

UK Nuclear Fleet Stakeholder Update

January 2024

Energy has continued to be in the headlines over the past year, whether in relation to the cost-of-living crisis or concerns about security of supply and how to address climate change.

Last year also saw EDF's Generation business unit relaunch as Nuclear Operations. Nuclear Operations is a core part of EDF's broad family of businesses in the UK (nuclear, renewables, technical services, retail and business/wholesale), and is an entity that is 80% owned by EDF Group and 20% by Centrica plc. Employing around 5,000 people, we own and operate eight nuclear power stations across the UK, five of which are generating zero carbon electricity and three that are now in the defueling phase, the first stage of decommissioning. Changing our business unit name to Nuclear Operations better reflects what we do, day in, day out.

The Nuclear Operations business has five clear priorities over the next decade - delivering value from the Sizewell B power station; maximising output from the four generating AGR nuclear stations; defueling the AGR stations efficiently; seamlessly transferring them to Nuclear Restoration Services (formerly Magnox) and developing our long-term future, recognising that by the mid-2030s seven of the eight power stations will be owned by the UK Government.

This annual update to interested stakeholders provides some background on the existing UK nuclear fleet and information on these five key priorities over the coming years. For those wanting a "two-minute" read the following is an executive summary and what we regard as the key messages at the Winter 2023-24 point.

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- Invest in our people and skills



Executive Summary

- Maintaining a strong nuclear safety track record remains the over-riding priority.
- Since acquiring the nuclear fleet 15 years ago (5 January 2009), EDF has invested more than £7.5 billion and will invest a further £1.3 billion over the next 3 years (2024-26) to help sustain current levels of generation, boost energy security and cut carbon.
- Over that 15-year period the UK's nuclear stations have generated over 212TWh more electricity than expected through life extensions and better operational performance. That is enough low carbon electricity to power every UK home for 2 years.
- UK nuclear output in 2023 totalled 37.3TWh, down 15% on 2022 due to three stations ending generation across 2021-22 and a significant maintenance season involving four statutory outages.
- The objective is to sustain output at around this level into 2026 and longer if possible.
- While this is the lowest UK output level for over 40 years, it is nearly four times the 10TWh forecast for 2023 when EDF acquired the fleet.
- Sustaining existing output is also positive for jobs and tax receipts. In 2023, EDF's Nuclear Operations business expects to pay £333 million in salaries and around £600 million in taxes including £200 million through the new Electricity Generator Levy.

- The estimated generating lifetimes of Hartlepool and Heysham 1 power stations were extended in March 2023 by a further two years, to March 2026. The prospect of further AGR lifetime extensions (four power stations) will be reviewed again by the end 2024 and the ambition is to generate beyond these dates, subject to plant inspections and regulatory approvals.
- The focus for the **Sizewell B** power station is on operational excellence and investing to enable a potential 20-year life extension, out to 2055. This decision is subject to agreeing the appropriate commercial model to ensure such an extension is viable.
- We are committed to defueling the AGR fleet efficiently and supporting the seamless transfer of the sites to Nuclear Restoration Services (NRS). Good progress is being made with the first AGR reactor in the fleet successfully defueled at Hunterston B in September 2023. Our aim is to transfer the first two power stations and many of their employees to NRS in 2026.
- Delivery of the above plans, and the investment in nuclear new build, will require hiring over 1,000 people in 2024 and investing around £40million in training. In the last decade EDF has hired over 1800 graduates and apprentices; in 2024 the number involved in early careers schemes will be over 200.

Nuclear **Operations**

EDF Nuclear Operations, part of EDF's Nuclear family, manages eight nuclear power stations across the UK, five of which are generating zero carbon electricity and three that are now in the defueling phase, the first stage of decommissioning. We will continue to safely decommission our two coal stations, while helping the UK Atomic Energy Authority develop the fusion reactor planned at West Burton.

We are Britain's biggest generator of zero carbon electricity, providing approximately 15% of the UK's power and consumers depend upon us to provide electricity safely and reliably.

With approximately 5,000 people employed directly, and thousands more in the supply chain across the country, Nuclear Operations plays a key part in EDF's purpose in the UK.



- PRESSURISED Commissioned 1995
- WATER REACTOR

 Lifetime expectation 2035+
 - Commissioned 1976 1988



- Heysham 1 & 2, Hartlepool and Torness generating until 2026-28+
- Hunterston B, Hinkley Point B and Dungeness B
- THERMAL 2 coal power stations, Cottam and West Burton, in the decommissioning stage







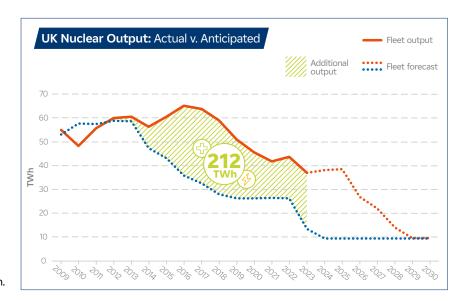
Supporting UK energy security

EDF acquired the nuclear fleet in January 2009 for more than £12billion and has since invested more than £7.5billion to extend lifetimes and improve reliability. Without EDF's investment in, and stewardship of, the nuclear fleet there would be one generating nuclear power station today, not five, and nuclear would be around 3% of the UK's power generation. This would mean even more reliance on gas, higher energy prices for households and businesses and more carbon in the atmosphere.

EDF has been a reliable partner to the UK since developing a business here over 25 years ago. Over the past 15 years the UK's nuclear fleet has generated around 212TWh, or 36%, more electricity than originally planned through life extensions and better operational performance. That is enough low carbon electricity to power every UK home for 2 years.

While output has dropped from a high point in 2016 of 65TWh from eight power stations, the fleet still plays an integral part in supporting UK energy security. This is especially true when demand is high and renewables output is low due to weather conditions.

The nuclear fleet's contribution to UK energy security goes beyond the reliable production of clean electricity, it also has a key role in maintaining grid stability. Grid stability is becoming increasingly important as the power system decarbonises and conventional thermal plants, like coal and gas, are being replaced by renewable generation.



These new technologies, while low carbon, often do not provide the same stability to the grid as they do not produce inertia. https://www.nationalgrideso.com/electricity-explained/how-do-we-balance-grid/what-inertia. The nuclear fleet is not only low carbon but also produces material quantities of inertia which supports grid system stability.

UK nuclear output in 2023 was 37.3TWh, 15% lower than 2022 due to three stations ending generation across 2021-22 and a significant maintenance season involving four statutory outages -at Sizewell B, Hartlepool and Heysham 1 and Heysham 2 power stations.

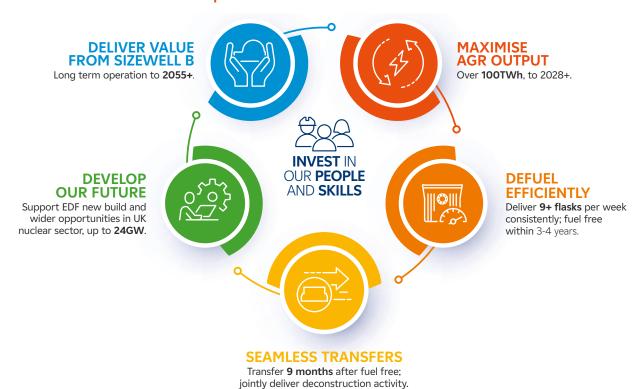
While 37TWh is the lowest UK nuclear output level for over 40 years, it is nearly four times the 10TWh forecast for 2023 when EDF acquired the fleet. At that time, all seven AGR stations were due to have stopped generating by now.

Over the next three years the company will invest more than £1.3 billion and plans to hire 200 people each year to help sustain annual output at the current level from the UK's five generating nuclear stations until at least 2026. We are working closely with our supply chain partners to ensure the right resources are available to deliver our plans. In 2023, we invested £750 million with suppliers and over 90% of this was with UK-based companies.

Given the high and volatile power prices behind the ongoing energy crisis, EDF recognised early the need for an additional tax to limit profits and engaged with UK Government to find a fair formula that does not discourage the investment required to support energy security. The result was the Electricity Generator Levy. Excess profits earned in 2023 are subject to the new levy, through which we expect to contribute around £200 million this year. The final figure depends on ultimate output and realised prices.



Our 10-YEAR priorities



Priority One:

Deliver long-term value from Sizewell B

Sizewell B power station in Suffolk started operations in 1995 and is a valuable UK asset. It provides 3% of the nation's electricity demand making it important for energy security and the UK's Net Zero goals.

The station differs from the other seven in the fleet and has a design based on standard Pressurised Water Reactor (PWR) technology in common use around the world. It was initially intended to be one of a fleet of PWR stations to be built in the UK, a programme that was cancelled by the Government more than 30 years ago.

In 2023, we invested more than £80million in planned maintenance and inspections, including the station's statutory outage, and will continue to invest in the station, with more than £300million earmarked across the 2024-26 period.

The focus for the Sizewell B power station is on operational excellence and investing to enable a potential 20-year life extension, taking the lifetime out from 2035 to 2055. This decision is subject to agreeing the appropriate commercial model to ensure such an extension is viable.



Priority Two:

Maximising Advanced Gas-cooled Reactor output

There are four Advanced Gas-cooled Reactor (AGR) nuclear power stations still generating zero carbon electricity and employing over 2,000 people in Lancashire, on Teesside and in East Lothian, with technical and other support provided from offices in Gloucester and Glasgow. Each station has two reactors that are capable of generating more than 500MW of clean power. These stations were designed and built in the 1970s and 1980s in a Government-led and financed programme to ensure nuclear and coalfired power formed the backbone of the UK's power system.

The aim is to continue generating from these stations for as long as it is safe and commercially viable to do so. EDF's technical and safety teams work hard to ensure appropriate regulatory permissions are in place for each reactor and that any technical challenges are dealt with efficiently. The operations and maintenance teams are responsible for managing the power stations and oversee various inspections, to check the graphite reactor cores and invest in key areas like equipment reliability. Every three years each of the eight reactors is required to undertake a statutory outage lasting approximately two months and this provides an opportunity to conduct maintenance and inspect critical equipment.

In 2023 the four generating AGR stations reached significant milestones with Heysham 2 and Torness celebrating 35 years of generation and Heysham 1 and Hartlepool marking 40 years since connecting to the grid.

In our last nuclear fleet update, we committed to review the end of generation dates for Heysham 1 and Hartlepool. In March 2023, we announced the decision to extend the generating lives of those stations by an extra two years to March 2026. The additional 29TWh of electricity these two stations could generate over the coming 2-year period will help displace 6billion cubic metres of gas. The carbon avoided from this displacement is 10million tonnes, like taking 5million cars off the UK's roads for a year.

Heysham 2 and Torness stations are currently forecast to generate until March 2028. This is based on a formal review in late 2021.

The actual end of generation dates for these four power stations will most likely be determined by the condition of the graphite making up the reactor cores, which is regularly inspected, and subject to rigorous assessment by the independent regulator. Inspections provide reassurance and allow us to meet external regulations, including global earthquake regulations. This means we must prove we can shut down the reactors during a major earthquake, a 1 in 10,000-year event, much larger than the UK has ever experienced or expects to happen.

We will continue to explore opportunities to maximise AGR output over the coming years and aim to achieve more than 100TWh of output from 2023 to 2028 and potentially beyond, as long as it is safe and commercially viable to do so. All AGR lifetimes will be reviewed again by the end of 2024 and the ambition is to generate beyond these dates, subject to plant inspections and regulatory approvals.

This ambition is in line with the recommendations of both the Parliament's Public Accounts Committee and the Science, Innovation and Technology Committee that we extend the lives of the AGR stations where safe and with regulatory support.

We will invest a further £1bn in maintenance, inspections and plant upgrades over the next three years to support this.





Priority Three:

Defuel the AGR Fleet Efficiently

EDF has agreed with the UK Government that it will defuel all seven AGR stations before they are transferred, on a rolling basis, to Nuclear Restoration Services (part of the Nuclear Decommissioning Authority) from 2026 onwards. There are three power stations currently in defueling and the costs come from an existing fund known as the Nuclear Liabilities Fund, which had a value of £20.4billion as of March 2023 - see the NLF website for further details https://www.nlf.uk.net

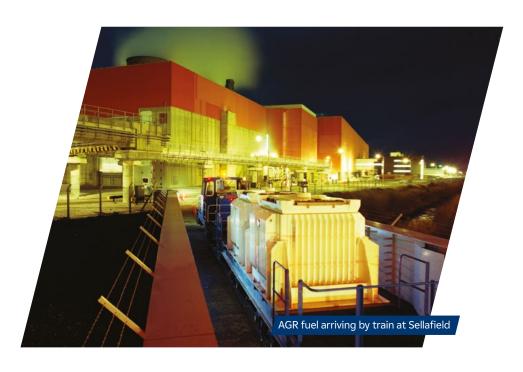
With the UK Government, and by extension the taxpayer, as our client, we are working hard to meet performance targets while driving value for money and minimising costs. This is primarily a cost-recovery contract with an incentive and penalty framework in place which is subject to stretching targets.

Operationally, defueling is an extension of the refuelling we have been carrying out for more than 40 years, though at a greater volume and faster pace. In 2023 we dispatched nearly 400 flasks to Sellafield. In 2024 we aim to dispatch up to 500 flasks. The programme requires the very best of our operating expertise and innovative ways of working as we aim to deliver defueling safely and cost effectively.

Our spent fuel is transported to Sellafield for processing and medium-term management until a deep geological disposal facility is available for final disposal. Performance at the NDA's Sellafield facility is key to successful defueling, and we continue to collaborate closely as volumes increase.

There has been a great deal of progress in our defueling programme during 2023:

- On 19 September, the defueling of the first reactor at Hunterston B was completed on time and on budget. Operators removed 308 fuel stringers from the reactor over 16 months. This is a strong start to AGR defueling and demonstrates our commitment to delivering on our government contract and ensuring the sites are ready to transfer to the NDA for its subsidiary, NRS, to carry out the rest of the decommissioning job.
- Good progress is also being made at Hinkley Point B with more than 60% of the first reactor defueled over the past year.
- We secured regulatory approval for the initial defueling safety case for Dungeness B and active defueling is now underway at the site.
- The programme aims to defuel efficiently and deliver 9+ flasks of spent fuel to Sellafield each week. In 2023, we hit this milestone for a sustained period of flask movements for the first time since the programme started. This has only been achieved through close working with our partners at Sellafield, Direct Rail Services (DRS) and the NDA.
- We completed substantial fuel route upgrades at Heysham 1 to allow us to increase the rate of defueling and make the process more efficient once that station comes offline. The station has already seen the benefit of this work having dispatched five flasks in one week in June. Similar upgrades are underway at Hartlepool and are due to start at Dungeness B.
- Since June 2021, when the first AGR station entered defueling (Dungeness B), our defueling expenditure has remained below our forecasts and we have delivered to schedule, demonstrating value to the taxpayer.





Priority Four:

Transfer of the AGR fleet to Nuclear Restoration Services

Completely decommissioning all seven AGR stations will be a multi-decade project. Once each site has been defueled by EDF it will be transferred to the NDA for its subsidiary, Nuclear Restoration Services (NRS), to carry out the next stages of decommissioning. This currently includes a period of deconstruction, before a Safestore facility is built to house the reactors for a passive period before final site clearance. It is our target to make this transfer 9-12 months after each power station is declared as "fuel free".

The first station due to transfer will be Hunterston B in 2026 with the rest of the fleet due to transfer on a rolling basis over the next decade, depending on actual end of generation dates and overall defueling performance at each station and at Sellafield.

We have developed a joint team with NRS and we are committed to working closely with them and the NDA to ensure we can carry out a seamless transfer of the sites and to identify efficiencies that will benefit the taxpayer.

Examples of progress during 2023:

- · We have agreed with NRS blueprints for the transfer for both Hunterston B and Hinkley Point B. These blueprints outline the joint ambition of both organisations and the assumptions for the design of each site at the point of transfer. They cover a broad range of areas including security, licencing, waste facilities, IT, and people. The blueprints set out the "what" rather than the "how" and have been used as the foundation on which to build the detailed plan that is needed for transfer.
- We carried out a public consultation on the decommissioning proposals for Hinkley Point B and a second round of consultation in the communities around Hunterston B in 2023. These consultations have helped us to understand areas of interest to local people. This includes things like the size of the workforces, the design of the Safestore buildings and methods of transport for deconstruction wastes.
- We have published a Career Pathways brochure at Hunterston B and Hinkley Point B which outlines the kinds of jobs which may be available to people following site transfer.
- We have completed a round of non-binding consultation with staff at Hunterston B to better understand their aspirations following the end of defueling the site. Options include transfer to NRS, a move to another EDF site or leaving the organisation. The results of this consultation have helped to inform the site structures and numbers we are working on with NRS. We are planning to share these with staff over the coming months.

Priority Five:

Develop our future as the UK's trusted nuclear operator

Our fifth priority over the next decade is to develop longer term options for our sites and people. The UK Government's support for new nuclear development has continued over the past year with the launch of a Small Modular Reactor (SMR) technology competition led by Great British Nuclear (GBN), further financial investment in Sizewell C and the appointment of Andrew Bowie as Minister for Nuclear and Networks. Our role is to support the Government as they develop the long term nuclear strategy and determine which reactor technologies will go on which sites.

As the owner and operator of the UK's existing nuclear fleet, and the company responsible for re-starting the UK's nuclear programme after a 30+ year hiatus, we are in a unique position to advise on the development of new nuclear.

EDF owns five of the eight sites currently designated for new nuclear development in the UK. Construction and advanced development plans are already underway at Hinkley Point C and Sizewell C respectively, with plans for Heysham in Lancashire and Hartlepool on Teesside still in the early stages. Bradwell's future is also unclear, awaiting direction from Government. We continue to engage closely with GBN to help determine the way forward.

EDF's primary, long term objective is to help restore UK nuclear output back above 60TWh per annum by replacing the existing AGR fleet capacity by installing new European Pressurised Reactors at Hinkley Point C and Sizewell C and extending Sizewell B out to 2055.

These are nationally important industrial projects requiring significant capital investment and tens of thousands of people to contribute to them. Once built they will provide power for up to eighty years, so into the 2100s. The Hinkley Point C project is showing the benefits new nuclear development can bring to an area. Hinkley Point C has now trained 1,200 apprentices and there are 22,000 people across the UK working on the project. It has seen £5.3 billion spent in the Southwest alone, smashing the original target of £1.5 billion, and £14.5 million has been provided to local groups through the project's community fund.

Beyond this major commitment of circa 7.7GW of nuclear capacity, we will continue to collaborate across the sector to support the drive towards the Government's target of up to 24GW of nuclear capacity by 2050.

Hartlepool and Heysham nuclear sites

In line with the UK Government strategy, EDF has continued to explore options for the long-term future of its sites. We are technology agnostic in terms of which designs are taken forward at Hartlepool and Heysham and believe they should be developed as part of a holistic UK new build programme.

Engagement with Advanced Modular Reactor (AMR) developers continued at Hartlepool through 2023 with some of these developers starting their own stakeholder activities in the local area. We believe Hartlepool is the most suitable site in the UK for High Temperature Gas Reactors (HTGR) - a type of AMR. HTGRs could help decarbonise industries on Teesside which need the heat and steam they could produce.

One or more HTGRs at Hartlepool - the Hartlepool Heat Hub - could secure hundreds of jobs at the site, and provide some of our employees, suppliers, and the wider industry on Teesside with longer term employment security.

In Lancashire, where we operate Heysham 1 and Heysham 2 power stations, and employ more than a thousand people, we believe that we have a site well suited to SMRs or AMRs. Not only does the site have available land, grid and rail connections and a supportive community, it also has a highly skilled workforce, the largest of any generating nuclear site in the UK, which could support the operation of any future nuclear development.

Heysham and Hartlepool have all the attributes needed to host successful nuclear new build projects but if timelines drift, skills will drift. It is up to the Government to direct which nuclear technologies go on which sites, but decisions need to be expedited quickly recognising the benefits of a timely transfer of skills and expertise from existing to new technologies. UK Government direction, through GBN, on how these sites should be re-developed is crucial to their futures.

Over the past year we have worked closely with GBN. We were pleased to see the official launch of the SMR technology competition in July and the down selection of six potential developers, including EDF. We look forward to seeing the results of this competition later this year and would welcome further clarity on GBN's wider role in site and technology selection. We are ready to support the development of any technology that GBN selects for our sites.



West Burton A site - STEP fusion reactor

Our West Burton A site, in Nottinghamshire, is also worth mentioning. As one of the UK's last operating coal stations, West Burton A remained available to support the grid during Winter 2022/23. Under agreement with the UK Government, two units at the site were kept on standby six months past their original decommissioning date, until 31 March 2023.

Work is now underway to decommission the station, but it is not the end of power generation at that site. West Burton A has been chosen as the location for the UKAEA's first commercial scale fusion project, STEP (Spherical Tokamak for Energy Production). It is a perfect fit for a site that has been providing electricity for the country and jobs for Nottinghamshire since the mid-60s, a core part of 'Megawatt Valley'. It has the grid connections and other required infrastructure as well as regional support. Transitioning from an area known for coal-fired power to nuclear fusion will be a powerful example of clean technology replacing fossil fuels and we look forward to seeing the project progress and the regeneration it will bring to the area.

Invest in our people and skills

EDF's Nuclear Operations business comprises nearly 5,000 permanent employees and thousands more contractors and suppliers supporting the power stations. The future of nuclear in the UK is heavily dependent on securing financing as well as progress in planning, regulation and the ability to deliver new infrastructure. The availability of skills for both the construction phase of new projects and the operations phase is one of the biggest challenges facing both the civil nuclear and defence sectors.

EDF is committed to promoting and developing nuclear skills. As well as chairing the board of the National College for Nuclear we also lead on a number of activities on the Nuclear Skills Strategy Group. In the last decade EDF has hired more than 1800 graduates and apprentices. In 2024, the number involved in early careers schemes will be more than 200. At sites which have ended generation we are preserving crucial nuclear skills by supporting our people to retrain to stay at their current location through defueling or take new opportunities at other sites. For example, more than 500 people have transferred to Hinkley Point C from Nuclear Operations in the last decade, from both stations and central support offices. We are also working with colleagues at NRS to transfer skilled people to support decommissioning.

EDF's long term vision is to be the UK's trusted nuclear operator. We will aim to maintain trust through the ongoing effective stewardship of the AGR fleet and Sizewell B. In addition, we will strengthen operational capability to serve the future water reactor fleet (Sizewell B, Hinkley Point C, Sizewell C); seek opportunities to provide technical skills to third party developers, once Government has approved new projects; promote our sites for future development to support the UK Government's nuclear strategy and plans; be prepared to operate other reactor technologies and work across industry on related energy technologies.

Looking at our business plan for the next five years, we plan to:

- Invest over £200m in nuclear training and R&D across all EDF nuclear businesses in the UK
- Hire up to 1,000 people to work at our existing stations and in various technical and business support roles, with over half of these being for graduates and apprentices. In 2024 alone, the wider EDF nuclear family in the UK aims to hire over 1,000 people into various new and replacement roles
- Continue to invest in developing EDF Nuclear Services, the home for specialist nuclear skills serving existing reactors and new build projects, to support the future water reactor fleet and other opportunities
- Work with our suppliers and Government-led forums to tackle the projected nuclear skills shortage.

EDF's investment in people and skills is one part of the picture. A joined-up approach from government, industry, academia, supply chain and Trade Unions is crucial to ensure any nuclear skills gap is managed effectively.

The UK Government's commitment to nuclear power must be seen in the context of a steady increase of nuclear capacity worldwide and growth in defence expenditure. At the recent COP28 summit in Dubai, 22 countries pledged to triple global nuclear capacity by 2050. Defence demand for nuclear skills, to deliver established and new nuclear submarine programmes, is also growing.

This level of nuclear development means increasing competition for relevant construction, technical and specialist nuclear skills nationally and globally.

EDF has already experienced challenges in sourcing the right number of qualified professionals to support maintenance outages at our generating sites over the past year. We are working closely with our supply chain partners to address this issue for forthcoming outages, but its long-term resolution will need a concerted industry-wide effort.

There will also need to be effective coordination between civil nuclear and defence. That is why we support initiatives like "Destination Nuclear" designed to attract people into the industry and the establishment of the Nuclear Skills Taskforce, led by Sir Simon Bollom. As a member of the task force, we are committed to actively contributing to its work to deliver concrete outcomes over the coming years.

EDF will continue to work with Government and industry to address skills shortages and issues that impact operations and project delivery, including diversity, further education, supply chain capacity, migration, and the efficiency of vetting.

Clarity over sequencing and timing of new developments in the UK is also essential to help skills planning and investment. Moving too slowly on new nuclear development at sites with an existing operational workforce will result in a loss of valuable skills and will make it harder to restart the industry in those areas.

Operations and technical support for the existing fleet involves close collaboration with contract partners and suppliers. In 2023, EDF spent £750million to support its operational sites with 1,400 suppliers, over 90% of these being UK-based. This included signing a contract extension with the Westinghouse Springfields site for AGR fuel fabrication through to the end of generation for the fleet, which will support continued operation at the site in Lancashire.

The EDF Nuclear Family



Nuclear Operations manages the eight power stations in the UK nuclear fleet.

Five of our stations are generating low carbon power, whereas Hunterston, Hinkley Point B and Dungeness B have entered the defueling stage of operations, the first stage of decommissioning.



Nuclear Services provides technical expertise and support to each of its three licensees: Hinkley Point C. Sizewell C and Nuclear Operations.



EDF EPR Engineering UK develops EDF's nuclear expertise by assembling leading companies to support in the design, build and commissioning of our Hinkley Point C and Sizewell C projects.

It's a subsidiary of Edvance - part of the EDF group.



Hinkley Point C is our current nuclear new build project, that once built and operating is expected to power 6m homes.



Sizewell C is another nuclear new build project, which is in the planning and investment stages.

The project will be a replica of Hinkley Point C and construction is expected to start in 2024.

Contact for more information:

Matt Taylor, Head of Communications and External Affairs - Nuclear Operations. Email: matt.taylor@edf-energy.com Tel: 07768 272 571

Fiona McCall, Senior External Relations Manager - Nuclear Operations. Email: fiona.mccall@edf-energy.com Tel: 07813 232 347