A, Oldbury and Sizewell A.

Magnox has, to date, transferred three shipments of FED waste from Bradwell to Dungeness A for dissolution. The results of this work will be used to inform the consultation process regarding the development of a regional dissolution facility or facilities. The consultation is running throughout 2013.

A contract has been awarded to build, manage and demolish the dissolution facilities. Construction of the first plant at Bradwell began during 2012.

Bradwell has successfully and safely retrieved its first drum of FED from vault 1A after completing inactive trials in February 2012.

FED ILW volume – dissolution

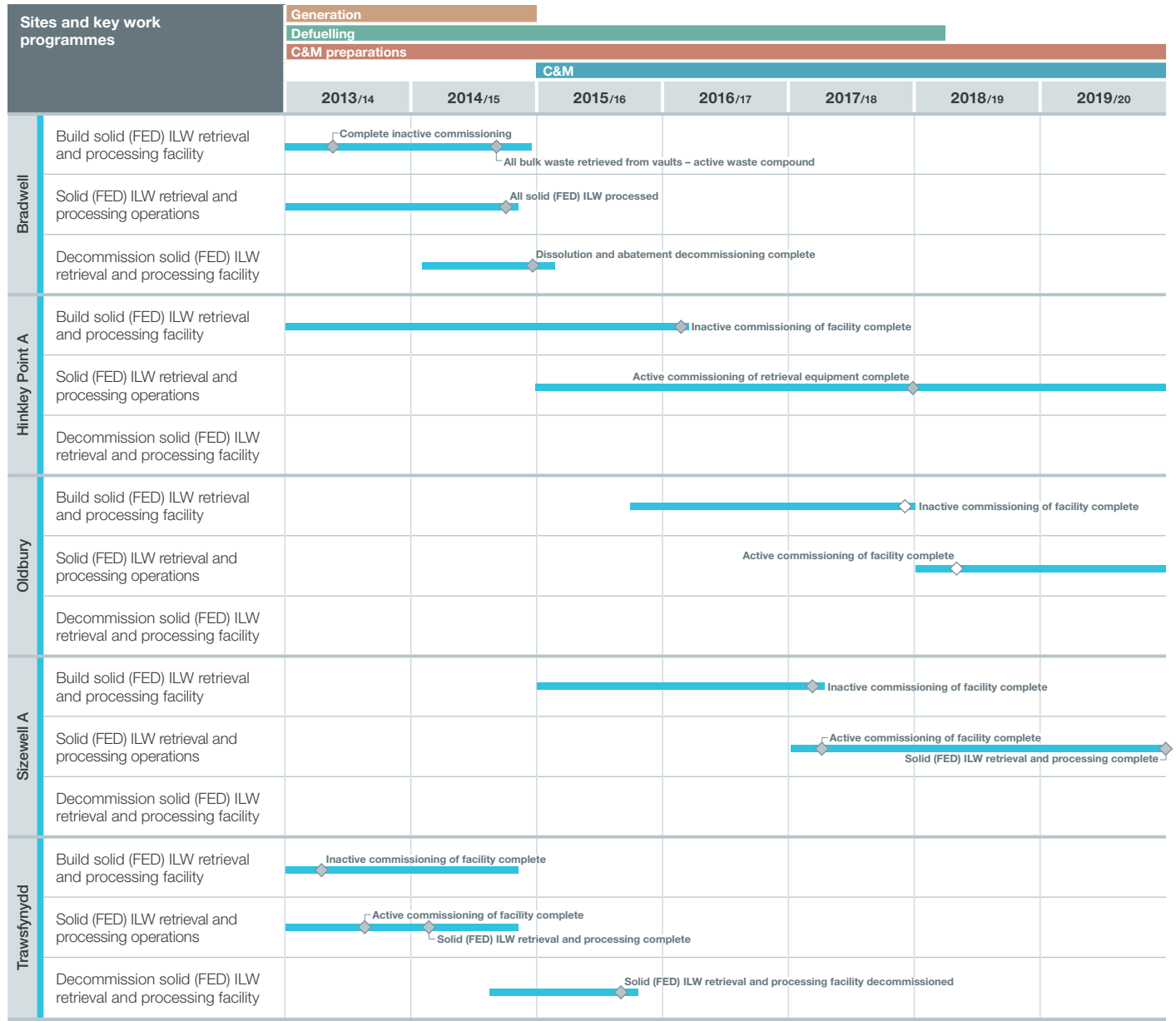


Key challenges and considerations

Risk/opportunity	Impact	Mitigation
There is a threat that the design requirements of the dissolution and abatement plant or the buffer store at Bradwell are not suitable for other sites, for example due to chemical characteristics of the waste, or specifics of the successor site	As a result of differences in other sites' requirements in relation to those at Bradwell Which may result in an extension to the programme to allow for multiple design under one contract or for multiple contracts to be put in place for the various designs	Lead site knowledge transfer. Successor site concept development activities
There is a threat that the FED processing plant fails to perform to specification	As a result of unproven design Which may result in reduced processing rates and increased resin requirements with associated costs and may impact successor site strategy with erosion of programme benefits	Learn from operational experience at Bradwell, which will inform design for successor sites A formal action plan is being discussed and developed
There is a threat that work may be required to implement the company standard strategy of nitric acid dissolution at all sites	As a result of previous work (for example stakeholder engagement, best practicable environmental option (BPEO) studies) undertaken by sites Which may result in additional stakeholder engagement/studies to demonstrate practicability of nitric acid dissolution	Programme team to work closely with site FED project teams to ensure programme approach is delivered
There is an opportunity to reduce the number of plants requiring designing, building, operating and decommissioning	In the event of implementing an optimised FED dissolution facility instead of the current strategy of separate facilities at each FED dissolution site which may result in cost savings	Magnox study to identify most suitable Magnox site for optimised FED dissolution facility
There is an opportunity to reuse plant and equipment from one site at a different site	In the event of commonality of plant between sites which may result in cost savings due to a reduced requirement to fabricate dissolution plants	Include an assessment of reuse of equipment within the scope of the optimised FED dissolution facility assessment

# FED Treatment Programme

## FED Treatment Programme schedule of work



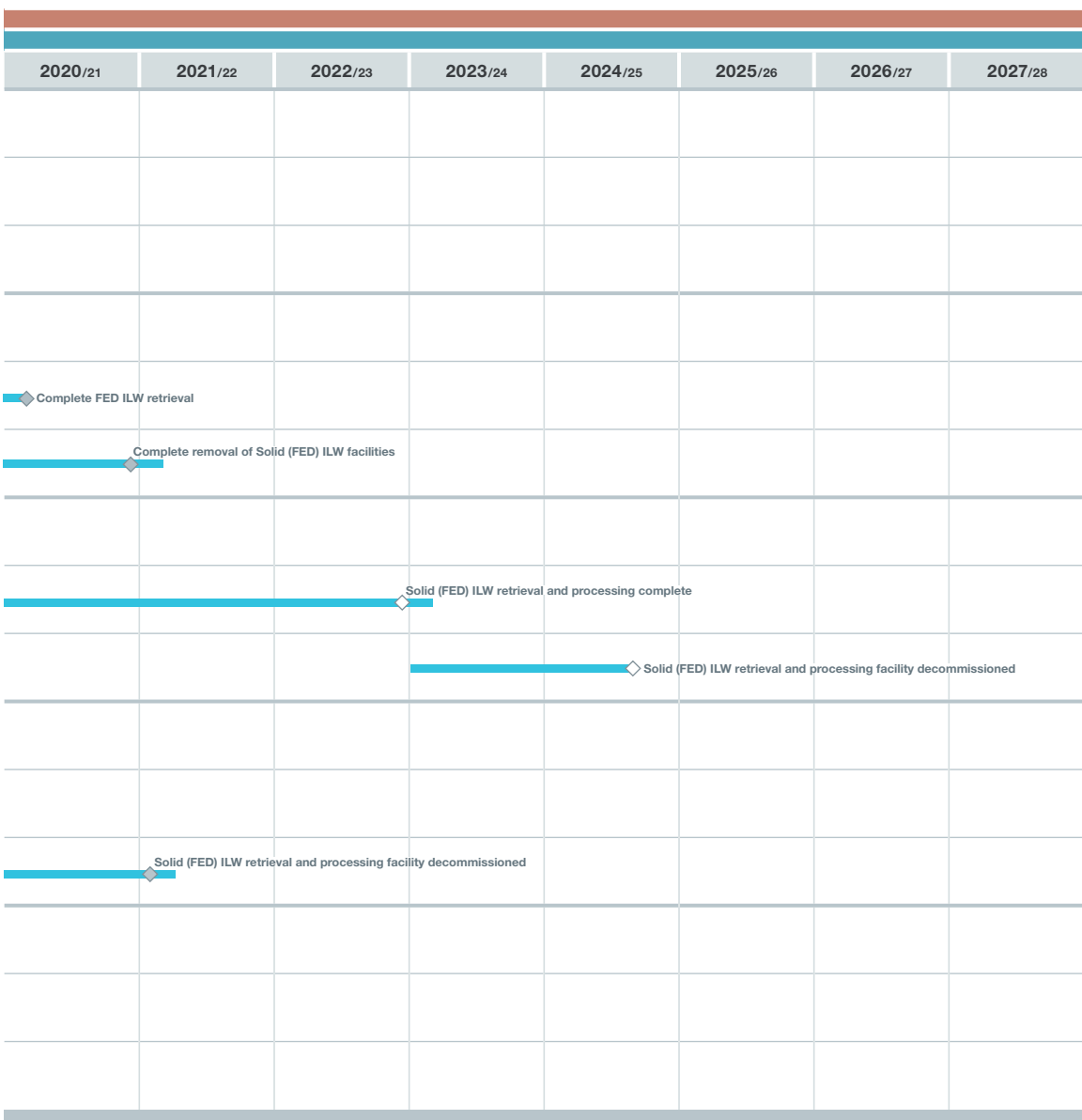
## FED Treatment Programme costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	-	-	-	-	-	-	-	-	-	-	-
2 Bradwell	13.41	8.95	0.01	-	-	-	-	-	-	-	-
3 Chapelcross	-	-	-	-	-	-	-	-	-	-	-
4 Dungeness A	-	-	-	-	-	-	-	-	-	-	-
5 Hinkley Point A	4.91	40.12	11.09	4.30	3.25	3.28	2.53	3.82	1.54	-	-
6 Hunterston A	-	-	-	-	-	-	-	-	-	-	-
7 Oldbury	-	-	-	-	1.32	19.96	13.22	2.00	2.00	2.43	2.22
8 Sizewell A	-	-	1.51	24.54	11.33	2.34	2.81	2.79	1.21	-	-
9 Trawsfynydd	10.68	4.07	0.26	-	-	-	-	-	-	-	-
10 Wylfa	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>28.99</b>	<b>53.14</b>	<b>12.87</b>	<b>28.84</b>	<b>15.90</b>	<b>25.58</b>	<b>18.57</b>	<b>8.62</b>	<b>4.75</b>	<b>2.43</b>	<b>2.22</b>



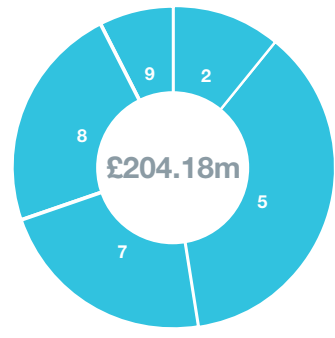
◆ Key milestone ◇ Regulatory milestone

The chart reflects the key projects, by site, which are part of the FED Treatment Programme. Not all sites incorporate FED projects.



2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost Magnox Plan (£m)
-	-	-	-	-	-	-
-	-	-	-	22.36	-	22.36
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	74.85	-	74.85
-	-	-	-	-	-	-
2.27	-	-	-	45.43	-	45.43
-	-	-	-	46.54	-	46.54
-	-	-	-	15.01	-	15.01
-	-	-	-	-	-	-
2.27	-	-	-	204.18	-	204.18

Proportional split of FED Treatment Programme costs by site



# Ponds Programme

The Ponds Programme is principally responsible for the decommissioning of the fuel storage ponds at sites, and the commissioning and decommissioning of AETPs.

The ponds stored used fuel elements after they were removed from the reactors, before being sent to Sellafield for reprocessing. The ponds facility is available for decommissioning when all the fuel has been removed.

The aim is to drain and decontaminate ponds in preparation for C&M. This programme of work is estimated to cost £350 million. The programme team is focused on a common approach for all the ponds, with a toolkit of processes and equipment able to be deployed from one site to another.

## Key achievements

### Hinkley Point A

Work is progressing well, with approximately 1,700m<sup>3</sup> of water drained from the main pond. Smaller areas of the pond complex (D-bays) have been completely drained and various pieces of redundant equipment removed.

### Bradwell and Trawsfynydd

In support of both sites' accelerated decommissioning plans, the Ponds Programme has been engaging with the Environment Agency (EA) and Office for Nuclear Regulation (ONR) on C&M entry states for the ponds at both sites.

### Hunterston A

Over half of the pond volume has now been drained and almost 1,000m<sup>2</sup> of the pond walls successfully decontaminated.

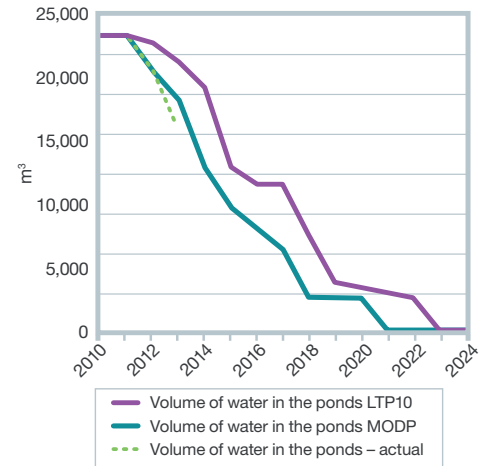
### Innovation

To deliver work faster, cheaper and more safely, the programme continues to undertake various innovation trials. In the last financial year work has commenced to investigate pond skips decontamination using various techniques such as milling, nitrogen blasting and laser cutting. This will inform the wider programme and learning will be shared across sites.

### Chapelcross

A strategy and methodology is under way to deal with empty fuel skips and ILW retrieval from pond two.

Pond water volume m<sup>3</sup>



Hunterston A pond clean and drain



Hinkley Point A D-bay



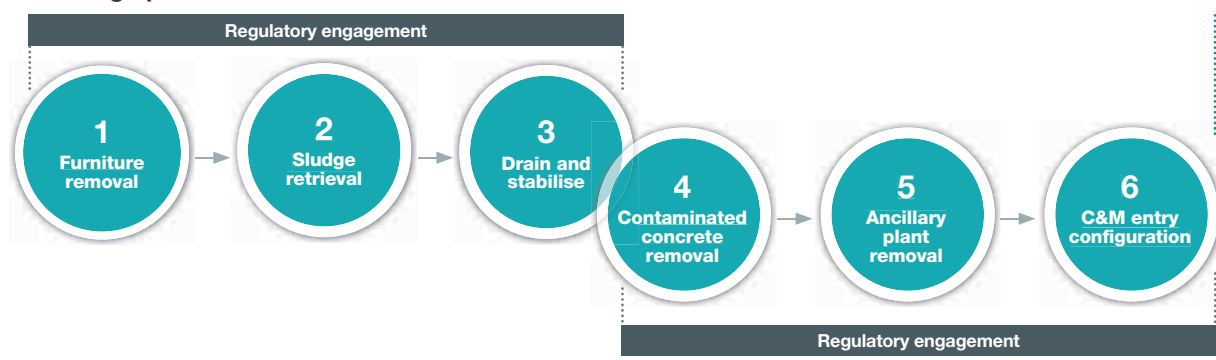
Hinkley Point A pond



**Key challenges and considerations**

Risk/opportunity	Impact	Mitigation
There is a threat that differing levels of expectation/standards cause additional work to be performed, (for example agreement of end states and specification of modular active effluent treatment plant (MAETP) capability)	As a result of differences in regulatory approach/opinion (EA, Scottish Environment Protection Agency (SEPA), ONR), or as a result of the entry conditions to C&M being further defined which may result in delay to the schedule through the need to accelerate out year scope and increase the cost	Engage regulators to agree consistent approach with regard to end states, discharge consents to prevent escalation (for example AETP at Chapelcross)
There is a threat that a decontaminated pond/vault/drain needs to have additional work performed to seal the structure from further water intrusion	As a result of water intrusion into the empty ponds which may result in delay to the schedule and increase the cost	Site specific solutions to employ industry standard remediation techniques
There is an opportunity to remove the need for, or reduce the scale of, the planned MAETP at Chapelcross	In the event of challenging the site's liquid waste disposal strategy Which may result in the saving of time and money	Ongoing regulatory dialogue and current discharge limits
There is an opportunity to explore techniques such as delamination, planning, microwaving, lasering or expanding grouts as alternatives to scabbling/ultra high pressure (UHP) and options for concrete recycling	In the event of challenging how bulk concrete removal is performed, where it's needed Which may result in the saving of time, money and worker dose	Feasibility study and trials for use of Nitrocision as concrete decontamination method commenced in 2012/13 and will continue in 2013/14 Investigating planning as an alternative concrete removal method for use in the miscellaneous sludge retention tanks
There is an opportunity to decontaminate empty ILW fuel skips to levels acceptable for LLWR, metal melt, or free release	In the event of a large number of skips at Chapelcross being characterised as ILW, and the subsequent challenge to the potential cost of disposal via DCICs Which may result in significant cost savings against the alternative of packing skip sections into DCICs. This will also reduce the number of DCICs required, and in turn the required capacity of the stores at sites (additional DCICs and capacity not currently accounted for at sites due to assumption that skips are low level waste (LLW))	1. Computer numerical control milling trials – field 2. NiThrow decontam trials 3. Laser cutting trials

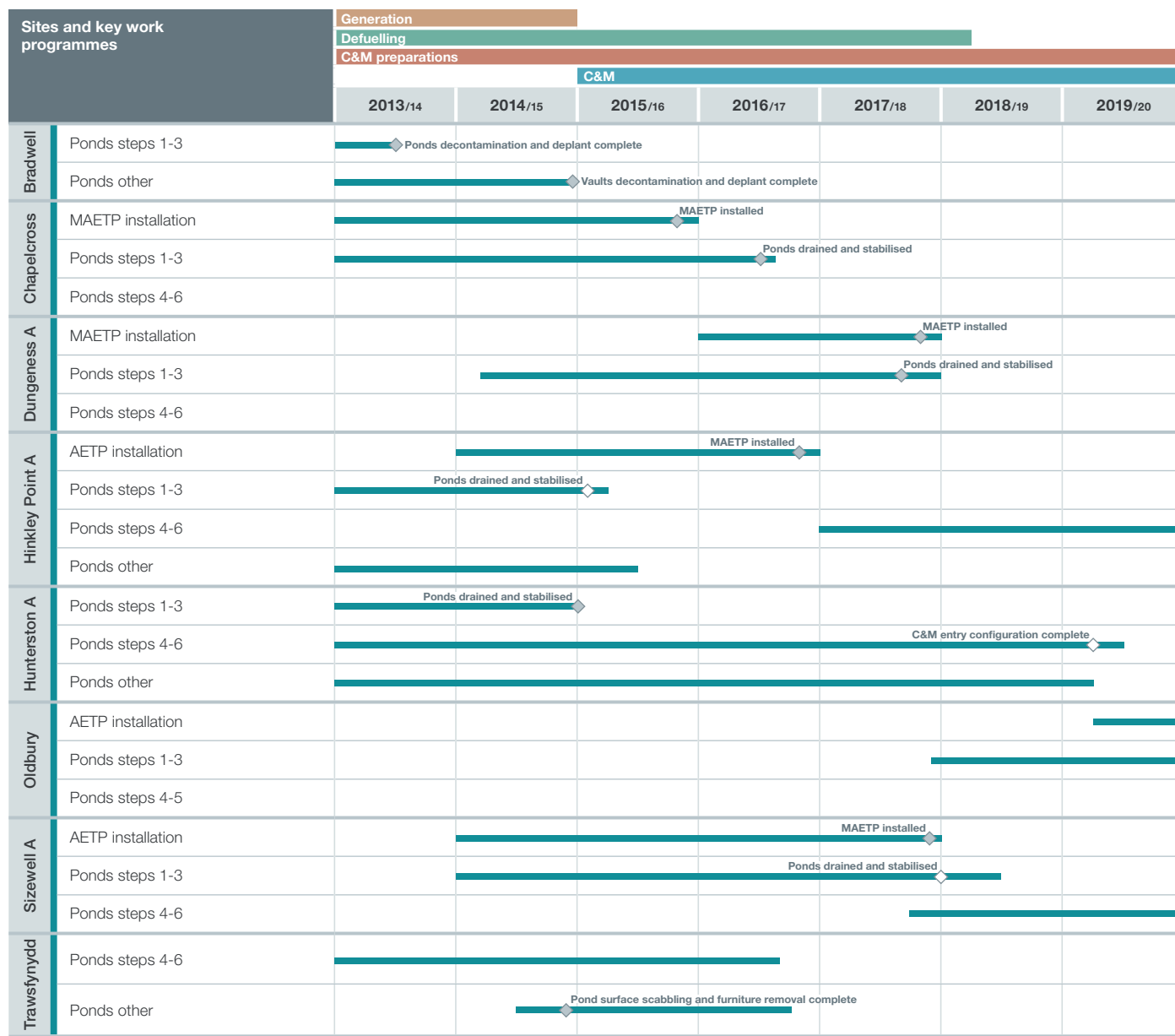
**Six stage process**



Each pond facility is different and has its own challenges. Adopting a simple six stage methodology ensures a consistent approach.

# Ponds Programme

## Ponds Programme schedule of work



## Ponds Programme costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	-	-	-	-	-	-	-	-	-	-	-
2 Bradwell	15.25	9.62	2.58	-	-	-	-	-	-	-	-
3 Chapelcross	6.61	13.81	11.03	2.68	1.22	1.22	1.22	1.22	1.22	0.98	1.44
4 Dungeness A	-	3.76	4.37	5.71	8.13	-	-	-	-	-	5.32
5 Hinkley Point A	6.79	4.56	0.93	1.27	1.86	2.68	6.23	5.14	-	0.02	0.21
6 Hunterston A	5.16	6.73	10.24	10.07	9.59	8.41	0.85	-	-	-	-
7 Oldbury	-	-	-	-	-	4.75	4.16	3.89	0.47	0.32	14.74
8 Sizewell A	-	1.87	6.81	5.30	5.70	2.04	4.37	4.44	4.96	5.21	1.09
9 Trawsfynydd	4.54	3.05	1.83	0.66	-	-	-	-	-	-	-
10 Wylfa	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>38.35</b>	<b>43.41</b>	<b>37.79</b>	<b>25.69</b>	<b>26.50</b>	<b>19.10</b>	<b>16.83</b>	<b>14.69</b>	<b>6.65</b>	<b>6.53</b>	<b>22.79</b>



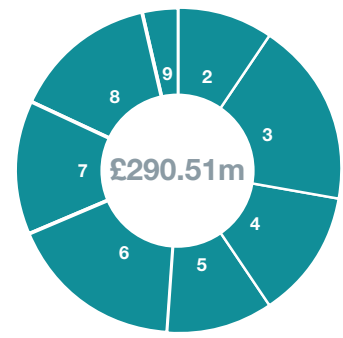
◆ Key milestone ◇ Regulatory milestone

The chart reflects the key projects, by site, which are part of the Ponds Programme. Not all sites incorporate ponds projects.



2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost Magnox Plan (£m)
-	-	-	-	-	-	-
-	-	-	-	27.45	-	27.45
2.25	3.74	3.23	1.97	53.84	-	53.84
9.33	0.33	0.08	-	37.03	-	37.03
0.55	-	-	-	30.25	-	30.25
-	-	-	-	51.05	-	51.05
10.30	0.32	0.08	-	39.03	-	39.03
-	-	-	-	41.79	-	41.79
-	-	-	-	10.08	-	10.08
-	-	-	-	-	-	-
22.43	4.39	3.38	1.97	290.51	-	290.51

Proportional split of Ponds Programme costs by site



# ILW Management Programme

The ILW Management Programme is responsible for the retrieval and packaging of operational solid and wet ILW for final disposal. Approximately 6,400m<sup>3</sup> of wet and solid ILW has been identified as waste that will be disposed of via the programme. The majority of waste is currently stored in ageing underground vaults and requires fit-for-purpose on-site storage until the geological disposal facility (GDF) is available for permanent disposal.

At most sites, on-site storage will be achieved through the retrieval of ILW into MiniStores. At Hunterston A and Trawsfynydd, encapsulation of the waste remains the intent as they have, or are in the process of building, on-site facilities.

MiniStores have passed a conceptual stage assessment led by the NDA's Radioactive Waste Management Directorate (RWMD) to consider their suitability for permanent disposal in the GDF.

## Key achievements

### Trawsfynydd resin vault one

Trawsfynydd is the first Magnox site to fully clear an ILW resin tank after retrieving all residual resin wastes.

In total, 5m<sup>3</sup> of residual resin was retrieved using a specially designed ROV to jet and flush the resin waste into a submerged pump system, for transfer into the main sludge vault ready for encapsulation as ILW.

### ISFs

To maximise cost efficiencies, a generic ISF design has been adopted across the ILW programme. Design works were initially started at Bradwell and a lead and learn approach has been adopted, where learning and best practice is passed to follow-on sites prior to starting the key phases of their ISF design, construction and commissioning.

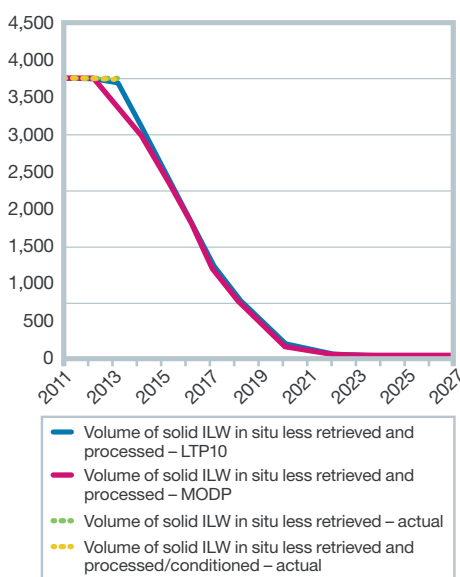
The generic design allows the ISFs to be designed and constructed to accommodate different numbers of ILW packages depending on the site's need, while retaining all the key aspects of the design.

Construction work is nearing completion at Bradwell and has started at Berkeley. The design for Hinkley Point A is also nearing completion with Chapelcross ready to start the design of its facility.

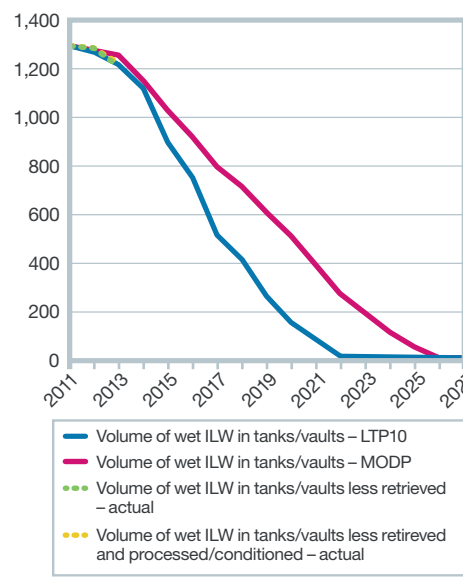
### Berkeley chute silo

A drum of gravel has been successfully retrieved from the Berkeley chute silo within the site's subterranean ILW vault complex. The chute silo currently contains ILW in the form of control rods and charge chutes, from the site's operational phase, and around 22m<sup>3</sup> of gravel. Full production equipment including the newly refurbished 16 tonne chute silo manipulator was used.

**Solid ILW processing**



**Wet ILW processing**







**Key challenges and considerations**

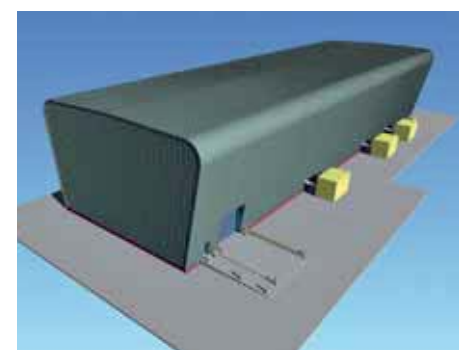
Risk/opportunity	Impact	Mitigation
<p>There is a threat that the RWMD will not issue LoCs demonstrating the disposability of Magnox ILW packages to the GDF</p>	<p>As a result of Magnox LoC submissions not providing sufficient assurance to RWMD of the disposability of Magnox ILW packages</p> <p>Which may result in increased overall programme schedule and costs (whilst additional underpinning work is carried out to satisfy RWMD's requirements)</p>	<p>Execution of necessary work scope to demonstrate a robust disposability case to RWMD</p>
<p>There is a threat that further design and development work will be required to establish an effective waste packaging (conditioning) capability (in support of making compliant LoC submissions)</p>	<p>As a result of Magnox processes/equipment capability (as reflected in Magnox LoC submissions) not providing sufficient assurance to RWMD of the disposability of Magnox ILW packages</p> <p>Which may result in increased overall programme schedule and costs (whilst additional underpinning work is carried out to develop suitable processes/equipment and thus satisfy RWMD's requirements)</p>	<p>Execution of necessary work scope to demonstrate a proven conditioning capability to RWMD</p>
<p>There is an opportunity to both enhance the security of supply, and to reduce the overall purchase costs of, DCICs for use in packaging ILW for disposal</p>	<p>In the event of establishing, via competition, additional commercial arrangements</p> <p>Which may minimise a threat to programme delivery (of DCIC supply shortages) and offer the potential to significantly reduce overall programme costs (via lower DCIC unit costs)</p>	<p>Establishment of "alternative container" commercial arrangements to supplement existing supply chain capability</p>
<p>There is an opportunity to reduce overall programme costs</p>	<p>In the event of optimising waste package numbers (minimising the volume of ILW to be packaged through the development of alternative packaging arrangements/equipment)</p> <p>Which may offer the potential to significantly reduce overall programme costs (via lower overall DCIC numbers/purchase costs)</p>	<p>Establishment of a dedicated project team to explore the feasibility of these opportunities – and if viable to then enable through developing the technical underpinning to support implementation</p>
<p>There is an opportunity to reduce overall programme costs</p>	<p>In the event of optimising ILW interim storage arrangements across all Magnox sites (building fewer than originally planned storage facilities)</p> <p>Which may offer the potential to significantly reduce overall programme costs (by avoiding the costs of the design, build, operation and decommissioning costs associated with those facilities not built)</p>	<p>Establishment of a dedicated project team to explore the feasibility of this opportunity – and if viable to then enable through developing the technical underpinning to support implementation</p>



ROV used in Trawsfynydd resin vault one



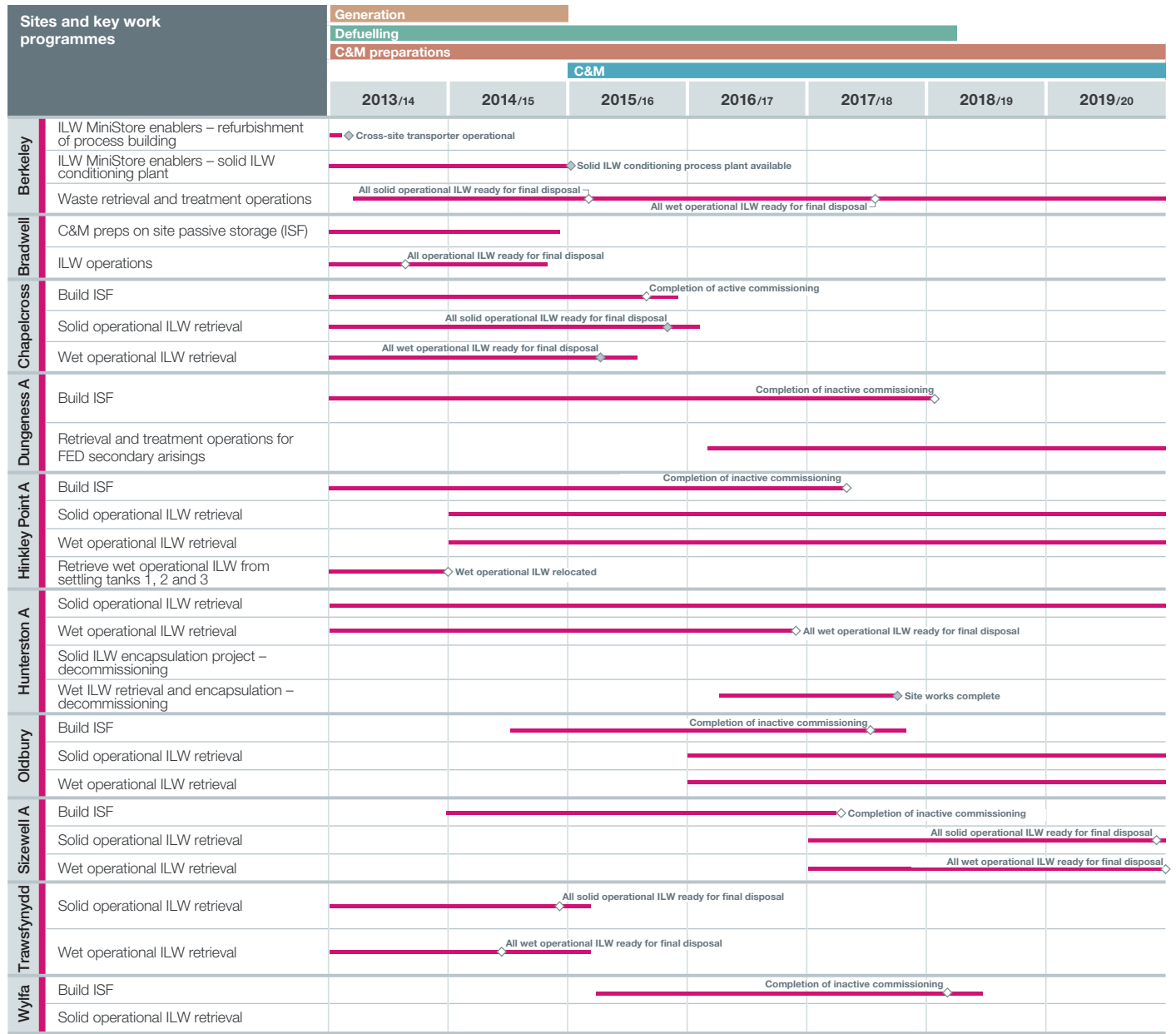
Berkeley chute silo petal grab



Design for Berkeley ISF

# ILW Management Programme

## ILW Management Programme schedule of work



## ILW Management Programme costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	56.44	46.63	53.90	56.03	13.99	3.55	3.01	0.63	–	–	–
2 Bradwell	32.70	11.94	3.36	–	–	–	–	–	–	–	–
3 Chapelcross	6.38	13.56	19.54	6.55	0.23	0.23	0.23	0.23	0.23	0.23	0.23
4 Dungeness A	1.83	2.70	7.71	4.59	9.90	13.21	0.15	0.15	0.15	0.15	0.15
5 Hinkley Point A	14.40	6.08	2.21	6.84	10.37	15.96	18.74	10.72	1.61	0.13	0.13
6 Hunterston A	9.95	22.62	21.00	12.79	8.72	3.00	2.75	3.23	3.71	–	–
7 Oldbury	–	0.62	2.83	8.78	14.05	5.37	0.66	2.86	1.64	1.80	1.13
8 Sizewell A	–	1.14	4.48	5.71	1.47	1.47	0.66	3.34	1.10	0.13	0.13
9 Trawsfynydd	8.81	5.68	4.17	3.45	–	–	–	–	–	–	–
10 Wylfa	0.39	1.11	2.40	3.63	7.12	1.93	1.00	1.49	0.10	0.10	0.11
<b>Total</b>	<b>130.90</b>	<b>112.09</b>	<b>121.60</b>	<b>108.37</b>	<b>65.85</b>	<b>44.72</b>	<b>27.20</b>	<b>22.66</b>	<b>8.55</b>	<b>2.55</b>	<b>1.88</b>



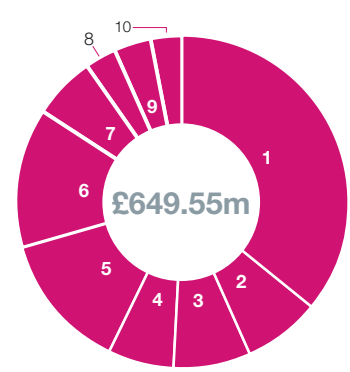
◆ Key milestone ◇ Regulatory milestone



The chart reflects the key projects, by site, which are part of the ILW Management Programme. All sites incorporate ILW projects.

2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost Magnox Plan (£m)
-	-	-	-	234.20	-	234.20
-	-	-	-	48.00	-	48.00
0.23	0.23	0.23	0.23	48.60	-	48.60
0.15	0.15	0.15	-	41.13	-	41.13
0.13	-	-	-	87.32	-	87.32
-	-	-	-	87.78	-	87.78
0.26	0.26	0.25	0.23	40.73	-	40.73
0.13	0.13	0.13	-	20.03	-	20.03
-	-	-	-	22.10	-	22.10
0.11	0.10	0.07	-	19.67	-	19.67
<b>1.01</b>	<b>0.87</b>	<b>0.84</b>	<b>0.46</b>	<b>649.55</b>	<b>-</b>	<b>649.55</b>

Proportional split of ILW Management Programme costs by site



# Plant and Structures Programme

The Plant and Structures Programme is responsible for deplanting, demolishing and remediating structures, buildings and land so that the sites are ready to enter C&M.

This involves the removal of hazardous materials such as asbestos, as well as the construction and preparation of facilities that will remain during the C&M period.

## Key achievements

### Lead and learn demolition at Dungeness A

The first phase of demolition work has been completed at Dungeness A as Erith, one of the demolition framework partners, brought down seven buildings including the old administration building and its adjoining annex and disused canteen.

The same contractor had previously successfully deplanted and demolished the turbine hall at Bradwell, so was able to transfer knowledge and experience to Dungeness A.

A combined 3,776m<sup>3</sup> of rubble and spoil was generated by this work and a simultaneous construction project. This was used as infill for the cooling water pumphouse, saving £350,000 on transport costs and keeping an estimated 1,640 vehicle movements off Kent roads, benefiting both local safety and the environment.

An extra £12.8 million of funding has now been secured from the NDA to speed up the clearance of the south side of the site over the next three years, rather than 15 years as originally planned.

### Europe's largest asbestos strip at Chapelcross

Phase one of Europe's largest-known asbestos removal project has led to a 2,000-tonne reduction of asbestos and man-made mineral fibres at Chapelcross.

Since stripping started in 2009, contract firm Silverdell has removed the hazardous materials from eight turbines, four dump condensers, 16 boiler, pump houses and a range of associated ducts and pipework.

In all, over 617,000 man-hours have been spent on the project, 23,000 of them on training to ensure the safety of all personnel,

Magnox has awarded two major framework contracts to support Plant and Structures Programme delivery.

A £304 million deplanting, demolition and bulk asbestos removal contract was awarded to specialist contractor partners including: Doosan Keltbray Consortium, Celadon, Erith, Squibb/LVI Group, Nuvia, EDS/Silverdell.

While a framework contract worth up to £300 million over ten years has recently been awarded to Costain and Balfour Beatty. This supports construction, infrastructure and maintenance projects at all the sites.

many of which have been regularly working at heights of up to 90ft and in temperatures ranging from -13 degrees to 28 degrees centigrade.

### Deplanting at Bradwell

The pile cap at Bradwell is unrecognisable as the huge charge machines have been dismantled. The four, 17 metre-tall charge machines, each weighing around 460 tonnes, were used to refuel the nuclear reactors during the site's operational phase.

More than 1,300 tonnes of redundant equipment have so far been removed from the pile caps and this is expected to rise to around 3,000 tonnes.

Meanwhile, the deplanting of boiler houses within the reactor buildings has also progressed at the site. More than 700 tonnes of recyclable waste including pipework, external boiler drums, walkways and stairwells have been removed.



Pile cap deplant at Bradwell



Demolition work at Dungeness A



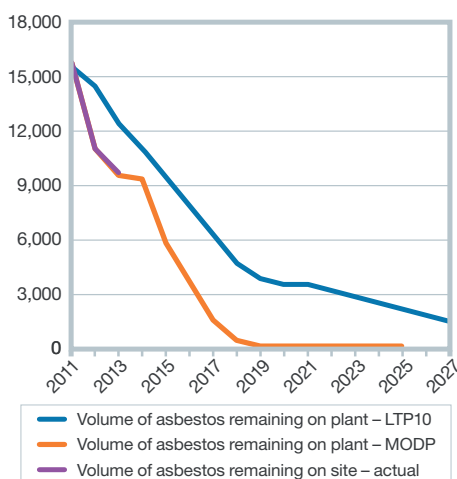
Chapelcross asbestos strip



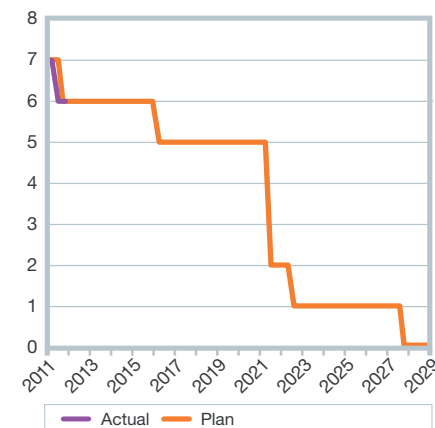
**Key challenges and considerations**

Risk/opportunity	Impact	Mitigation
There is a threat that the C&M entry state agreed by the regulator and the SLC is not in-line with the entry state assumed in the programme baseline	As a result that the MODP baseline assumes an entry state for C&M Which may result in significant additional cost and delays to C&M entry from performing work that might otherwise have been deferred to final site clearance (for example boiler deplant)	The Plant and Structures Programme is directly engaged with the C&M Hub Director regarding end state definitions to ensure that any agreement with the regulator takes into account the current proposed end state and associated risks  End states are likely to be agreed for Bradwell first, with other sites following
There is a threat that the actual costs for major deplant and demolition activities in the outyears may be over and above the levels of estimating uncertainty in the current baseline plan	As a result of outyears baseline estimates not having been subject to detailed review or been benchmarked against the out-turn of similar scope  Which may result in a significant increase in costs for the programme and erosion of programme benefits	1. Baseline benchmarking and development strategy 2. Commercial frameworks are in place to ensure that lead and learn is maximised 3. Review of safestore weather protection sub-programme in progress – results of which will establish the scale of the issue
There is an opportunity to embed site learning into standard cost and schedule models to reduce baseline costs and uncertainty across the Plant and Structures Programme scope at sites	In the event of lessons learned and improved understanding  Which may result in the removal of contingency, improvements in estimates and reduction in the tier one delivery model, leading to release of funds	The programme is developing a series of standard project models to ensure a consistent strategy and methodology for the execution of work under the programme. The standard model approach will be the vehicle through which the programme captures learning, embeds this learning within site baseline plans and arms the project manager with recognised best practice and "toolkit" for the execution of the work. Review of the tier one delivery model is being embedded as part of standard project models
There is an opportunity to transfer land and decommissioning liabilities to the "new build" contractor	In the event of positive benefit realisation Which may result in significant release of funds to the NDA	Work is under way with investigating the detail. Initial work is to assess the extent of work required for separation, benefits and risks, constraints, and interdependencies such that the opportunities can be better defined in terms of technical requirements, feasibility, costs and likely income

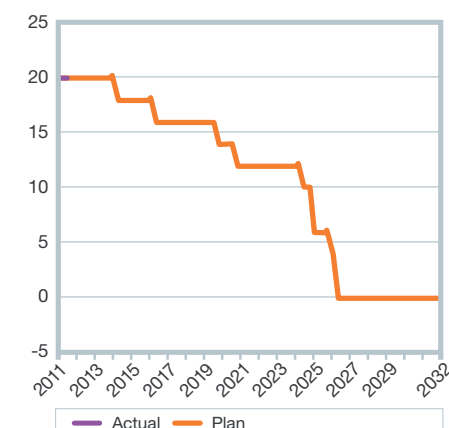
**Bulk asbestos removal**



**Turbine hall demolition**

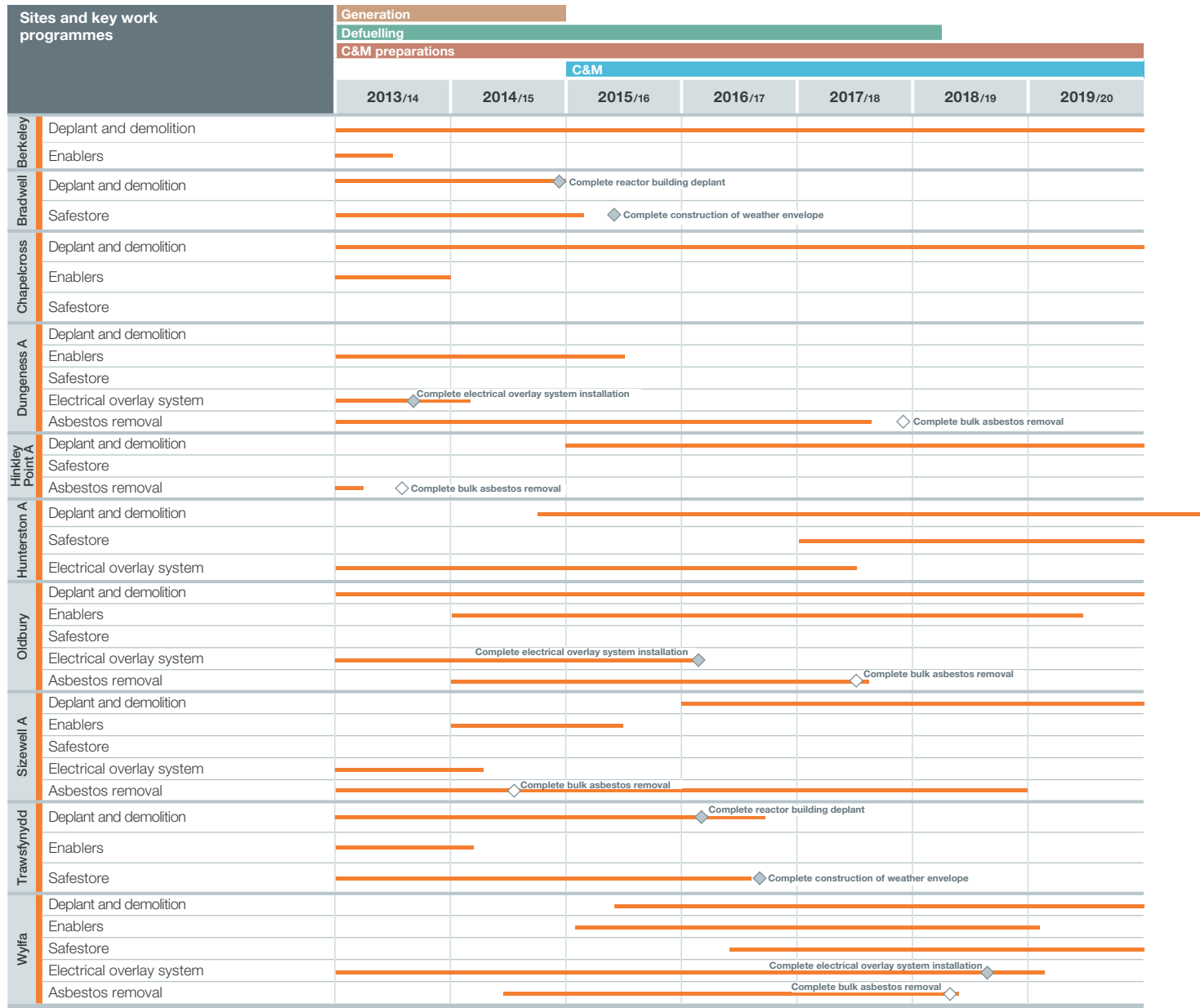


**Reactor building deplant**



# Plant and Structures Programme

## Plant and Structures Programme schedule of work



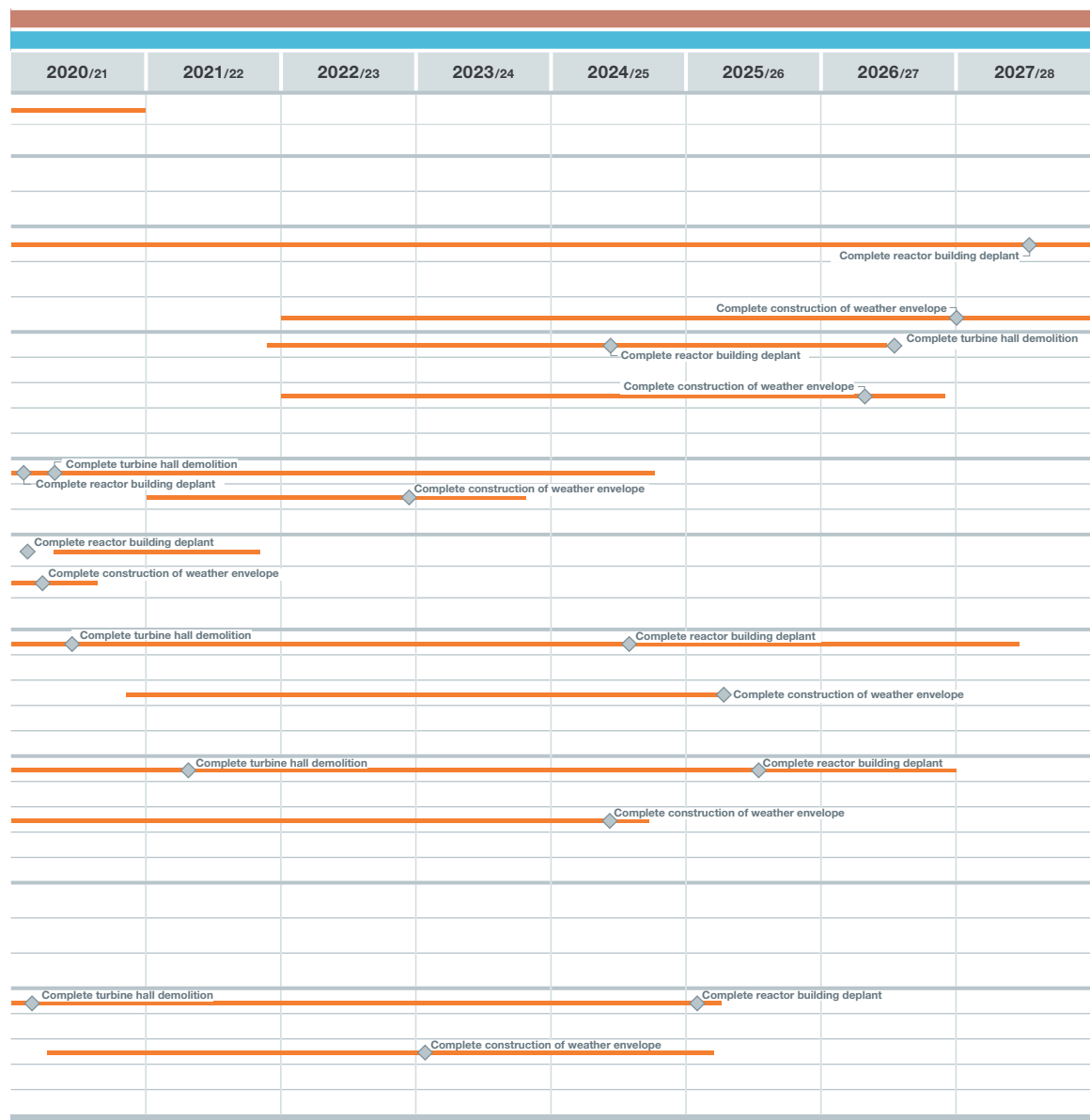
## Plant and Structures Programme costs by site

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	3.15	2.18	0.09	0.04	3.21	15.86	12.22	8.66	-	-	-
2 Bradwell	40.10	36.18	3.18	-	-	-	-	-	-	-	-
3 Chapelcross	7.74	14.05	17.34	5.84	0.49	0.49	0.49	0.49	0.49	2.14	7.72
4 Dungeness A	10.78	13.69	10.80	7.59	3.70	2.09	1.99	1.98	1.34	6.34	29.66
5 Hinkley Point A	0.08	0.08	0.77	1.75	8.24	15.39	12.92	10.17	9.45	30.52	3.98
6 Hunterston A	2.03	2.95	9.80	15.37	22.48	38.11	39.83	12.24	2.26	-	-
7 Oldbury	1.26	11.15	13.60	18.70	18.65	8.63	3.36	6.48	41.79	17.96	25.79
8 Sizewell A	1.92	2.60	1.10	3.99	11.35	14.45	17.93	21.81	23.13	18.41	22.24
9 Trawsfynydd	15.80	26.22	29.09	16.26	-	-	-	-	-	-	-
10 Wylfa	0.31	0.50	5.58	13.00	26.80	36.25	18.58	21.17	26.30	23.58	18.58
<b>Total</b>	<b>83.16</b>	<b>109.59</b>	<b>91.36</b>	<b>82.54</b>	<b>94.91</b>	<b>131.27</b>	<b>107.30</b>	<b>82.99</b>	<b>104.77</b>	<b>98.94</b>	<b>107.98</b>



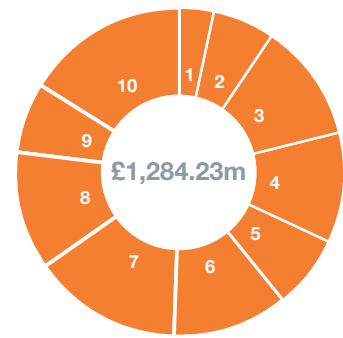
◆ Key milestone ◇ Regulatory milestone

The chart reflects the key projects, by site, which are part of the Plant and Structures Programme. All sites incorporate plant and structures projects.



2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2028/29 (£m)	Remaining years (£m)	Total cost Magnox Plan (£m)
-	-	-	-	45.40	-	45.40
-	-	-	-	79.45	-	79.45
6.47	11.87	37.11	34.49	147.23	-	147.23
28.21	16.02	5.28	-	139.48	-	139.48
1.25	-	-	-	94.59	-	94.59
-	-	-	-	145.06	-	145.06
10.96	6.01	2.99	1.01	188.33	-	188.33
8.14	1.89	1.89	-	150.85	-	150.85
-	-	-	-	87.37	-	87.37
14.81	1.02	-	-	206.47	-	206.47
<b>69.83</b>	<b>36.81</b>	<b>47.27</b>	<b>35.50</b>	<b>1,284.23</b>	<b>-</b>	<b>1,284.23</b>

Proportional split of Plant and Structures Programme costs by site



# Waste Management

Waste Management is responsible for maintaining waste inventories, developing disposal routes and maintaining the company decommissioning strategy, including strategic regulatory engagement.

The inclusion of waste management within Strategic Programmes provides a vehicle for achieving full integration between the problem (the waste inventories), the solution (the C&M end states and the waste disposal routes) and the projects, which enable the journey from problem to solution.

## Key achievements

### VLLW shipments

A new route for VLLW has been successfully trialled at Trawsfynydd and 165m<sup>3</sup> of VLLW shipped to a specialist landfill facility. The main long-term benefit will be the saving of valuable space at LLWR. Cost savings will also be realised from reduced disposal costs associated with disposing of VLLW to landfill. The new route will be used by other Magnox Ltd sites.

### Higher active waste guidance

Working in collaboration with Sellafield and the NDA, the waste management function has produced industry wide guidance on UK higher active waste management. For the first time this gives clear direction on waste management, packaging and storage of this type of waste. The guidance has been recognised by the International Atomic Energy Authority as a leading example of knowledge management within the nuclear industry.

### Waste tracking system

Magnox is leading the way across the nuclear industry with the implementation of a waste management tracking system at all its sites. This innovative approach allows access to a real time inventory data for the first time.

The cradle to grave system means all waste streams can be tracked from the current position, through processing and over packing to disposal destinations. This provides confidence to the regulator that all waste packages contain what is stated on the label and can easily be tracked back to the source location.

More than 23,977 tonnes of non-radiological waste and 2,685m<sup>3</sup> of radiological waste were dispatched from Magnox sites last financial year. The programme continues to effectively manage all waste streams through the Magnox Integrated Waste Management Strategy and has re-issued the Joint Waste Management Plan, working closely with LLWR to ensure that, where possible, waste is diverted away from LLWR to save space in this valuable national asset.



VLLW waste drum



Shipment of Trawsfynydd VLLW



Waste tracking system





## Key challenges and considerations

Risk/opportunity	Impact	Mitigation
There is a threat that unidentified emergent scope will be necessary to facilitate sites to enter C&M phase	<p>As a result of stakeholders (primarily regulators) identifying additional requirements to achieve an acceptable C&amp;M entry point</p> <p>Which may result in additional scope being required to achieve regulatory acceptance, and additional time and cost required to achieve entry into C&amp;M</p>	<p>Generic C&amp;M entry specification to be applied at all sites</p> <p>Assessment methodology to underpin planned C&amp;M entry states being prepared</p>
There is the threat that it will not be possible for sites to use the current disposal route for LLW generated from site decommissioning activities	<p>As a result of LLWR being unavailable to receive LLW packages</p> <p>Which may result in the need for provision of on-site storage facilities to cover the period of unavailability of LLWR or availability of an alternative facility, with the potential for project activities to be delayed until a waste route is made available</p>	<p>Engage with LLWR to ascertain and review contingency arrangements for the vault being unavailable</p> <p>Conduct feasibility study into provision of alternative LLW storage options</p>
There is a threat that land contamination within or external to licence boundaries on Magnox sites may require significant intervention and/or remediation before entry into C&M	<p>As a result of contaminated land being present on all of the Magnox sites and has the potential to, or is, migrating</p> <p>Which may result in significant costs, regulatory action, reputational and environmental impact and may delay entry into C&amp;M for accelerated sites. Could also affect land sale potential and plans for phased delicensing</p>	<p>The land quality programme has undertaken work to develop and sanction specific issues related to Hunterston A, Chapelcross and Bradwell. Close out of these remediation/containment options over the next 24 months</p> <p>A programme for implementation of the land quality standard has been developed for sites to undertake. Expected to be a two year programme; this duration relates to resource requirements and phased prioritisation of elements for sites to deliver</p> <p>The land quality programme has identified the next phases for near term strategic focus for the next six months at Chapelcross and Trawsfynydd</p>
There is an opportunity to take advantage of new treatment and disposal routes	<p>In the event of an agreed Joint Waste Management Plan between LLWR and Magnox</p> <p>Which may result in better implementation of the National LLW Strategy and reductions in costs and/or preservation of capacity at LLWR</p>	<p>Magnox LLW programme now established</p> <p>Programme driving management and monitoring of Joint Waste Management Plan with benefits realisation being identified and tracked</p>
There is an opportunity to reduce the number of plants requiring designing, building, operating and decommissioning	<p>In the event of implementing an optimised FED dissolution facility instead of the current strategy of separate facilities at each dissolution site</p> <p>Which may result in cost savings</p>	<p>Magnox is supporting NDA in investigation of ways in which the FED dissolution programme could be optimised. Gate 0 Strategic management system (SMS) Case for Change presented and Magnox awaiting permission to begin the project with intention to complete Stage A SMS by year end 2012/13</p>

# MOP

The objective of the MOP is to enable the UK to meet its international environmental and safety commitments in bringing the Magnox fuel cycle to a close.

The programme determined the closure sequence of the Magnox Ltd sites and sets out expected timescales for the completion of defuelling and reprocessing of fuel. The sequence and timings are also used to plan site transitions from generation to defuelling and into decommissioning.

The MOP has been updated and revised a number of times since its inception in 2000. The publication of MOP9 in 2012/13 saw a significant change in approach.

For the first time, the MOP incorporates underpinned performance ranges and associated completion dates, rather than a single rate and set of dates.

In addition, 2012/13 saw inclusion of the remaining Downreay fast reactor breeder material into the MOP.



**Joe Lamonby**  
Chief Nuclear Officer,  
Generating and Fuelled Sites

## The MOP team co-ordinated by Magnox

### MOP management

Tasked by the NDA to provide overall coordination and governance of MOP activities across all the SLCs and contractors involved in the programme.

### MOP strategy

Leading the long term strategic planning and risk mitigation to deliver the NDA strategy.

### MOP operations

In-year tactical planning and execution.

### Flask engineering and compliance

Design authority for Magnox flasks ensuring ongoing compliance.

### MOP projects

Delivering distinct risk mitigation and improvement work.

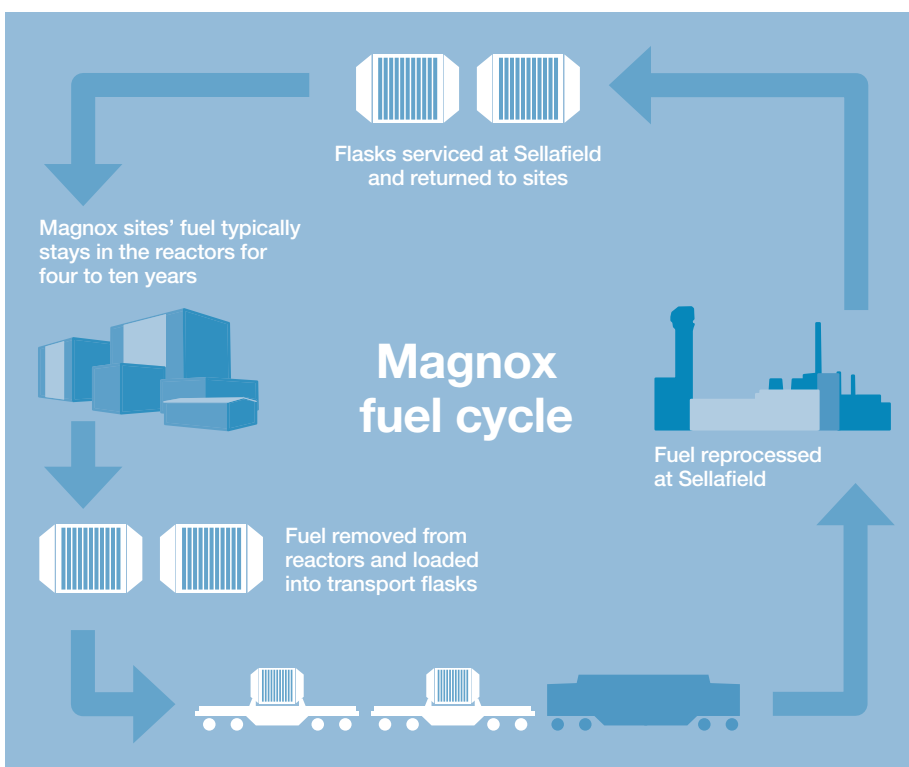


Movement of a Magnox fuel transport flask



Spent fuel is transferred by rail to Sellafield for reprocessing

**Magnox fuel cycle**



The first of the 11 strong fleet of Magnox reactors, including Calder Hall (now part of Sellafield), started generation in 1956 with Wylfa being the most recently commissioned site in 1971.

Around 5.5 million fuel elements were manufactured, equating to approximately 62,000 tonnes, to support generation at these sites producing in excess of 1,000 TWh of electricity.

There are approximately 3,500 tonnes of fuel left to be reprocessed, of which around 2,600 tonnes are still to be sent to the reprocessing plant.

# C&M Hub

Entry into C&M is a key milestone in the process of decommissioning the Magnox sites, with the early entry into C&M being a major strategic objective of the MODP. The C&M Hub will manage all ten Magnox Ltd sites from their entry into C&M (following the successful completion of the C&M preparations work programme) through to FSC.



**Brian Hughes**  
C&M Hub Director

The C&M Hub's primary aim is to ensure that each site remains safe and secure throughout the C&M phase, including the emptying and decommissioning of the ISF and ILW stores, prior to FSC.

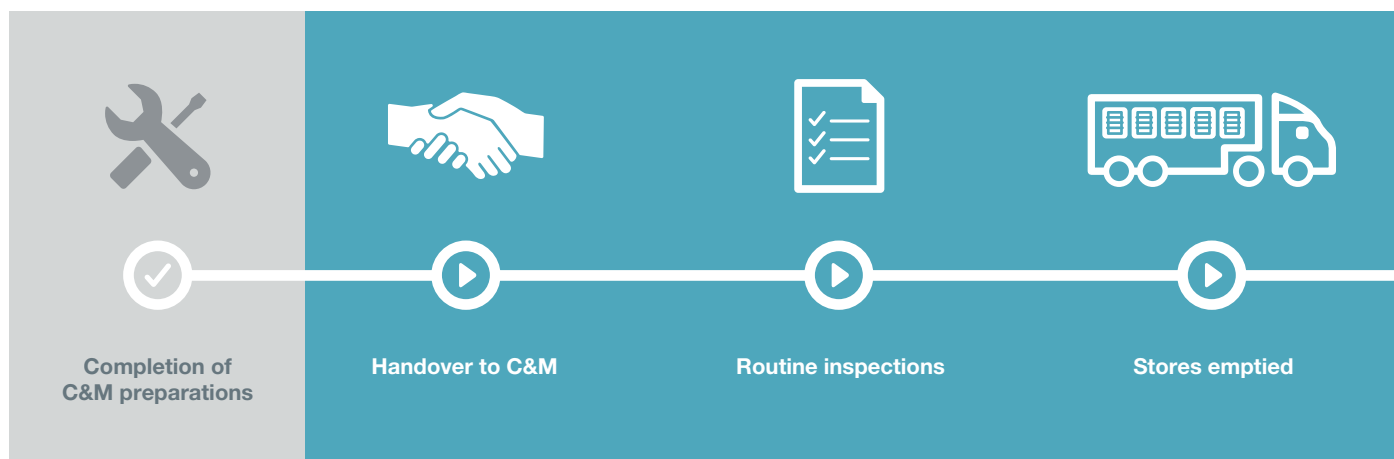
A generic C&M specification has been set out and all sites will achieve this as directed by the C&M Hub. This will enable a single set of simple, fit-for-purpose arrangements to be applied during the C&M phase.

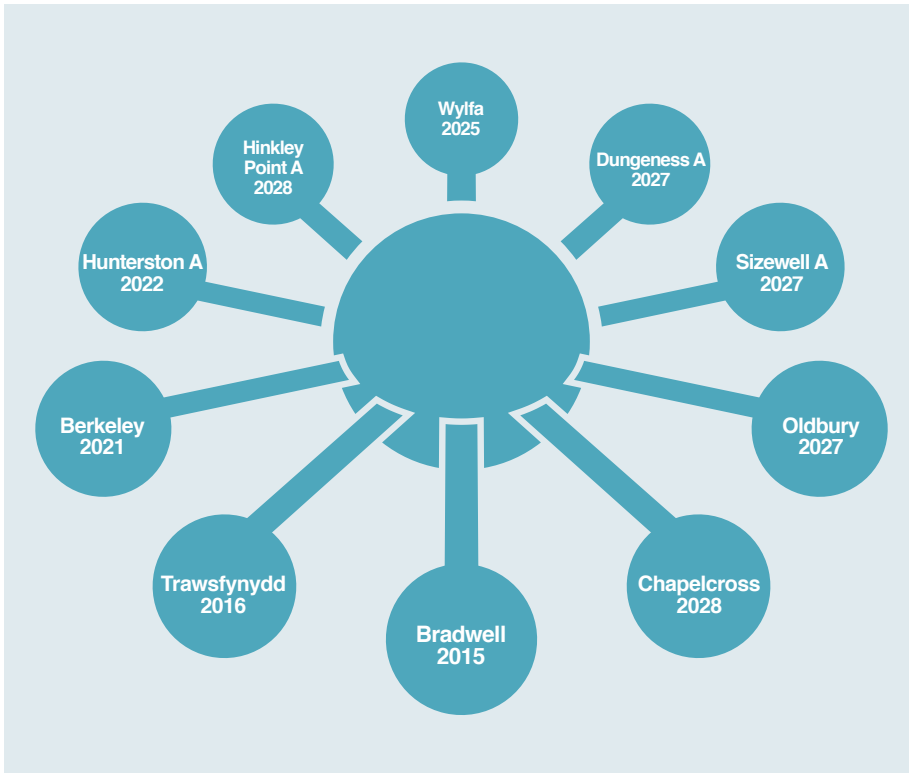
Each site will be left, passively safe as far as reasonably practicable, with a number of 'boxes'. The 'boxes' will be safestores, the ISF or ILW store, plus any additional buildings, such as ponds.

In addition to the ten Magnox Ltd sites, the C&M Hub will continue to manage, operate and decommission the Maentwrog hydro-electric power station near Trawsfynydd.

The C&M Hub will be led by the Hub Director, supported by a small specialist team.

The site will be managed through a combination of continuous monitoring, supported by planned maintenance and inspection activities.



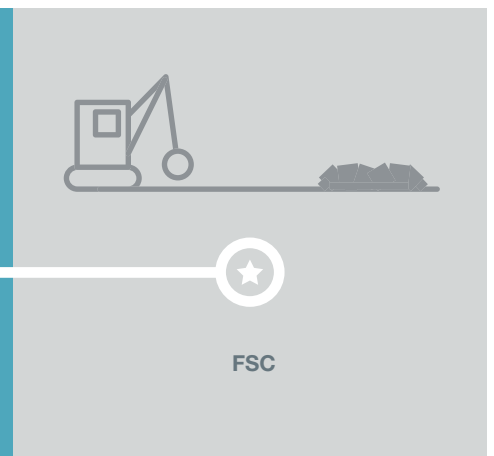


Berkeley safestore



Trawsfynydd ILW store

The C&M Hub will enable the effective management of all Magnox Ltd sites in the C&M phase.



# MSO

MSO is based at three locations, Berkeley, Daresbury and Oldbury Technical Centre. Its role is to provide fit-for-purpose, one-way processes across the Magnox sites to maximise efficiency and effectiveness.

The MSO is made up of a number of functions:

- HR
- Commercial
- Business
- Communications
- EHSS&Q
- Engineering
- Transition

## HR

Magnox was awarded Investors in People (IiP) Gold status, the highest level of award, achieved by only three per cent of accredited companies. With an action plan in place to achieve continuous improvement, Magnox will be working towards its interim IiP review, due at the end of 2013.

Magnox was also recognised for its talent management processes during the year, receiving the prestigious Personnel Today Award in this category, as well as taking the overall prize on the night.

## Commercial

Suppliers working on two Magnox projects were amongst the winners at the first-ever NDA Estate Supply Chain Awards.

In the collaboration category the winners were the nine organisations who jointly coordinated the recycling of the Berkeley boilers. The project, to remove five 310 tonne boilers off-site, transporting them through the nearby town for shipment to Sweden for recycling, was successfully completed in 2012.

## Business

There have been several key changes to the way in which Magnox operates its business systems this year, with the introduction of Agresso to manage all commercial, finance and HR processes. This was a challenging change for the organisation with implementation and improvement continuing through the coming year.

In addition, a shared services contract for information technology services was finalised during the year, with Atos taking over the provision of services for Magnox.

## Communications

Communications' ongoing focus is to support internal and external stakeholders as the company continues along a path of change, both in terms of work delivery and workforce transition.

In April 2012, working in partnership with the NDA and EnergySolutions, a socio-economic web portal was launched to manage the administration of applications for funding.

## EHSS&Q

Magnox was awarded ten awards at the 2012 RoSPA Awards ceremony. This included the prestigious Engineering and Construction Sector Award, recognising the outstanding performance in health and safety by a company or organisation within a particular industry or sector.

In addition, the British Safety Council Sword of Honour was awarded to both Wylfa and Oldbury, with Wylfa also presented with the Globe of Honour, one of only six organisations to receive this recognition.

## Engineering

Following the earthquake and tsunami in Japan during March 2011, which led to a serious nuclear accident at the Fukushima Dai-ichi plant, Magnox has identified and implemented pragmatic enhancements that further increase the resilience of sites to withstand extreme and improbable events.



Magnox wins RoSPA awards



i4 innovation



HR receive Personnel Today Award

#### Sites in transition in 2013-14:

- Oldbury, generation to defuelling
- Chapelcross, defuelling to decommissioning
- Dungeness A, defuelling to decommissioning
- Trawsfynydd, decommissioning to C&M
- Bradwell, decommissioning to C&M

Magnox is fully supporting ONR with regard to the Fukushima Dai-ichi event and is addressing the recommendations and findings from the reviews carried out by HM Chief Inspector of Nuclear Installations.

#### Transition

All Magnox sites are transitioning their workforce as they progress from generation to defuelling, then on to decommissioning. With Bradwell and Trawsfynydd approaching C&M in the coming years there will be an inevitable reduction in staff numbers.

During the current year, transition processes have been in place at five sites, including both accelerated decommissioning sites.

Development continues in terms of managed transfer agreements with more protocols signed and the first successful transfer achieved. Over the coming year revised training for leaders during transition will be introduced and the outplacement and case management processes will be developed.



New NDA Supply Chain Award

#### Changes at Magnox sites developed following learning obtained from Fukushima, include:

- Deployment of satellite phones for diversity of communication at all sites
- Production of enhanced accident management guidance and procedures
- Provision of emergency equipment storage containers to reinforce existing equipment
- Provision of an 'emergency store building' to house new equipment at Wylfa
- Deployment of new radiation monitoring equipment at all sites

#### i4, imagine, inspire, innovate, implement

The i4 initiative continues to go from strength to strength, with the 2013 competition attracting a record number of entries thanks to the introduction of a site-by-site roadshow, the 'i4 Pod'.

The annual event provides an opportunity to recognise the very best in innovation across Magnox and presents awards in three categories:

- Innovation, for new ideas not yet delivered or inserted into the approved work plan
- Implementation, for a recently implemented idea which went on to deliver a demonstrable benefit to the business
- Improvement, for changes in the way the processes or teams work with both new and implemented ideas recognised in this category



i4 judges in action



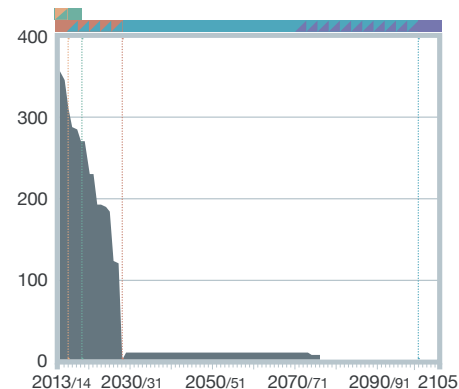
innovation

i4, inspire, imagine, innovate, implement

#### The RoSPA awards in full:

- Magnox Engineering Construction Sector Award
- Berkeley, Order of Distinction (18 years)
- Bradwell, Presidents Award
- Chapelcross, Presidents Award
- Dungeness A, Presidents Award
- Hinkley A, Order of Distinction (16 years)
- Oldbury, Presidents Award
- Sizewell A, Order of Distinction (three years)
- Trawsfynydd, Presidents Award
- Wylfa, Presidents Award
- Hunterston A, Gold Medal Award

#### Resource profile for support functions



# Socio-economic support

The socio-economic portfolio ensures that Magnox supports the NDA in its secondary duty under the Energy Act 2004, to mitigate the impact of its decommissioning work programme in communities where it operates.

In April 2012, following the production of a socio-economic impact assessment and development plan, and working in partnership with the NDA and EnergySolutions, a one-stop-shop web portal was launched to manage the administration of applications for funding.

The Socio-Economic Development Plan 2011-15 introduced the concept of prioritisation, based on the findings of the socio-economic impact assessment of the MODP. This ensured that sites were considered on the basis of those areas most impacted by the change to the work programme. Prioritising the sites enables Magnox to implement an effective planning process in consideration of socio-economic funding.

## Bradwell

### Enters C&M in 2015

The impacts of the MODP on Bradwell are the most significant of any Magnox site.

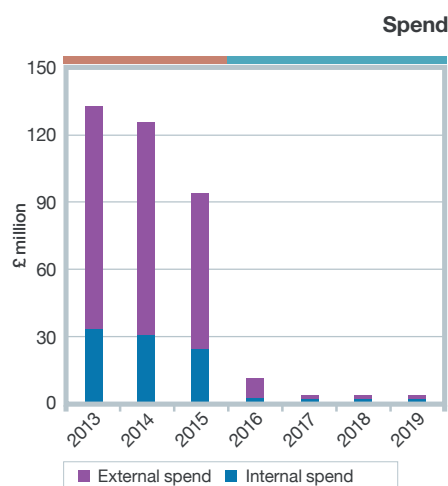
During the course of 2012/13 a detailed impact assessment was commissioned by Maldon District Council, funded through the Magnox socio-economic process. The impact assessment was researched and produced by Regeneris, a consultancy that had undertaken a similar project at Dungeness A, was able to employ a consistent process and template.

This impact assessment and action plan provides significant information and guidance to the local authority to effectively mitigate the impacts of decommissioning in the local area. The socio-economic team will continue to work with the appropriate local stakeholders to establish a partnership group to implement the findings of the impact assessment.

## Trawsfynydd

### Enters C&M in 2016

The strategic oversight board, which includes the Welsh Government, Gwynedd Council, NDA, Magnox, Energy Island and other development agencies, is now well established. During the 2012/13 year, the Welsh Government announced the establishment of the Snowdonia Enterprise Zone, which includes some areas of land within the Trawsfynydd Site, providing several potential opportunities in the area.





**Top priority sites**

- Bradwell
- Trawsfynydd
- Dungeness A

**Mid priority sites**

- Chapelcross
- Wylfa
- Hunterston A

**Low priority sites**

- Berkeley
- Hinkley Point A
- Oldbury
- Sizewell A



Romney Marsh community garden volunteer



A school in Llanfechell buys high-visibility vests and Welsh reading books

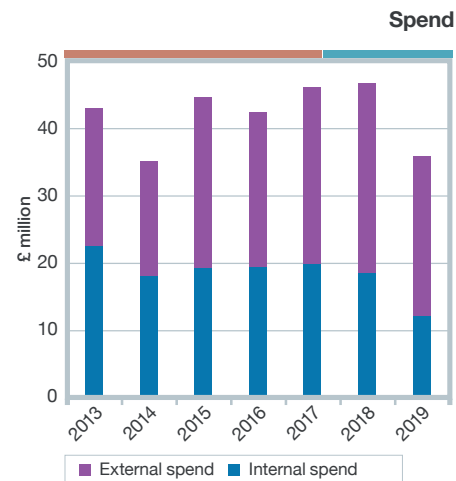
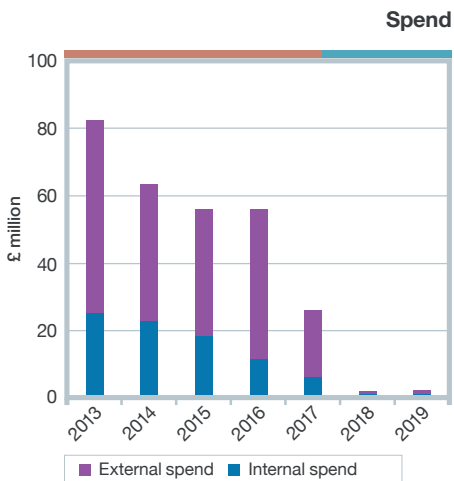
Magnox will continue to support the oversight board and work with the Energy Island programme and the local authority to ensure that opportunities are maximised, considering applications for funding on a case-by-case basis.

**Dungeness A**

**Enters C&M in 2027**

An independent socio-economic impact assessment was conducted by Regeneris in 2011. The findings of the assessment have been used to develop working relationships with local and county authorities and other stakeholder groups.

A partnership group, comprised of a number of appropriate stakeholders, has now been established. During the 2013/14 financial year, an opportunity to work in partnership with Kent County Council and Shepway District Council to jointly fund projects on Romney Marsh will be explored.



# Socio-economic support

## Mid priority sites

### Chapelcross and Wylfa

Both sites have mature socio-economic arrangements in place as a result of being NDA priority areas. Beyond Chapelcross, a five-year project run by Dumfries and Galloway Council, has now entered its second year and is the key NDA-funded project to mitigate the impact of decommissioning in this area.

On Anglesey, the Energy Island programme is now established, providing energy-related opportunities for development, not least of which is the planned new nuclear build at Wylfa. The NDA has provided significant funding to the Energy Island programme in recent years and this funding continues to be managed through the Magnox socio-economic funding process.

## Hunterston A

At Hunterston A in North Ayrshire, work continues to support the development of a partnership group, comprised of the local authority, Scottish Enterprise, Irvine Bay Regeneration Company and other interested stakeholder groups. Several projects are currently being managed through the Magnox socio-economic process and will be implemented in the coming year.

## Low priority sites

### Hinkley Point A, Oldbury and Sizewell A

Identified as potential new build locations and relatively affluent when compared with other areas of the country, these sites are considered to be low priority in terms of consideration for socio-economic funding.

### Berkeley

Berkeley also falls into the low priority sites category due to its proximity to Oldbury Site and some major cities where alternative employment opportunities exist. In each of these cases, support for good neighbour schemes will continue.

## Enablers

The socio-economic process is a robust system that ensures all applications for funding are subjected to rigorous assessment against set criteria, in line with the NDA's socio-economic policy.

A regional socio-economic team is in place to provide a consistent approach to socio-economic funding across the ten Magnox sites. The team work together to manage and approve applications up to £10,000, with funding requests above this threshold approved by the socio-economic executive panel, made up of members of the Magnox Executive, NDA, EnergySolutions and employee representatives.

All applications over £100,000, if recommended for support by the executive panel, are forwarded to the NDA for final consideration.



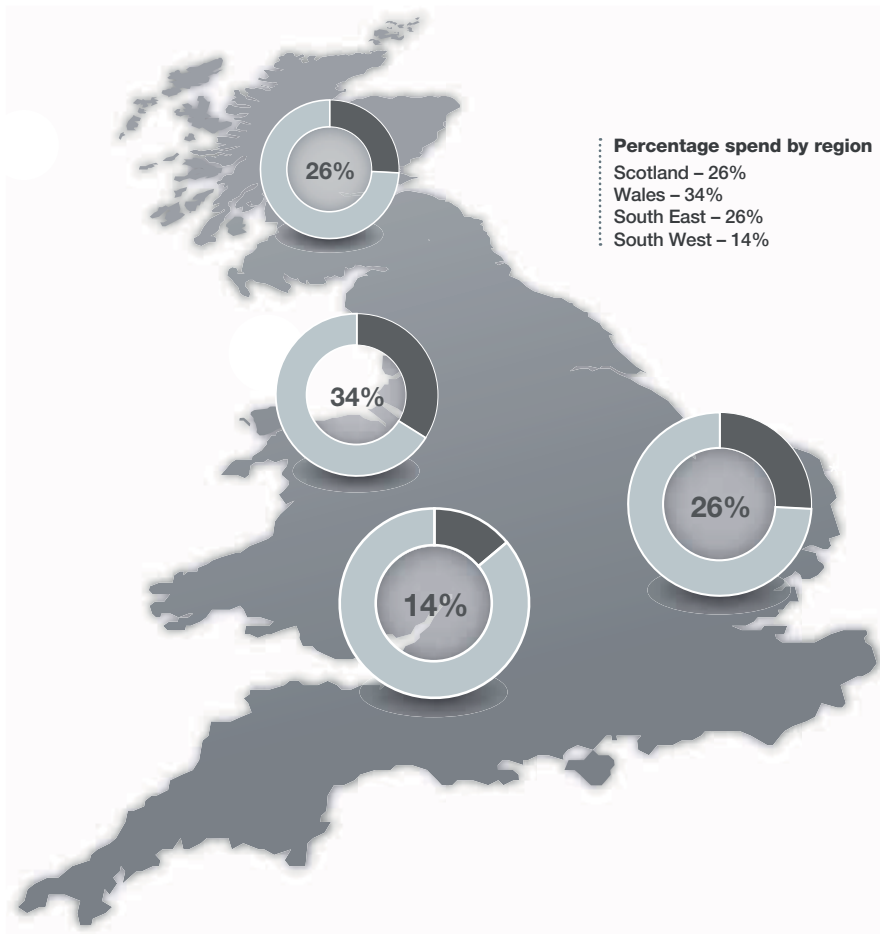
.....  
New Maldon Sea Cadets  
community minibus



.....  
Deudraeth Cyf Digital inclusion community  
information technology volunteer teaching  
Photoshop



.....  
Bristol Storm Basketball 'Storming  
the Streets' summer engagement  
programme



North Wales watersports marine challenge



Lockerbie 3x3 basketball competition



West Kilbride community centre development project

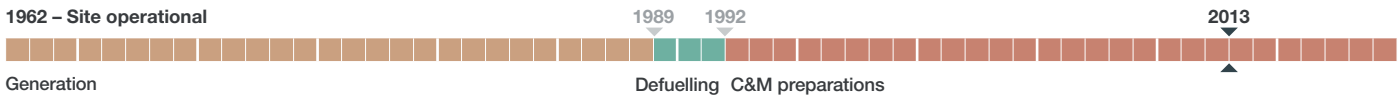


South Gloucestershire Beekeepers' Association renovate pig shed



Dalry primary school build a community playground

# Berkeley



Berkeley is located on a 27 hectare Site of Special Scientific Interest (SSSI) on the eastern bank of the River Sever in Gloucestershire. Electricity generation started in 1962 and stopped in 1989. During 27 years of operation the site generated 43 TWh of electricity. The site is currently decommissioning, following the entry of the two reactors into safestore in 2010.



**Defuelling**  
1989-1992

## Berkeley costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	-	-	-	-	-	-	-
Ponds	-	-	-	-	-	-	-	-	-	-	-
ILW Management	56.44	46.63	53.90	56.03	13.99	3.55	3.01	0.63	-	-	-
Plant and Structures	3.15	2.18	0.09	0.04	3.21	15.86	12.22	8.66	-	-	-
Waste Management	1.24	1.23	1.31	1.32	2.12	2.00	2.66	2.27	-	-	-
C&M	-	-	-	-	-	-	-	-	0.47	0.47	0.46
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	6.74	6.79	6.80	6.80	5.84	5.82	5.01	4.13	-	-	-
Site projects	6.26	6.51	6.80	6.46	6.46	6.24	6.10	5.57	-	-	-
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	-	-	-	-	0.69	-	0.69	5.54	-	-	-
<b>Total</b>	<b>73.82</b>	<b>63.33</b>	<b>68.90</b>	<b>70.65</b>	<b>32.32</b>	<b>33.47</b>	<b>29.69</b>	<b>26.80</b>	<b>0.47</b>	<b>0.47</b>	<b>0.46</b>

## Key near term activities

Currently in the C&M preparations phase, work at Berkeley Site will continue with its main focus being on FED retrieval from the vaults, the undertaking of preparatory and enabling works for various programmatisation streams, fulfilling regulatory obligations and delivery of milestones.

Some key projects that Berkeley will be focusing on in the near term are:

- Completion of the chute silo enabling works and retrievals
- Continuation of FED retrievals from the vaults, comprising the manufacture, test, installation and commissioning, and the start of operations
- Completion of the ILW resin and sludge campaigns including commissioning and retrieval operations
- Continuation of solid ILW conditioning enabling works and start solid ILW conditioning
- Continuation of retrieval operations, deplant and post-operation clean out of the shielded area facility
- Completion of the construction of the ILW ISF in 2013
- Decommissioning and demolition of the caesium removal plant (CRP) in 2014
- Achievement of important regulatory milestones, relating to the retrieval of ILW on-site:
  - RWMD issue final letter of compliance (FLoC) for chute silo miscellaneous activated components (MAC)
  - RWMD issue FLoC for FED vault two retrievals
  - RWMD issue FLoC for sludge and resin retrievals from the CRP building
  - All wet ILW retrieved and passively processed for final disposal

# The sites

27

Site area

213

Current number of full time equivalents (FTEs)

43

Station lifetime output of electricity

117

Number of years from the start of generation to FSC



C&M preparations  
1992-2021



C&M  
2021-2074

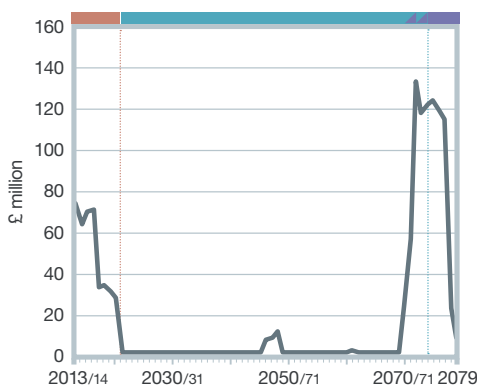


FSC  
2070-2079

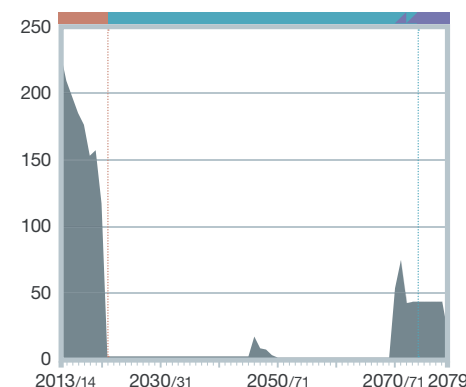
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	234.20	-	234.20
-	-	-	-	45.40	-	45.40
-	-	-	-	14.14	-	14.14
0.47	0.47	0.46	0.47	3.26	39.48	42.74
-	-	-	-	-	837.72	837.72
-	-	-	-	47.93	-	47.93
-	-	-	-	50.40	-	50.40
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	6.92	-	6.92
0.47	0.47	0.46	0.47	402.25	877.20	1,279.45

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

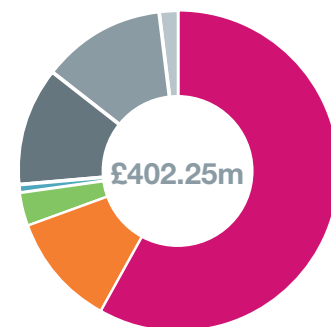
Budgeted cost of work scheduled throughout the plan



Resource profile throughout the plan



Proportional split of site cost through to 2027/28



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Berkeley



Berkeley boiler in Sweden



Cells one to ten removed at Berkeley



Sludge canister from the Berkeley vaults

## Achievements

### Boiler disposal operations

In 2011 Berkeley executed an opportunity for early hazard reduction by disposal, via recycling, of LLW metallic waste. Five boilers, each weighing 310 tonnes, were transported to Sweden for recycling. During 2012 works were accelerated to complete the off-site disposal of the ten remaining boilers, thus reducing decommissioning works during FSC in 2074.

### ILW Management Programme

The ILW Management Programme has made good progress with the successful completion of a number of key work activities, both on and ahead of schedule, delivering a number of NDA operating targets. These include:

- On-site demonstration of cross-site MiniStore transporter completed ahead of schedule
- The active commissioning of the ILW sludge retrieval plant from the ILW sand and sludge storage tank one in the CRP was completed. Work continued with the successful retrieval of 0.7m<sup>3</sup> (five shielded drums) of sludge
- In vault three, six sludge cans were retrieved and data from these samples provided underpinning information to support the interim letter of compliance (iLoC) and design of the sludge can processing module
- The key milestones for the issue of iLoC submissions for sludge, resin and MAC to RWMD were achieved on schedule with assessment reports, forming a key component of an Operating Plan Target
- The active commissioning of the chute silo was used to retrieve the first waste (gravel) from the floor of the Active Waste Vault (AWV) using production equipment

### Safety

Safety is always the highest priority for all works carried out on-site. This positive safety culture resulted in the site receiving the RoSPA Order of Distinction in 2012.

## Cost variance to previous Magnox plan costs

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by programme summary work breakdown structure (PSWBS).

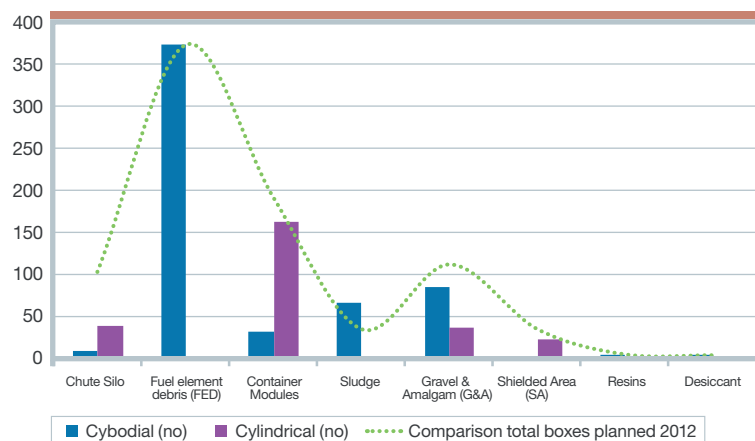
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	7.0	6.9	-0.10	-
.11 New construction	236.7	258.1	21.42	Reassessment of ILW work scope and alignment with framework contracts and LTP update to remove P50-P80 contingency and incorporate inflation/indexation
.12 Commercial operations	-	-	-	-
.13 Decommissioning and termination	324.2	276.4	-47.78	Acceleration of boiler disposal operations, inclusion of accommodation for security personnel and facilities management support. LTP update to incorporate inflation and indexation
.14 Waste and nuclear materials management	574.2	586.9	12.69	Additional C&M preparations workscope, reassessment of existing workscope and LTP update to remove P50-P80 contingency and incorporate inflation/indexation
.15 Site support	138.3	64.8	-73.50	Centralisation of IT scope. LTP update to remove embedded savings and efficiencies and incorporate inflation/indexation
.16 Support services	99.0	74.5	-24.50	Centralisation of communications scope to MSO and management of cost across categories. LTP update to remove embedded savings and efficiencies and incorporate inflation/indexation
.17 Stakeholder support	18.1	11.7	-6.32	Centralisation of HR and occupational health scope and LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1,397.51</b>	<b>1,279.42</b>	<b>-118.09</b>	

**Key challenges and considerations**

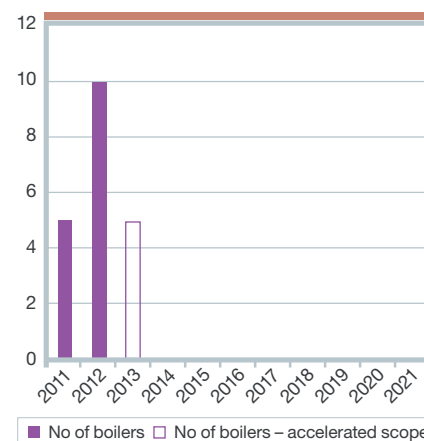
Risk/opportunity	Impact	Mitigation
There is a threat that waste is uncovered that cannot be processed through the existing module	As a result of inaccurate waste inventory Which may result in the requirement for modification to existing module or purchase of additional module	Mitigation strategies developed including establishing a process for managing fuel fragments up to elements
There is a threat that the RWMD LoC approval takes longer than planned	Which may result in delays to the schedule	Site working with regulators and programme to support delivery against schedule
There is a threat that the number of boxes to be stored increases above the available provision for cuboidal DCIC or cylindrical DCIC boxes	As a result of a prolonged assessment period Which may result in increased costs for further processing and storage	Package numbers have been underpinned by best estimates from the waste team, and there will be close monitoring of changes in volumes
The opportunity to utilise a single conditioning plant to dry wet and solid ILW wastes is still being investigated, potentially resulting in the elimination of the requirement for separate plants for solid waste, sludge and resin	In the event that trials are successful Which may result in a benefit being realised that would eliminate the requirement for separate plants for solid waste, sludge and resin	Trials can be conducted with the sludge wet conditioning solution, to gain sufficient information to confirm if a viable solution to sludge, resin, and solid conditioning. Trials progressing to demonstrate drying of resin without the need for separate dewatering plant
There is an opportunity to remove the requirement for a site MAETP	In the event of successful conditioning plant results Which may result in a benefit being realised that would be the elimination of a MAETP to be replaced by simplified solution "fit-for-purpose"	Developing conditioning plant to minimise active effluent discharged and ensuring that low volume abatement can be applied locally

Assumption	Justification
It has been assumed that no unidentified underground or surface radiological or hazardous contamination will be found during the construction activities to enable the specification of the use of conventional construction methodologies	Based on the data from the Contaminated Land Survey Report of 2003
It has been assumed that the current strategy for commencing FSC 85 years after stopping generation remains unchanged to enable the definition of decommissioning work and schedule development across the lifecycle of the site	Based on the current decommissioning strategy for Magnox reactor sites endorsed by the ONR and the NDA for use in the lifetime plan
It has been assumed that the national UK ILW/LLW repositories will be available when programmed, to enable the definition of scope, schedule and cost associated with planning for site storage and disposal of ILW/LLW	Based on the site integrated waste strategy and NDA instruction until such time as the NDA strategy is reviewed in response to the Government's decision based on Committee of Radiological Waste Management (CoRWMM) recommendation for long term management of radioactive waste

**MiniStores – quantity per waste type**



**Number of boilers dispatched off-site**



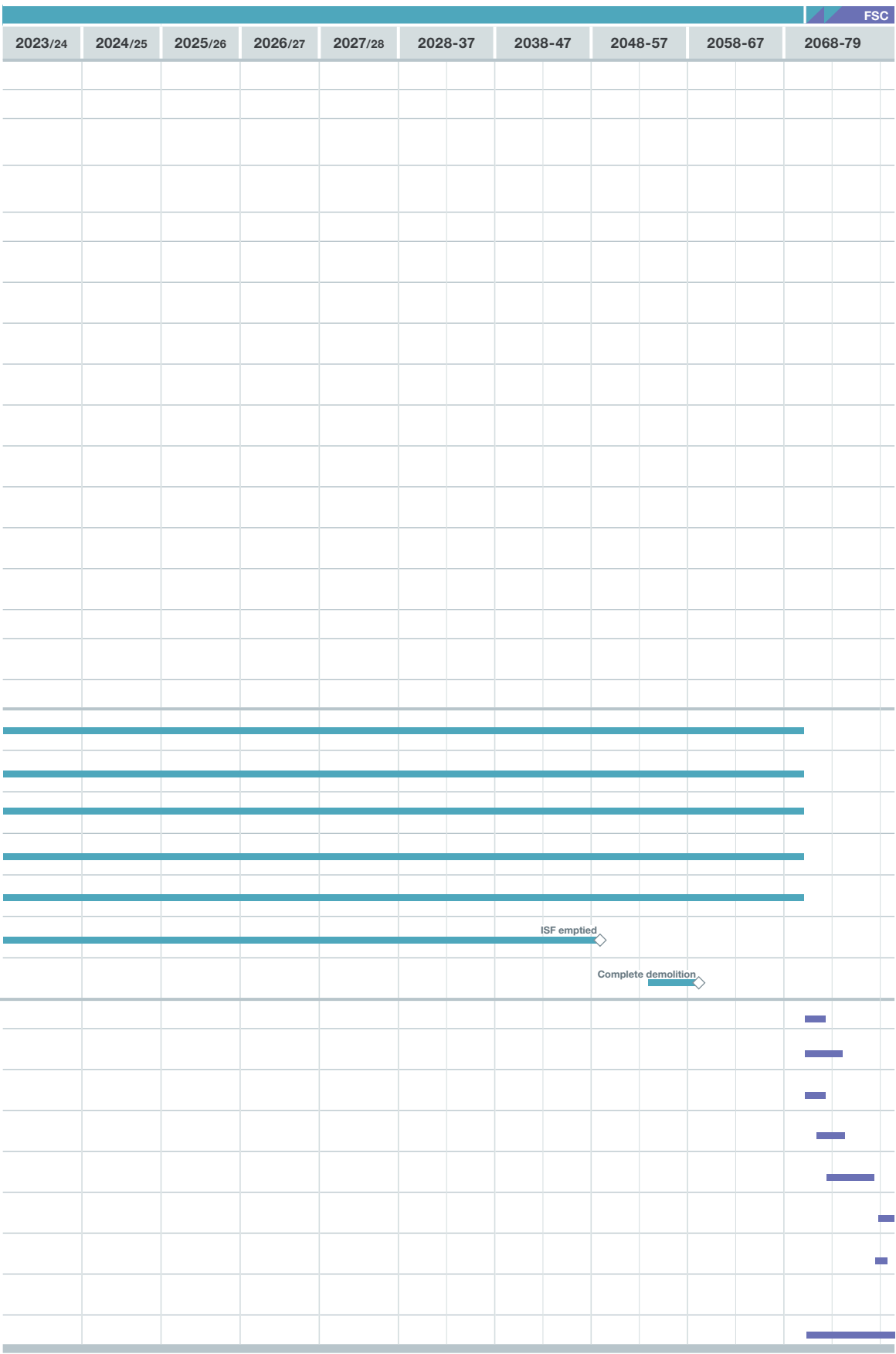
# Berkeley

## Milestone schedule of work

Key work programmes	C&M preparations							C&M		
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
C&M preparations	Install MAETP	Inactive and active commissioning of MiniStores AETP complete								
	Build ISF	Inactive ILW weather protection commissioning complete								
	Decommission wet ILW processing facility	Contract award - CRP and additional spent resin store demolition CRP waste streams processed and packaged								
	AETP and other WTP decommissioning	AETP decommissioning and demolition complete								
	Decommission shielded area facility	Demolish buildings complete								
	Decommission solid (FED) ILW retrieval and processing facility	Decontaminate structures Decommission and demolition complete								
	Decommission LLW facility	Complete decommissioning of LLW facility								
	Remove admin and ancillary buildings									
	CRP pond sludge drums retrieval and treatment operations	Pond sludge drum operations post-operation clean-out complete								
	Build SILWR facility - sludge can processing	Active commissioning sludge can processing complete								
	Build SILWR facility - retrievals and FED processing	Active commissioning complete vault retrieval and FED processing								
	Build SILWR facility - containerised waste processing	Active commission containerised waste processing complete								
	Retrieval and treatment operations for shielded area waste	Pond elevator tunnel survey and ILW recovery complete Caves survey and ILW retrieval complete ILW recovery and processing complete								
	C&M preps on-site passive storage (ISF)	Completion of active commissioning								
	Waste retrieval and treatment ops	All wet operational ILW ready for final disposal All solid operational ILW ready for final disposal								
	Solid (FED) ILW retrieval and processing operations	Solid (FED) ILW retrieval and processing complete								
	Functional support									
	C&M	Facilities management and control								
Corporate support and licence management										
Environmental monitoring										
Civil structures maintenance										
Safestore cladding maintenance										
ISF empty										
Demolish ISF										
FSC	Install site infrastructure									
	Supply/install reactor dismantling facilities									
	Build waste management facility (LLW)									
	Build waste management facility (ILW)									
	Reactor dismantling and building demolition									
	Remove waste management facility (LLW)									
	Remove waste management facility (ILW) - encapsulation plant									
	Site surveys, radiological clearance and landscaping									
	Site security and surveillance									



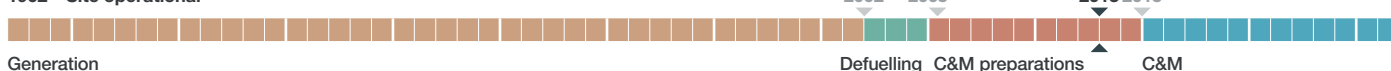
◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Bradwell

1962 – Site operational



Bradwell was built on the edge of a former World War Two airfield, one and a half miles from the Essex coastline. Electricity generation started in 1962 and ceased in 2002. During 40 years of operation the site generated nearly 60 TWh of electricity. The site is following an accelerated decommissioning programme which should see it become the first reactor site in the UK to enter C&M in 2015.



Defuelling  
2002-2005

## Bradwell costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	13.41	8.95	0.01	-	-	-	-	-	-	-	-
Ponds	15.25	9.62	2.58	-	-	-	-	-	-	-	-
ILW Management	32.70	11.94	3.36	-	-	-	-	-	-	-	-
Plant and Structures	40.10	36.18	3.18	-	-	-	-	-	-	-	-
Waste Management	8.33	5.42	3.34	-	-	-	-	-	-	-	-
C&M	-	-	0.58	0.58	0.57	0.58	0.58	0.58	0.58	0.58	0.57
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	13.27	12.34	-	-	-	-	-	-	-	-	-
Site projects	5.93	3.58	-	-	-	-	-	-	-	-	-
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	0.84	4.76	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>129.83</b>	<b>92.79</b>	<b>13.06</b>	<b>0.58</b>	<b>0.57</b>	<b>0.58</b>	<b>0.58</b>	<b>0.58</b>	<b>0.58</b>	<b>0.58</b>	<b>0.57</b>

## Key near term activities

The site is in the third year of an aggressive early C&M schedule and is now more than halfway through delivering the scope of work required to reach a conclusion in 2015. There have been various challenges in progressing the plan including development and implementation of first of a kind technologies, a ramp up in infrastructure to approximately 900 personnel, and the development of an agreed end state stage submission to the regulators. Bradwell is leading the way for the future of accelerated decommissioning. Key activities for delivery of Bradwell into early C&M include:

### FED:

- Complete construction of the FED dissolution plant
- Retrieval and dissolution of all FED

- Building, installation and inactive commissioning of the aqueous abatement discharge plant (ADAP)

### Ponds decommissioning:

- Vaults decontamination
- Construction of the new active effluent discharge outfall
- Decommissioning of active drains
- Complete the pond and vaults complex demolition design
- Transfer tunnel void cells ready for C&M
- AETP deplant and demolition (D&D)

### ILW retrieval and processing:

- ISF commissioning complete
- Resin retrieval from the vaults

- Retrieval and treatment of other ILW waste such as miscellaneous contaminated items (MCI) and sand
- Conditioned waste in DCICs and stored in ISF

### Plant and Structures:

- Completion of reactor building deplant including all boiler houses, circulator halls and annex buildings
- Completion of pile cap deplant including charge machines
- Commence reactor cladding and steelwork in preparation for safe store
- Commence final C&M preparations

### Transition:

- Continue with closure of the transition programme in preparation for Hub handover



30

Site area



372

Current number of FTEs



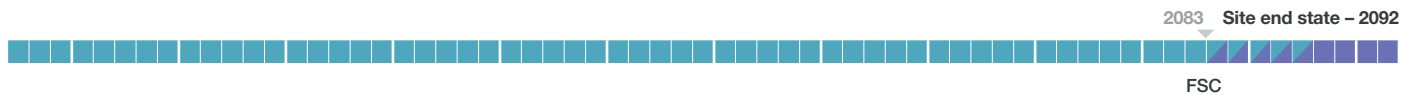
60

Station lifetime output of electricity



130

Number of years from the start of generation to FSC



**C&M preparations**  
2005-2015



**C&M**  
2015-2087

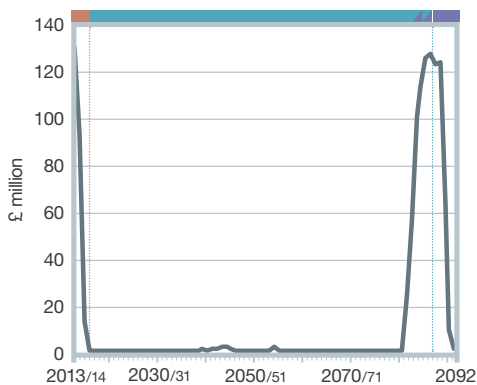


**FSC**  
2083-2092

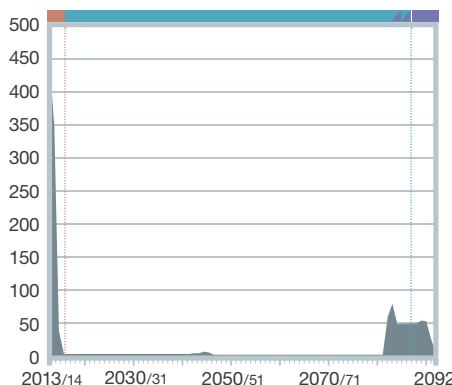
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	22.36	-	22.36
-	-	-	-	27.45	-	27.45
-	-	-	-	48.00	-	48.00
-	-	-	-	79.45	-	79.45
-	-	-	-	17.10	-	17.10
0.58	0.58	0.57	0.58	7.49	30.04	37.53
-	-	-	-	-	864.88	864.88
-	-	-	-	25.61	-	25.61
-	-	-	-	9.51	-	9.51
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	5.60	-	5.60
0.58	0.58	0.57	0.58	242.58	894.91	1,137.49

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

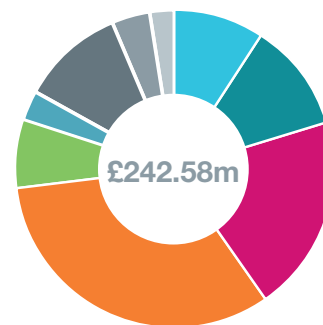
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Bradwell



Bradwell boiler house deplant



Bradwell prepares for resin and sludge retrieval



Bradwell pile cap deplant

## Recent achievements

### Boiler house and circulator hall deplant

The deplant of the first circulator hall, and boiler houses one and three, has been achieved. Boiler house two was deplanted in 2011/12 and boiler house four has now commenced with learning from the previous boiler house deplants being deployed within the programme.

### Ponds concrete removal strategy agreed

Following almost two years of hard work and in-line with stage submission criteria, an as low as reasonably practicable (ALARP) case is anticipated for the optimised ponds entry state. The regulatory licence instrument will allow an application of polyurea sealant to be applied to the ponds walls and floors (approx 1,260m<sup>2</sup> surface area). This option will place the cooling ponds in a safe and passive state, saving a significant amount of money and paving the way for this alternative strategy to be used across the Magnox fleet.

## FED tactical changes

FED retrieval and dissolution will no longer be a sequential process, however dissolution remains on the site critical path. Capitalising on the success of the first phase of early FED retrieval has enabled the site to continue acceleration of FED retrieval from all other vaults. The regulators have now approved the safety case to continue to retrieve FED from all of the Bradwell vaults. Bulk FED and gravel from vaults 1A and 1B has now been completed. As the dissolution plant was not fully operational this year, a case was considered which allowed the first shipment of FED to Dungeness A for dissolution. This commenced in early 2012 and, since then, there have been a further two shipments.

## ILW sludge

Following an extensive design process, construction and installation of a retrieval facility and equipment, sludge retrieval has now commenced. To date six DCICs have been filled with sludge providing a safe, secure environment prior to conditioning.

Other activities that have been started/ completed include:

- Significant progress on pile cap deplant
- Near completion of the ILW ISF
- Preparations for resin retrieval started
- Deplanting of AETP and water treatment plant (WTP) started
- Completion of the site buffer storage for FED waste

## Cost variance to previous Magnox plan costs

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
10 Transition	10.15	5.60	-4.55	Predominant variance is the acceleration of statutory voluntary severances in line with tranche 2 additional expenditure approval
11 New construction	273.47	282.89	9.42	Predominant variance associated with Bradwell Optimised Plan Two rebaseline of safestore cladding
12 Commercial operations	-	-	-	-
13 Decommissioning and termination	308.92	257.46	-51.46	Predominant variance is associated with Bradwell Optimised Plan Two rebaseline
14 Waste and nuclear materials management	433.65	457.68	24.03	Predominant variance is associated with Bradwell Optimised Plan Two rebaseline of the ILW Programme
15 Site support	153.58	55.57	-98.00	Predominant variance is associated with Bradwell Optimised Plan Two rebaseline
16 Support services	97.51	67.80	-29.71	Predominant variance is associated with Bradwell Optimised Plan Two rebaseline
17 Stakeholder support	18.10	10.49	-7.61	Predominant variance is associated with Bradwell Optimised Plan Two rebaseline
<b>Total</b>	<b>1,295.37</b>	<b>1,137.49</b>	<b>-157.88</b>	

## Key challenges and considerations

Risk/opportunity	Impact	Mitigation
There is a threat that the ponds end state is not accepted by the regulators	As a result of ponds end state proposal being first of a kind Which may result in having to undertake further decontamination, increasing costs and schedule durations and delays to interdependent projects	Continued engagement with the regulators
There is a threat that the ILW programme will not receive LoC approval in adequate time to complete all ILW conditioning by March 2015	As a result of the DCIC being first of a kind within the UK Which may result in having to amend conditioning techniques or finding an alternative ILW strategy	Continued engagement with the regulators. Discussions between senior management from Magnox, NDA and RWMD continue. Trial work is currently being undertaken to assist the project team in finding a pragmatic solution to the LoC issues. The ILW programme team are also pursuing multiple conditioning plant options to avoid relying on a single solution
There is a threat that technical issues prevent ILW conditioning or slow down commencement and operation	As a result of waste streams differing from those wastes successfully processed with the conditioning equipment Which may result in increased costs and schedule durations	Trials are being undertaken
There is a threat that a heel of compacted waste exists within the vessels (resin retrieval)	As a result of the age of the waste within the vaults Which may result in retrieval equipment requiring modifications to break the heel, increasing costs and schedule duration	Sludge retrieval will be undertaken during February/March 2013. Lessons learned from these activities will inform resin retrieval
There is a threat that the FED nature differs from that anticipated	As a result of the age and limited characterisation of FED purpose Which may result in actual processing conditions differing from expectations requiring major redesign	The separation of the retrieval plant from the dissolution plant now allows FED to be retrieved continuously from the vaults and has maximised the duration of the dissolution period
There is a threat of increased number of safety related events and/or disruptions	As a result of the physical size and scale of the reactor building cladding project Which may result in slower than anticipated progress and delays to interdependent projects within that work area	Continued engagement between the Bradwell lead team and all personnel to reinforce the importance of safety on site. Adequate control and supervision through communication, tool box talks, pre and post job briefs and application of the stop think act review (STAR) principle. Ensure 'flow-down' of Magnox processes and expectations to the tier three contractors is maintained
There is an opportunity to build on lessons learned from the early vault retrieval and improve the process appropriately	In the event of having started vault retrieval early Which may result in more efficient retrieval operations, reducing schedule durations and associated costs	Due to the nature of the vaults, although surveys of the contents can be undertaken, until the vaults are opened and retrieval has started, the project cannot determine the condition within the vaults. Visual surveys have been undertaken as part of the continued acceleration of vault retrieval. As the project team enter each vault, lessons are learned and applied to the next entry

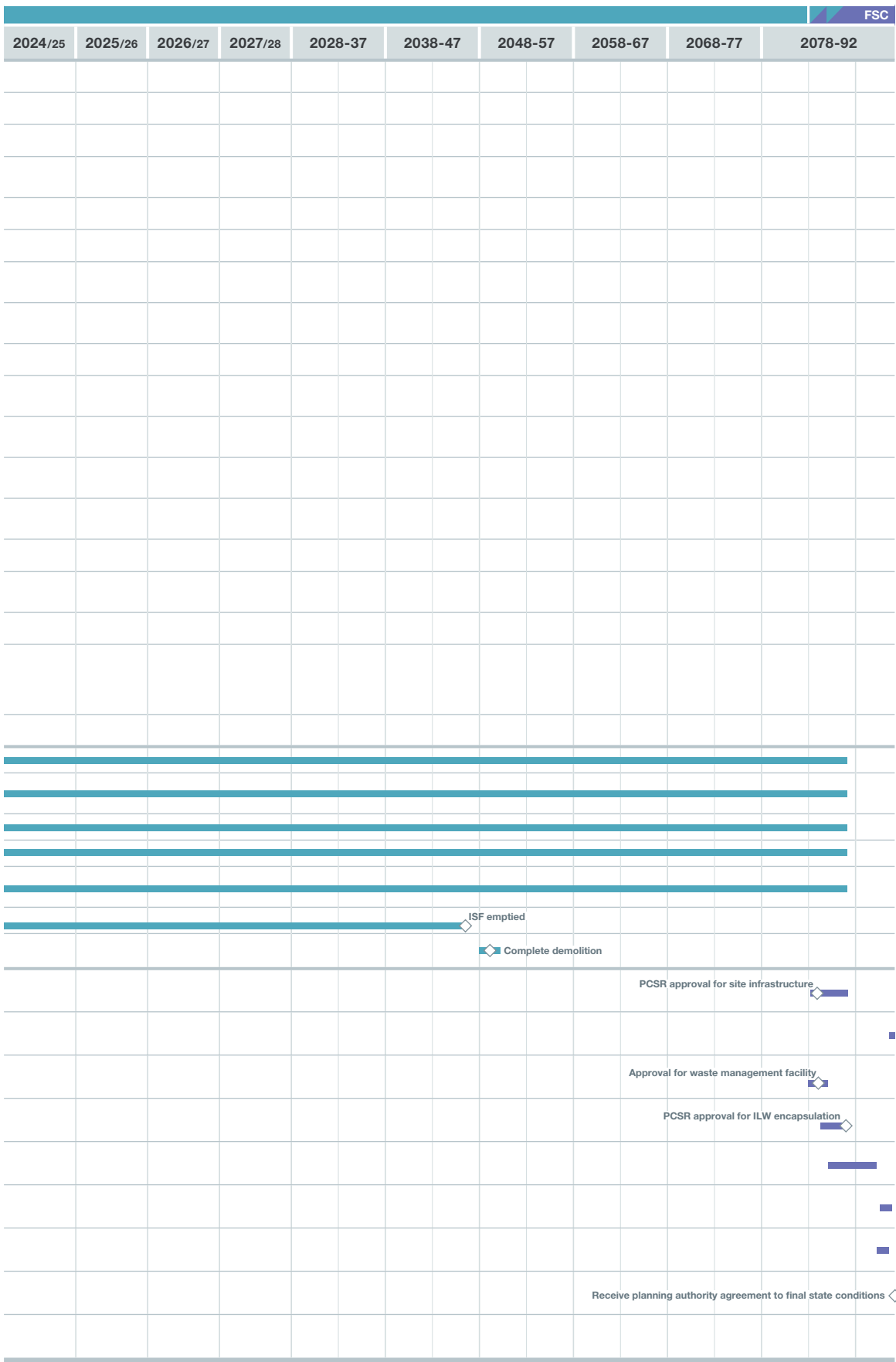
Assumption	Justification
It has been assumed that the regulators agree to the proposed ponds end state and minimal decontamination is required to the ponds and vaults complex	This is based on current regulatory engagement
It has been assumed that the conditioning LoC will be approved in an adequate time to allow conditioning of ILW to be completed by March 2015	This is based on regulatory engagement
It has been assumed that the timescales for conditioning of ILW are in line with European norms	This is based on guidance from the supplier and review by the ILW programme
It has been assumed that the reactor steelwork frame will require only minor remediation as detailed within the contract	This is based on previous surveys of the reactors
It has been assumed that the site end state for C&M preparations is as per the paper of intent and this end state is supported by all regulators and stakeholders	This is based on regulatory engagement
It has been assumed that the remaining quantities of waste for disposition as LLW will be as detailed in the revised 2013 UKRWI	This is based on the revised 2013 UKRWI a certified document sent to stakeholders, produced using site experience, characterisation data and knowledge of remaining waste from the programmes
It is assumed that facilities will be available for the disposal of asbestos contaminated LLW through to entry to C&M	This is based on the current disposal route and ongoing stakeholder engagement

# Bradwell

## Milestone schedule of work

Key work programmes	C&M preparations		C&M									
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
C&M preparations	Install ADAP plant	ADAP inactive commissioning										
	Ponds demolition complete			Ponds building and vault complex demolition complete								
	Decommission ADAP plant			Dissolution and abatement decommissioning complete								
	Decontaminate and deplant AETP and other WTP											
	Decommission active drains			Drains decommissioned								
	Build ISF	Completion of inactive commissioning										
	Boiler house and reactor building deplant			Boiler house and reactor building deplant complete								
	AETP and other WTP			Decommissioning of deionisation complete								
	Low level waste management facility deplant and demolition											
	Remove conventional plant and buildings											
	C&M preparations on site passive storage (ISF)			All operational ILW ready for final disposal								
	Decommission solid (FED) ILW retrieval and processing facility			Dissolution and abatement decommissioning complete								
	Build solid (FED) ILW processing facility	Complete inactive commissioning										
	FED retrieval			All bulk waste retrieved from vaults – active waste compound								
	Solid (FED) ILW processing operations dissolution			All solid (FED) ILW processed								
	ILW enablers	Installation and inactive commissioning of conditioners 1,2,3										
	ILW operations	Retrieval of MCI solid ILW complete All wet resin conditioned Conditioning of FED secondary solid ILW complete Retrieval of sludge campaign 2 complete Retrieval of sand complete										
	Functional support											
C&M	Facilities management and control											
	Corporate support and licence management											
	Environmental monitoring											
	Civil structures maintenance											
	Safestore cladding maintenance											
	ISF empty											
	Demolish ISF											
FSC	Install site infrastructure											
	Supply/install reactor dismantling facilities											
	Build waste management facility (LLW)											
	Build waste management facility (ILW)											
	Reactor dismantling and building demolition											
	Remove waste management facility (LLW)											
	Remove waste management facility (LLW) – encapsulation plant											
	Site surveys, radiological clearance and landscaping											
	Site security and surveillance											

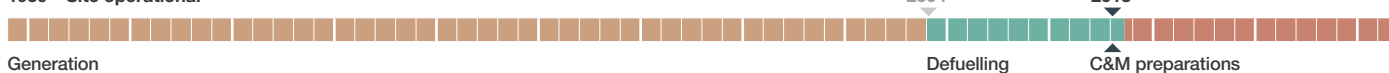
◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Chapelcross

1959 – Site operational



Chapelcross, Scotland’s first commercial nuclear power station, was built on the 92 hectare site of a World War Two training airfield in Dumfriesshire. Built to produce 200 Megawatts of electricity, the site ceased generation in 2004 after 45 years of successful operation. The site has recently completed defuelling ahead of its LTP schedule and is preparing to carry out the fuel-free verification process together with progressing decommissioning for entry into IC&M.



Defuelling  
2004-2013

## Chapelcross costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	-	-	-	-	-	-	-
Ponds	6.61	13.81	11.03	2.68	1.22	1.22	1.22	1.22	1.22	0.98	1.44
ILW Management	6.38	13.56	19.54	6.55	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Plant and Structures	7.74	14.05	17.34	5.84	0.49	0.49	0.49	0.49	0.49	2.14	7.72
Waste Management	4.69	6.98	12.25	5.27	0.15	0.15	0.15	0.15	0.15	0.15	10.20
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	13.13	11.59	11.74	9.47	4.81	4.82	4.75	4.75	4.75	6.01	8.14
Site projects	1.45	6.45	6.46	5.29	3.39	3.39	3.39	3.39	3.39	3.39	3.85
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	15.37	-	-	-	-	-	-	-	-	-	-
Transition	0.32	0.30	0.63	5.17	0.39	0.27	0.25	0.14	0.14	0.41	0.05
<b>Total</b>	<b>55.68</b>	<b>66.75</b>	<b>78.99</b>	<b>40.27</b>	<b>10.69</b>	<b>10.58</b>	<b>10.49</b>	<b>10.38</b>	<b>10.38</b>	<b>13.32</b>	<b>31.63</b>

## Key near term activities

Chapelcross is preparing to carry out the fuel-free verification process together with progressing decommissioning for entry into IC&M. In addition to defuelling, other significant hazard reduction activities ongoing at the site include the removal of asbestos lagging, the retrieval, processing and conditioning of ILW, the drain down and stabilisation of pond two and the remediation of some contaminated land areas. The site is also implementing infrastructure improvements and completing minor deplant and demolition projects in preparation for IC&M.

Work streams to be progressed in the near term are:

- Fuel-free verification in-line with the MOP requirements. Fuel-free verification to be agreed with ONR by quarter two of 2013/14
- Workforce transition following completion of the defuelling phase
- Continuation of the asbestos strip in the reactor buildings in order to deliver NDA operating plan targets for the clearance of the first and second reactors by quarter three and four of 2013/14
- Enabling works leading to retrieval, processing, conditioning and storage of ILW
- Drain and stabilisation of final cooling pond
- Construction of ISF scheduled for completion in 2015/16
- Completion of connection of site buildings to the newly installed electrical overlay system schedule, for completion in 2013/14
- Land, groundwater and effluent characterisation and remediation
- Radiological and non-radiological waste management activities
- Site infrastructure improvements in support of future decommissioning activities
- Preparation of buildings for IC&M
- Preparations for heat exchanger top and bottom duct removal
- Demolition of graphite handling facility to be completed in 2013/14



92

Site area

422

Current number of FTEs

60

Station lifetime output of electricity

136

Number of years from the start of generation to FSC



**C&M preparations**  
2013-2028



**C&M**  
2028-2089

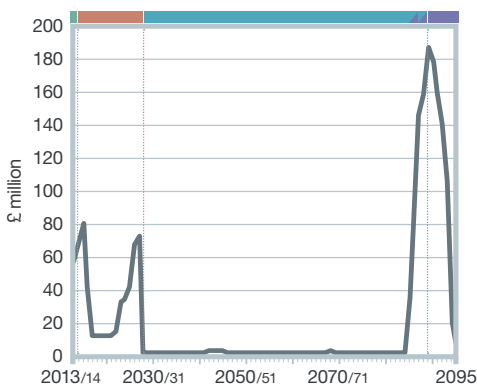


**FSC**  
2085-2095

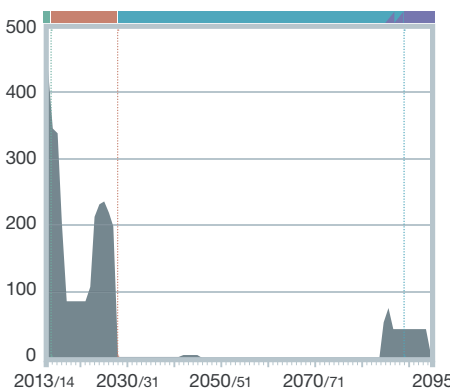
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
2.25	3.74	3.23	1.97	53.84	-	53.84
0.23	0.23	0.23	0.23	48.60	-	48.60
6.47	11.87	37.11	34.49	147.23	-	147.23
10.17	12.04	12.57	18.16	93.25	-	93.25
-	-	-	-	-	27.98	27.98
-	-	-	-	-	1,204.52	1,204.52
8.14	8.14	8.14	8.14	116.53	-	116.53
4.59	4.59	4.46	3.77	61.26	-	61.26
-	-	-	-	-	-	-
-	-	-	-	15.37	-	15.37
0.13	0.03	0.10	4.33	12.64	-	12.64
31.98	40.64	65.84	71.09	548.71	1,232.50	1,781.21

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

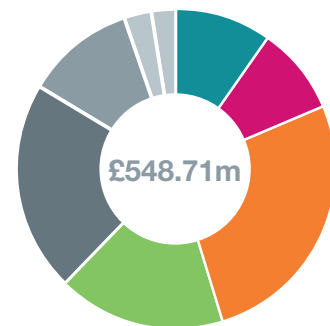
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Chapelcross



Chapelcross removes over 2,000 tonnes of asbestos



Electrical overlay project team



Chapelcross completes defuelling

## Recent achievements

### Asbestos

The asbestos removal project at Chapelcross is the largest asbestos strip programme in Europe and has employed a workforce of approximately 100 staff and subcontractors. Overall the project has progressed very well, with all 16 boilers, eight turbines and four dump condensers now fully stripped. A total of 2,232 tonnes of asbestos lagging have been removed. The original completion date for heat exchanger asbestos removal was June 2012 with the turbine hall completing in October 2013, however, the project completed this phase by the end of September 2012. This achieved an NDA operating target and one licence condition 35 milestone 12 months ahead of schedule, with significant progress being made on the second licence condition 35 milestone associated with this project.

The project has now commenced the bulk removal of asbestos from the reactor buildings. This programme of work is due to run from 2012/13 to 2016/17.

### Ponds

Following on from the successful drain and seal of pond one, the pond decommissioning project has developed the strategy and methodology for dealing with the empty fuel skips and other ILW stored in pond two prior to its drain down.

### Defuelling

The defuelling programme at Chapelcross has progressed steadily since the first flask was dispatched to Sellafield in 2009. The site successfully achieved a challenging joint NDA/Department of Energy and Climate Change (DECC) target by completing the removal of all fuel in February 2013. A total of 257 flasks containing 437 tonnes of fuel have been dispatched over the period. The site is now focused on completing the fuel-free verification process and subsequent ONR approval by December 2013.

### Electrical overlay

The NDA operating plan target to install an electrical overlay system was achieved in December 2012. Meeting the target involved the installation of a new 11kV ring main around the site which included five transformers with associated switchgear, over 7km of cable ducting, 3.5km of earth conductor, 3km of HV cable and over 10km of LV and control cabling. The system provides the site with an incoming 33kV supply which is transformed down to 11kV and 415v for distribution around the site. The commissioning of the new system provides the site with a much smaller, more reliable distribution system and allows the site's ageing high voltage equipment to be de-energised. The connection of many smaller buildings around the site to the new system will take place over the next few years taking into account the requirements of the site during the C&M phase.

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

## Cost variance to previous Magnox plan costs

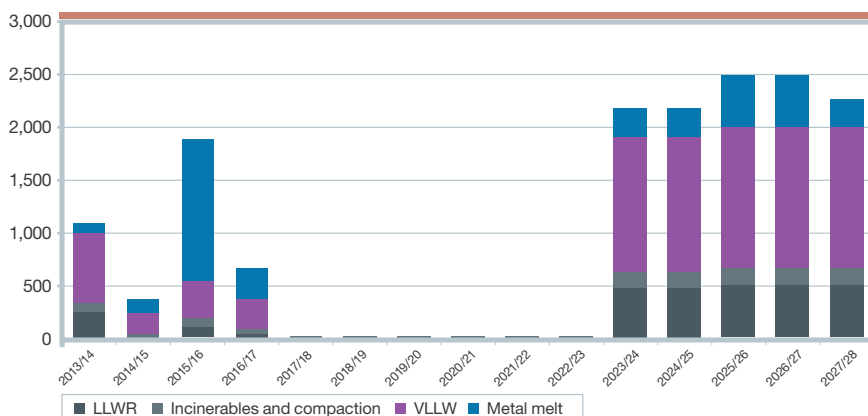
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	21.89	12.64	-9.25	Acceleration of severance cost and LTP update to incorporate inflation/indexation
.11 New construction	327.95	337.64	9.69	Reassessment of existing work scope and LTP update to incorporate inflation/indexation
.12 Commercial operations	-	15.51	15.51	Inclusion of MOP9, additional work scope and LTP update to incorporate inflation/indexation
.13 Decommissioning and termination	559.62	498.56	-61.06	Reassessment of existing work scope and LTP update to incorporate inflation/indexation
.14 Waste and nuclear materials management	670.55	687.09	16.54	Reassessment of existing work scope and LTP update to incorporate inflation/indexation
.15 Site support	175.85	114.71	-61.14	Inclusion of MOP9, reassessment of resource and LTP update to incorporate inflation/indexation
.16 Support services	99.26	91.87	-7.39	HR, occupational health and communications scope to central support office and LTP update to incorporate inflation/indexation
.17 Stakeholder support	24.00	23.20	-0.80	Transfer of HR, occupational health and communications scope to central support office and LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1,879.12</b>	<b>1,781.22</b>	<b>-97.90</b>	

**Key challenges and considerations**

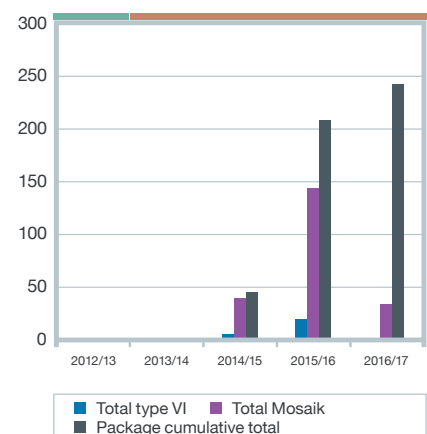
Risk/opportunity	Impact	Mitigation
There is a threat of substantial increases in the cost of inspection, maintenance and repair	As a result of age and condition of the site buildings Which may result in significant cost and schedule loss	Plant Health Committee monitors infrastructure. Asset care programme under construction. Learning from experience through discussions with other sites across SLC and Calder Hall regarding similar issues
There is a threat that additional contaminated land or ground water is discovered or known contaminated areas contain higher contamination levels than initially indicated	As a result of characterisation Which may result in the requirement to remediate additional land areas, with associated cost and schedule implications, regulator involvement and increased stakeholder involvement in local community	Contaminated land strategy and safety case developed. Monitoring programme established with routine borehole sampling to establish the condition and extent of contaminants
There is a threat that waste policy or regulations change	As a result of a change in Scottish Government policy or SEPA regulations Which may result in significant schedule delays and increased costs for ILW programmes	Higher Active Waste Policy issued, working with SEPA to gain understanding of policy implementation and multimedia authorisation
There is an opportunity to enter C&M earlier than currently scheduled	In the event of removing IC&M and delivering full C&M Which may result in significant cost savings	Investigate opportunity
There is an opportunity to establish alternative decommissioning workstreams	In the event that the site is able to recycle or salvage major pieces of plant and equipment Which may result in generation of income or reduction of costs elsewhere in the NDA portfolio if the plant and equipment can be used at another site with associated cost and schedule benefits	Investigate opportunity

Assumption	Justification
It is assumed that all waste is accounted for in the SMART inventory and that no new legacy waste is identified	Based on SMART Inventory survey of 2011 plus revisions
It is assumed that the MODP is based on MOP9	Based on information currently available to the site

**LLW baseline inventory disposal routes**

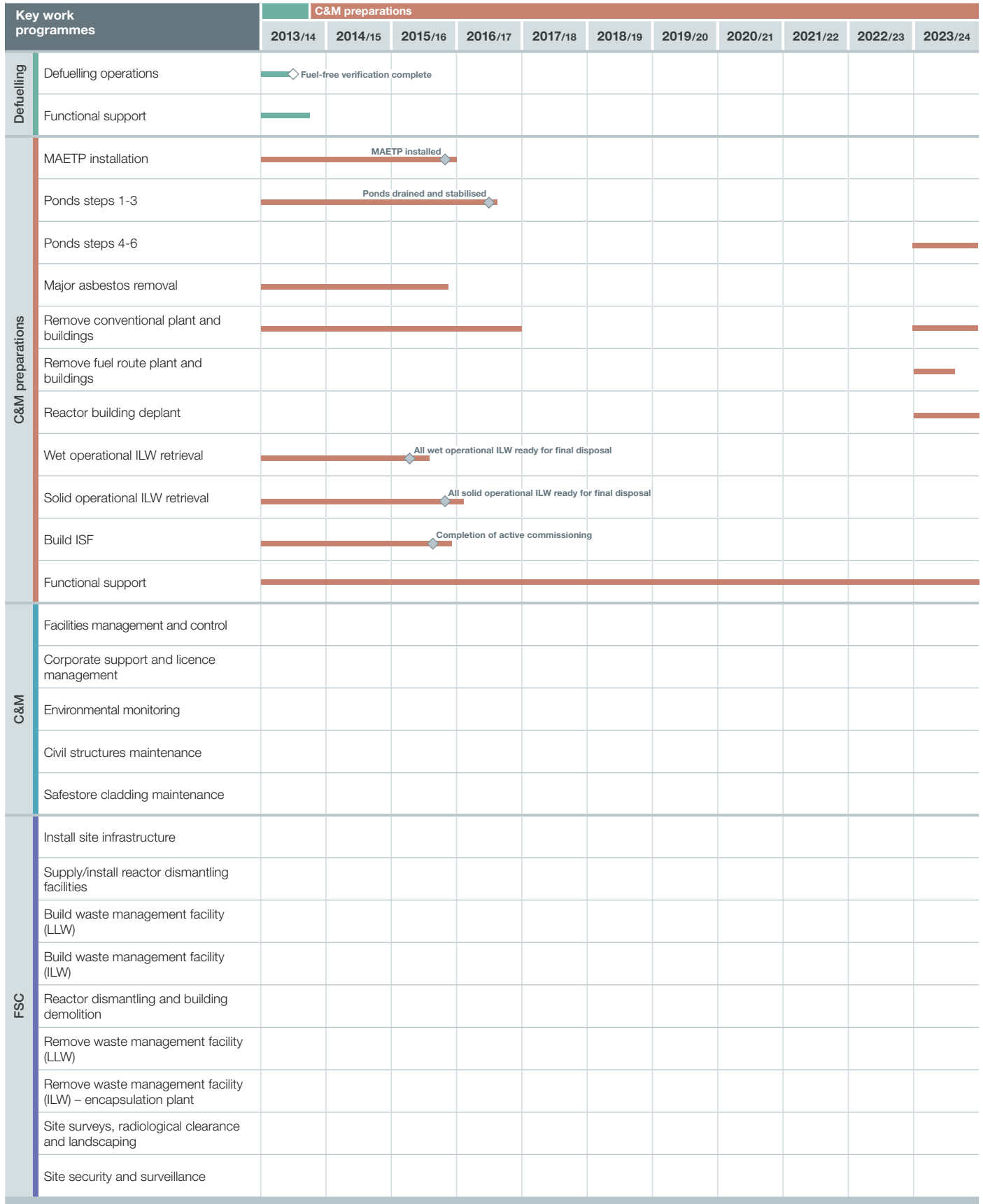


**Packaged waste**



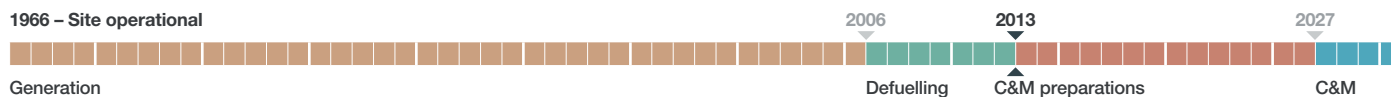
# Chapelcross

## Milestone schedule of work





# Dungeness A



Dungeness A occupies about a quarter of a 91 hectare civil nuclear site on the Kent coast in an area of SSSI. The site stopped generating at the end of 2006 and, in July 2012 transitioned from defuelling to its decommissioning phase.



Defuelling  
2007-2012

## Dungeness costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	-	-	-	-	-	-	-
Ponds	-	3.76	4.37	5.71	8.13	-	-	-	-	-	5.32
ILW Management	1.83	2.70	7.71	4.59	9.90	13.21	0.15	0.15	0.15	0.15	0.15
Plant and Structures	10.78	13.69	10.80	7.59	3.70	2.09	1.99	1.98	1.34	6.34	29.66
Waste Management	4.16	3.35	3.08	3.16	2.53	1.21	0.44	0.44	0.44	1.03	3.05
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	12.33	12.27	12.13	11.22	11.13	8.09	4.71	4.69	4.71	6.11	7.37
Site projects	9.71	11.72	12.89	12.28	8.27	4.47	1.87	1.86	1.87	4.06	3.27
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	-	-	-	-	5.03	8.15	-	-	-	-	-
<b>Total</b>	<b>38.82</b>	<b>47.49</b>	<b>50.98</b>	<b>44.56</b>	<b>48.68</b>	<b>37.23</b>	<b>9.15</b>	<b>9.12</b>	<b>8.51</b>	<b>17.69</b>	<b>48.82</b>

## Key near term activities

Dungeness A identified a number of safety and hazard reduction opportunities. The approval of the additional funding enabled work packages including asbestos removal works, drum house roof replacement for reactor two and the removal of external warming steam pipework. An opportunity remains to further reduce hazards on site via the acceleration of further south side of site clearance work packages. A potential to reduce costs has been recognised within the ILW Programme through the opportunity for a regional storage facility rather than an on-site facility at Dungeness A.

The electrical overlay scheme reconfiguration project is currently in its implementation phase and physical site works are due for completion in May 2013. This work will be a key enabler for the site to maximise the opportunity to accelerate the turbine hall demolition and south side of site clearance, reducing the ongoing asset care costs associated with these buildings.

The site plans to continue with its current asset management programme, ensuring the buildings and structures remain safe and mitigate the significant hazards that arise annually from both plant degradation and adverse weather conditions. In conjunction, the site will commence the preparations of assets for the entry into IC&M.



22.8

Site area



269

Current number of FTEs



115

Station lifetime output of electricity



131

Number of years from the start of generation to FSC

2087 Site end state - 2097



**C&M preparations**  
2013-2027



**C&M**  
2027-2092

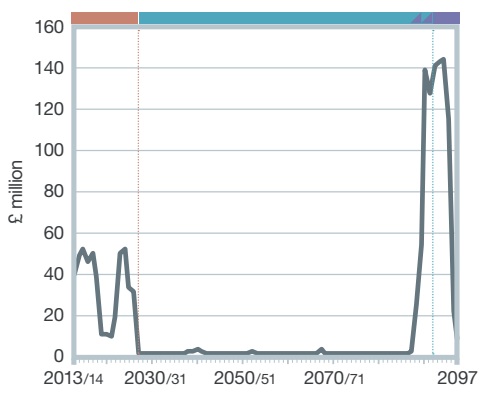


**FSC**  
2087-2097

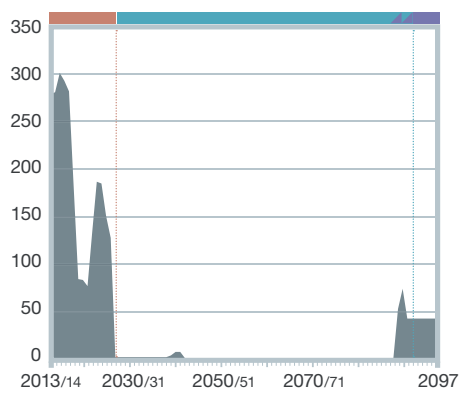
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
9.33	0.33	0.08	-	37.03	-	37.03
0.15	0.15	0.15	-	41.13	-	41.13
28.21	16.02	5.28	-	139.48	-	139.48
3.31	3.77	8.68	-	38.67	-	38.67
-	-	-	0.41	0.41	21.98	22.39
-	-	-	-	-	906.96	906.96
7.46	7.21	7.15	-	116.56	-	116.56
2.00	4.55	5.81	-	84.63	-	84.63
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	2.54	-	15.72	-	15.72
50.45	32.03	29.68	0.41	473.62	928.94	1,402.57

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

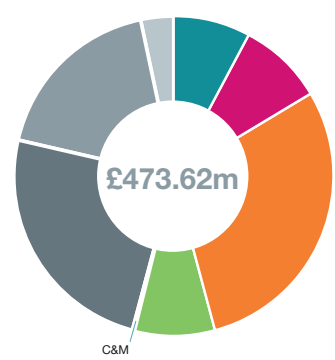
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Dungeness A



..... Dungeness A demolition of seven buildings



..... Defuelling complete and Dungeness A declared fuel free



..... Sludge transported by rail to LLWR

## Recent achievements

### Fuel-free

The site was verified as fuel-free by the ONR in June 2012 ahead of target. Over the weekend of 30 June/1 July 2012, the transition of the site from its defuelling to decommissioning phase was completed. The site director signed the management of change on 28 June 2012, for the implementation of the new decommissioning arrangements, thereby achieving a major milestone for the site. This was enabled due to the receipt of the two licence instruments from the ONR for the withdrawal of the operating rules, the implementation of the new emergency plan and the completion of all the other transition work streams. In addition to completing the fuel-free transition, the site also received formal acknowledgment from ONR that the decommissioning security plan had been agreed and that the security classification of the site has been reduced to category four.

### Sludge

The site has achieved a significant milestone in June 2012 with the completion of the fluid sludge retrieval from storage tank two, sludge storage tank one and sludge storage tank two.

### Bradwell FED

Following the successful inter-site transfer of the initial 36 drums of FED from Bradwell to Dungeness A in 2012, the second batch was received at Dungeness A in October 2012. The site commenced dissolution of this waste in August 2012 and dissolution continues in 2013.

## Cost variance to previous Magnox plan costs

..... The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	17.18	15.72	-1.45	Reassessment of work scope
.11 New construction	257.30	242.84	-14.45	Reassessment of work scope and LTP update to remove P50-P80 contingency from execution year 2013/14
.12 Commercial operations	-	-	-	Centralisation of occupational health, HR and communications and corporate response
.13 Decommissioning and termination	495.11	456.35	-38.76	Reassessment of work scope and LTP update to remove P50-P80 contingency and embedded savings and efficiencies
.14 Waste and nuclear materials management	464.05	468.57	4.52	Reassessment of work scope and LTP update to remove contingency from execution year 2013/14
.15 Site support	206.73	113.63	-93.10	Centralisation of IT scope, LTP update to remove embedded savings and efficiencies offset additional work scope
.16 Support services	119.66	89.80	-29.86	Centralisation of occupational health, HR and communications and corporate response
.17 Stakeholder support	23.40	15.65	-7.75	Centralisation of occupational health, HR and communications and corporate response
<b>Total</b>	<b>1,583.43</b>	<b>1,402.57</b>	<b>-180.86</b>	

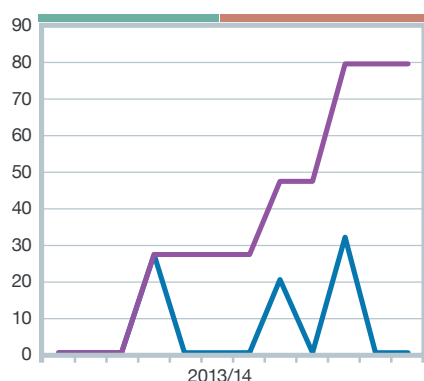


### Key challenges and considerations

Risk/opportunity	Impact	Mitigation
There is a threat that IONSIV dose rates greater than expected or above suitability for yellow boxes/Mosaik safety case limits	As a result of prolonged exposure to pond water due to no disposal route Which may result in another solution for disposal being required as Yellow Boxes/Mosaiks would not be suitable	Early understanding of IONSIV dose rates and isotope contents comply with safety case requirements
There is a threat of asbestos found on site not identified on the refurbishment demolition survey	As a result of inaccessible areas until deplant is in progress Which may result in delays to south side of site clearance and possible prosecution by regulators under Construction Design Management (CDM) Regulations	Comprehensive refurbishment and demolition surveys to be carried out Any exclusions to be agreed before survey commences
There is a threat that cross-site interactions with Dungeness B Site (for example sewage processing, 6.6kV cable removal etc) may impact on Dungeness A	As a result of contractual agreement timeframes and Dungeness B completion of work Which may result in delays to the Dungeness A decommissioning programme and associated continued maintenance and support costs	Stakeholder engagement and dedicated relationship managers appointed Some contracts either terminated or termination notice given
There is a threat that working interface issues associated with multiple projects running concurrently (including sufficient supplies, lay down areas etc)	As a result of limited space and restrictions of the SSI regulations Which may result in schedule delays and additional costs associated with finding lay down areas for the materials for example stoppage of work while this is undertaken/ increased duration for transport from larger distances etc	Work planning Project meetings and CDM meetings Hire additional plant as required and identify or create alternative hardstandings. CDM coordination and planning Early engagement with EA and Natural England
There is an opportunity to accelerate remaining C&M period to follow on from optimised C&M period	In the event that resources, funding and performance give a business benefit Which may result in an overall saving at site	Work up business case for NDA approval Clear scope and delivery strategy Good delivery performance
There is an opportunity to accelerate early pond decommissioning by moving waste and skips into one pond	In the event that funding is available and further acceleration of entry into C&M Which may result in the site being able to accelerate the draining and deplanting of one pond	Strategy and safety case to be carried out to get approval to use fuel flask to move waste, skips and IONSIVs to single pond

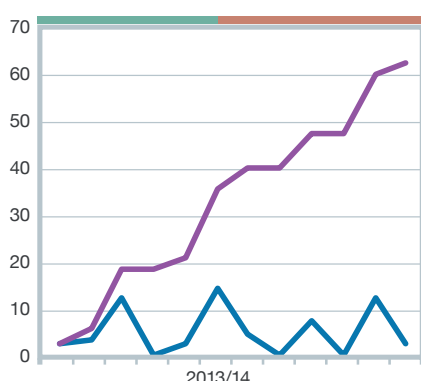
Assumption	Justification
It has been assumed that MiniStores will be approved for ILW storage and final disposal	Based on MODP strategy includes for MiniStore as interim storage
It has been assumed that waste quantities are based on SMART inventory	Based on the SMART inventory being used for all waste metrics
It has been assumed that C&M is based on three box model (waiting for regulatory approval for intent at Bradwell)	Based on costings and schedule produced to meet regulatory acceptance of the three box model

Legacy combustible waste



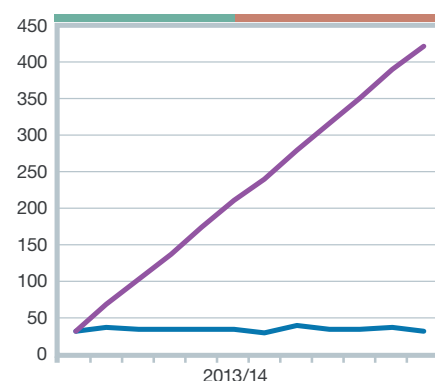
— Legacy combustible waste (total for FY13/14 – 79.0 m³)  
— Legacy combustible waste cumulative

Legacy metal waste



— Legacy metal waste (total for FY13/14 – 62.6 tonnes)  
— Legacy metal waste cumulative

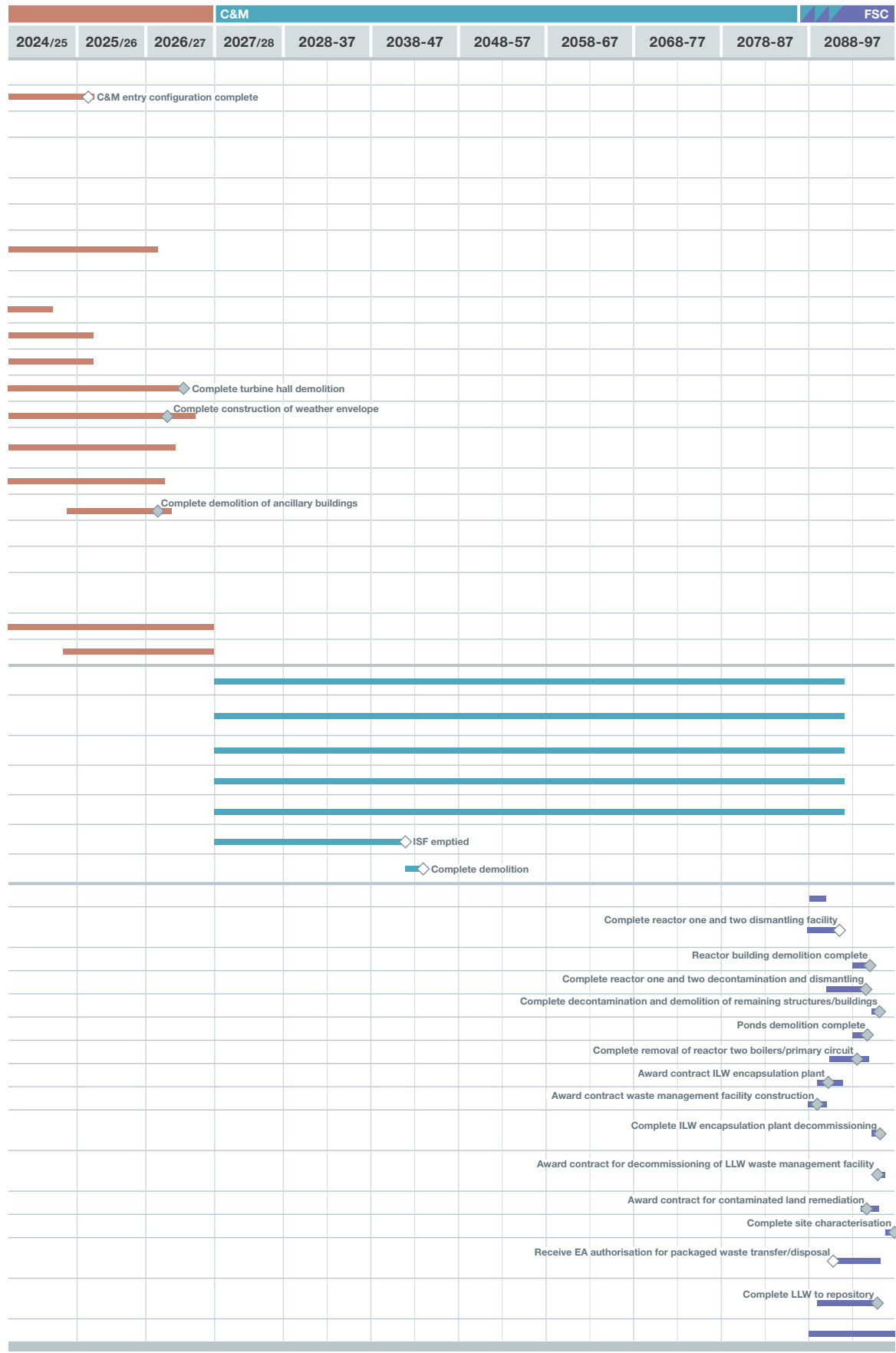
Turbine hall thermal insulation removal



— Turbine hall thermal insulation removal planned (total for FY13/14 – 661 m³)  
— Turbine hall thermal insulation removal cumulative



◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Hinkley Point A



Hinkley Point A is located on a 19.4 hectare site on the Somerset coast. Hinkley Point A is a twin reactor station currently being decommissioned. The station stopped generating in 2000 having completed 35 years of operation.



Defuelling  
2001-2004

## Hinkley Point A costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	4.91	40.12	11.09	4.30	3.25	3.28	2.53	3.82	1.54	-	-
Ponds	6.79	4.56	0.93	1.27	1.86	2.68	6.23	5.14	-	0.02	0.21
ILW Management	14.40	6.08	2.21	6.84	10.37	15.96	18.74	10.72	1.61	0.13	0.13
Plant and Structures	0.08	0.08	0.77	1.75	8.24	15.39	12.92	10.17	9.45	30.52	3.98
Waste Management	1.70	1.68	1.66	1.67	3.10	3.19	3.67	2.43	2.24	2.06	2.20
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	10.91	10.91	10.93	10.93	10.90	10.92	10.92	10.91	10.15	10.15	9.37
Site projects	8.59	6.77	6.72	7.58	6.40	6.48	6.64	5.51	5.53	5.51	5.46
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	-	-	-	-	-	-	-	-	0.69	-	0.69
<b>Total</b>	<b>47.38</b>	<b>70.21</b>	<b>34.30</b>	<b>34.33</b>	<b>44.12</b>	<b>57.89</b>	<b>61.65</b>	<b>48.71</b>	<b>31.21</b>	<b>48.39</b>	<b>22.04</b>

## Key near term activities:

- Work started to drain both cooling ponds, enabling the physical draining and stabilisation of the pond surfaces
- Continuation of work to start ILW resin and sludge campaign and completion of a buffer store in advance of an ISF
- Continuation and development of the concept design for retrieval and sorting of FED waste and active trials on the wet vaults
- Continuation of separation of site from Hinkley Point B site security (EDF Energy owned). Part of this work will require the site to provide its own security team. The site must also provide its own security access control system and a reception building
- The site is currently using land owned by EDF Energy for parking, this arrangement is to come to an end and the site will construct a new car park for use in 2013
- Submission in March 2014, of a periodic safety review (PSR) pack to ONR. This is a ten yearly requirement for the site under its site licence to review its safety cases to ensure alignment with modern standards, it is also linked to its ongoing programme of key liability and asset management through its systems and structures preservation project work
- Achievement of two important regulatory milestones, relating to the reduction or management of hazards on site:
  - Complete the bulk removal of all asbestos from site, October 2013
  - Complete the retrieval of ILW from settling tanks one, two and three and relocate it into suitable containers by March 2014
- Purchasing of a cross-site transporter system for MiniStores



19.4

Site area



264

Current number of FTEs



103

Station lifetime output of electricity



125

Number of years from the start of generation to FSC



**C&M preparations**  
2004-2025



**C&M**  
2025-2084

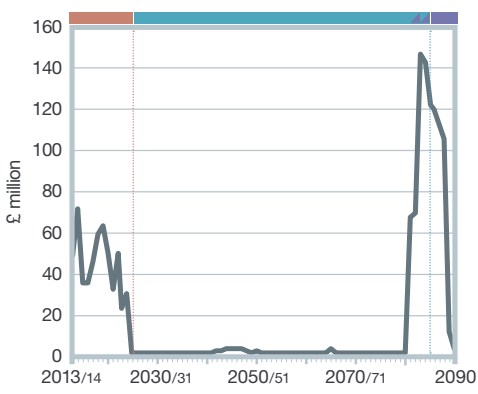


**FSC**  
2081-2090

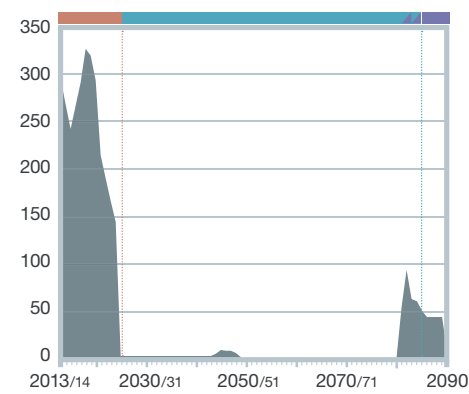
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	74.85	-	74.85
0.55	-	-	-	30.25	-	30.25
0.13	-	-	-	87.32	-	87.32
1.25	-	-	-	94.59	-	94.59
1.77	-	-	-	27.37	-	27.37
-	0.56	0.56	0.57	1.68	32.57	34.26
-	-	-	-	-	888.60	888.60
8.59	-	-	-	125.58	-	125.58
5.03	-	-	-	76.22	-	76.22
-	-	-	-	-	-	-
-	-	-	-	-	-	-
11.39	-	-	-	12.77	-	12.77
28.71	0.56	0.56	0.57	530.63	921.17	1,451.80

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

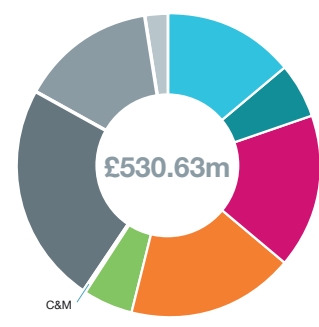
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Hinkley Point A



Hinkley Point A complete removal of all bulk asbestos



Shield cooling stacks removed for recycling



Pressure washing of pond walls

## Recent achievements

Winners of the RoSPA Order of Distinction for attaining 15 consecutive Gold Awards. Hinkley Point A has also achieved more than five years without a lost time accident.

Decommissioning activities for this year concentrated on hazard reduction.

Cooling pond water draining, processing and discharge has progressed well, exceeding 2,500m<sup>3</sup>, which includes the full drain of both dispatch bays.

The removal of bulk asbestos was completed after a nine year project.

The work to enable the removal of mobile ILW sludge and resin from ageing settling tanks has been progressed with engagement of the supply chain to deliver cross-site transport, a buffer store and a fill house in 2013/14.

The site began its five yearly periodic safety review walk downs and technical reports.

The building of the car park has progressed to remove the reliance on the Hinkley Point B station facility which will be unavailable in future years.

Critical degrading plant items have been maintained or removed in accordance with the site's asset management plan. The site has also completed a physical inspection programme for the active waste water tanks.

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

## Cost variance to previous Magnox plan costs

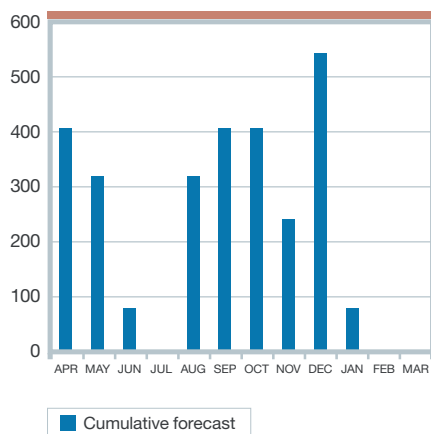
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	12.96	12.77	-0.19	Misc low value changes
.11 New construction	276.96	245.35	-31.61	Additional work scope relating to ILW concept design and provision of security and access control. Reassessment of FED baseline and ISF construction. LTP update to incorporate inflation/indexation
.12 Commercial operations	-	-	-	-
.13 Decommissioning and termination	434.40	409.54	-24.86	Reassessment of FED baseline and ponds work scope. LTP update to incorporate inflation/indexation
.14 Waste and nuclear materials management	492.32	555.91	63.60	Reassessment of FED baseline and LTP update to incorporate inflation/indexation
.15 Site support	214.72	125.85	-88.87	Centralisation of IT work scope and LTP update to incorporate inflation/indexation
.16 Support services	115.98	89.34	-26.64	Centralisation of occ. health and LTP update to incorporate inflation/indexation
.17 Stakeholder support	21.37	13.04	-8.33	LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1,568.71</b>	<b>1,451.80</b>	<b>-116.92</b>	

**Key challenges and considerations**

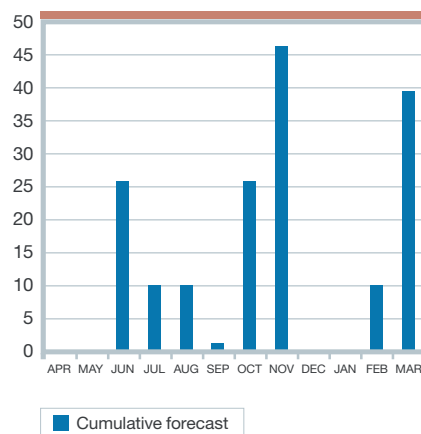
Risk/opportunity	Impact	Mitigation
There is a threat that the pond concrete may be harder than original design specification	As a result of age hardening of the concrete in an alkaline environment Which may result in reduced productivity for the decontamination equipment and faster wear rate	Conduct hardness tests on concrete samples
There is a threat that there is additional asbestos clean-up work beyond that which is in the baseline	As a result of recontamination of areas that had previously been declared as clean Which may result in delays due to clean-up work and significant disposal costs	To carry out refurbishment and demolition surveys on building areas to confirm extent of asbestos recontamination
There is a threat that it will take longer than anticipated to retrieve residual waste from vessels-sludge	As a result of the heel of compacted waste within the vessel Which may result in increased costs from redesign of the process to retrieve the remaining waste	Investigate various retrieval systems
There is a threat that it will take longer than anticipated to retrieve residual waste from vessels-resin	As a result of the heel of compacted waste within the vessel Which may result in increased costs from redesign of the process to retrieve the remaining waste	Investigate various retrieval systems
There is an opportunity to reduce operating period by obtaining campaign discharge consent	In the event that Hinkley Point A can negotiate an amendment to the discharge consent Which may result in circa two years reduction in programme duration	Underpinning research and development to be carried out and establish estimates of discharges whilst continuing dialogue with the EA

Assumption	Justification
It has been assumed that there will be no further challenges from Somerset County Council regarding receiving waste onto site from other sites	Based on inter-site transfer aligns with NDA National Strategy
It has been assumed that the chosen dissolution method does not change	Based on the strategic programmes preferred option of nitric acid based on lead and learn from Bradwell
It has been assumed that reactor one and reactor two ponds drained and sealed by January 2017 licence condition 35 milestone will be met	Based on work that has been accelerated (via MODP) and will be delivered prior to the licence condition 35 milestone date
It has been assumed that Hinkley Point B will complete security works to enable the Hinkley Point A/Hinkley Point B security system separation	Based on ongoing liaison with Hinkley Point B over an extended period

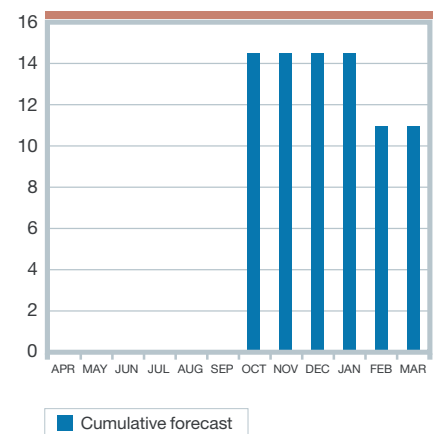
**Pond water drained from ponds m<sup>3</sup>**



**LLW retrieved m<sup>3</sup>**

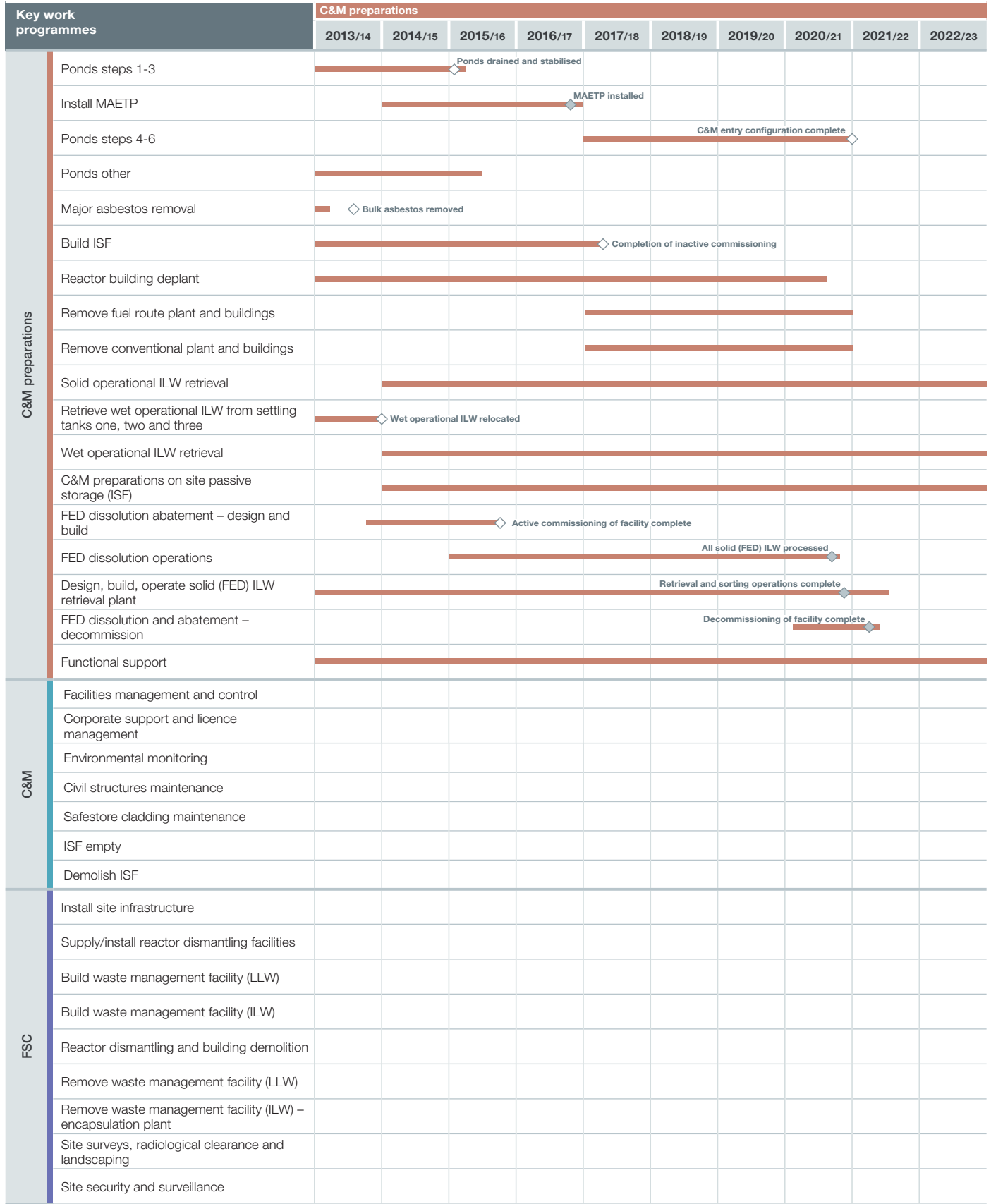


**ILW pumped m<sup>3</sup>**



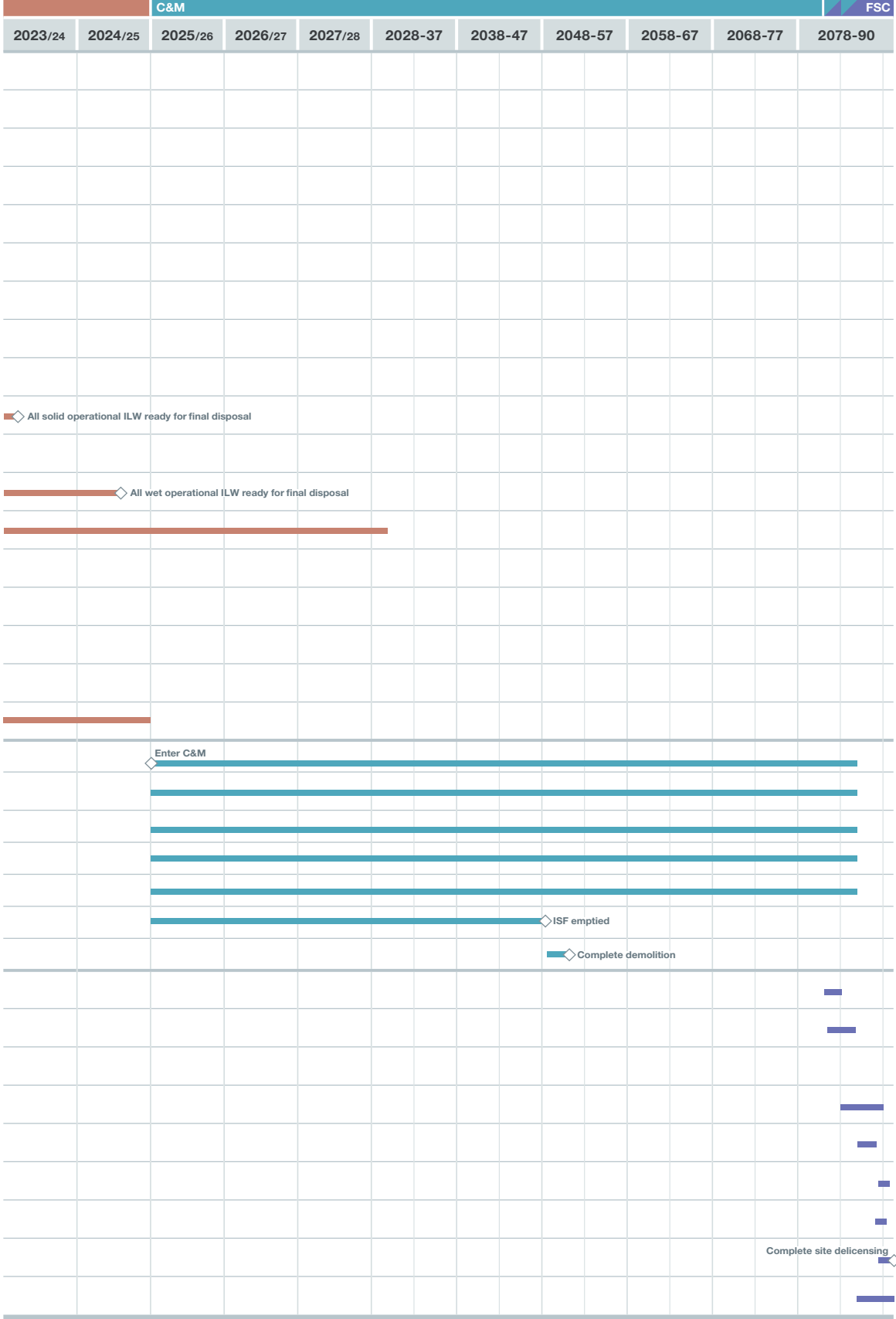
# Hinkley Point A

## Milestone schedule of work



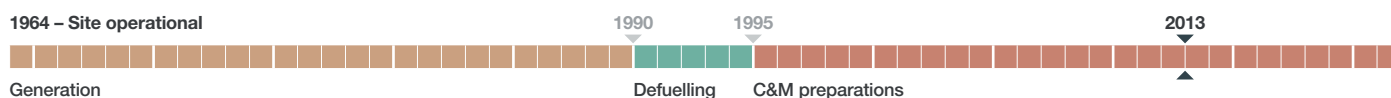


◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Hunterston A



Hunterston A is located on a promontory of the Ayrshire coast 30 miles south west of Glasgow. Hunterston A is a twin reactor site. The site was Scotland's first civil nuclear generating station and, at the time of opening, the largest in operation anywhere in the world.



**Defuelling**  
1990-1995

## Hunterston A costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	-	-	-	-	-	-	-
Ponds	5.16	6.73	10.24	10.07	9.59	8.41	0.85	-	-	-	-
ILW Management	9.95	22.62	21.00	12.79	8.72	3.00	2.75	3.23	3.71	-	-
Plant and Structures	2.03	2.95	9.80	15.37	22.48	38.11	39.83	12.24	2.26	-	-
Waste Management	1.51	2.90	2.91	2.90	2.89	3.26	5.78	3.98	0.92	-	-
C&M	-	-	-	-	-	-	-	-	-	0.44	0.44
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	10.43	10.43	10.46	10.43	10.41	8.57	9.04	8.98	3.44	-	-
Site projects	5.88	5.66	7.08	9.10	7.81	4.54	3.94	3.57	5.43	-	-
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	-	-	-	-	-	0.92	-	0.92	7.69	-	-
<b>Total</b>	<b>34.96</b>	<b>51.29</b>	<b>61.49</b>	<b>60.67</b>	<b>61.89</b>	<b>66.80</b>	<b>62.18</b>	<b>32.92</b>	<b>23.45</b>	<b>0.44</b>	<b>0.44</b>

## Key near term activities

During the next three years of work, the site will focus on the retrieval and encapsulation of ILW together with the draining and stabilisation of the cartridge cooling pond. Towards the latter half of the near term period there will be a significant increase in reactor deplanting works together with preparation work for the reactor safe store configuration.

The following project scope will be executed during this period:

### Wet ILW retrieval and encapsulation plant (WILWREP)

Completion of active commissioning, retrieval and encapsulation of bulk sludges, resins and depleted acid. Work will commence on the retrieval and encapsulation of orphan wastes.

### Solid active waste bunker retrieval (SAWBR)

Complete active commissioning and retrieval operations of waste from bunkers five to two for storage in a containerised form pending encapsulation.

### Solid ILW encapsulation (SILWE)

Complete detailed design of this new facility together with civil enabling works and complete major mechanical plant installation. Commence site electrical and instrumentation works.

### Clean and drain pond

Complete project scope which will have comprised: UHP cleaning of all pond surfaces followed by surface stabilisation, removal of all residual fixed pond furniture.

### Cartridge cooling pond (CCP) decontaminate, deplant and demolish

Commence assessment works including preparation of technical specifications and safety case documentation. Commence characterisation works. Review final end state requirements.

### Land quality

Complete implementation of in situ remediation of the catch pit seven compound to isolate the mobile and immobile contamination.

### ILW store active commissioning

Receive first drums of encapsulated wet ILW in the ILW store, complete active commissioning and commence operations. Commence receipt of solid ILW in containerised waste form.

36

Site area

238

Current number of FTEs

73

Station lifetime output of electricity

116

Number of years from the start of generation to FSC



**C&M preparations**  
1995-2022



**C&M**  
2022-2075

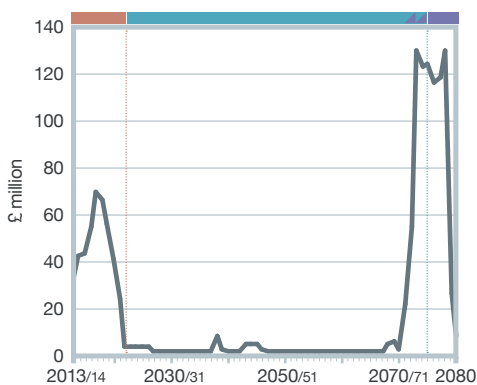


**FSC**  
2072-2080

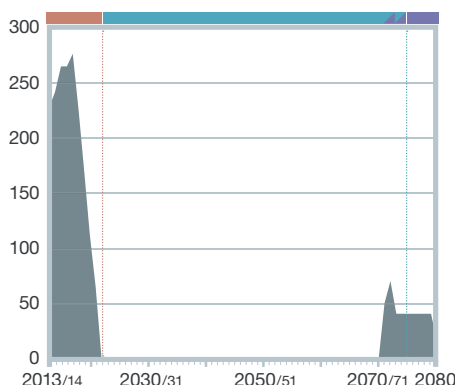
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
-	-	-	-	51.05	-	51.05
-	-	-	-	87.78	-	87.78
-	-	-	-	145.06	-	145.06
-	-	-	-	27.04	-	27.04
0.45	0.44	0.44	0.45	2.67	36.26	38.93
-	-	-	-	-	863.76	863.76
-	-	-	-	82.19	-	82.19
-	-	-	-	53.00	-	53.00
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	9.54	-	9.54
0.45	0.44	0.44	0.45	458.33	900.02	1,358.35

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

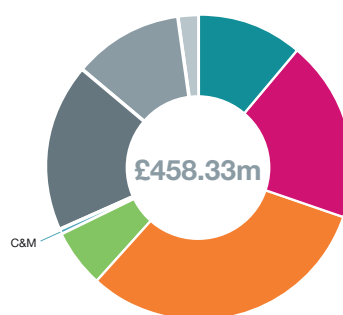
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Hunterston A



Land remediation at Hunterston A



ILW store



Charge machine deplant

## Recent achievements

The site's ILW strategy was finalised during September 2012. Following the decision not to pursue the Graphite Pathfinder project, a number of options have been evaluated to determine the optimum ILW strategy for Hunterston A. These options have included scenarios involving encapsulation, containerisation, local and off-site dissolution. Due to a number of site specific attributes the evaluation has shown full encapsulation to be the preferred option for Hunterston A.

Hunterston A successfully achieved its two operating plan targets (i) 400m<sup>2</sup> of pond walls have been cleaned using UHP equipment and made stable; (ii) International Nuclear Safety Authority approval of a safety case to enable temporary storage of containerised waste in the ILW store. This together with recent approval of the final LoC is a significant step towards active commissioning of the SAWBR facility.

A contract has been awarded to modify Berkeley boxes ensuring a supply of boxes for the commissioning and initial operational phase of the SAWBR project.

WILWREP has completed inactive commissioning and work is progressing towards active commissioning and operations. In addition, commissioning of the export route to the ILW store has commenced, utilising the cross-site transporter and trial drums.

The bentonite slurry wall which comprises a major part of the in situ remediation of the catch pit seven compound has been installed, thereby inhibiting any migration of ground contamination.

A 400 tonne charge machine has been deplanted. This work together with a programme of decontamination enabled significant quantities of metal to be free released for recycling. The sponge jet decontamination facility has achieved full operational status, enabling a further 31 tonnes of contaminated metal to be free released for recycling.

The repairing of the reactor building corbels, which was a finding from the 2010 PSR, was successfully completed in August 2012.

## Cost variance to previous Magnox plan costs

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

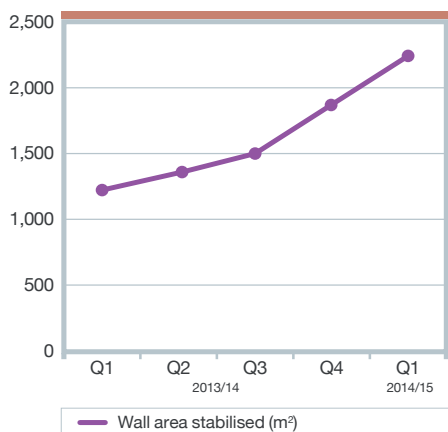
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	9.7	9.5	-0.14	No significant variance
.11 New construction	226.0	226.0	-0.02	No significant variance
.12 Commercial operations	-	-	-	-
.13 Decommissioning and termination	463.7	438.8	-24.92	Reassessment of existing work scope and inclusion of additional work scope. LTP update to incorporate inflation/indexation
.14 Waste and nuclear materials management	494.4	500.0	5.63	Reassessment of work scope. LTP update to remove P50-P80 contingency and incorporate inflation/indexation
.15 Site support	147.2	90.1	-57.16	Reassessment of engineering and other resource costs, centralisation of IT scope. LTP update to incorporate inflation/indexation.
.16 Support services	90.5	82.4	-8.05	Centralisation of communications and elements of occupational health and HR. LTP update to incorporate inflation/indexation
.17 Stakeholder support	18.7	11.5	-7.23	Centralisation of communications and elements of occupational health and HR. LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1,450.25</b>	<b>1,358.35</b>	<b>-91.90</b>	

### Key challenges and considerations

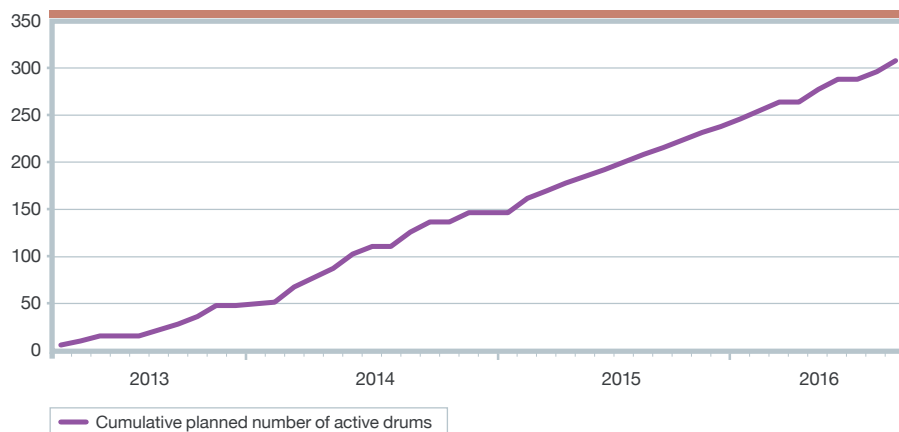
Risk/opportunity	Impact	Mitigation
There is a threat that high dose areas will be discovered on pond floor under the skip registers and in structural joints	As a result of discovering high dose areas under skip registers and in floor joints, further decontamination may be required Which may result in increased time and cost	Site undertaking floor core sampling regime
There is a threat that small particulate fuel fragments are found in the sand from the sand filters	As a result of the sand having been in contact with concentrating particulate from highly active pond water, the radiological content of the sand material may be greater than the higher bounding levels for wet ILW requiring further characterisation and resource Which may result in delays and associated costs and, potentially, additional regulatory involvement could arise	Benchmarking across Magnox and detailed characterisation
There is a threat that a fault will occur during WILWREP active commissioning	As a result of commissioning errors, further contractor and Magnox resource could be required to rectify the problems Which may result in extra costs and delay to the project	Commissioning team to include increased resources; collaborative daily working meetings with contractor; equipment successfully tested
There is an opportunity to reclassify some of the current inventory of VLLW to free release by recognising revised exemption limits following a change to legislation	In the event that existing VLLW stock can be reclassified, the waste can be sent off-site as free release Which may result in significantly reduced disposal costs	Undergo characterisation works to reclassify VLLW stored in site awaiting disposal
There is an opportunity to maintain and repair the weather barrier thus avoiding constructing the weather envelope	In the event that the weather barrier could be further utilised such that the permanent weather envelope is not required, considerable labour, equipment and resource would not be needed  Which may result in significant cost saving being realised by not constructing the weather envelope and entry into C&M could be accelerated, saving the site's hotel costs	Review the environmental impact analysis document for the C&M entry requirements

Assumption	Justification
It is assumed that government policy, construction standards, legislative and regulatory requirements, guidance and advice, including those related to health, security, safety and engineering and environmental issues and the management, storage and disposal of radioactive wastes will remain unchanged, or changes pending have no significant impact on Hunterston A's LTP	No significant proposed changes have been identified
It is assumed all necessary approvals, consents, consultations, commentary and authorisations, from the NDA, ONR, SEPA, RWMD and local authorities will be obtained in the time scheduled	Time allowed is based on recent experience. In addition, the regulators are given the opportunity to comment on the reasonableness of such timings
It is assumed the waste products as retrieved will be consistent with the basis of designs	Sampling and characterisation studies have been undertaken consistent with ALARP principles. These have provided base data which has been utilised for design together with margins for product variability between the site and RWMD indicate that this is the stated intention

CCP wall decontamination



Drums encapsulated and sent to ILW store

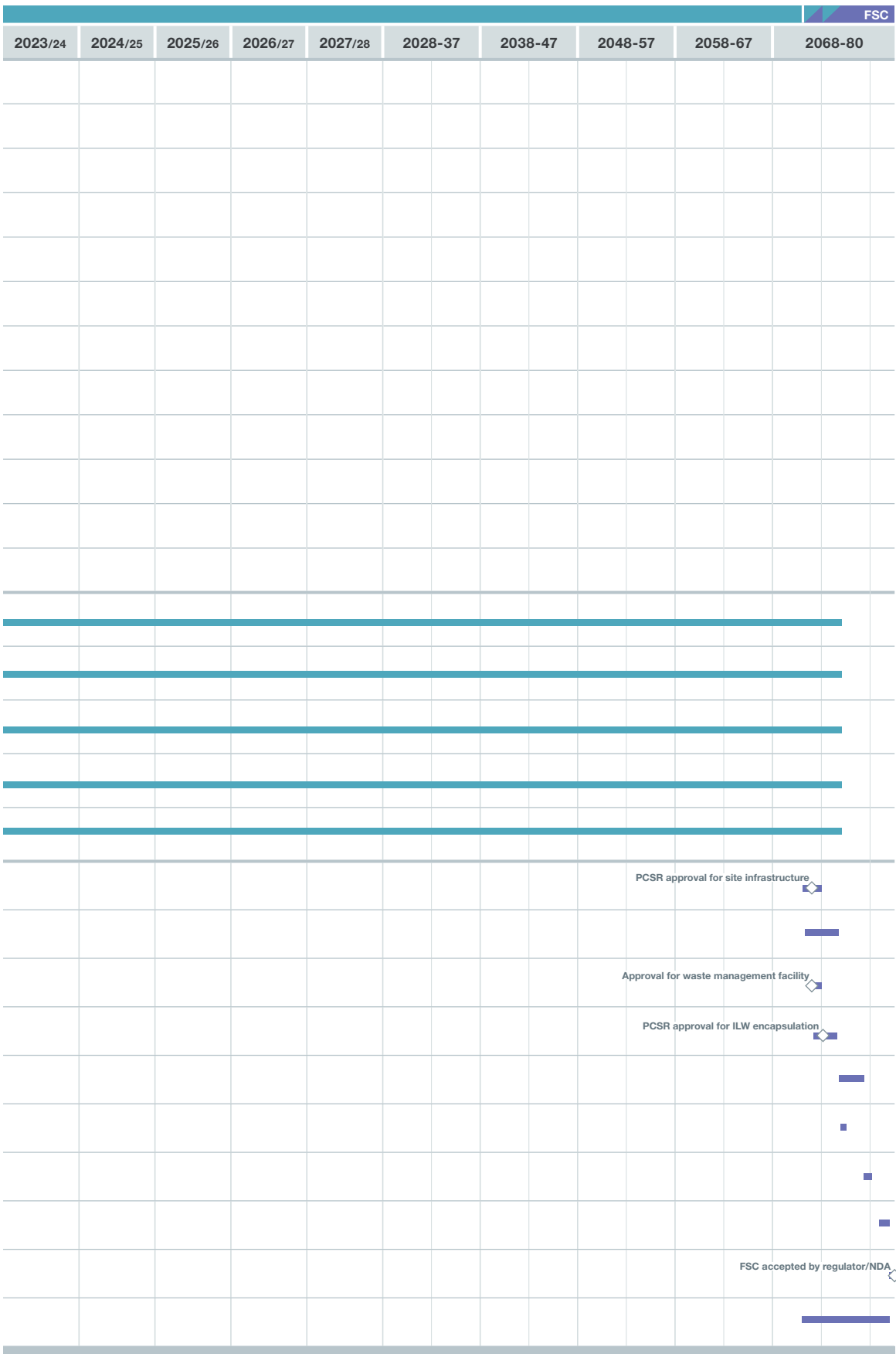


# Hunterston A

## Milestone schedule of work

Key work programmes	C&M preparations										C&M	
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23		
C&M preparations	Pond steps 1-3			Pond drained and stabilised								
	Pond steps 4-6											
	Pond deplant/demolition								Pond demolition complete			
	Solid active waste bunker – decommissioning						Site works complete					
	Reactor building deplant											
	Remove conventional plant and buildings											
	SAWBR project – build/operate	Active commissioning complete										
	All wet operational ILW retrieved and passivated ready for final disposal				Licence condition 35 wet operational ILW ready for final disposal							
	Solid ILW encapsulation project – build/operate					Bunker one waste retrieved and passivated						
	Wet ILW retrieval and encapsulation – decommissioning				Site works complete							
	Solid ILW encapsulation project – decommissioning								Site works complete			
	Functional support											
C&M	Facilities management and control											
	Corporate support and licence management											
	Environmental monitoring											
	Civil structures maintenance											
	Safestore cladding maintenance											
FSC	Install site infrastructure											
	Supply/install reactor dismantling facilities											
	Build waste management facility (LLW)											
	Build waste management facility (ILW)											
	Reactor dismantling and building demolition											
	LLW store demolition											
	Remove waste management facility (ILW) – encapsulation plant											
	Remove waste management facility (LLW)											
	Site surveys, radiological clearance and landscaping											
	Site security and surveillance											

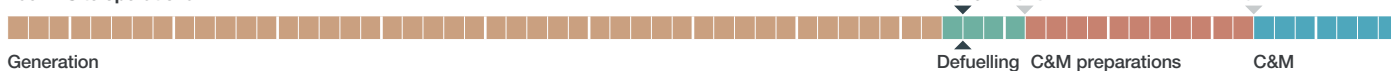
◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Oldbury

1967 – Site operational



Oldbury is located on a 39 hectare site 15 miles north of Bristol on the south bank of the River Severn in South Gloucestershire, and was shut down in February 2012 following 44 years of safe and successful operation. The site's focus is on hazard removal to ensure entry into a C&M state, safely and efficiently.



Defuelling  
2012-2016

## Oldbury costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	1.32	19.96	13.22	2.00	2.00	2.43	2.22
Ponds	-	-	-	-	-	4.75	4.16	3.89	0.47	0.32	14.74
ILW Management	-	0.62	2.83	8.78	14.05	5.37	0.66	2.86	1.64	1.80	1.13
Plant and Structures	1.26	11.15	13.60	18.70	18.65	8.63	3.36	6.48	41.79	17.96	25.79
Waste Management	1.53	1.69	1.66	2.69	10.33	10.77	10.56	10.49	10.51	10.47	10.40
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	16.91	16.24	13.09	9.85	9.81	9.40	9.13	9.01	8.99	8.94	8.79
Site projects	21.41	19.64	16.41	23.74	23.70	15.34	13.81	12.72	12.84	12.62	12.59
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	21.01	20.79	18.78	-	-	-	-	-	-	-	-
Transition	-	-	5.92	-	-	-	-	-	-	2.31	2.31
<b>Total</b>	<b>62.12</b>	<b>70.12</b>	<b>72.30</b>	<b>63.76</b>	<b>77.86</b>	<b>74.22</b>	<b>54.89</b>	<b>47.45</b>	<b>78.24</b>	<b>56.87</b>	<b>77.96</b>

## Key near term activities

Having consulted with both internal and external stakeholders, Oldbury has further organisational changes planned in the near term.

Careful transition to post-generation staff structures will be completed. A balance will be maintained between retaining site skills, retraining, and providing a motivated workforce to deliver the stated programme.

Work in the near term is planned to make a positive safety contribution by delivering a schedule of activities focused around hazard reduction and preparedness for decommissioning, but will also enable the development of opportunities to deliver value in the agreed programme.

## Current and future site goals:

- Retaining an excellent safety record
- Protecting the environment
- Ensuring safe and compliant delivery of the LTP
- Promoting best practice and ensuring value for the taxpayer

## Key projects in the near term include:

- Commencement of defuelling of both reactors
- Spent fuel shipped in line with the MOP to Sellafield
- Meeting regulatory expectations and requirements

- Place both reactors into natural circulation
- Implement revised emergency scheme arrangements
- Deliver agreed asset care portfolio
- Early implementation of the alternative effluent dispersal line and of the electrical overlay system to provide the site with electricity once the present arrangements cease
- Strategic programmes activities supporting the MODP including the retrieval, processing, storage and dispatch of waste
- Exploiting opportunities to decommission redundant plant where feasible, to remove hazards sooner





39

Site area



403

Current number of FTEs



137

Station lifetime output of electricity



134

Number of years from the start of generation to FSC



**C&M preparations**  
2016-2027



**C&M**  
2027-2096

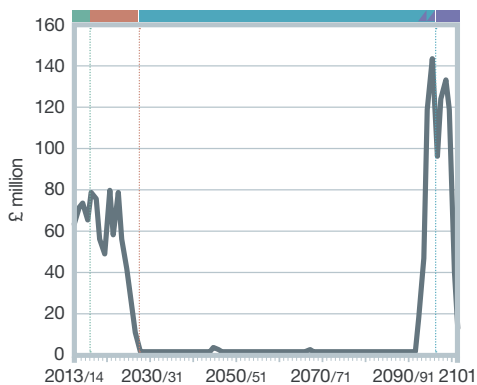


**FSC**  
2092-2101

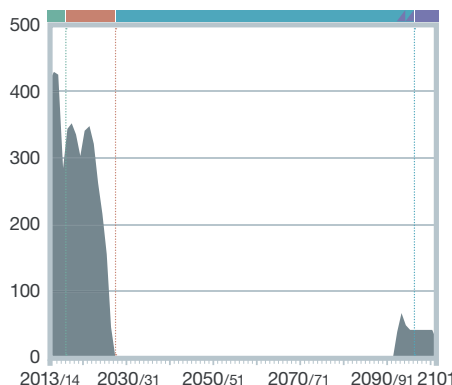
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
2.27	-	-	-	45.43	-	45.43
10.30	0.32	0.08	-	39.03	-	39.03
0.26	0.26	0.25	0.23	40.73	-	40.73
10.96	6.01	2.99	1.01	188.33	-	188.33
10.31	9.84	8.97	0.27	110.50	-	110.50
-	-	-	0.19	0.19	24.29	24.48
-	-	-	-	-	842.37	842.37
7.61	7.57	5.69	2.31	143.35	-	143.35
10.85	10.11	7.87	3.97	217.62	-	217.62
-	-	-	-	-	-	-
-	-	-	-	60.58	-	60.58
2.31	6.15	2.31	1.54	22.85	-	22.85
54.87	40.27	28.16	9.51	868.59	866.67	1,735.26

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

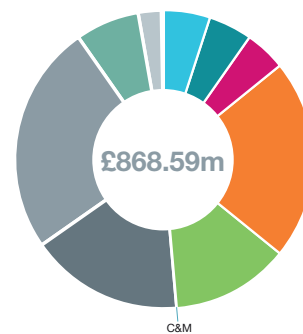
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Oldbury



Defuelling structure is implemented



Oil removed from the turbines as part of defuelling preparations



Operator moves fuel skips in the ponds

## Recent achievements

Oldbury saw reactor one shut down on 29 February 2012. The following months have seen permanent disabling of both reactors so they cannot be returned to service, preparation and commencement of defuelling and completion of planned major hazard reduction in preparedness for decommissioning, in parallel with ensuring that spent fuel continued to be shipped in accordance with the MOP.

Post-operational clean-out of plant has resulted in the site being declared free from carbon dioxide and hydrogen. Elsewhere more than 60,000 litres of oil was drained from main tanks situated in the turbine hall and disposed of in accordance with the Hazardous Waste Regulations 2005. Approximately 7,000kg of boron dust was also removed from site.

All of these activities were completed whilst maintaining a proud safety record of more than 1,000 days without a lost time accident.

Although bulk defuelling of the reactors has not yet commenced, 19 per cent of reactor two has been verified fuel-free. This means that 392 fuel channels, from which fuel was removed to support generation on reactor one during 2011, have been confirmed as devoid of fuel and certified as empty. In anticipation of the intensive defuelling programme ahead, improvements have been made across a range of equipment on the fuel route to ensure availability and reliability of performance during the defuelling period.

Oldbury was the winner of a 2012 RoSPA Presidents Award for occupational health and safety. The award recognised the continued demonstration of a robustly implemented health and safety management system on site.

Furthermore Oldbury was awarded the prestigious 2012 British Safety Council Sword of Honour for excellent conventional safety performance, having achieved the maximum rating in the council's five star health and safety management system audit.

This demonstrated a culture of best practice for health and safety throughout the business.

Additionally, it has been recognised that Oldbury has successfully moved from a generating to a post-generation structure in the short space of just over six months, whilst maintaining safety and compliance and the confidence and support of stakeholders and regulators. More than 500 changes to the quality management system were made, verified and revalidated in a very limited timeframe to support successful implementation of this change. Following regulatory approval a much simplified set of operating rules has been introduced and maintenance schedule commitments have also reduced to reflect the change in plant configuration.

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

## Cost variance to previous Magnox plan costs

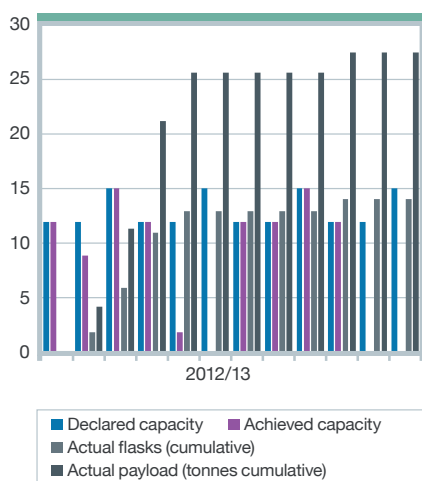
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	27.25	22.85	-4.40	Acceleration of severances
.11 New construction	282.54	287.41	4.87	Embed lead and learn for ILW ISF and FED programmes, inclusion of exceed MODP and acceleration of alternative electricity supply scope. LTP updated to remove of P50-P80 contingency incorporate inflation/indexation
.12 Commercial operations	63.04	127.63	64.59	Alignment of scope in line with PSWBS, acceleration of two cold charge chutes, inclusion of MOP9 and exceed MODP and reassessment of other work scope. LTP update to incorporate embedded savings, removal of P50-P80 contingency and inflation/indexation
.13 Decommissioning and termination	492.12	444.75	-47.36	Embed lead and learn for FED programme. Alignment of scope in line with PSWBS and inclusion of exceed MODP and MOP9. LTP updated to remove P50-P80 contingency and incorporate inflation/indexation
.14 Waste and nuclear materials management	652.53	619.36	-33.17	Embed lead and learn for FED programme and inclusion of exceed MODP. LTP updated to remove P50-P80 contingency and incorporate inflation/indexation
.15 Site support	223.33	130.23	-93.09	Centralisation of IT scope, alignment of scope in line with PSWBS and inclusion of electricity cost increases, MOP9 and exceed MODP. LTP update to remove embedded savings and remove P50-P80 contingency and incorporate inflation/indexation
.16 Support services	120.61	88.50	-32.11	Centralisation of IT, occ health, HR and communications scope, alignment of scope to correct PSWBS and inclusion of MOP9 and exceed MODP. LTP update to incorporate inflation/indexation
.17 Stakeholder support	22.06	14.53	-7.53	Centralisation of occ health, HR and communications scope and inclusion of MOP9. LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1883.47</b>	<b>1735.26</b>	<b>-148.21</b>	

**Key challenges and considerations**

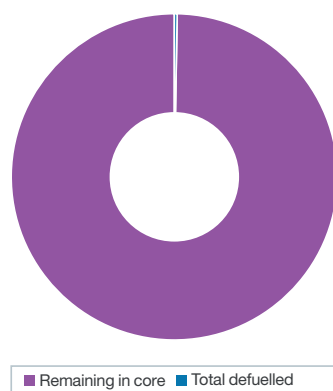
Risk/opportunity	Impact	Mitigation
There is a threat that defuelling dates are changed giving a later end date to the defuelling phase	As a result of a change in the MOP strategy arising from issues at Sellafield delaying planned shipment dates. This may result in the requirement for site to maintain its defuelling structure for longer than planned leading to increased cost	Liaison with the MOP delivery team to ensure awareness of present status is maintained Review options to self perform activities
There is a threat of failing infrastructure, services or plant	As a result of the ageing plant and infrastructure, some of which is over 40 years old, resulting in obsolescence of plant items. This may affect planned activities on site, with associated costs and schedule delay, leading to disruption of decommissioning	Priority assets identified and corrective/ improvement actions identified and planned Strategic and preventative maintenance routine and other site licence conditions which maintain the integrity of the site are in place Asset manager appointed to manage ongoing registers
There is an opportunity to reduce the post-generation energy usage on site	As a result of improvements in plant and installation since the site was designed and commissioned. This may result in reduced costs and environmental impact	Carry out heat loss surveys Review alternative building heating arrangements Review alternative strategies for operating plant
There is an opportunity to make the strategy for reconfiguring/isolating unused plant more efficient	As a result of the strategy taken during planning for decommissioning redundant plant during decommissioning. This may result in greater site efficiency leading to cost and schedule savings	Devise strategy and systems Prioritise configuration of plant which is scoped to be isolated Carry out plant configuration Review use of suitably qualified experienced person (SQEP) resource
There is an opportunity to increase site capability for defuelling and decommissioning the site	As a result of changes in MOP9 and site strategy. This may result in cost and schedule savings	Carry out training on defuelling verification equipment and defuelling procedures Review skill broadening of plant technicians Increase human performance training

Assumption	Justification
It is assumed that the NDA requirements remain as set out in their current programme control procedures	Lifetime planning has been structured around the current NDA requirements
It is assumed that there are no changes to government policy, legislation or regulatory environment that have a significant effect on activities on-site	In-line with NDA expectations, as defined in document EGG04, all work has been scheduled around existing policy and legislation
It is assumed that the regulators continue to adopt a consistent and proportionate approach and all necessary approvals, consents and authorisations are obtained in the time scheduled	Site continues close liaison with the regulators and use of the regulator schedule support this assumption

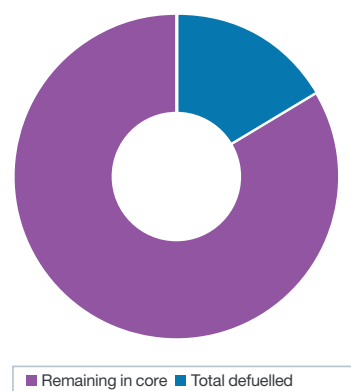
**MOP 2012/13 flask shipment**



**Reactor one – percentage defuelled**



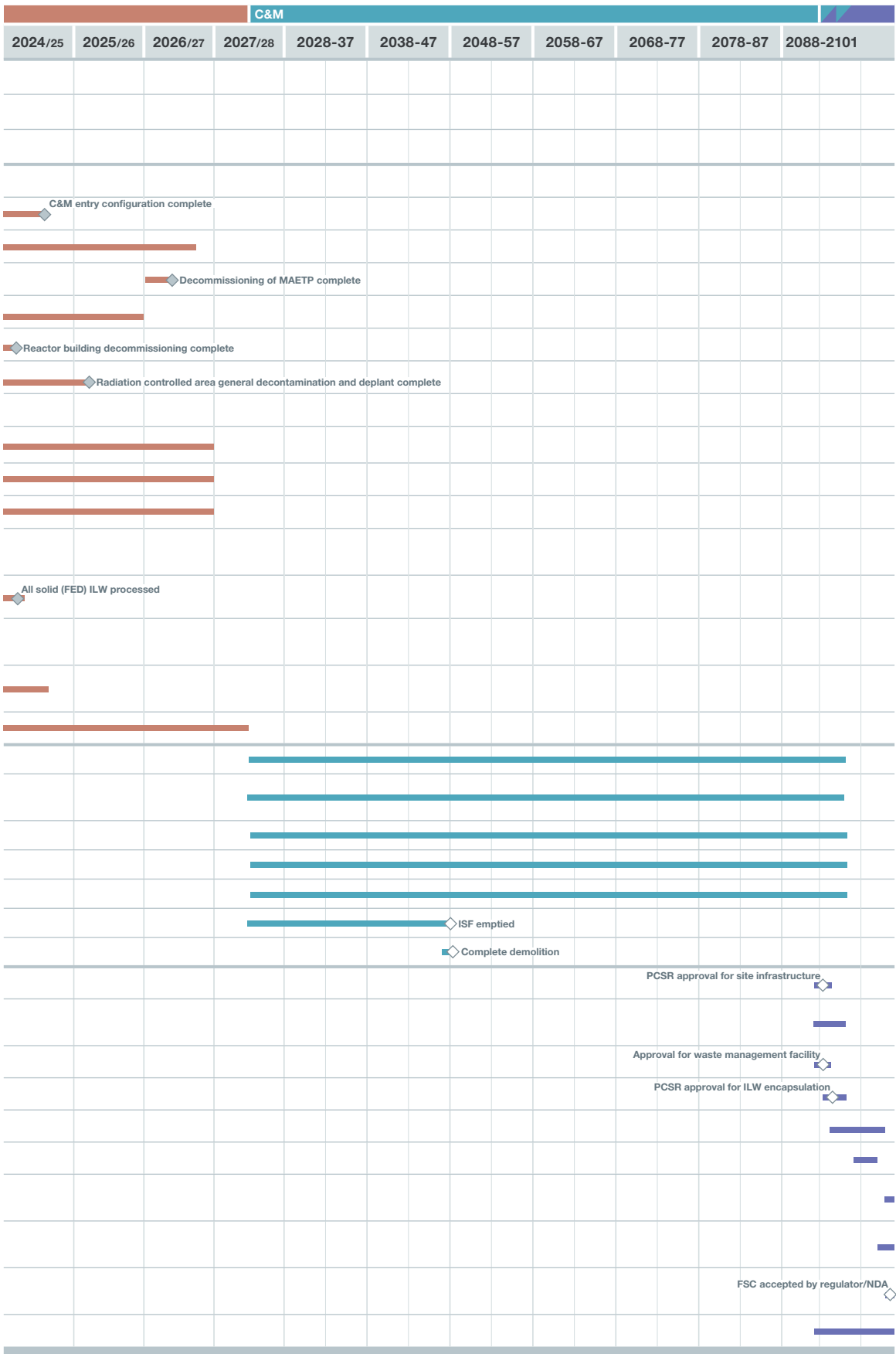
**Reactor two – percentage defuelled**



## Milestone schedule of work

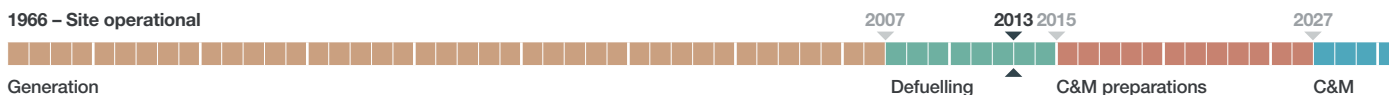


◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Sizewell A



Sizewell A is located near Leiston in Suffolk and is a twin reactor site. The site became fully operational in 1966, and shut down on 31 December 2006 after 40 years of safe, compliant generation. The site is currently being defuelled.



Defuelling  
2007-2015

## Sizewell A costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	1.51	24.54	11.33	2.34	2.81	2.79	1.21	-	-
Ponds	-	1.87	6.81	5.30	5.70	2.04	4.37	4.44	4.96	5.21	1.09
ILW Management	-	1.14	4.48	5.71	1.47	1.47	0.66	3.34	1.10	0.13	0.13
Plant and Structures	1.92	2.60	1.10	3.99	11.35	14.45	17.93	21.81	23.13	18.41	22.24
Waste Management	1.67	1.68	2.11	2.43	1.82	4.05	6.25	7.94	7.40	6.43	3.15
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	12.44	11.73	10.43	10.47	10.38	10.43	10.43	10.43	10.43	10.43	9.63
Site projects	20.64	17.81	17.04	15.39	12.16	12.12	13.50	14.72	14.89	13.60	12.25
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	1.49	1.44	-	-	-	-	-	-	-	-	-
Transition	-	7.85	-	-	-	-	-	-	-	0.69	-
<b>Total</b>	<b>38.15</b>	<b>46.11</b>	<b>43.48</b>	<b>67.84</b>	<b>54.19</b>	<b>46.90</b>	<b>55.95</b>	<b>65.48</b>	<b>63.13</b>	<b>54.91</b>	<b>48.50</b>

## Key near term activities

Sizewell A is currently in the defuelling phase and is also undertaking project works which are enabling its transition into decommissioning.

The key near term activity for Sizewell is defuelling, along with further work on both the electrical and control and instrumentation overlay projects.

The site will also continue its on-going efforts in ensuring that systems and structures remain fit-for-purpose and creating opportunity as required through configuration control.

## Defuelling

Sizewell A had 627 tonnes of spent fuel from the generation phase of its lifecycle, 46 per cent of that fuel has been removed from the reactors, and the site is working steadily towards completion of defuelling in 2015.

## Configuration control

Configuration control drives the isolation of plant and creates opportunities for future deplanting and demolition work when resources and funding are available. It has been a significant factor in enabling the site to move into decommissioning and remains a key driver by providing both a visual and practical tool for reducing nугatory systems, increasing efficiency and the removal of latent hazards.

## Systems and structures preservation project

Following cessation of generation in December 2006, the site had a very well defined decommissioning plan. However, due to a number of factors, these plans could not be enacted. As a result there are degrading systems and structures at Sizewell A that would have been either shut down, decommissioned or demolished as part of the original plan. These must now be refurbished

or replaced in order that they remain in a fit-for-purpose state.

The project is systematically examining systems and structures to determine and implement appropriate solutions. Work to date includes the town's main reservoir, boiler house roofs, sewage plant and off-shore structures.

The current focus is the refurbishment of the active effluent tanks which, should they fail, would jeopardise the site's defuelling activities and fuel-free milestone.

## Electrical and control and installation (C&I) overlay projects

The site is currently working on the modification of the electrical and C&I systems. These projects will ensure compliance and business continuity throughout C&M preparations, and act as an enabler for the isolation and decommissioning of redundant plant and buildings.

10  
Site area

319  
Current number of FTEs

110  
Station lifetime output of electricity

131  
Number of years from the start of generation to FSC



**C&M preparations**  
2015-2027



**C&M**  
2027-2092

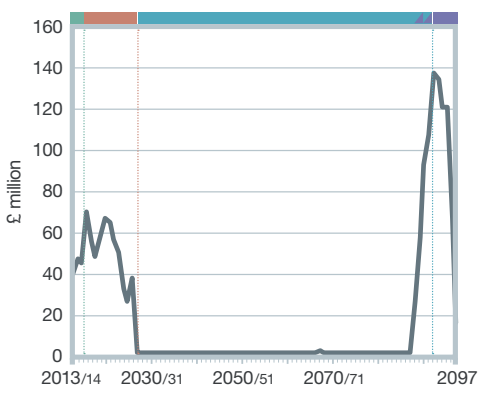


**FSC**  
2088-2097

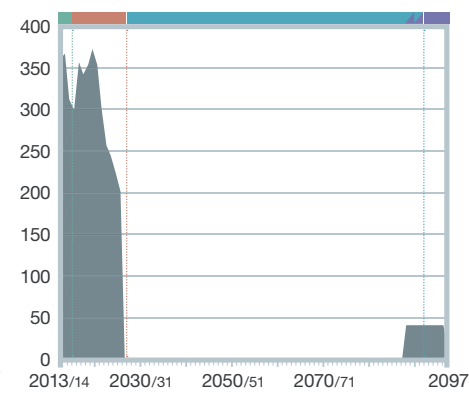
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	46.54	-	46.54
-	-	-	-	41.79	-	41.79
0.13	0.13	0.13	-	20.03	-	20.03
8.14	1.89	1.89	-	150.85	-	150.85
1.92	1.87	1.62	-	50.34	-	50.34
-	-	-	0.43	0.43	21.97	22.40
-	-	-	-	-	860.76	860.76
9.63	8.84	8.04	-	143.75	-	143.75
11.01	11.11	11.11	-	197.35	-	197.35
-	-	-	-	-	-	-
-	-	-	-	2.92	-	2.92
0.69	0.69	13.39	-	23.31	-	23.31
<b>31.53</b>	<b>24.52</b>	<b>36.17</b>	<b>0.43</b>	<b>677.30</b>	<b>882.73</b>	<b>1,560.03</b>

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

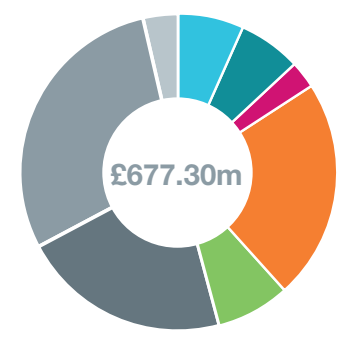
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Sizewell A



Maintenance on essential defuelling equipment



Electrical overlay rewiring



Sizewell A

## Recent achievements

Routine visual inspections of the site's AETP tanks revealed anomalies to the integrity of the regenerant neutralising tank (RNT) lining. This prompted redirection of the project team towards an internal inspection and removal of this tank's lining. Further investigation and removal of the liner revealed extensive degradation and damage to the tank's concrete structure including sections of steel rebar.

This presented the team with new challenges to address, including the application of a new glass fibre reinforced plastic (GRP) coating to ensure that provision of a watertight membrane is in place.

The fact that the RNT is the only tank within the system to perform its function presented further challenges to the project team to return a fit-for-purpose tank in a timely manner.

Without the RNT in service, ponds water treatment is shut down which slowly detracts the chemistry properties to a point where irradiated fuel would not be accepted into the ponds and therefore put a hold on defuelling. In spite of all the challenges, the RNT has been returned to service, repaired and relined in a timely manner and to high quality.

The new skills required by the Tank Repair team in order to achieve this feat included removal of old GRP, steel bar repairs, extensive concrete repairs to a depth of 350mm in places, rescreeding of the concrete floor and application of new GRP matting, resins and waxcoat.

The configuration control process is continuing to drive the isolation of plant and systems so that its status is fully understood and actively controlled, creating an opportunity for future deplant and demolition work when resources and funding are available.

This process has proved to be a great success on-site, and has resulted in an interactive site plan being developed and launched to act as a visual communication aid showing the current status, access information and future requirements of plant, buildings and areas in and around site. This simple but effective management tool allows the user to navigate around the site plan accessing key information in a structured format.

Defuelling continues at a steady pace, with the site able to process additional flasks when they become available.

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

## Cost variance to previous Magnox plan costs

Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	23.66	23.31	-0.35	-
.11 New construction	263.65	271.40	7.75	Reassessment of existing work scope. Inclusion of FED lead and learn, new ILW ISF & EDF Energy opportunities. LTP update to remove P50-P80 contingency and incorporate inflation/indexation
.12 Commercial operations	15.76	34.76	19.00	Increase in work scope, inclusion of MOP update. LTP update to remove embedded savings and efficiencies and incorporate inflation/indexation
.13 Decommissioning and termination	565.83	521.04	-44.79	Inclusion of MOP update and new FED lead and learn. Management of EDF Energy scope including new opportunities, close out of existing work and change in cost categories, reassessment of existing workscope. LTP update to incorporate inflation/indexation
.14 Waste and nuclear materials management	452.65	460.40	7.75	Inclusion of new FED lead and learn and reassessment of existing workscope. LTP update to remove P50-P80 contingency and incorporate inflation/indexation
.15 Site support	228.39	138.06	-90.33	Centralisation of IT scope. Inclusion of MOP update, management of opportunities with EDF Energy and change of cost category for some EDF energy costs. LTP update to remove embedded savings and efficiencies and incorporate inflation/indexation
.16 Support services	127.35	95.20	-32.15	Centralisation of HR scope. LTP update to remove embedded savings and efficiencies and incorporate inflation/indexation
.17 Stakeholder support	24.05	15.87	-8.18	Centralisation of HR scope. LTP update to remove P50-80 contingency and incorporate inflation/indexation
<b>Total</b>	<b>1,701.33</b>	<b>1,560.03</b>	<b>-141.30</b>	

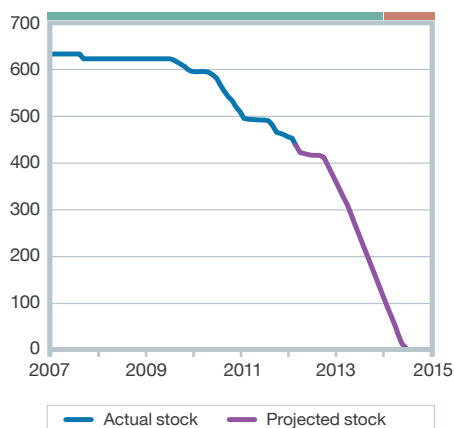


**Key challenges and considerations**

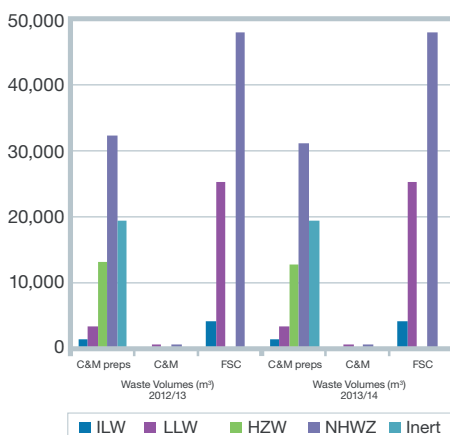
Risk/opportunity	Impact	Mitigation
There is a threat that defuelling may be delayed	As a result of increased sulphate levels in the ponds Which may result in the current programme for completion not being achieved	Defuelling operations have stopped, all fuel has been removed from the ponds and a programme of ponds purging has commenced to reduce the sulphate to the correct levels
There is a threat that ageing plant and poor processes challenge the site's ability to meet the defuelling target of 31 March 2015	As a result of historical delays Which may result in delays in decommissioning work as defuelling is extended	Defuelling improvement group have made significant improvements in managing the defuelling process. Risk mitigation activities were undertaken during the Olympic outage to improve equipment reliability
There is a threat that the protests will prevent normal operations at Sizewell A	As a result of protestors preventing access to site Which would result in additional costs and contract/staff downtime	Emergency and business continuity plans are activated. Lessons learned from event on 1 December 2012. Site personnel aware of business continuity hotline. Shift charge engineers now responsible for updating the hotline
There is a threat that an extensive scope of work within the AETP is required (particularly the final active waste tank)	As a result of the age and condition of AETP Which may result in additional baseline being sought	A lead team review of the AETP management arrangements was conducted in August 2012 and a proposal for forming a self contained delivery team for the AETP was agreed
There is a threat that the site lose SQEP specialist resources (safety cases/discipline engineering/civils/rotating plant expertise)	As a result of changes in government policy (for example the announcement of a new build programme within the nuclear industry creating additional international, national and local competition for resource)  Which may affect the ability to deliver work within planned timescales	Dependent on the progress of negotiations, a good relationship with EDF Energy is being built which will improve the possibility of resource transfer negotiations in the future
There is an opportunity to have plant and buildings ready for demolition	As a result of the configuration control principle Which may result in a reduction of the total plant and buildings that require maintenance in the future and their consequent financial burden	A configuration control team has been established and is working successfully
There is an opportunity to carry out fuel-free verification on some channels within the reactor cores	As a result of reorganisation and downtime on defuelling Which may shorten the final verification timescale at the end of defuelling, currently scheduled for 31 March 2015	Site refocused to support fuel route with the defuelling improvement group steering the way forward

Assumption	Justification
It has been assumed that there are no events or issues at Sellafield or with the flasks that would prevent us from dispatching fuel from site	Based on the MODP being MOP9
It has been assumed that all waste has been accounted for in the SMART inventory and that no further legacy waste is discovered	Based on the SMART inventory surveys
It is assumed that the requirements of the NDA and our regulators remain the same for the duration of the MODP	Based on the current requirements within the MODP

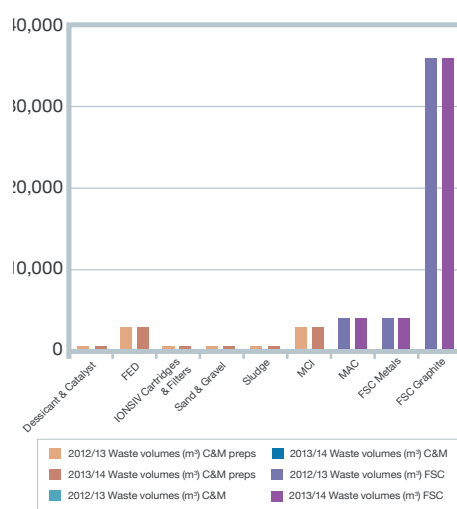
**Defuelling plan**



**Defuelling decommissioning waste arising by phase and waste category plan**



**ILW arising by type and phase**

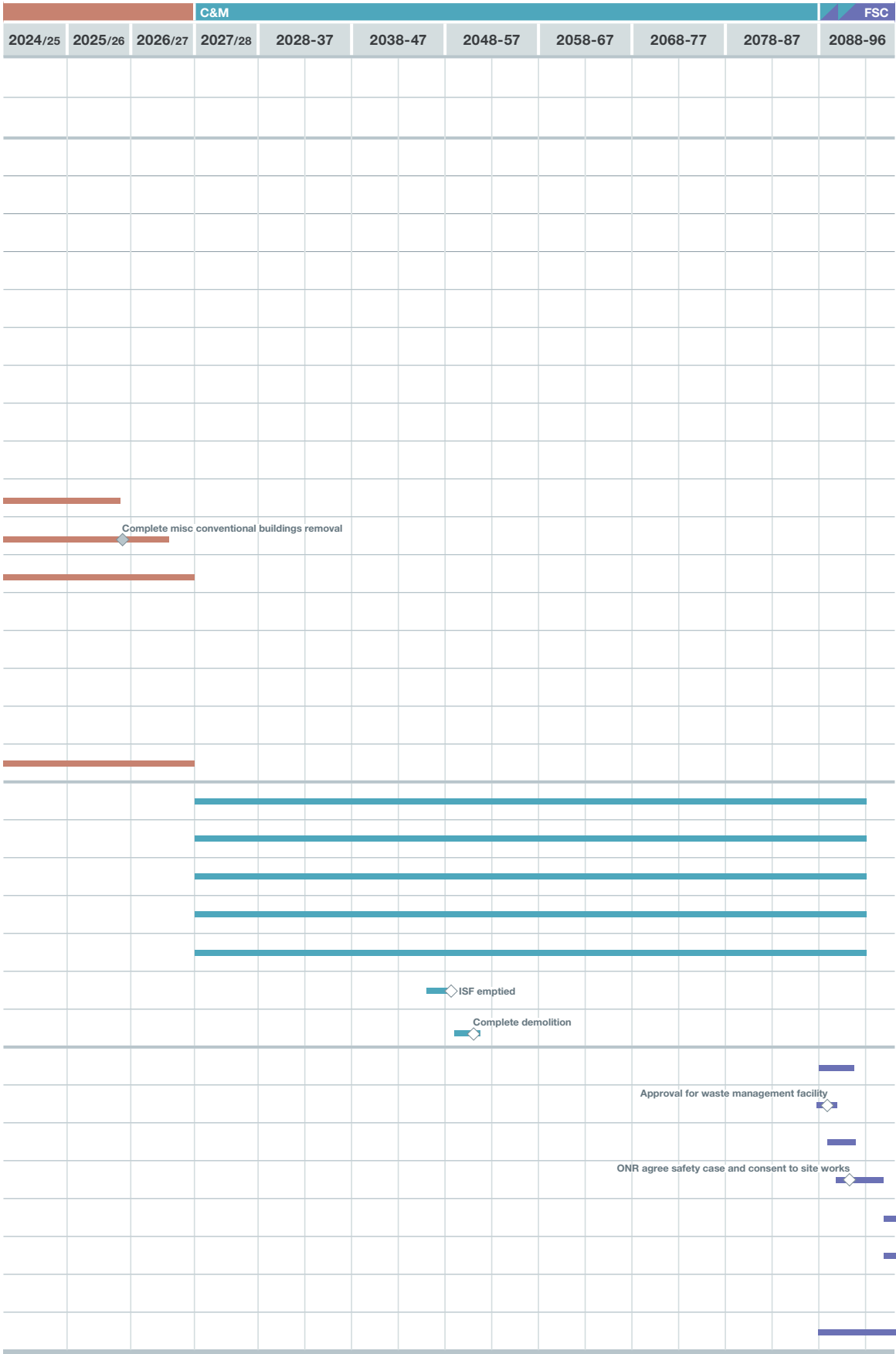


# Sizewell A

## Milestone schedule of work

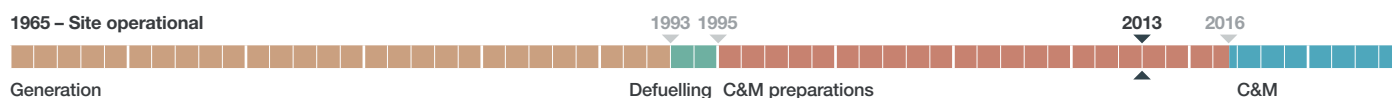
Key work programmes	Defuelling		C&M preparations										
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
Defuelling	Defuelling support	Fuel-free verification											
	Functional support												
C&M preparations	Install MAETP	MAETP installed											
	Ponds step 1-3	Ponds drained and stabilised											
	Ponds step 4-6	C&M entry configuration complete											
	Turbine hall thermal insulation removal	Complete bulk asbestos removal											
	Build ISF	Completion of inactive commissioning											
	AETP and other WTP decommissioning	AETP deplanted and demolished											
	Boiler house thermal insulation removal												
	Remove cooling water pumphouse and off-shore structures	Complete cooling water pumphouse demolition											
	Decommission and demolish turbine hall	Complete turbine hall and auxiliary buildings removal											
	Reactor building deplant												
	Remove admin and ancillary buildings												
	C&M preparations on site passive storage (ISF)	Completion of active commissioning											
	FED dissolution abatement – design and build	Active commissioning of retrieval equipment complete											
	FED retrieval	Complete FED ILW retrieval											
	FED dissolution operations	All solid (FED) ILW processed											
	FED dissolution and abatement – decommission	Decommissioning of facility complete											
	Functional support												
	C&M	Facilities management and control											
		Corporate support and licence management											
		Environmental monitoring											
Civil structures maintenance													
Safestore cladding maintenance													
ISF empty													
Demolish ISF													
FSC		Supply/install reactor dismantling facilities											
	Build waste management facility (LLW)												
	Build waste management facility (ILW)												
	Reactor dismantling and building demolition												
	Remove waste management facility (LLW)												
	Remove waste management facility (ILW) – encapsulation plant												
	Site surveys, radiological clearance and landscaping												
	Site security and surveillance												

◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Trawsfynydd



Trawsfynydd is located on a 15.4 hectare site, on an inland lake in Snowdonia National Park, North Wales. Trawsfynydd was the first inland civil Magnox nuclear station and drew its cooling water from Llyn Trawsfynydd. It started service in 1965 and generated electricity for 26 years until 1991.



Defuelling  
1993-1995

## Trawsfynydd costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	10.68	4.07	0.26	-	-	-	-	-	-	-	-
Ponds	4.54	3.05	1.83	0.66	-	-	-	-	-	-	-
ILW Management	8.81	5.68	4.17	3.45	-	-	-	-	-	-	-
Plant and Structures	15.80	26.22	29.09	16.26	-	-	-	-	-	-	-
Waste Management	6.36	3.91	3.28	1.50	-	-	-	-	-	-	-
C&M	-	-	-	0.12	0.44	2.20	2.83	16.77	28.83	26.48	40.08
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	14.18	10.74	7.34	4.94	-	-	-	-	-	-	-
Site projects	6.97	4.79	3.25	2.01	-	-	-	-	-	-	-
Generation projects	-	-	-	-	-	-	-	-	-	-	-
Defuelling projects	-	-	-	-	-	-	-	-	-	-	-
Transition	0.07	1.96	9.73	0.27	-	-	-	-	-	-	-
<b>Total</b>	<b>67.40</b>	<b>60.42</b>	<b>58.94</b>	<b>29.21</b>	<b>0.44</b>	<b>2.20</b>	<b>2.83</b>	<b>16.77</b>	<b>28.83</b>	<b>26.48</b>	<b>40.08</b>

## Key near term activities

Currently in C&M preparations, Trawsfynydd is a key site in the NDA portfolio as it is one of the accelerated sites trying to achieve early C&M entry. The work is focused around key hazard reduction projects in addition to the maintenance of key assets which include the reactor safestores and the newly constructed ILW store.

The site has discharged over half the work required to achieve C&M with significant key hazard reduction milestones achieved including emptying resin vault one and significant emptying of the ponds north void. Good progress has been made in enabling commencement of the FED retrieval project with active commissioning expected in 2013/14. Progress has also been made on safestore preparations for C&M. Structural repairs and internal deplating activities within the safestore are due to continue for the next two years.

## Some key projects

- Resin vault one, two and three emptied of ILW resin and cleaned. Waste within these vessels will either be processed through the resin solidification plant or transferred to main sludge vault (MSV) for processing
- MSV emptied of bulk sludges and cleaned. The MSV currently contains legacy waste from operations and will receive further waste from the emptying of residual waste from resin vaults two and three. The sludge waste will be processed by the sludge solidification plant and transferred to the ILW store
- Civil construction and plant installations for FED enhanced retrievals. Construction and plant installation works are in progress and plant being installed. These works will be completed prior to actively commissioning the plant

- Active commissioning for FED retrievals. The installed retrieval plant will be non-actively and actively commissioned to satisfy the requirements of key stakeholders, including the regulators
- Routine operations for FED retrievals. Once actively commissioned, the FED plant will be handed over to the operations team. From this point onwards the operations team will retrieve all legacy FED waste and any other ILW waste such as dusts and floor screeds
- Safestore strengthening works. Following structural integrity surveys and routine asset care surveys, issues have been identified which resulted in structural repairs being necessary. This will ensure that the structural integrity of the safestore is maintained for the next ten years until height reduction



15.4

Site area



365

Current number of FTEs



69

Station lifetime output of electricity



118

Number of years from the start of generation to FSC



**C&M preparations**  
1995-2016



**C&M**  
2016-2078

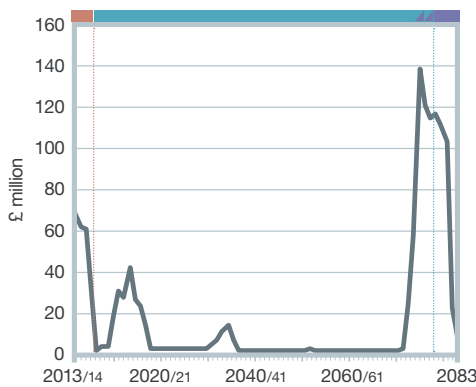


**FSC**  
2074-2083

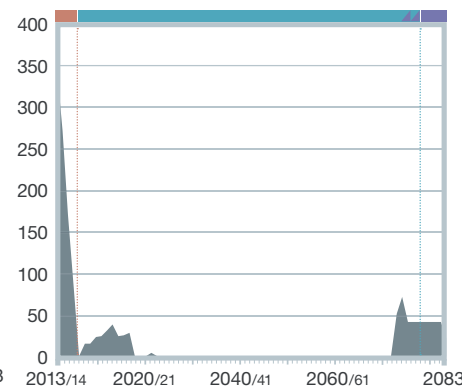
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	15.01	-	15.01
-	-	-	-	10.08	-	10.08
-	-	-	-	22.10	-	22.10
-	-	-	-	87.37	-	87.37
-	-	-	-	15.04	-	15.04
24.60	21.59	12.29	1.09	177.31	61.85	239.16
-	-	-	-	-	799.56	799.56
-	-	-	-	37.20	-	37.20
-	-	-	-	17.02	-	17.02
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	12.03	-	12.03
24.60	21.59	12.29	1.09	393.16	861.41	1,254.57

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

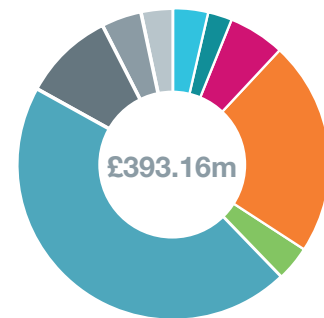
**Budgeted cost of work scheduled throughout the plan**



**Resource profile throughout the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Trawsfynydd



Bulk resin retrieval from resin vault two



Brokk for retrieving FED



ROV retrieves sludge from resin vault one

## Recent achievements

Some recent activities at Trawsfynydd:

- Resin vault two retrievals complete. Key hazard reduction and wet waste retrieved and packaged ready for transfer to the ILW store
- First resin tank cleared (resin vault one). This has been a major achievement in proving technology utilised can achieve the required end states. The learning from this can be shared and lessons learned across many Magnox decommissioning sites
- Civil preparatory works in advance of FED retrieval substantially complete. Active commissioning is expected to commence in 2013 ahead of routine FED retrieval operations
- Ongoing repairs to safestores (pre-cast panels/strengthening work). Significant work has been undertaken to ensure that the structures are in a safe compliant condition and they remain so until commencement of height reduction. This project is due to commence in 2020

- Completion of environmental clean and strengthening to safestore boiler box three. This is a significant milestone which was of interest to the regulators
- Legacy waste packages transferred from safestore basement to ILW store. Basements have now been emptied of all legacy waste packages which are now safely stored in the ILW store
- Commence transfer of ILW resin drums from drum stores to ILW store (active commissioning)
- VLLW disposal, Trawsfynydd has become the first Magnox site to dispose of waste as VLLW. This is a major success as the waste was previously destined for LLWR. By sorting and segregating waste the lower activity wastes are isolated and monitored to assess whether they achieve VLLW criteria. Disposing of the waste as VLLW to licensed landfill sites ensures that the burden on LLWR to store waste is greatly reduced.



Inside resin vault two

## Cost variance to previous Magnox plan costs

Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	12.18	12.03	-0.15	LTP update incorporate inflation/indexation
.11 New construction	376.17	379.66	3.49	Additional work scope and LTP update incorporation of inflation/indexation
.12 Commercial operations	-	-	-	-
.13 Decommissioning and termination	275.18	259.67	-15.51	LTP update incorporation of inflation/indexation
.14 Waste and nuclear materials management	427.36	446.10	18.74	Additional work scope and LTP update incorporation of inflation/indexation
.15 Site support	122.69	76.15	-46.54	Centralisation of IT scope and LTP update incorporation inflation/indexation
.16 Support services	80.36	71.78	-8.59	LTP update incorporation of inflation/indexation
.17 Stakeholder support	10.07	9.17	-0.90	LTP update incorporation of inflation/indexation
<b>Total</b>	<b>1304.02</b>	<b>1254.57</b>	<b>-49.45</b>	

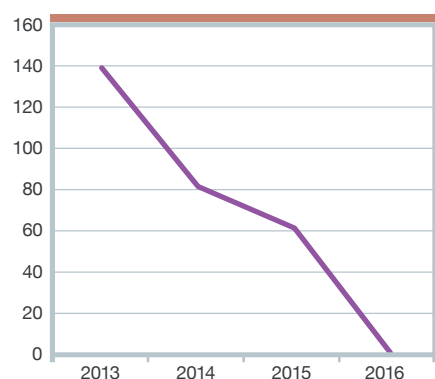
The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

### Key challenges and considerations

Risk/opportunity	Impact	Mitigation
There is a threat of failing key infrastructure leading to critical delays on projects	As a result of ageing plant and infrastructure Which may result in schedule delays if time is spent undertaking major repairs on existing key facilities	Regular inspections and maintenance of key plants Plant health committee in place
There is a threat that as areas are decontaminated and deplanted, unanticipated asbestos is found in inaccessible areas	As a result of building surveys Which may result in delays while asbestos is sampled and removed and which may lead to cost and schedule increases	Extensive surveys in areas which are reasonably accessible to determine asbestos presence. Some areas may not be accessible until deplanting and decontamination is in progress
There is a threat that future characterisation results of the radiological contamination in the ground below the ponds may invalidate the current strategy of maintain and monitor until FSC	As a result of ongoing contamination characterisation Which may result in the site revisiting the safety case strategy and developing a forward action plan to deal with contaminated ground	Complete characterisation to understand extent of contamination, in particular under the cooling ponds complex
There is a threat that additional waste or unanticipated waste may be identified that requires additional treatment or an orphan waste stream. In particular new active waste vault waste streams over and above current inventory	As a result of current operations and ongoing waste characterisation Which may result in additional plant operations/alternative methodologies to deal with waste streams not within the site inventory	Mitigation activities included in the plans to characterise/trial potential technical solutions to deal with difficult waste streams
There is an opportunity to negotiate a more practical entry state requirement in the ponds complex	In the event that a revised entry state is agreed Which may result in the ability to negate some scabbling activities in the ponds complex with associated cost and schedule benefits	Ongoing characterisation and sampling Early negotiations with regulators have been well received

Assumption	Justification
It has been assumed that no additional waste will be discovered, that could have been identified through reasonable endeavours of characterisation that are incompatible with the current designs of on-site waste treatment facilities or current disposal routes	Based on the on-site waste treatment facilities being designed and developed using the characteristics of the waste within the waste inventories underpinned by surveys, investigations and characterisation works that have been completed as far as reasonably possible
It has been assumed that government policy, construction standards, legislative and regulatory requirements, guidance and advice, including but not limited to those related to health, security, safety and safety cases, engineering, environmental issues and the management, storage and disposal of radioactive wastes, and NDA requirements, will remain unchanged, and/or changes pending have no impact on MODP	Based on Magnox contractual obligations stating that work is to current legislation, government policies, construction standards and regulatory requirements. Continued engagement with the relevant agencies has identified that there are no significant proposed changes
It has been assumed that no events occur that adversely affect site, stop activities and that are not of the SLC's own making (including but not limited to examples such as external site event, force majeure event, pre-contract historic event, encounter protected species, extreme weather conditions)	Based on the historical trend that there have been no significant weather events that have significantly disrupted work over the last five years, and there have been no major environmental or force majeure events during this time

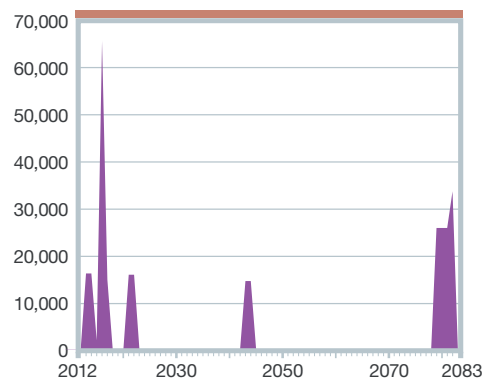
Boxes of FED to be recovered



ILW packages transferred to ILW store



Building demolition timeline



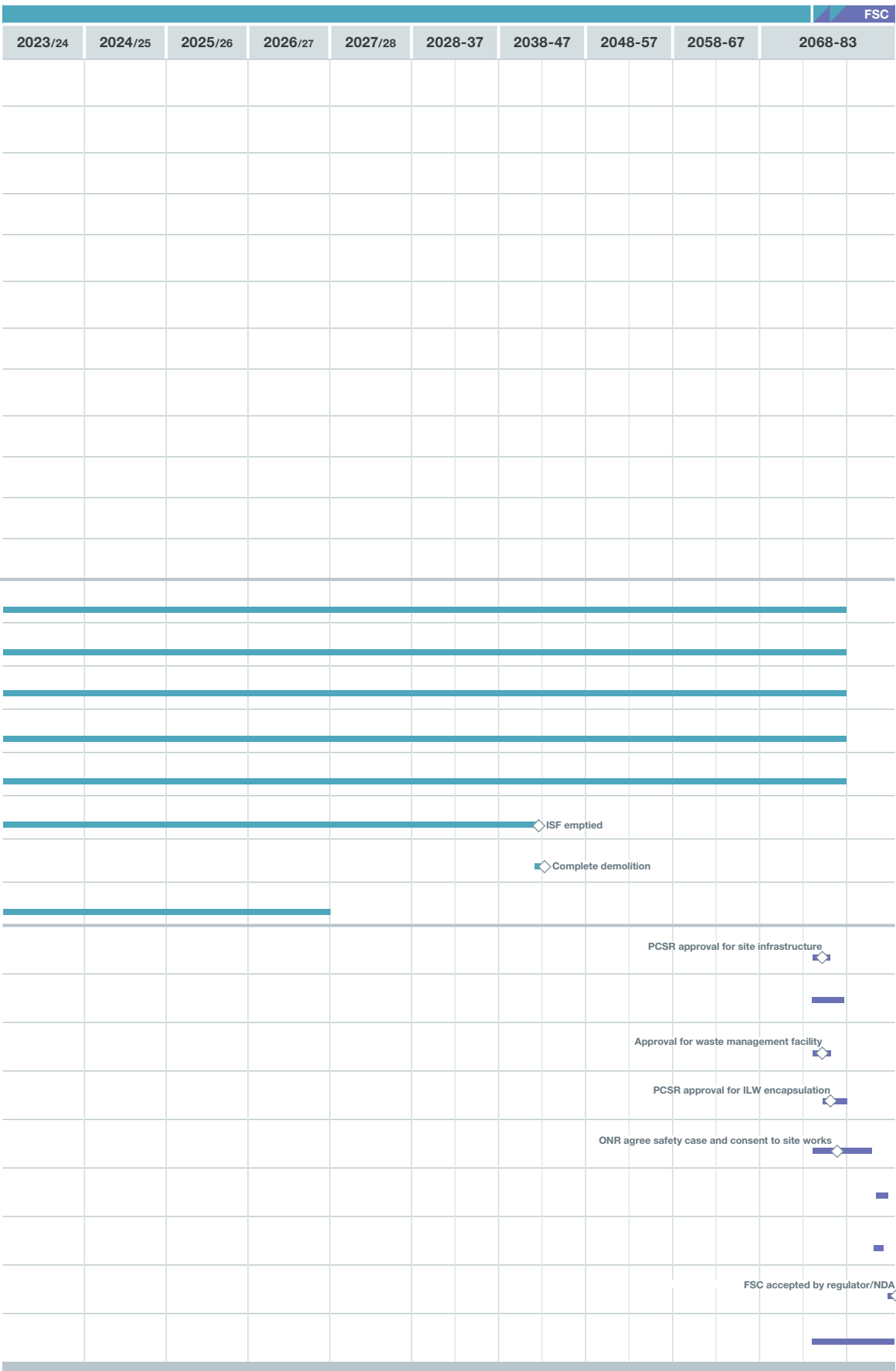
# Trawsfynydd

## Milestone schedule of work

Key work programmes	C&M preparations				C&M						
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
C&M preparations	Build solid (FED) ILW retrieval and processing facility	Inactive commissioning of facility complete									
	Solid (FED) ILW retrieval and processing operations	Active commissioning of facility complete									
	Solid (FED) ILW retrieval and processing operations	Solid (FED) ILW retrieval and processing complete									
	Solid operational ILW retrieval	All solid operational ILW ready for final disposal									
	Wet operational ILW retrieval	All wet operational ILW ready for final disposal									
	Decommission solid (FED) ILW retrieval and processing facility	Solid (FED) ILW retrieval and processing facility decommissioned									
	Reactor building deplant										
	Remove conventional plant and buildings										
	Ponds steps 4-6					Ponds demolition complete					
	Ponds other					Ponds surface scabbling and furniture removal complete					
	Remove fuel route plant and buildings										
	Functional support										
	C&M	Facilities management and control									
Corporate support and licence management											
Environmental monitoring											
Civil structures maintenance											
Safestore cladding maintenance											
ISF empty											
Demolish ISF											
Safestore height reduction											
FSC	Site security and surveillance										
	Overall project support										
	Build waste management facility										
	Install site infrastructure										
	Install reactor dismantling facilities										
	Waste management facility LLW operations, transport and disposal										
	Waste management facility ILW operations and transport										
	Reactor dismantling										
Landscaping and radiological clearance											

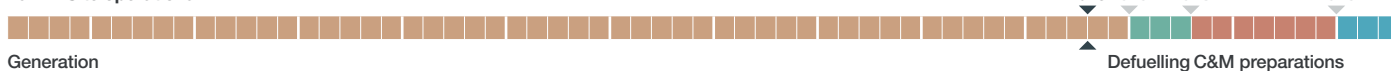


◆ Key milestone ◇ Regulatory milestone



# Wylfa

1971 – Site operational



Wylfa is an operational power station on a 20.8 hectare site on the north coast of Anglesey between Holyhead and Amlwch. The site has only one running reactor and two operational turbine generators. It meets more than 20 per cent of Wales' electricity needs.



Defuelling  
2015-2018

## Wylfa costs

Programmes/ key activities	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
FED Treatment	-	-	-	-	-	-	-	-	-	-	-
Ponds	-	-	-	-	-	-	-	-	-	-	-
ILW Management	0.39	1.11	2.40	3.63	7.12	1.93	1.00	1.49	0.10	0.10	0.11
Plant and Structures	0.31	0.50	5.58	13.00	26.80	36.25	18.58	21.17	26.30	23.58	18.58
Waste Management	1.24	1.25	2.18	2.39	2.70	2.89	2.97	3.04	3.21	3.37	3.98
C&M	-	-	-	-	-	-	-	-	-	-	-
FSC	-	-	-	-	-	-	-	-	-	-	-
Support and overhead	17.42	16.74	14.53	14.52	14.56	20.54	21.53	21.22	21.43	18.51	18.28
Site projects	15.38	11.09	10.48	11.59	12.26	7.08	3.84	3.30	2.54	2.22	2.57
Generation projects	63.31	59.30	0.23	0.35	0.26	-	-	-	-	-	-
Defuelling projects	0.26	0.39	35.56	35.29	31.58	7.83	-	-	-	-	-
Transition	0.23	8.00	0.17	0.17	0.24	10.20	9.57	-	0.71	-	0.94
<b>Total</b>	<b>98.57</b>	<b>98.38</b>	<b>71.14</b>	<b>80.95</b>	<b>95.51</b>	<b>86.71</b>	<b>57.49</b>	<b>50.22</b>	<b>54.29</b>	<b>47.77</b>	<b>44.46</b>

## Key activities near term

Wylfa was the final Magnox station to be built in the UK and as such is the only remaining Magnox Ltd site generating electricity. Its current focus is to safely, compliantly and with environmental responsibility optimise NDA revenue through electricity generation.

The opportunity to extend generation was achieved in 2012. IRX from one reactor to another will enable the site to generate with one reactor (reactor one) until the end of 2014, subject to a successful PSR.

To facilitate this, changes with respect to the fuel records system and the fuel route processes have been made.

Following shut down early in 2012, reactor two has undergone a post-generation inspection programme.

Wylfa will continue to manage and operate Maentwrog hydro-electric power station, which was opened in 1928 and is situated near Trawsfynydd.

Opportunities for generation to the end of 2015 are being considered however the need to defuel within the MOP time constraints takes priority.

Following recognition from a WANO peer review in 2011 for continuous improvement to plant condition and housekeeping, the station has continued to upgrade plant and material condition despite being in the latter stages of generation.

In preparation for defuelling, the site has invested not only in ensuring that plant is ready for defuelling, but that the organisation is prepared for the change in focus. Work is ongoing to agree the defuelling structures and transition plans to ensure a seamless transition into the defuelling phase.



20.8

Site area



602

Current number of FTEs



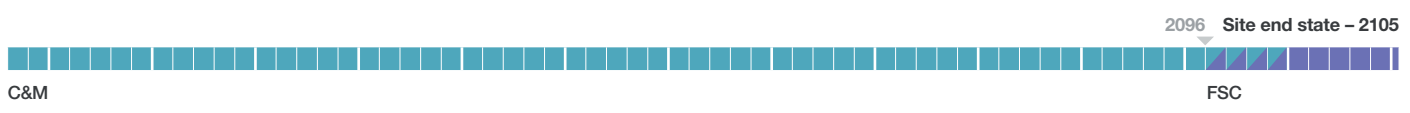
232

Station lifetime output of electricity



134

Number of years from the start of generation to FSC



**C&M preparations**  
2018-2025



**C&M**  
2025-2100

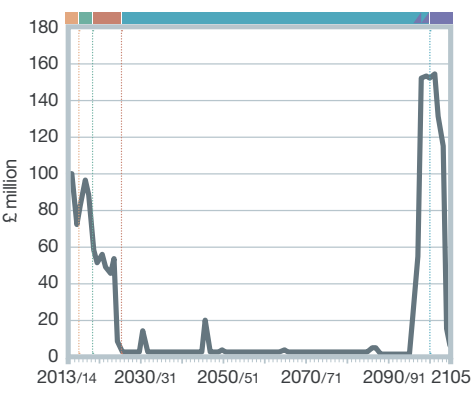


**FSC**  
2096-2105

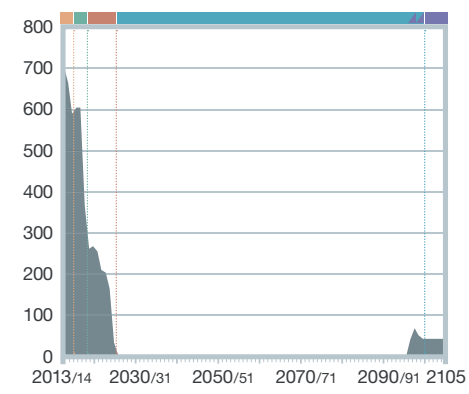
2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
-	-	-	-	-	-	-
-	-	-	-	-	-	-
0.11	0.10	0.07	-	19.67	-	19.67
14.81	1.02	-	-	206.47	-	206.47
1.94	0.43	-	-	31.59	-	31.59
-	0.25	0.32	0.33	0.90	17.50	18.40
-	-	-	-	-	943.90	943.90
16.21	3.30	-	-	218.79	-	218.79
3.58	1.60	1.23	1.26	90.02	109.55	199.57
-	-	-	-	123.46	-	123.46
-	-	-	-	110.91	-	110.91
15.62	-	-	-	45.85	-	45.85
<b>52.27</b>	<b>6.70</b>	<b>1.63</b>	<b>1.59</b>	<b>847.67</b>	<b>1,070.94</b>	<b>1,918.61</b>

The table reflects the total LTP costs from 1 April 2013 allocated against key phases, with C&M preparations further subdivided into strategic programmes. Costs are shown annually up to 2027/28, when the last Magnox site enters C&M.

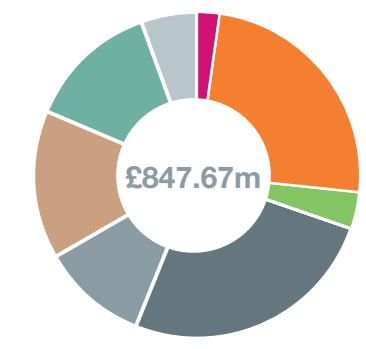
**Budgeted cost of work scheduled throughout the plan**



**Resource profile through the plan**



**Proportional split of site cost through to 2027/28**



The chart above shows total site costs up to 2027/28 split by phase and strategic programme.

# Wylfa



Rotor exchange supports generation to 2014



Turbine rotor sent for recycling



Personnel at work

## Recent achievements

After 41 years of safe generation, reactor two was shut down on 25 April 2012.

On 27 July 2012 the site received permission for IRX. This allows the site to continue generation to the PSR date of the end of September 2014. The actual fuel movements for IRX commenced after the operating rules changed.

The site has continued to generate electricity from reactor one following the successful implementation of the IRX project. Reactor one is being fuelled from the partially utilised fuel which is available in reactor two.

The phased loading of fuel from reactor two to reactor one has commenced successfully, with the spent fuel from reactor one being returned to reactor two where it can be safely stored.

The IRX rates achieved have demonstrated the site's capability to achieve the defuelling rates required post-generation.

The generation target for 2012/13 was achieved safely and compliantly.

In response to the recommendations made by the ONR Chief Inspector following the incident at the Fukushima nuclear plant in Japan, the site has taken action to procure additional emergency response equipment and materials.

The Welsh Government has revalidated Wylfa's Platinum Corporate Health Standard Award (2012-2015) in recognition of the site's outstanding commitment to health and well-being in the workplace and corporate social responsibility and sustainable development practices. Wylfa is the first organisation in Wales to receive revalidation of this prestigious award.

## Cost variance to previous Magnox plan costs

The table shows the movement from the previous LTP submission on 31 March 2012. The costs are split by PSWBS.

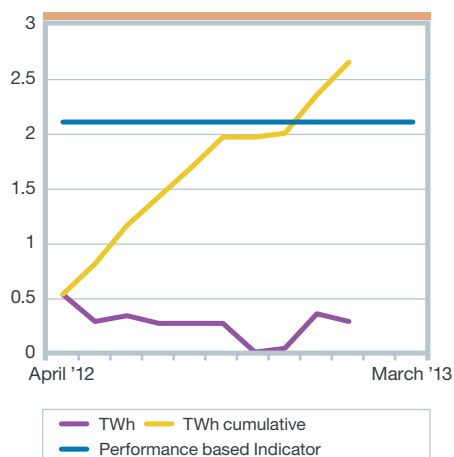
Category	LTP08 Rev. D as at 31 March 2012 (£m)	LTP08 Rev. D as at 31 March 2013 (£m)	Variance (£m)	Summary of variance
.10 Transition	45.94	45.85	-0.09	Inclusion of extended generation and MOP9 and LTP update to incorporate inflation/indexation
.11 New construction	190.86	198.97	8.11	Reassessment of work scope and LTP update to incorporate inflation/indexation
.12 Commercial operations	253.46	393.94	140.48	Reassessment of work scope, additional work including reactor and conventional scope and power/safety enhancements. Inclusion of MOP9 and exceed MODP and LTP updates to incorporate inflation/indexation
.13 Decommissioning and termination	429.30	374.54	-54.76	Reassessment of work scope, inclusion of extended generation, MOP9 and exceed MODP. LTP update to incorporate inflation/indexation
.14 Waste and nuclear materials management	595.87	597.23	1.36	Inclusion of extended generation and MOP9. LTP update to incorporate inflation/indexation
.15 Site support	323.46	175.67	-147.79	Inclusion of exceed MODP, MOP9 and extended generation including associated services. Reassessment of work scope and LTP update to incorporate inflation/indexation
.16 Support services	132.23	110.94	-21.29	Centralisation of HR, occ health and learning and development tier two costs and inclusion of MOP9, exceed MODP and extended generation. LTP update to include embedded efficiencies and savings and incorporation of inflation/indexation
.17 Stakeholder support	23.16	21.47	-1.69	Centralisation of communications tier two costs, extended generation and LTP update to incorporate inflation/indexation
<b>Total</b>	<b>1,994.28</b>	<b>1,918.61</b>	<b>-75.67</b>	

**Key challenges and considerations**

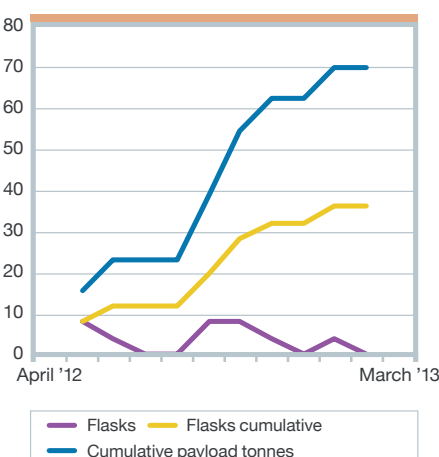
Risk/opportunity	Impact	Mitigation
There is an opportunity that improved fuel harvesting scheme may result in additional generation	As a result of optimising IRX, an opportunity exists to implement an improved fuel harvesting scheme from reactor two to reactor one Which may result in increased generation	Undertake feasibility studies
There is an opportunity to submit a PSR for consideration that includes a period of additional generation	As a result of losses in the period of generation, an opportunity exists to submit a PSR in September 2014 which would include an additional period of generation for a limited period Which may lead to generation to December 2015	Strategy documents currently under way for discussion with stakeholders
There is an opportunity to reduce the time taken to defuel Wyifa's two reactors	As a result of investment in fuelling and defuelling related plant an opportunity exists to reduce the time to defuel the reactors Which may result in increased confidence in meeting the MOP	Fuel route opportunities group set up to identify and enable improvements. Ongoing discussions with MOP team Project to return to service the secondary route is under way
There is a threat that the ageing operational plant will adversely affect generation	As a result of the ageing plant at Wyifa, there is a threat to the plant's performance Which would adversely affect the generation above the expected allowances within the generation forecast model	Continue to follow the asset management arrangements defined in the company standard which includes reviews by site plant health committees and chief engineers
There is a threat of increased fuel route related breakdowns	As a result of the increased complexity of IRX operations and the reliance on a number of interdependent sequential activities, there is a threat of increased fuel route related breakdowns which may result in adverse impacts on fuelling operations Which could lead to a loss of generation	Maintenance team on double days to ensure availability of staff, site arrangements in place to allow power to be reduced such that Wyifa does not have to shut down due to low refuelling rates Daily board and scorecard in place to monitor performance
There is a threat that our existing stocks of trailing lead single element (TLSE) thermocouples may not be acceptable for safety circuit duty	As a result of the unacceptability of the TLSE thermocouples for safety circuit duty, there is a threat that reactor one will be shut down until satisfactory spares have been secured and fitted Which may result in a loss of generation	Understand root cause, investigate restoration of existing components, procure new components once current problem understood

Assumption	Justification
It has been assumed that the site will generate into financial year 2014/15	In accordance with the DECC approved date
It has been assumed that the planned reactor one outage will commence in January 2014 for 100 days	Based on a standard biennial outage
It has been assumed that the organisational structure will be maintained until completion of the 100 day cooldown period following the end of generation	Based upon the current agreed baseline structure
It has been assumed that the site will send its last fuel off-site in December 2017, with a fuel-free verification date of June 2018	Based on MOP9

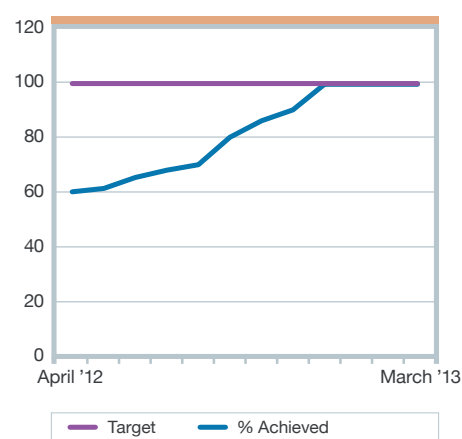
**Generation**



**Spent fuel**

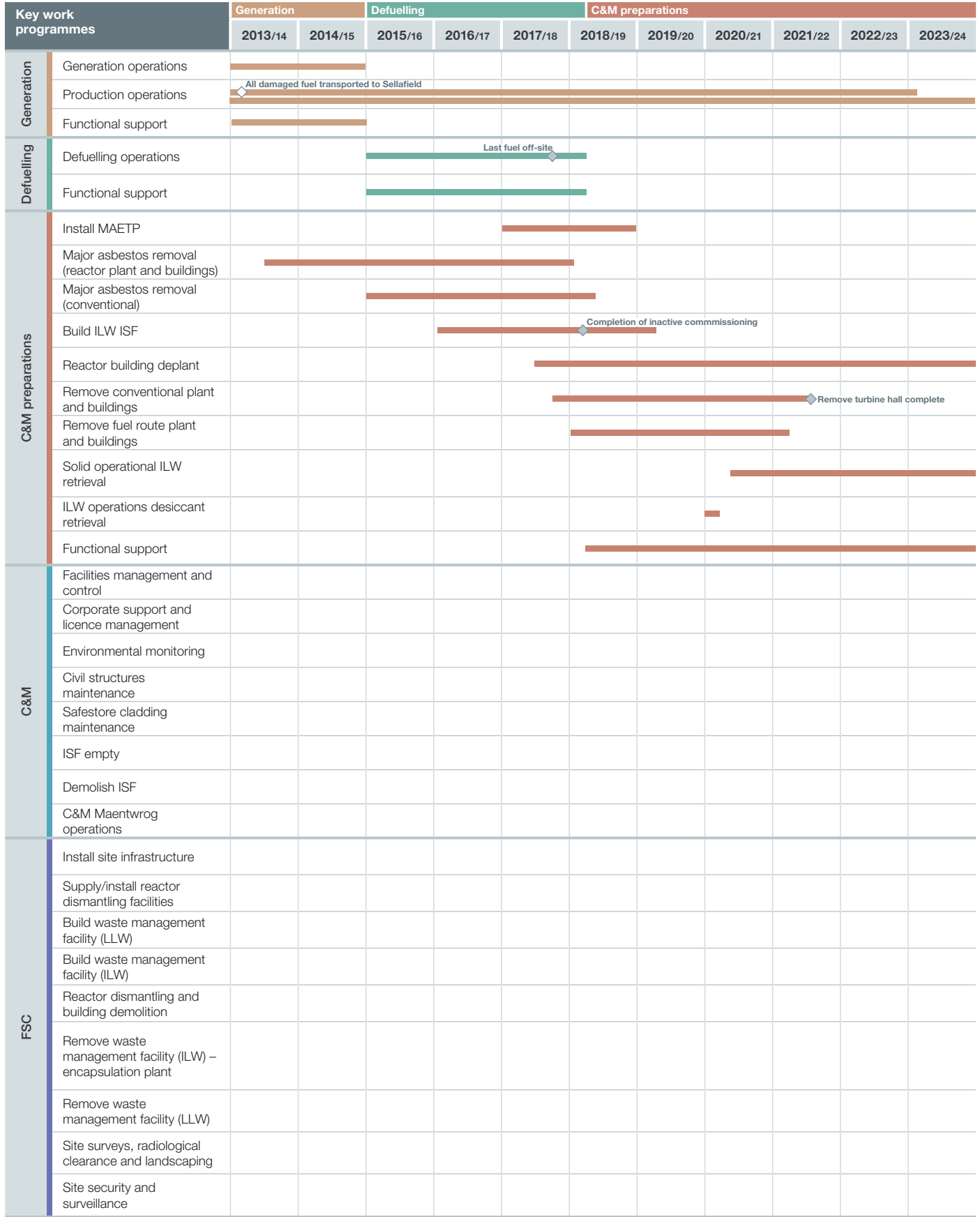


**Process safety indicators**

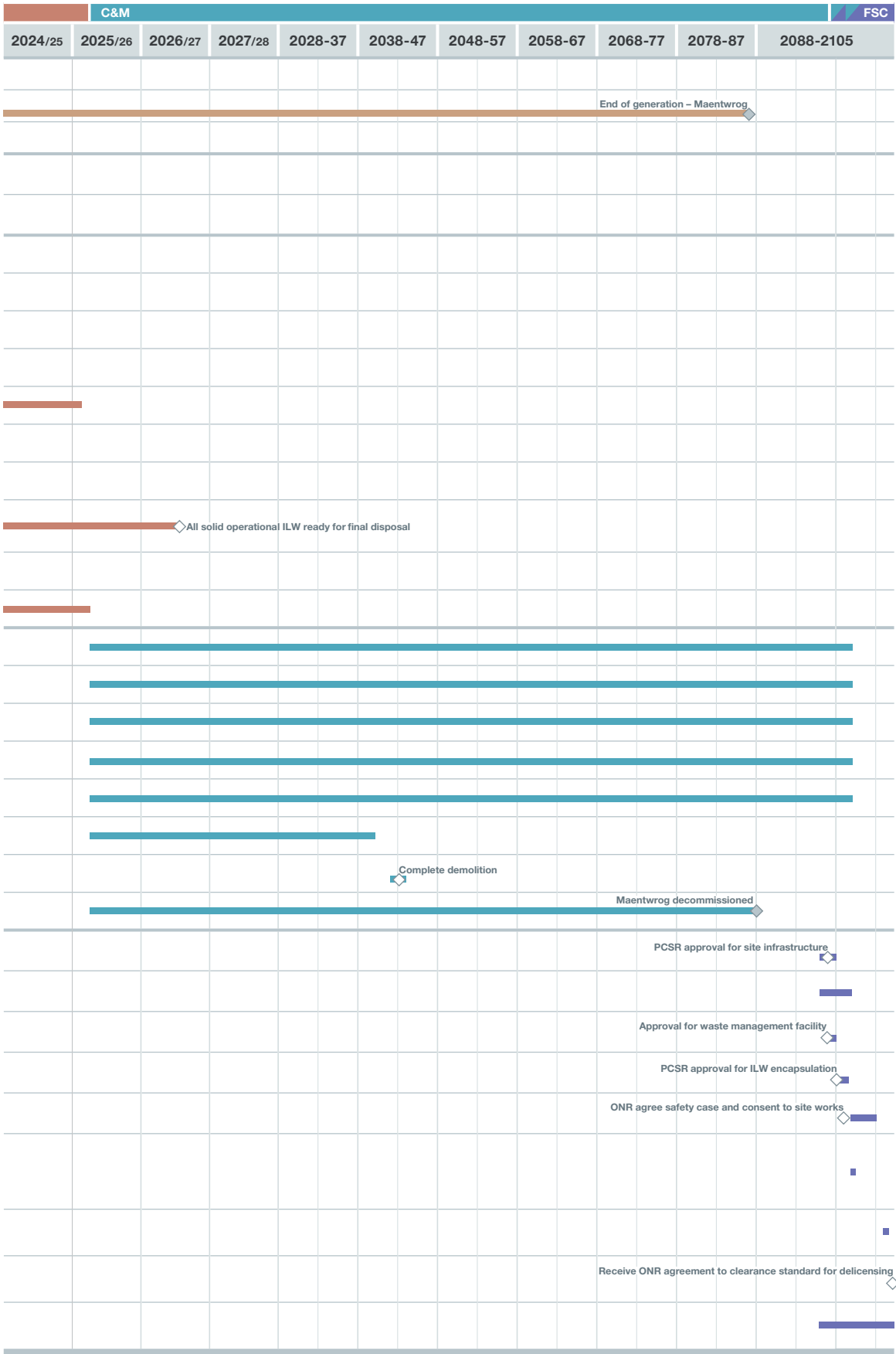


# Wylfa

## Milestone schedule of work



◆ Key milestone ◇ Regulatory milestone



The chart shows the key site activities up to the end of FSC, and the associated milestones identified to support monitoring of progress. The activities are coded according to phase or strategic programme.

# Work breakdown structure and costs

Magnox operates within a project controls framework procedure as requested by the NDA. Work breakdown structures represent the fundamental building blocks which provide the overall framework and structure for the LTPs. This allows the NDA to plan, manage and monitor the entire portfolio of work being managed by the UK civil public sector nuclear sites in a consistent manner.

## Programme summary

The Programme Summary Work Breakdown Structure (PSWBS) is the basis for structuring work within the NDA and provides a consistent framework for managerial and financial oversight of the overall NDA programme. It is used for allocation of funds, developing and updating LTPs, and provides the structure for performance monitoring and reporting.

Broadly, there are two generic types of activity associated with the PSWBS:

- Physical activities on-site:
  - .11 New construction projects
  - .12 Commercial operations
  - .13 Decommissioning and termination, and
  - .14 Waste and nuclear materials management
- Site wide support activities and income:
  - .15 Site support
  - .16 Support services
  - .17 Stakeholder support

It should be noted that the PSWBS is not designed to enable Magnox to plan, manage and execute work programmes on the sites on a day-to-day basis. Instead, this purpose is serviced by individual contractor work breakdown structures. However these two structures are linked to ensure that Magnox manages its projects in line with client procedure.

Further information on the PSWBS cost categories is on the following pages.


## Total plan costs of work breakdown structure

Sites	2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	2021/22 (£m)	2022/23 (£m)	2023/24 (£m)
1 Berkeley	73.82	63.33	68.90	70.65	32.32	33.47	29.69	26.80	0.47	0.47	0.46
2 Bradwell	129.83	92.79	13.06	0.58	0.57	0.58	0.58	0.58	0.58	0.58	0.57
3 Chapelcross	55.68	66.75	78.99	40.27	10.69	10.58	10.49	10.38	10.38	13.32	31.63
4 Dungeness A	38.82	47.49	50.98	44.56	48.68	37.23	9.15	9.12	8.51	17.69	48.82
5 Hinkley Point A	47.38	70.21	34.30	34.33	44.12	57.89	61.65	48.71	31.21	48.39	22.04
6 Hunterston A	34.96	51.29	61.49	60.67	61.89	66.80	62.18	32.92	23.45	0.44	0.44
7 Oldbury	62.12	70.12	72.30	63.76	77.86	74.22	54.89	47.45	78.24	56.87	77.96
8 Sizewell A	38.15	46.11	43.48	67.84	54.19	46.90	55.95	65.48	63.13	54.91	48.50
9 Trawsfynydd	67.40	60.42	58.94	29.21	0.44	2.20	2.83	16.77	28.83	26.48	40.08
10 Wylfa	98.57	98.38	71.14	80.95	95.51	86.71	57.49	50.22	54.29	47.77	44.46
11 MSO	75.13	91.58	70.63	67.31	60.30	60.65	54.03	53.16	45.61	47.12	47.93
<b>Total</b>	<b>721.86</b>	<b>758.46</b>	<b>624.21</b>	<b>560.12</b>	<b>486.58</b>	<b>477.23</b>	<b>398.95</b>	<b>361.58</b>	<b>344.71</b>	<b>314.03</b>	<b>362.89</b>


# Appendix




PSWBS category summaries




Category .10




Category .11




Category .12




Category .13




Category .14



Category .15



Category .16

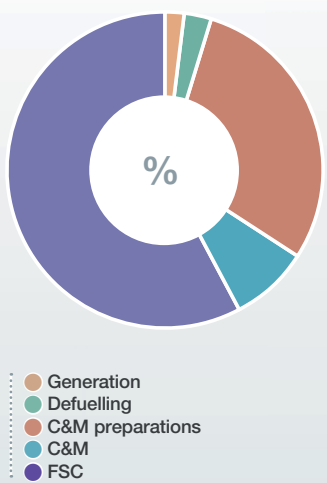


Category .17

- PSWBS categories:**
- .10 Transition
  - .11 New construction projects
  - .12 Commercial operations
  - .13 Decommissioning and termination
  - .14 Waste and nuclear materials management
  - .15 Site support
  - .16 Support services
  - .17 Stakeholder support

2024/25 (£m)	2025/26 (£m)	2026/27 (£m)	2027/28 (£m)	Subtotal to 2027/28 (£m)	Remaining years (£m)	Total cost (£m)
0.47	0.47	0.46	0.47	402.25	877.20	1,279.45
0.58	0.58	0.57	0.58	242.58	894.91	1,137.49
31.98	40.64	65.84	71.09	548.71	1,232.50	1,781.21
50.45	32.03	29.68	0.41	473.62	928.94	1,402.57
28.71	0.56	0.56	0.57	530.63	921.17	1,451.80
0.45	0.44	0.44	0.45	458.33	900.02	1,358.35
54.87	40.27	28.16	9.51	868.59	866.67	1,735.26
31.53	24.52	36.17	0.43	677.30	882.73	1,560.03
24.60	21.59	12.29	1.09	393.16	861.41	1,254.57
52.27	6.70	1.63	1.59	847.67	1,070.94	1,918.61
55.80	48.29	49.40	25.48	852.43	644.55	1,496.98
<b>331.70</b>	<b>216.09</b>	<b>225.20</b>	<b>111.67</b>	<b>6,295.27</b>	<b>10,081.05</b>	<b>16,376.33</b>

Proportional split of the total plan costs by phase



# Transition (.10)



Work in this category covers the cost and activities associated with workforce restructuring, required when there are significant changes in the type and amount of work being delivered at the sites.

**Category aim:**

To supply the skills required to meet the changing business needs.

**Achieved by:**

- Being open and transparent with a principle of 'no surprises' to employees and trade unions
- Taking experience learned from sites and sharing it across the organisation
- Coordinating an extensive programme of staff counselling and role training

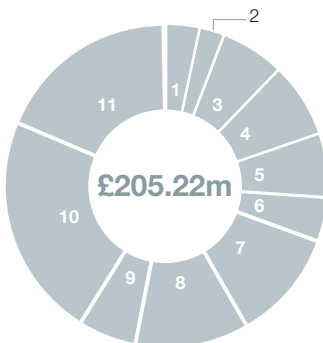


The scope of work in the transition category ensures an optimal balance between the skills and resources available and the scope of work being delivered. As the SLC still has sites in generation and defuelling the maintenance of a resource pool, with the range of core competencies and intelligent customer capability, is a key regulatory requirement.

This is maintained by ensuring a balance of capability between the central functions and the sites. Similarly, the head of profession concept to maintain EHSS&Q assurance is balanced between the central functions and the sites.

The skills and resource mix will change through transition from operations to decommissioning. The maintenance and development of the skills pool through transition is a major objective. The company agreement has been fully implemented and underpins optimal use of resources across Magnox and seeks to minimise future severance costs. It will support mobility of staff to respond to changing requirements as the sites progress through the key phases, and will promote retraining to meet new technical and project challenges.

**Proportional split of (.10) category costs by site**



**Transition costs by site**

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	6.92	-	6.92
2 Bradwell	5.60	-	5.60
3 Chapelcross	12.64	-	12.64
4 Dungeness A	15.72	-	15.72
5 Hinkley Point A	12.77	-	12.77
6 Hunterston A	9.54	-	9.54
7 Oldbury	22.85	-	22.85
8 Sizewell A	23.31	-	23.31
9 Trawsfynydd	12.03	-	12.03
10 Wylfa	45.85	-	45.85
11 MSO	36.83	1.14	37.97
<b>Total</b>	<b>204.07</b>	<b>1.14</b>	<b>205.22</b>

# New construction projects (.11)



Work in this category covers all work associated with the construction of new facilities to support the decommissioning programme of the Magnox sites.

## Category aim:

To facilitate the hazard reduction tasks of decommissioning and waste management.

## Achieved by:

- Understanding the needs of the decommissioning task in developing new plant
- Targeted completion of new construction projects to meet desired decommissioning timescales
- Construction of plant in support of waste management strategies



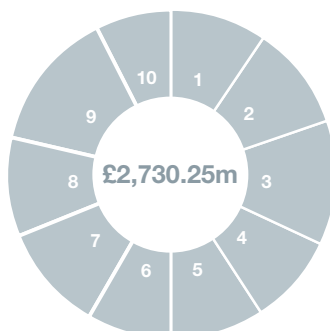
A key element of the successful and timely delivery of the decommissioning programme is the construction of reliable plants for retrieval, processing and storage of radioactive waste.

The projects will occur primarily during C&M preparations and planned projects include construction of waste treatment facilities for ILW retrieval, processing and storage. All sites will also need to build facilities capable of processing waste created during FSC.

Other construction projects required to facilitate rapid and safe decommissioning of sites include installation of electrical overlay systems to replace arrangements previously supporting generation of electricity; provision of a range of active and non-active waste management facilities, and site infrastructure improvements such as roads and accommodation.

The activities are coordinated by Strategic Programmes to ensure that learning from experience from lead sites is sequentially fed into the other sites.

Proportional split of (.11) category costs by site



New construction projects costs by site

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	62.94	195.15	258.09
2 Bradwell	67.06	215.83	282.89
3 Chapelcross	21.94	315.69	337.64
4 Dungeness A	49.79	193.06	242.84
5 Hinkley Point A	51.11	194.24	245.35
6 Hunterston A	33.23	192.78	226.01
7 Oldbury	95.84	191.57	287.41
8 Sizewell A	75.77	195.62	271.40
9 Trawsfynydd	185.04	194.63	379.66
10 Wylfa	8.66	190.31	198.97
11 MSO	-	-	-
<b>Total</b>	<b>651.38</b>	<b>2,078.87</b>	<b>2,730.25</b>

# Commercial operations (.12)



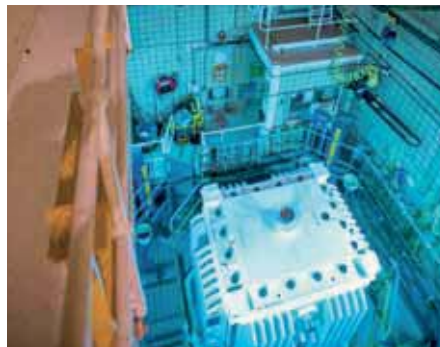
Work in this category is predominantly confined to activities associated with delivering the remaining generation at Wylfa and then to remove fuel from Oldbury, Sizewell A and Wylfa (following shut down), in a safe and cost-effective manner.

**Category aim:**

To operate assets effectively, efficiently maximise income and safely manage fuel removal.

**Achieved by:**

- Compliance to all site licence conditions
- Continued comprehensive maintenance of plant
- Coordinated defuelling operations



Oldbury flask corridor

Commercial operations at Oldbury, Sizewell A and Wylfa are driven by the MOP during generation and defuelling.

Optimisation of fuel dispatched from sites is dependent on the timely availability of fuel skips and transport flasks and is managed and coordinated by the MOP team.

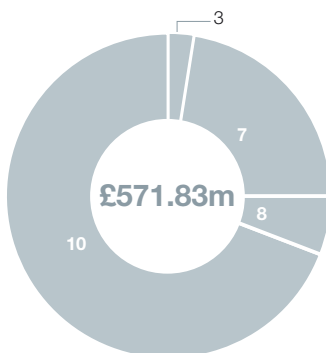
A significant proportion of engineering support cost is included in the sites' cost base. Engineering costs are charged back to sites by internal transfers, covering provision of ongoing generation and defuelling safety case support, plant inspection and outage management provisions.



Flask lorry

Wylfa will require one statutory outage each year whilst it remains generating. Defuelling of the reactors at the remaining sites will be a challenge that requires significant engineering and technical support. Both in development of the defuelling safety cases for Oldbury and Wylfa and in the flask logistical support from the MOP, during generation and defuelling.

Proportional split of (.12) category costs by site



Commercial operations costs by site

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	-	-	-
2 Bradwell	-	-	-
3 Chapelcross	15.51	-	15.51
4 Dungeness A	-	-	-
5 Hinkley Point A	-	-	-
6 Hunterston A	-	-	-
7 Oldbury	127.63	-	127.63
8 Sizewell A	34.76	-	34.76
9 Trawsfynydd	-	-	-
10 Wylfa	291.28	102.66	393.94
11 MSO	-	-	-
<b>Total</b>	<b>469.17</b>	<b>102.66</b>	<b>571.83</b>

# Decommissioning and termination (.13)



Work in this category covers the decontamination, deplanting and demolition of facilities that become redundant after generation and defuelling. This is the principal hazard reduction activity and discharge of liabilities at each of the sites.

**Category aim:**

To decontaminate, deplant and demolish facilities that become redundant once generation and defuelling is complete.

**Achieved by:**

- Planning and underpinning work to support decommissioning strategy
- Deplant and demolition of redundant facilities
- Land remediation and management



Asbestos removal project at Chapelcross



Redundant plant awaits recycling

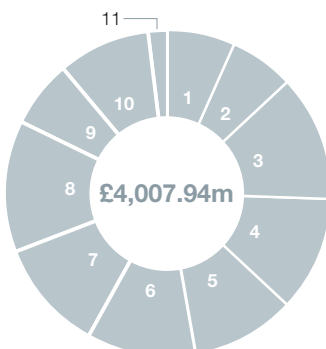
The decommissioning and termination work within Magnox will encompass the removal of radioactive hazards through to decontamination and removal of plant and buildings. In doing so, BPEOs will be implemented to provide for long term passive storage.

The Magnox portfolio contains a mixture of plant and equipment of varying design. The types and number of reactors also vary between sites. This creates a diverse set of technical challenges.

Innovation and capture of world best practices, to maximise value to the decommissioning and termination activities, is also a key aspect of the future approach.

The projects have been organised for the purpose of programme management into a range of work streams, covering numerous possible future scenarios.

Proportional split of (.13) category costs by site



Decommissioning and termination costs by site

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	95.48	180.89	276.38
2 Bradwell	65.35	192.10	257.46
3 Chapelcross	239.30	259.25	498.56
4 Dungeness A	199.38	256.97	456.35
5 Hinkley Point A	168.63	240.91	409.54
6 Hunterston A	214.56	224.20	438.76
7 Oldbury	296.97	147.78	444.75
8 Sizewell A	313.67	207.37	521.04
9 Trawsfynydd	96.07	163.60	259.67
10 Wylfa	223.12	151.42	374.54
11 MSO	58.00	12.89	70.89
<b>Total</b>	<b>1,970.55</b>	<b>2,037.39</b>	<b>4,007.94</b>

# Waste and nuclear materials management (.14)



Work in this category covers the retrieval, treatment, storage and, where appropriate, disposal of all site waste forms. Progress in this area reduces site hazards and is a fundamental step in reaching the site end status.

**Category aim:**

To ensure radioactive waste is managed safely and in-line with regulatory requirements.

**Achieved by:**

- Desiccant retrieval and processing of waste
- Storage of waste in a secure facility
- Transportation and disposal of waste



MOSAIK for storage of ILW



Non-radiological waste storage compound

Magnox is working towards the development of new and innovative approaches to dealing with waste. Work in this category is also a potential area for significant added value by innovation through learning and sharing.

The types of waste being generated at Magnox are:

- ILW
- LLW
- HZW
- NHZW

All sites have both solid and wet ILW waste streams that require retrieval, treatment and storage.

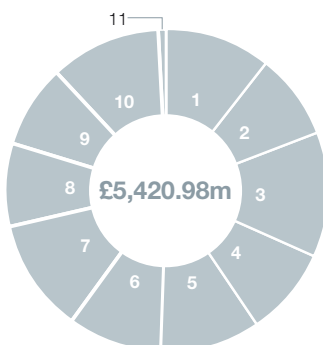
Waste will be managed in accordance with the appropriate legislation, but in the intervening period ILW will be stored on-site in dedicated facilities.

LLW produced during decommissioning is placed into ISO containers and shipped to LLWR for disposal.

All Magnox sites contain significant quantities of asbestos hazardous waste.

NHZW is treated in a similar way to conventional industries and reuse and recycling is undertaken wherever possible. If disposal is required, it is achieved at licensed waste management facilities.

Proportional split of (.14) category costs by site



Waste and nuclear materials management costs by site

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	188.98	397.98	586.96
2 Bradwell	78.95	378.73	457.68
3 Chapelcross	142.79	544.30	687.09
4 Dungeness A	92.17	376.40	468.57
5 Hinkley Point A	172.54	383.37	555.91
6 Hunterston A	118.81	381.21	500.02
7 Oldbury	181.96	437.40	619.36
8 Sizewell A	86.05	374.36	460.40
9 Trawsfynydd	43.35	402.75	446.10
10 Wylfa	59.96	537.26	597.23
11 MSO	40.12	1.54	41.66
<b>Total</b>	<b>1,205.68</b>	<b>4,215.30</b>	<b>5,420.98</b>



# Site support (.15)

Site support is a key part of the management system that ensures safe and compliant delivery of LTPs. The MSO and site support functions play a significant part in helping maintain a high level of performance and compliance.

## Category aim:

To provide a portfolio of professional services, infrastructure and facilities to support the business throughout its lifecycle.

## Achieved by:

- Ensuring the security of sites is maintained, in-line with regulatory requirements
- Delivering a highly efficient and cost-effective range of facilities management and services
- Providing a supply chain management service which secures maximum value for money from subcontractors and suppliers



Health physics services

Work within site support is ongoing through all phases of the LTP. It enables the sites to comply with regulatory requirements, support generation and defuelling operations, decommissioning projects and infrastructure needs.

The nature of site support within Magnox will vary during the lifetime phases:

For all sites during C&M preparations:

- Site security
- Decommissioning operations and maintenance
- Occupational health and health physics
- Utilities
- Programme management



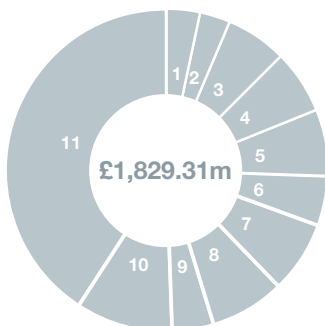
Supporting the business throughout its lifecycle

In addition, during generation and defuelling, Oldbury, Sizewell A and Wylfa will need:

- 24 hour provision of radioactive protection to staff, contractors and the public
- Occupational health services to eliminate potential risks to the health of people on-site
- Facilities management on-site

For all sites, during the remaining phases, site security and utilities will be required. As sites move into FSC, site services, staffing support and health physics will be reintroduced.

## Proportional split of (.15) category costs by site



## Site support costs by site

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	31.19	33.66	64.84
2 Bradwell	16.52	39.06	55.57
3 Chapelcross	77.27	37.43	114.71
4 Dungeness A	80.27	33.36	113.63
5 Hinkley Point A	92.36	33.48	125.85
6 Hunterston A	56.85	33.21	90.06
7 Oldbury	99.68	30.56	130.23
8 Sizewell A	102.13	35.92	138.06
9 Trawsfynydd	43.13	33.03	76.15
10 Wylfa	145.33	30.34	175.67
11 MSO	379.15	365.38	744.53
<b>Total</b>	<b>1,123.89</b>	<b>705.43</b>	<b>1,829.31</b>

# Support services (.16)



Work in this category produces the governance mechanisms for the sites and ensures all locations have a robust safety culture and clear strategic direction.

**Category aim:**

To ensure the portfolio is appropriately managed, supported and resourced to deliver a safe and effective business for the NDA.

**Achieved by:**

- Providing direction, control and leadership
- Maintaining a healthy, motivated, successful and suitably qualified workforce
- Delivering the terms of the contract for the NDA



A motivated, successful and suitably qualified workforce

Work in this category provides the management structure, policy and procedures to ensure all work on-site is robustly controlled from a safety, financial and commercial perspective.

It is within this category that the greatest linkage and interaction occurs with the MSO support units. Strategy and direction for Magnox is set by the Magnox executive.

It is also within this set of arrangements that the overall performance envelope for the sites is set, for safety and environmental performance, commercial and programme performance, and overall contract delivery.

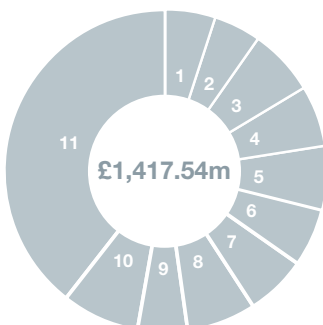


Maintaining skills and resource base

The strategies adopted by Magnox on optimum supply chain strategies and the linkage to the maintenance of the skills and resource base, within the overall human resource strategy, will be driven by the executive arrangements.

The skills and resourcing plan, developed for each site, will be a key enabler to underpin the future programme with a robust and skilled workforce for each of the lifecycle phases.

**Proportional split of (.16) category costs by site**



**Support services costs by site**

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	12.85	61.66	74.52
2 Bradwell	6.51	61.29	67.80
3 Chapelcross	25.22	66.65	91.87
4 Dungeness A	28.47	61.33	89.80
5 Hinkley Point A	28.01	61.33	89.34
6 Hunterston A	21.62	60.82	82.45
7 Oldbury	36.69	51.82	88.50
8 Sizewell A	33.60	61.60	95.20
9 Trawsfynydd	12.18	59.60	71.78
10 Wylfa	59.49	51.45	110.94
11 MSO	313.21	242.14	555.35
<b>Total</b>	<b>577.85</b>	<b>839.69</b>	<b>1,417.54</b>





# Stakeholder support (.17)

Stakeholder support provides a forum for the sites to ensure that stakeholders are aware of future strategies and provides an early warning sign of potential challenges to the agreed strategies.

**Category aim:**

To increase public knowledge and support to the industry.

**Achieved by:**

- Building and maintaining relationships with stakeholders through honest and open communications
- Promoting a greater understanding of the NDA and Magnox
- Maintaining a mature regulatory relationship to achieve good standards of performance and compliance, and to make continuous improvements



Building relationships with stakeholders



Promoting greater understanding of the NDA and Magnox

Magnox and each of its sites deal with a range of different groups and individuals, Site Stakeholder Groups (SSGs) or Local Community Liaison Councils (LCLCs). The SSGs/LCLCs include local councils, education establishments, emergency services, community groups, pressure groups, elected representatives, employees and supply chain organisations.

The key activities are:

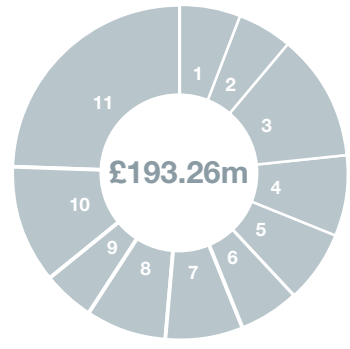
- Supporting the ongoing development of the SSGs/LCLCs at individual sites
- Maintaining regular staff communications
- Hosting events that explain future work plans to local businesses, encouraging local supply solutions

The socio-economic development plan for Magnox details how Magnox will work with SSGs/LCLCs and local agencies to mitigate the effects of decommissioning. Stakeholder support will continue through all phases of work, through to FSC.

The fees charged by ONR and EA are paid through this category for the provision of inspection services and advice in meeting all safety and regulatory issues.

For Chapelcross and Hunterston A, SEPA is the relevant environmental regulatory body.

**Proportional split of (.17) category costs by site**



**Stakeholder support costs by site**

Sites	Plan cost to 31/03/2028 (£m)	Remaining years costs (£m)	Total cost (£m)
1 Berkeley	3.88	7.86	11.74
2 Bradwell	2.59	7.91	10.49
3 Chapelcross	14.03	9.17	23.20
4 Dungeness A	7.82	7.84	15.65
5 Hinkley Point A	5.20	7.83	13.04
6 Hunterston A	3.72	7.80	11.52
7 Oldbury	6.99	7.54	14.53
8 Sizewell A	8.02	7.85	15.87
9 Trawsfynydd	1.37	7.80	9.17
10 Wylfa	13.97	7.50	21.47
11 MSO	25.12	21.46	46.58
<b>Total</b>	<b>92.69</b>	<b>100.56</b>	<b>193.26</b>

# Glossary

<b>ADAP</b> – aqueous discharge abatement plant	<b>IiP</b> – Investors in People
<b>AETP</b> – active effluent treatment plant	<b>iLoC</b> – interim letter of compliance
<b>ALARP</b> – as low as reasonably practicable	<b>ILW</b> – intermediate level waste
<b>BAT</b> – best available technique	<b>IRX</b> – inter-reactor fuel transfer
<b>BCWS</b> – budgeted cost of work scheduled	<b>ISF</b> – interim storage facility
<b>BPEO</b> – best practicable environmental option	<b>IT</b> – information technology
<b>C&amp;I</b> – control and instrumentation	<b>LCLC</b> – Local Community Liaison Committee
<b>C&amp;M</b> – care and maintenance	<b>LLW</b> – low level waste
<b>CCP</b> – cartridge cooling pond	<b>LLWMF</b> – low level waste management facility
<b>CDM</b> – construction, design and maintenance	<b>LLWR</b> – Low Level Waste Repository
<b>CNC</b> – computer numerical control	<b>LoC</b> – letter of compliance
<b>CoRWM</b> – Committee on Radioactive Waste Management	<b>LTP</b> – lifetime plan
<b>CRP</b> – caesium removal plant	<b>MAC</b> – miscellaneous activated components
<b>CSM</b> – chute silo manipulator	<b>MAETP</b> – modular active effluent treatment plant
<b>D&amp;D</b> – deplant and demolition	<b>MCI</b> – miscellaneous contaminated items
<b>DCIC</b> – ductile cast iron container	<b>MODP</b> – Magnox Optimised Decommissioning Programme
<b>DECC</b> – Department of Energy and Climate Change	<b>MOP</b> – Magnox Operating Programme
<b>EA</b> – Environment Agency	<b>MSO</b> – Magnox Support Office
<b>EDF</b> – Electricité de France	<b>MSV</b> – main sludge vault
<b>EFR</b> – early FED retrieval	<b>NDA</b> – Nuclear Decommissioning Authority
<b>EGG04</b> – NDA document which can be found on the NDA website: <a href="http://www.nda.gov.uk">www.nda.gov.uk</a>	<b>NHZW</b> – non-hazardous waste
<b>EHSS&amp;Q</b> – environment, health, safety, security and quality	<b>ONR</b> – Office for Nuclear Regulation
<b>FED</b> – fuel element debris	<b>PBI</b> – performance based indicator
<b>FLoC</b> – final letter of compliance	<b>PBO</b> – parent body organisation
<b>FSC</b> – final site clearance	<b>PCP</b> – programme control procedure
<b>FTE</b> – full-time equivalent	<b>PCSR</b> – pre-commencement safety report
<b>GDF</b> – geological disposal facility	<b>PDSC</b> – post-defuelling safety case
<b>GNS</b> – Gesellschaft für Nuklear-Service mBH	<b>PNV</b> – ponds north void
<b>GRP</b> – glass fibre reinforced plastic	<b>POCO</b> – post-operation clean-out
<b>HR</b> – human resources	<b>PSI</b> – process safety indicator
<b>HZW</b> – hazardous waste	<b>PSR</b> – periodic safety review
<b>IC&amp;M</b> – interim care and maintenance	<b>PSWBS</b> – programme summary work breakdown structure

**RNT** – regenerant neutralising tank

**RIDDOR** – reporting of injuries, diseases and dangerous occurrences regulations

**RoSPA** – Royal Society for the Prevention of Accidents

**ROV** – remotely operated vehicle

**RSRL** – Research Sites Restoration Ltd

**RWMD** – Radioactive Waste Management Directorate

**SAWBR** – solid active waste bunker retrieval

**SEPA** – Scottish Environment Protection Agency

**SILWE** – solid intermediate level waste encapsulation

**SILWR** – solid intermediate level waste retrieval

**SLC** – site licence company

**SMS** – strategy management system

**SQEP** – suitably qualified experienced person

**SSG** – Site Stakeholder Group

**SSI** – Site of Special Scientific Interest

**STAR** – stop, think, act, review

**TLSE** – trailing lead single element

**TWh** – terawatt hour

**UHP** – ultra high pressure

**VLLW** – very low level waste

**WANO** – World Association of Nuclear Operators

**WILWREP** – wet intermediate level waste retrieval and encapsulation plant

**WTP** – water treatment plant



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