Institute for Public Policy Research

NUCLEAR ENRICHMENT

BUILDING A STABLE AND EFFECTIVE NUCLEAR WORKFORCE

Joshua Emden,
Andrew Sudmant
and **Teresa Farinha**

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SUMMARY

The government has talked a good game on the future of nuclear generation. It sees a strong civil nuclear sector as playing a crucial role in the UK's energy mix and in providing resilience in a more turbulent world, underpinning growth (such as supplying power for data centres) and defence.

Recent actions have started to back up these ambitions. These include the prime minister's recent decision to approve Sizewell C ahead of the June spending review, the reform of the planning system to encourage new nuclear sites, and the results of its Small Modular Reactor (SMR) competition.

Now, however, industry needs more specific details if it is going to move forward. Questions remain over where new sites will be, when they will be confirmed, and whether government or the private sector is in the lead. All this will impact how many workers are needed, where and with what skills. Given the long lead times for building new nuclear, it is critical that these questions are answered as soon as possible.

KEY FINDINGS

In this report, we highlight the workforce-related risks to the government's nuclear ambitions:

- Nuclear generation should provide 8–10 per cent of the UK's electricity but 80 per cent of current nuclear generation capacity is set to undergo defuelling and/or decommissioning by 2030.
- To replace this generation, the Climate Change Committee estimates that the UK will need to build 8GW of new nuclear capacity by 2050. While there are already some projects in the pipeline, the government has no firm plans beyond 2035.
- The nuclear sector has created long-standing relationships with local communities, and nuclear jobs are often some of the best paid in the region. However, this also makes some undiversified economies exposed if there are delays to new projects or no plans to build on existing sites when plants retire.
- For construction workers, carefully sequencing large-scale nuclear projects, ideally at five-year intervals, would help maintain a consistent workforce to meet government ambitions. By contrast, delays would see workers leave the sector to work on other (often less well-paid) infrastructure projects where their skills are in high demand.
- For workers in nuclear operation, unless new projects are swiftly announced on existing sites, there will be no operational nuclear power plants in Scotland or the north of England by 2030, ending a nearly 75-year legacy since Calder Hall was built in Cumbria in 1956. This would also see a halving of the approximately 3,000 workers currently employed in operating existing nuclear sites.
- The type of technology the government chooses has an impact on the workforce. Current plans to deliver just two SMR plants would mean by some industry estimates a reduction from 21,000 at the moment to around 5,400 jobs. This will impact developers' ability to build on these ambitions.
- A volatile workforce would risk causing further delays to nuclear projects beyond those currently in the pipeline and would repeat the mistakes of the past where a 20-year gap between building Sizewell B and Hinkley Point C

meant the workforce needed to be rebuilt from scratch. Consequently, it is likely that the government will need to provide a much more ambitious plan to roll out SMRs than current industry expectations.

- Where job losses are unavoidable, particularly for workers in power plants that are set to retire, it is critical that government co-develops plans with local stakeholders to support workers and diversify local economies as part of its broader industrial strategy.

KEY RECOMMENDATIONS

- **The government should build on the existing nuclear strategy by setting out a long-term nuclear programme between now and 2050 that details specific projects, technology choices and target dates for Final Investment Decisions (FIDs), construction and completion.** Where possible, this should include sites with existing nuclear capabilities.
- **The government should set out a workforce plan in collaboration with industry, unions and workers which sets out which workers will be affected and how their jobs may change.** This plan should be included within the government's broader industrial strategy and, where job losses are unavoidable, lay out career options for workers and seek to co-develop plans to diversify local economies that have a long-standing history of nuclear employment. The aim should be for at least three years' notice to workers to give them time to prepare.
- As part of negotiations for the contents of the workforce plan, **the government should commit to the following policies: travel subsidies, subsidised housing, a funded right to retrain, a right to interview, rights of access for unions, investment into training opportunities, and rigorous health and safety standards**.
- **The case of worker agreements at Hinkley Point C that go above and beyond the current national agreements for the engineering and construction industry should be used as a reference point for commitments being made as part of the industry-wide workforce plan.**
- **The government should seek to set out the use cases for SMRs to incentivise further proposals by exploring contracting arrangements such as PPAs between SMRs and energy-intensive users.**

1. THE CURRENT PLANS FOR FUTURE NUCLEAR GENERATION

SUMMARY

- The government is committed to building more nuclear generation. In particular, the government has indicated that it sees a role for nuclear generation supporting growth, such as providing power to new data centres. Developing the civil nuclear sector is also key to the government's renewed emphasis and increased spending on defence.
- There has been a steady stream of commitments to nuclear, most recently the proposed national planning policy changes (EN-7), Great British Nuclear (GB Nuclear) buying up sites in preparation for new nuclear, and the ongoing small modular reactor (SMR) competition.
- Less attention is given to the impact current plans will have on the existing nuclear workforce. Questions remain over where new sites will be, when new sites will be confirmed, whether new nuclear will come from a government-led programme or a more ad hoc developer-led approach, and therefore how many workers will be needed, in what locations and with what skills.

1.1 NUCLEAR GENERATION: DRIVING DEFENCE AND GROWTH

The current government has stated its support for nuclear generation, recently stating that "new nuclear is an integral part of the government's plans to replace the UK's dependence on fossil fuel markets with clean homegrown energy" (PMO et al 2025a). Most notably the prime minister recently confirmed the construction of Sizewell C will be approved ahead of the June spending review, following public funding to the project in the 2024 autumn budget (Swinford 2025; Pashby 2024). In addition, it has continued the small modular reactor (SMR) selection process with the chosen provider expected this year (GBN 2025).

The government sees nuclear generation as part of its growth agenda. For example, it hopes that its recent planning reforms will encourage developers to propose new sites for small modular reactors that can collocate with data centres that require the kind of consistent and reliable electricity that nuclear generation can provide (Wodecki 2025). Planning reforms have also recategorised data centres as nationally significant infrastructure projects which could help to provide a corresponding signal to nuclear development (Roffe and Devitt 2025).

Turbulent geopolitics have driven an increase in commitment to defence spending. The government has emphasised how defence spending can boost economic growth, citing the example of BAE Systems in Barrow, which will play a key role in delivering new submarines as part of the AUKUS programme (a collaboration between Australia, the UK and US) (PMO et al 2025b). As we discuss in chapter 2, the increased focus on defence requires a well-resourced civil nuclear workforce due to the transferability of skills between the two sectors.

1.2 GOVERNMENT ACTION TO ADVANCE THIS AGENDA

We set out the government's actions on nuclear power generation in table 1.1. This allows us to highlight where the government needs to turn next to progress.

TABLE 1.1

The current government is continuing from previous governments in taking actions to support the nuclear sector

List of key government policies introduced to support nuclear power

Date	Policy	Intended impact
9 April 2025	Announcement to approve Sizewell C by prime minister	Sizewell C confirmed as part of the government's growth plans and clean power target.
Spring 2025	Latest Nuclear Workforce Assessment published by the Nuclear Skills Delivery Group	To provide an update on the latest skills needs in the nuclear workforce.
Spring 2025	Small Modular Reactor (SMR) selection announcement	To select developers to deploy the first SMR power station in the UK and initiate a pipeline of further SMR projects.
February 2025	National Policy Statement on nuclear (EN-7)	To increase the number of sites where nuclear could be deployed beyond the current eight sites specified in planning law. This would encourage a more developer-led approach where developers, not government, come forward to propose new sites and the intention is to see some SMRs collocate with the development of new data centres.
October 2024	£2.7 billion for Sizewell C	To confirm government commitment to achieving a Final Investment Decision on Sizewell C.
May 2024	GB Nuclear purchases potential nuclear sites at Oldbury and Wylfa	To encourage developers to come forward with proposals for nuclear power stations, including SMRs, on sites with existing nuclear expertise and legacy.
March 2024	National Nuclear Strategic Plan for Skills	Skills Plan setting out how to fill demand for additional 40,000 workers by 2030.
February 2024	Civil Nuclear Roadmap to 2050	Introduced the target of up to 24GW of nuclear power by 2050, including 3–7GW every five years between 2030–44. This target has been kept by the current government.
January 2024	£300 million investment into fuel manufacturing	Investment to support domestic production of advanced nuclear fuel for advanced modular reactors.
December 2023	Nuclear Workforce Assessment (2023)	Projections for the future size and skills requirements of the nuclear workforce.
July 2023	Nuclear Fuel Fund	£22.3 million of funding to support the UK's nuclear fuel supply chain.
July 2023	GB Nuclear and SMR competition launched	GB Nuclear created to deliver UK's nuclear projects including Sizewell C, alongside the announcement of a competition that invites developers to deliver SMR reactors.
January 2020	£385 million Advanced Nuclear Fund	A fund created to invest in progress the development of both small modular reactors (SMRs) and advanced modular reactors (AMRs)

Sources: BEIS 2020; DESNZ 2023a; NSDG 2023; Twidale 2023; DESNZ 2024a; DESNZ 2024b; NSDG 2024; Pashby 2024; DESNZ 2025; GBN 2025; Swinford 2025

1.3 QUESTIONS THE GOVERNMENT MUST RESOLVE TO MEET ITS AMBITION

Despite the commitments referred to above, workers, industry and union stakeholders that we interviewed told us that, given the long lead times for building nuclear generation, **it is critical that the government provides greater clarity and starts making decisions over new nuclear generation now**. As one worker summarised:

> ***"They have good discussions in Parliament, but they're far behind the curve now for building new power and getting new skills."***

Key areas include:

1. When will new projects be built and how frequently?
2. Will the approach be a government-led programme or a more developer-led approach?
3. Where will new power stations be built?
4. What type of nuclear power stations will be built?

In the following chapters of this report, we unpack these questions in relation to the nuclear workforce, and explore the potential for nuclear to support both economic growth and defence.

2. THE ROLE OF NUCLEAR GENERATION IN THE UK ECONOMY

SUMMARY

- Nuclear generation will provide 8–10 per cent of electricity generation from 2035 and beyond because of its ability to provide continuous baseload power (that is, it is almost always on).
- 80 per cent of current nuclear capacity is set for defuelling and decommissioning by 2030, yet the CCC estimates the UK needs to build around 8GW of additional nuclear power by 2050.
- Nuclear power creates good-quality jobs with benefits like training opportunities and pay that is often higher than the surrounding regional average.
- Nuclear power is an outsized local employer and plays a more important role in specific local economies than it does nationwide. In many of these communities, it is an important part of their culture and history.
- Nuclear power creates more jobs in the supply chain than most other low-carbon power generators.
- The skills in civil nuclear power are also important for nuclear defence, and the coexistence is important for national security.

2.1 NUCLEAR PLAYS A CRITICAL ROLE IN THE UK'S LOW-CARBON GRID GOAL

In 2023, nuclear represented 4.6 per cent of the UK's electricity generating capacity,[1] but it provided 13 per cent of actual electricity generation (CCC 2025). This is because certain buildings like hospitals or universities need a consistent and reliable supply of electricity (collectively known as the UK's 'baseload') which nuclear power is well equipped to provide.

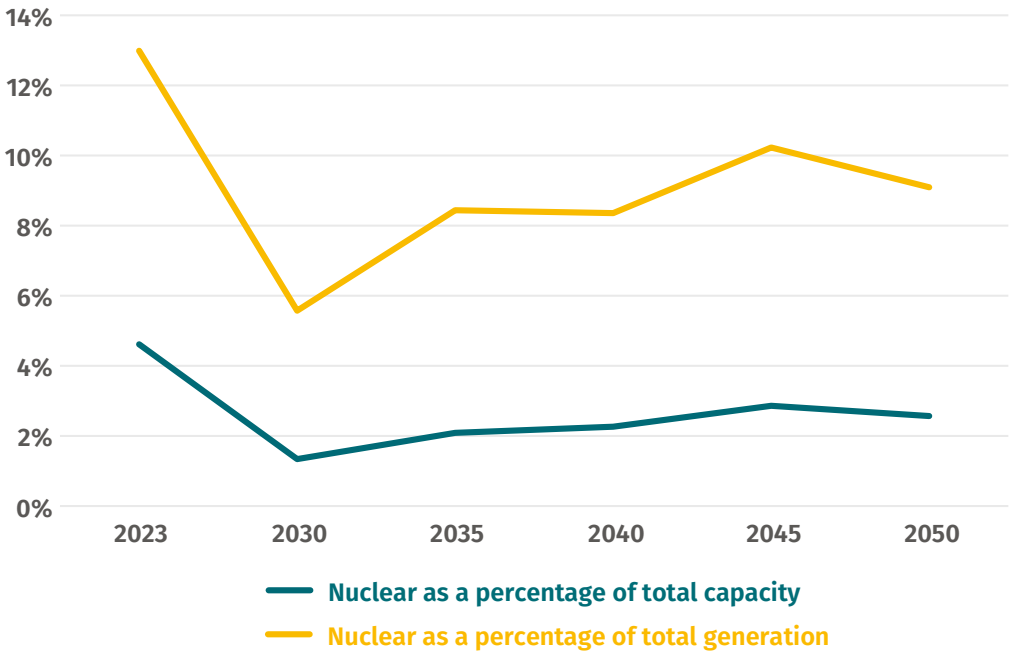
Consistent supply could also support the development of new, power-hungry data centres. As figure 2.1 shows, the latest Climate Change Committee 7th Carbon Budget estimates suggest that nuclear power will continue to generate 8–10 per cent of the UK's electricity needs from 2035 and beyond.

1 The theoretical total amount of electricity which the UK could produce if every generator was producing at the same time.

FIGURE 2.1

Nuclear will continue to play an important role in meeting the UK's electricity needs

CCC projections for nuclear power as a percentage of total capacity and total generation by year



Source: CCC 2025

Figure 2.1 also shows a decline in nuclear capacity between now and the 2030s. By 2030, all operational nuclear power stations apart from Sizewell B, representing 80 per cent of total existing capacity, are set to undergo defuelling and decommissioning (Dalton 2024). By 2035, this could increase to all current nuclear power stations, although Sizewell B's operational lifetime may be extended to 2055 (King 2025). According to the CCC, to keep pace on decarbonising our electricity grid, the UK therefore needs to build an additional 8GW of new nuclear capacity by 2050 (CCC 2025).

2.2 THE NUCLEAR SECTOR'S ROLE IN CREATING GOOD, LOCAL JOBS

Nuclear power creates local, well-paid jobs in both the construction and operation of power stations. As figure 2.2 shows, jobs in nuclear power tend to command higher salaries than the median wages of most of the local economies in which those jobs are based.[2]

As we found from our interviews with workers, many felt that nuclear jobs were ones that they wanted to stay in for life, as one said:

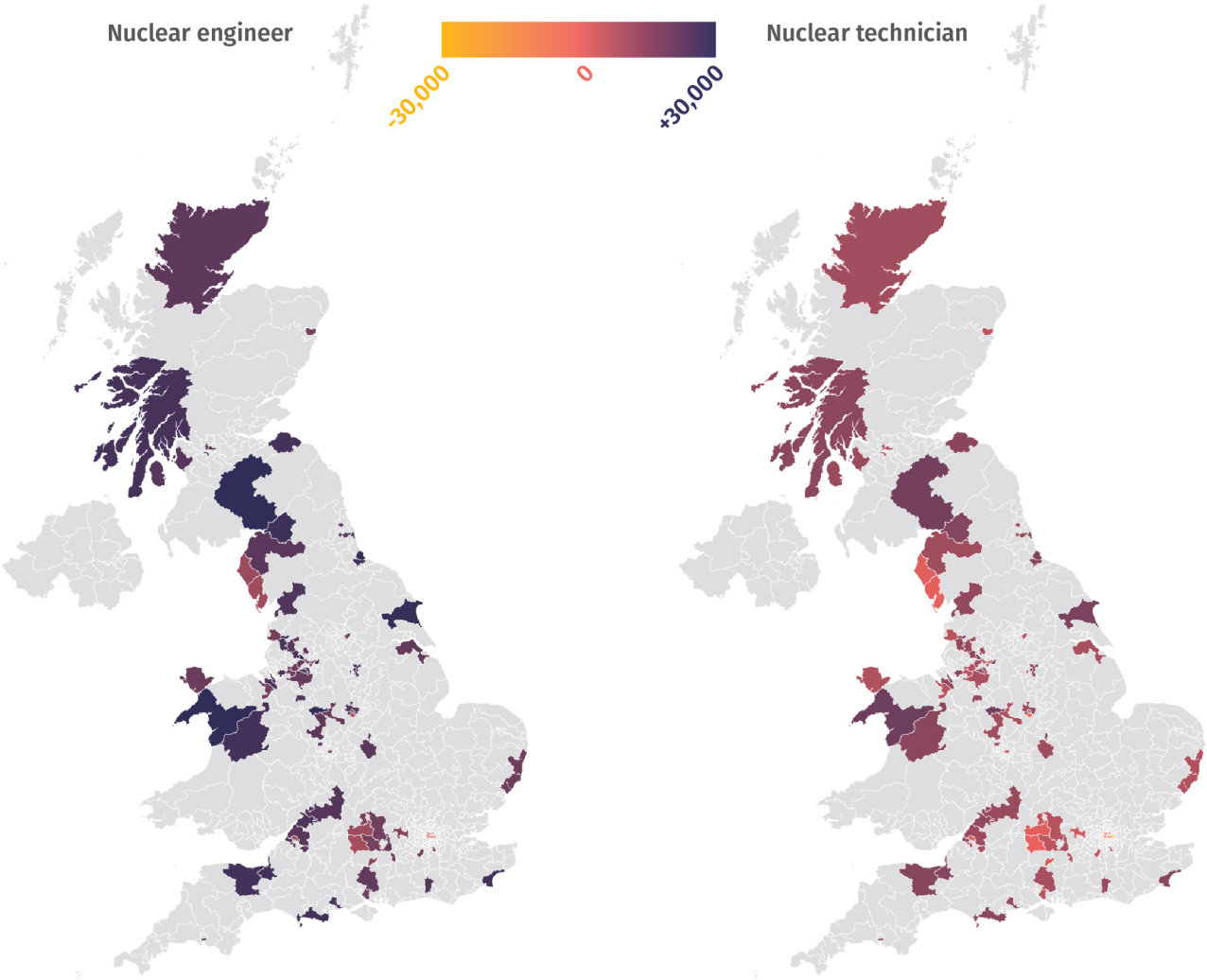
> ***"I've been here since I left school, I was an apprentice in the '90s. There was scope for developing your career … and I've had a job for 30 years that has been rewarding."***

2 For the purposes of this analysis, the 'average nuclear salary' for each job assumes the location of jobs in the samples from which the average salary is derived are roughly evenly distributed across the UK to therefore include and account for regional variations in salary within the average.

FIGURE 2.2

In almost every constituency with workers in the nuclear sector, the median salary for a nuclear engineer or technician exceeds the local median, except for in London

Comparison of median salary for nuclear engineer (left) and technician (right) with overall median salary in parliamentary constituencies with equal to or greater than 50 nuclear jobs



Sources: IPPR analysis of NIA 2024; ONS 2024; Talent.com 2025a, 2025b

Stakeholders we spoke to for this research also pointed out that construction work for nuclear projects is particularly well paid because of the need to outcompete other sectors with similar skills demands. For example, employment at Hinkley Point C pays around 25 per cent above existing national agreements between trade unions and businesses for the engineering and construction industry, and includes other benefits such as bonuses, training opportunities and decent accommodation for workers who have relocated from across the country (NAECI 2024).

Nuclear jobs are also very important to specific local economies. In figure 2.3, we use 'Location Quotient', or 'LQ', analysis to demonstrate the importance of nuclear jobs in local economies compared to the UK-wide economy.[3]

3 For the purposes of this analysis, we review all nuclear jobs including nuclear defence and only analysed constituencies with greater than or equal to 50 nuclear jobs.

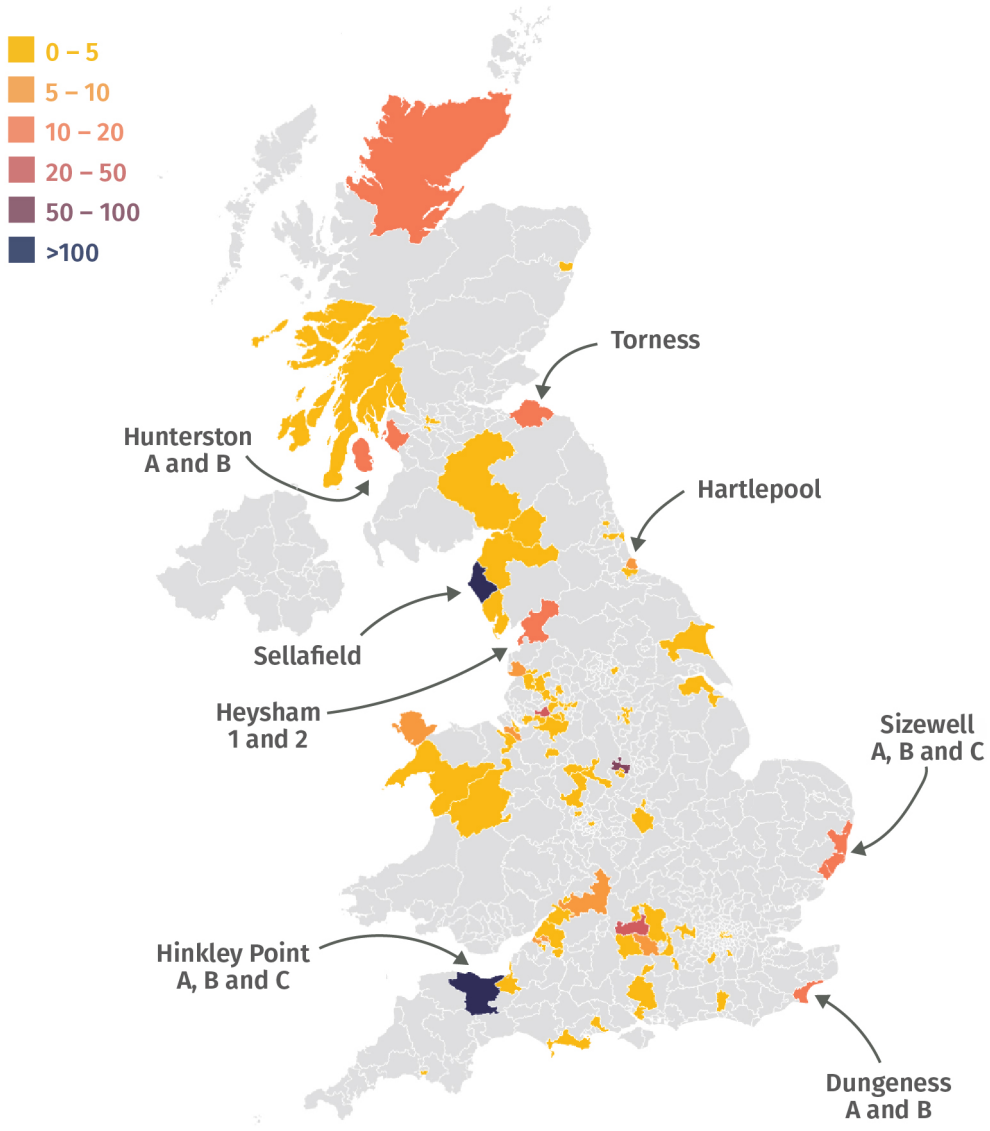
LQ analysis looks at the percentage of jobs that a certain industry represents within a local economy and compares this with the percentage of jobs it represents nationally, expressing the result as a ratio. For example, if an industry represents 50 per cent of all jobs in a local economy, but only 25 per cent of jobs nationally, the LQ ratio is 50 divided by 25, which is 2. Any ratio above 1 for the local economy in question shows that a given industry plays a bigger role in that local economy than it does nationally.

Figure 2.3 shows that in many of the constituencies where current nuclear power stations (or other nuclear key infrastructure like Sellafield) are situated, nuclear sector jobs are vital to the local community. As we discuss further in chapters 3 and 4, this also highlights how vulnerable certain communities will be to the loss of nuclear jobs.

FIGURE 2.3

The nuclear sector is a major employer in particular constituencies

Location Quotient of nuclear sector jobs by parliamentary constituencies in 2024



Sources: IPPR analysis of NIA 2024; ONS 2024

2.3 NUCLEAR POWER SUPPORTS JOBS IN THE SUPPLY CHAIN AND DEFENCE

The nuclear power sector is also critical for the jobs it supports in the supply chain and in the defence sector. Looking first at the supply chain, nuclear power is one of the largest creators of jobs in the supply chain compared to other low-carbon energy industries (see table 2.1). For example, as part of Hinkley Point C's construction programme, EDF partnered with Bridgwater & Taunton College to create a Welding Centre of Excellence, to train up new welders, meeting a key skills gap.[4] This skills pipeline will also support other high demand areas such as renewables (Dykes 2024).

TABLE 2.1

The nuclear power sector drives significant supply chain job creation
List of indirect job multipliers by low-carbon energy sector in 2020

Sector	Job multiplier (2020)
Hydropower	3.11
Nuclear power	2.78
Bioenergy	2.61
Fuel cells and energy storage systems	2.56
Onshore wind	2.43
Offshore wind	2.41
Energy monitoring, saving or control systems	2.16
Solar photovoltaic	2.08

Source: ONS 2020

Maintaining a strong civil nuclear sector is also important for the health of the nuclear defence industry. As table 2.2 shows, academic analysis of the occupations present in both the civil nuclear and nuclear defence sectors in the US shows how many similarities there are between the two sectors, including many engineering disciplines, health and safety occupations and technicians. In addition, many roles in both civil nuclear and defence require similar training and checks, such as the Counter Terrorism Check, which makes it easier to move between the sectors once they are obtained.

4 See: https://www.btc.ac.uk/the-college/campuses/bridgwater-campus/welding-centre-of-excellence/

TABLE 2.2

The civil nuclear and nuclear defence sectors share many occupations

*List of civil nuclear and nuclear defence occupations according to the US O*NET database, those highlighted in green show occupations that are shared by both sectors*

Civil nuclear	Nuclear defence
Chemical Engineers	Aerospace Engineers
Construction Managers	Electrical Engineers
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors
Electrical Engineers	Health Physicists
Environmental Engineers	Logisticians
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	Marine Engineers and Naval Architects
Health Physicists	Mechanical Engineers
Industrial Engineers	Military Enlisted Tactical Operations and Air/ Weapons Specialists and Crew Members, All Other
Materials Engineers	Military Officer Special and Tactical Operations Leaders, All Other
Mechanical Engineers	Nuclear Defence Scientists/Researchers
Nuclear Engineers	Nuclear Engineers
Nuclear Equipment Operation Technicians	Nuclear Monitoring Technicians
Nuclear Medicine Technologists	Nuclear Technicians
Nuclear Monitoring Technicians	Nuclear Weapons Technicians
Nuclear Power Reactor Operators	Security Managers
Nuclear Technicians	Weapons Engineers
Power Plant Operators	
Quality Control Analysts	
Radiologic Technologists and Technicians	
Security Managers	

Source: Analysis of Farinha et al 2019

In the most recent nuclear workforce assessment (2023), while jobs are predicted to increase in the nuclear sector as a whole, this predominantly comes from defence. In addition, announcements by Australia, the UK and US (AUKUS) to collaborate over nuclear defence could increase employment demand in nuclear defence in future (NSDG 2023).

3. RISKS FROM GOVERNMENT DELAY ON NUCLEAR DECISIONS

SUMMARY

- The UK does not have firm plans for building nuclear generation beyond 2035. If existing plans on new nuclear are too slow, it is likely that gas power stations will fill the gap, increasing the UK's dependency on gas imports.
- Longer extensions to ageing power plants increase the risk that they suddenly come off the grid due to faults, as was the case with Dungeness B in 2021 (BBC News 2021).
- A consistent pipeline of projects ensures that just as construction jobs peak in one project, workers can move onto another. If this does not happen, there is a risk that construction workers, whose skills are in high demand elsewhere, move out of nuclear and it could be challenging to bring them back.
- Delays in decision-making also pose a major risk to workers operating existing nuclear sites. Based on current plans, between 2026–33, all nuclear power stations in the north of England and Scotland are due to undergo defuelling and decommissioning which could see a halving of the approximately 3,000 workers in these regions.
- Even with Hinkley Point C due to come online from 2029 and, in the best-case scenario, Sizewell C and one to two SMRs from 2035, these power stations will either become operational too late to take existing workers or have mismatched requirements.
- If workers have no confidence in new nuclear generation they may leave before the power plant is due to defuel, making it challenging to run existing power stations.
- Advanced nuclear fuel manufacturing has seen a steady fall in employment over several decades. If the government wants to improve the UK's energy security position, it must clarify how the existing nuclear fuel manufacturing workforce fits into its investments into advanced fuels, and what reactors these fuels will be expected to supply.

3.1 RISKS TO ENERGY SECURITY

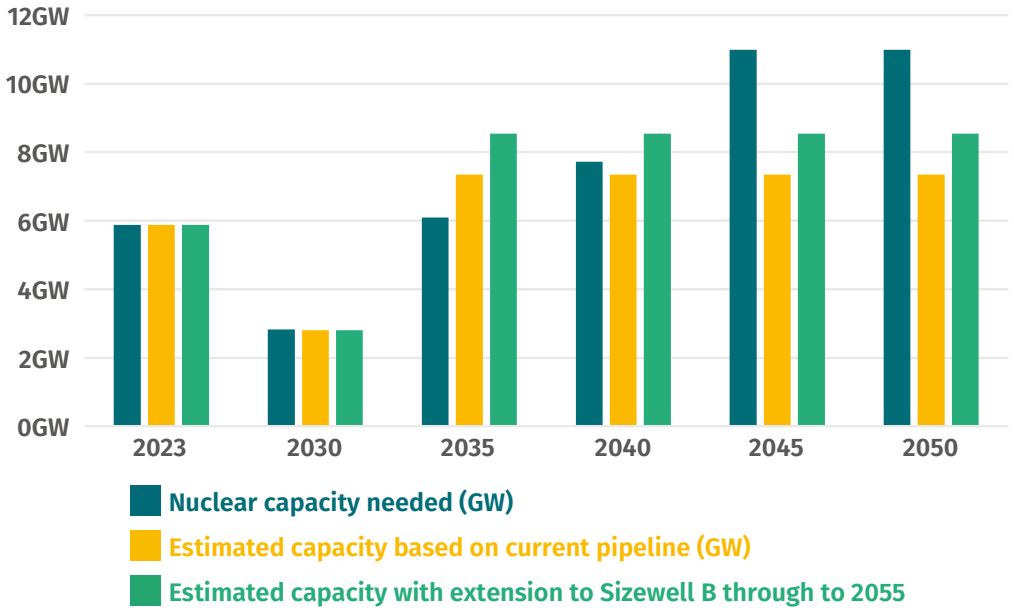
As discussed in chapter 2, to keep pace on decarbonising electricity and continue to displace gas power stations, the UK needs to deploy an additional 8GW of nuclear power by 2050. However, there is uncertainty around nuclear capacity beyond 2035.

As figure 3.1 shows, in a best-case scenario,[5] nuclear capacity meets or exceeds trajectories anticipated by the CCC by 2035, particularly if Sizewell B's operational lifespan is extended to 2055 (Hakimian 2024). However, this assumes that Hinkley Point C, Sizewell C and at least two SMR projects are operational by 2035. Any delays, particularly to Sizewell C, would likely increase the UK's reliance on existing gas power stations to fill the gap in supply in the meantime (Smout 2024).

FIGURE 3.1

Even in the best-case scenario for the current nuclear pipeline, there could be a shortfall in nuclear capacity as early as 2040 without decisions on future projects being made now

Comparison of nuclear capacity set out by the CCC's 7th Carbon Budget compared to best-case scenario estimates of the current pipeline6



Sources: IPPR analysis of Horgan 2022; Nuclear AMRC 2024; Smout 2024; Hakimian 2024; CCC 2025

Beyond 2035, future nuclear capacity is much less certain. On current evidence, GW-scale projects can take around 20 years from the planning stage up until they become operational, including anywhere between 10–15 years of construction (see figure 3.2) (Khalil and Morton 2025). Any plans for new GW-scale projects need to be made now to ensure the UK is building enough nuclear capacity in the 2030s and 2040s.

This urgency also applies for SMR projects. Even in an optimistic future where SMR projects become the main technology pathway for nuclear and there are minimal hurdles facing first-of-a-kind construction, SMR projects could still take up to 10 years from planning to operation. If reactor designs in the current SMR competition take four to five years to build, a Final Investment Decision for the first project is not expected until 2029 at the earliest (DESNZ 2023b; Nuclear AMRC 2024).

Finally, while the extension of Sizewell B would ease pressure on demand for nuclear capacity in the 2030s, this comes with increased risk, as ageing power

5 We use this same scenario for figure 3.3 below.

6 For the purpose of this optimistic scenario, we assume that the first reactor at Hinkley Point C (approximately 1.6GW) becomes operational by 2029 and that Hinkley Point C (3.2GW), Sizewell C (3.2GW) and two SMR reactors totalling 0.94GW all become fully operational by 2035.

plants are more likely to develop faults that mean they suddenly come off the grid. In the worst-case scenario, if faults are too expensive to repair, this may result in a permanent and unexpected loss of nuclear capacity. This occurred in 2018 when problems were found with the reactor at Dungeness. By 2021, EDF assessed that repairs would be too expensive and so they began defuelling the reactor (BBC News 2021).

3.2 THE IMPACT OF DELAYS TO WORKERS IN NUCLEAR CONSTRUCTION

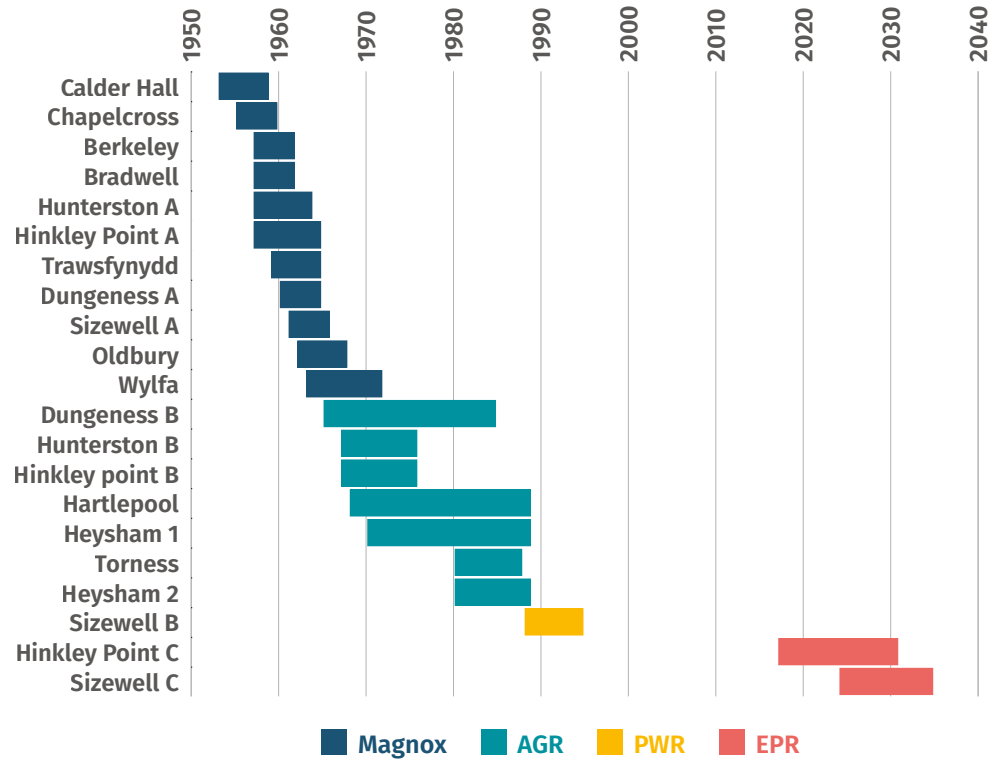
With a stop-start approach to nuclear projects, there is a risk that the current 21,000-strong workforce leave the sector to find other employment, where their skills are often in high demand, particularly on other low-carbon energy projects (Lay 2024). This would benefit those sectors but harm nuclear development. Workers we interviewed described the situation as having "cliff-edges, [where] people drop off, disappear into other organisations and other sectors ... there's a risk you lose workers and can't get them back".

However, as figure 3.2 shows, the UK has not had a regular nuclear construction programme since the 1980s. Indeed, while in chapter 2 we highlight investment into the Welding Centre of Excellence at Hinkley Point C as a positive example of the jobs which nuclear projects can create, many stakeholders we spoke to pointed out that one of the causes of delays to building Hinkley Point C was the time taken to rebuild the skills base virtually from scratch. As such, the Welding Centre is also a cautionary tale that highlights the importance of maintaining a skilled workforce.

FIGURE 3.2

The UK has not had a regular nuclear construction programme since the 1980s

List of nuclear power stations built in the UK by years of construction and reactor type



Source: IPPR analysis

Some stakeholders we spoke to suggested that even the gap between construction starting at Hinkley Point C around 2017 and at Sizewell C in 2024 was too large. This is because workers on Hinkley Point C may leave the nuclear workforce before Sizewell C reaches the point in their construction when they needed. Stakeholders suggested that the ideal timeline between projects should be around five years so that just as construction work is peaking on one project, a new project can start to absorb the workers coming off the first one.

The way in which the government plans to sequence nuclear construction could also impact the availability of skills. For example, if the government's planning reforms encourage a predominantly developer-led approach, this could cause a surge in project proposals. Without sequencing, we could see a short-term boom in jobs that cannot be sustained or a skills crunch that causes project delays. Government would therefore still need to take a role in smoothing this disruption.

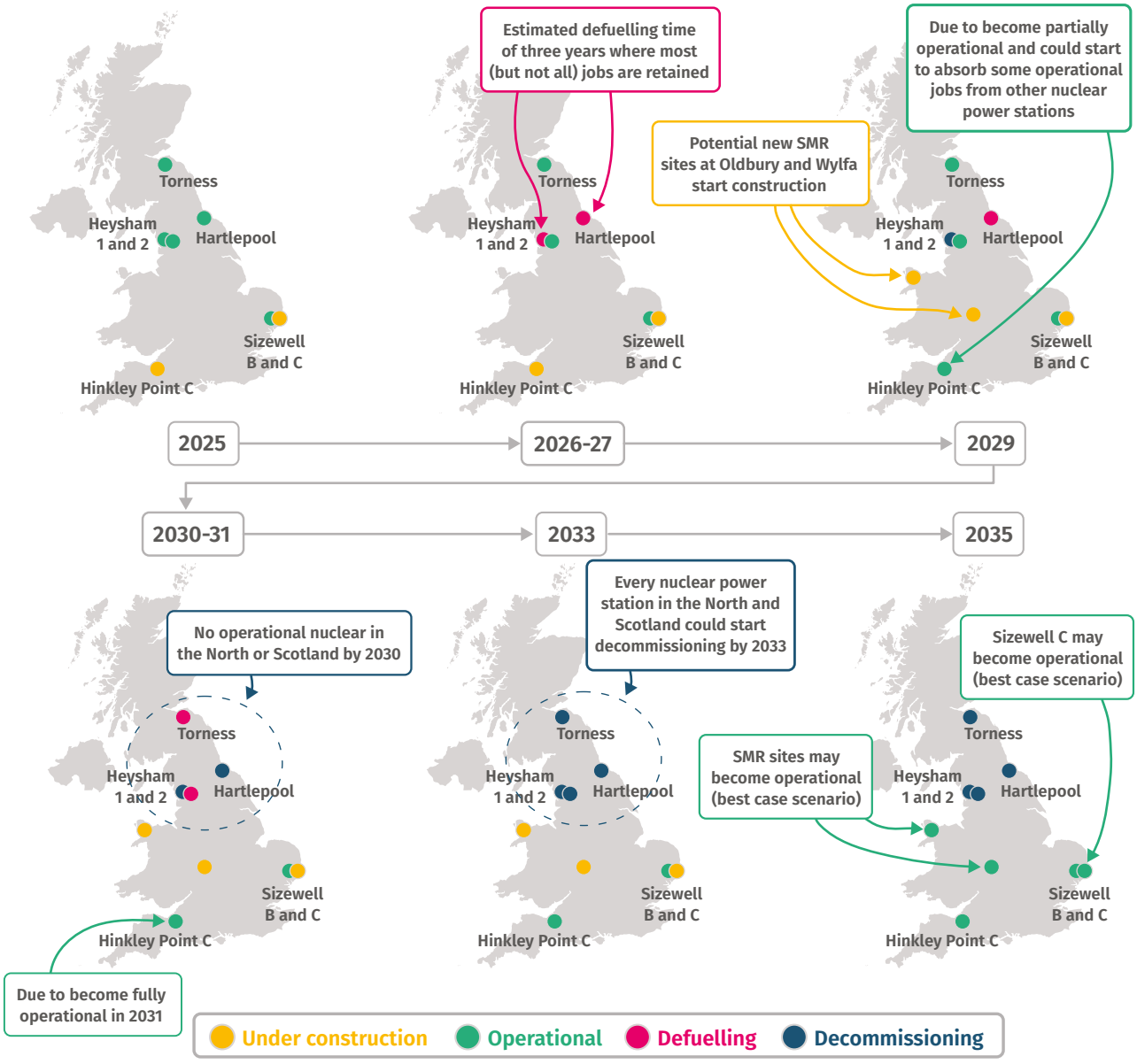
3.3 THE IMPACT OF DELAYS TO WORKERS IN NUCLEAR OPERATIONS

Delays in decision-making pose a major risk to workers operating existing nuclear sites. Based on current plans, as figure 3.3 shows, between 2026–33 all nuclear power stations in the north of England and Scotland are due to undergo defuelling and decommissioning, which could see a halving of the approximately 3,000 workers in these regions. These estimates come from previous experience of nuclear sites where around half of the operational workforce is retained as the nuclear power plant transitions from defuelling to decommissioning.

FIGURE 3.3

By 2030, every nuclear power station in Scotland and the north of England will have undergone defuelling and/or decommissioning

Timeline for existing nuclear fleet based on industry estimates of defuelling, decommissioning, construction and operation years



Source: IPPR analysis

As figure 3.3 shows, even in the best-case scenario, Hinkley Point C becomes partially operational in 2029 and Sizewell C and one to two other SMRs are operational from 2035. This will be too late for workers at many of the existing power stations, even before considering whether new power stations could absorb jobs being lost or if workers would want to move in the first place. In short, unless the government sets outs plans for new nuclear projects at existing sites – and the Scottish government agrees to consent new sites in Scotland - there will be no operating nuclear power

station in Scotland or the north of England by 2030, the first time in nearly 75 years since Calder Hall was built in 1956.

> ***"[I] don't like the lack of a future. There is employment in the wider community, but not like this power station." (Nuclear worker)***

In addition, if workers on existing nuclear sites can see there will be no new nuclear coming to their area, we were warned that workers may leave before the power plant is due to defuel. This would make it challenging to run existing power stations. As well as encouraging developers to propose new sites, there is still clear potential for new nuclear on the original eight sites with existing capabilities.

3.4 THE IMPACT OF DELAYS ON NUCLEAR FUEL MANUFACTURING

Previous governments have recognised that maintaining a domestic nuclear fuel manufacturing industry is of "strategic national importance" and forms part of a broader plan to remove dependence on uranium imported from Russia (Sutherland and Hinson 2021; DESNZ 2024a). These ambitions are underpinned by significant public investment into UK advanced nuclear fuels manufacturing.

However, while investment in advanced nuclear fuel manufacturing is increasing, the UK is also losing valuable skills and expertise in fuel manufacturing as the current fleet retires. Many stakeholders we spoke to noted how employment in nuclear fuel manufacturing had fallen from a peak of 4,000 workers when all the UK's AGR fleet were operating, down to 800 now as these power stations have started to retire. Many expressed their concern that there was "no prospect of future work" due to uncertainty over what role domestic fuel manufacturing would play in new nuclear generation.

This concern was also shared by those workers we interviewed who worked in the sector, with many pointing out how Hinkley Point C had chosen to be supplied by Framatome based in France (Framatome 2023a). Indeed, referring to the Springfields site for nuclear fuel manufacturing, one worker said:

> ***"It was the first and largest [site] in the world, but it seems as though we're lagging behind now. Is it all going to go to France?"***

More positively, in 2023 Framatome themselves announced their intention to establish nuclear fuel manufacturing facilities in the UK (Framatome 2023b). However, this has not yet been confirmed, and a lack of clarity remains over what role, if any, the current workforce will play in recent investments into more advanced fuels and indeed what reactors these fuels will supply.

4. REMAINING RISKS TO THE NUCLEAR WORKFORCE

SUMMARY

- Even with a clear pipeline in place, the question over which type of nuclear technologies will exist in future will impact workforce composition. SMRs for example are estimated to be three to four times less job intensive in construction than GW-scale nuclear projects.
- In instances where job losses are unavoidable in nuclear operations or fuel manufacturing, it is critical for workers to understand what jobs they could do instead. To achieve this, the government needs to translate its growing understanding of skills transferability into practical training courses.
- More broadly, the government needs to see nuclear jobs as part of a broader workforce strategy that sets out how it plans to harness the significant skills and expertise in the nuclear sector and diversify local economies where nuclear employment is crucial to the local community.

4.1 TECHNOLOGY CHOICES AND THEIR IMPACT ON THE WORKFORCE

Both the number and type of jobs will change depending on the type of nuclear reactors that the UK builds in future. Studies estimate that SMR construction requires three to four times fewer workers than large, GW-scale projects (Stewart et al 2022). SMRs also require different kinds of skills because a greater proportion of the reactors will be prefabricated in factories rather than built on site (ibid).

Based on estimates of *current* government and industry ambitions from stakeholders we interviewed for this research, a future SMR construction workforce could result in around 5,000 core construction workers that move from site to site and around 400 factory workers that prefabricate components for each new reactor. This would clearly be a significant reduction from the approximately 21,000 construction workers in the sector.

However, these estimates over the size of the workforce are largely based on assumptions that SMR projects will only be delivered at Wylfa and Oldbury (as shown in chapter 3) and likely do not cover the full scope of the government's ambition for SMRs, particularly given their desire for developers to propose new sites, for example, that collocate with data centres. In addition, the government has not ruled out support for future GW-scale nuclear generation that would be more job-intensive.

As such, it would not serve the government's ambitions to see a permanent reduction in the nuclear construction workforce. A reduction in the construction workforce would risk causing further delays to nuclear projects beyond those currently in the pipeline and would repeat the mistakes of the past where a 20-year gap between building Sizewell B and Hinkley Point C meant the workforce needed to be rebuilt from scratch. Consequently, it is likely that the government will need to provide a much more ambitious plan to roll out SMRs than current industry expectations.

Finally, insights from our interviews with workers revealed scepticism that these plants would be built, with some suggesting that they did not think they would be delivered any more quickly than larger-scale projects. As one worker noted, "SMRs are just a brochure". To address this scepticism, it is critical for the government to minimise the time between the results of the SMR competition and final investment decisions being made.

4.2 THE NEED TO SUPPORT WORKERS AND DIVERSIFY LOCAL ECONOMIES

Even with a long-term nuclear programme, some job losses, particularly in nuclear operating, may be unavoidable. Even with an accelerated rollout, it is unlikely that every site with a nuclear power station will see a new and operational facility at the same site by the time they are due to be defuelled or decommissioned by 2033. Indeed, as we show in figure 3.3 in the previous chapter, based on estimations of current plans for new nuclear, none of the existing sites in the north of England or Scotland are due to see new nuclear facilities before they are decommissioned.

It is unrealistic to expect that all workers will move locations, nor will new facilities be able to absorb all workers. It is critical to understand what jobs may be available to workers in the regions where current nuclear sites are set to be retired. In the annex to this report, we provide an analysis which gives an indication of what jobs workers leaving nuclear operations could move into, based on the work tasks shared between nuclear jobs and other roles.

However, this analysis does not capture the specific training required to move from one job to another because the government does not yet have this data for most sectors. In general, while the current government is making progress on understanding the transferability of skills across many different energy jobs, the next step will be to translate these findings into bespoke training courses.

More broadly, given the highly skilled and high-paid jobs that may be at risk in nuclear operations, the government will need to co-develop plans with local communities and local governments to harness the skills and expertise of the sector as part of a broader industrial strategy that can direct workers to other sectors where their skills will be in high demand. This could include other renewable energy sectors, or as noted in chapter 1, in nuclear defence. Finally, as we discuss in chapter 2, in some communities, nuclear generation is both a major employer and a key part of the area's cultural legacy. Consequently, if retiring nuclear plants would result in job losses or workers moving away from these areas, it is critical to co-develop plans for economic diversification with those local communities and local government.

5. POLICY RECOMMENDATIONS

Recommendation: Build on the civil nuclear roadmap and set out a detailed long-term nuclear programme with specific capacity targets and milestones.

While Labour has shown a continuity with the previous government in its commitment to meet high-level targets for nuclear power, greater clarity would provide certainty for both developers and the workforce.

The government should build on the civil nuclear roadmap by setting out a long-term nuclear programme between now and 2050. This programme should detail both the technology choices and target dates for completion. For example, the government could set a target for the Final Investment Decision (FID) of at least one SMR for 2027, another by 2029, and at least one FID for a new GW-scale plant by 2030. This programme should set out options for new projects on existing sites that have the local expertise, community and historic ties to working in the nuclear industry. Finally, the government should set out a specific role for the domestic nuclear supply chain to supply new nuclear projects. In particular, it should ensure there is a clear role for the UK's existing nuclear fuel manufacturing base in both GW-scale and SMR sites.

Importantly, this state-led approach should not rule out the opportunity for developers to propose new projects. However, by having a clear timeline for building new nuclear, the government could determine how to properly sequence new proposals to ensure consistency in deployment and workforce.

> ***"There's a strong role for the state in this pipeline – particularly if it's going to preserve skills." (Nuclear worker)***

Recommendation: Commit to developing a workforce plan with specific consideration of support for the existing workforce as part of a broader industrial strategy.

The collaborative development of workforce plans is a consistent need across many different sectors that are set to decarbonise in the coming decades and must form a crucial part of a wider industrial strategy. In this regard, the nuclear sector should build on its reputation for good-quality employment and similarly develop a best-practice framework for co-developing a comprehensive workforce plan for the nuclear industry. In the annex below, we set out an example of a checklist of key questions which both government and industry will need to answer.

Broadly speaking, we recommend that all workforce plans should be co-developed by government, unions and industry stakeholders, and seek to cover three areas:

1. An understanding of the demand for skills in the industry now and in future and an understanding of how this demand will be met between existing workers with transferable skills, existing expertise from outside the sector, or training new labour market entrants. From here all parties will agree on the policies and support that will be put in place to meet this demand for skills.
2. An understanding of the number of workers whose roles will change in future, either because they will require upskilling or because they are likely to be made redundant. From here all parties will similarly agree on the policies and support that will need to be put in place to support the existing workforce,

with a particular focus on providing workers with information as early as possible, ideally at least three years before changes to their roles are likely to take place.

3. The co-development of plans with local communities and local government to diversify economies in cases where there are long-standing cultural and economic ties to nuclear employment but the retirement of nuclear plants will result in job losses or workers moving away from the area.

> **Recommendation: Co-develop support measures for workers and nuclear communities as part of the workforce plan.**

As we discuss in chapter 1, there are many initiatives and discussions that already seek to address questions over skills gaps. However, we recommend an additional focus on support measures for the existing workforce.

Drawing on previous IPPR research, the government should commit, within the workforce plan, to a number of support measures to be negotiated between government, industry and trade unions (IPPR 2021; Emden et al 2024). These include but are not limited to:

- a comprehensive careers advice service that builds on our analysis of job transferability to support workers who may lose their jobs to find new employment in nearby industries that require similar skills
- a funded right to upskill or retrain, whether while in post or between jobs
- a right to interview for new positions where a worker can demonstrate transferable skills
- travel subsidies if taking a new role that requires significant extra travel
- subsidised housing if workers are required to move across the country for a new role
- guarantees over workplace health and safety
- guarantee trade unions a right to access workers to make the case for membership.

Due to the high demand for skilled workers which the civil nuclear sector provides, in many cases, it is likely that this support will largely cater for workers either moving within the wider nuclear sector, such as from civil to defence, or to other energy sectors. However, careers advice services will also be particularly important if workers wish to move out of the sector (and indeed, these services should be available to all workers beyond just the nuclear industry). Indeed, many workers we spoke to for this research indicated that they would be unsure what jobs they would move into without the nuclear industry, with one working saying:

> ***"[I] don't know where you'd take these skills outside of the job, especially where you live."***

> **Recommendation: Model negotiations over pay and other benefits in the workforce plan on worker agreements at Hinkley Point C but apply this to all types of reactors.**

As a starting point for negotiations over pay, job quality and other benefits, government, industry and unions should use worker agreements in place at Hinkley Point C. This basis for negotiations should be viewed as the standard for what good agreements should look like for new projects, including for all new SMR projects that may be confirmed in the coming decades.

Recommendation: Specify use cases for new nuclear.

Until the SMR competition is concluded and the first-of-a-kind SMR project proceeds with a Final Investment Decision, it is unclear how much SMRs will contribute to the UK's future nuclear power portfolio. However, if the government intends for them to play a significant role, it will be important – both for the nuclear construction workforce and for the government's own ambitions – to encourage SMR developers to come forward with new proposals after the conclusion of the competition.

To achieve this, as IPPR has previously argued, the government should explore developing PPA where generators – in this case SMRs – could provide energy-intensive industries with a stable electricity supply (IPPR 2021). To ensure competitive pricing, the government would hold auctions that invite SMRs to bid to supply these industries. To incentivise competition within the auction, the government could also offer energy-intensive industries the chance to bundle together their anticipated electricity demand into a series of larger electricity contracts. This could help provide SMR developers with the reassurance that they will be bidding to deliver large-scale contracts and in turn incentivise them to develop proposals for new sites.

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APPENDIX

A.1 ANALYSIS OF TRANSFERABILITY OF SKILLS FROM NUCLEAR ROLES INTO OTHER OCCUPATIONS COMPATIBLE WITH A FUTURE NET-ZERO ECONOMY

In table A.1, we analyse five key roles found within the civil nuclear sector[7] and compare them with the five most similar occupations outside of the nuclear sector that are compatible with a net zero economy (that is, we do not want to suggest anyone should be moving into fossil fuel occupations that may be lost further down the line).

In this context, we define 'similarity' as the estimated percentage of 'work tasks' (such as managing a team or repairing machinery) shared between two occupations. We then estimate how many jobs there are for each of these closely related occupations outside the nuclear sector (as of 2023) in Scotland, the North West, and the North East – the regions where Torness, Heysham 1 and 2, and Hartlepool respectively are all expected to undergo decommissioning between 2026 and 2033.

Looking at the number of jobs in these closely related occupations does not guarantee there is a vacancy and is instead intended to indicate how easy or difficult it may be for workers to move out of a nuclear role. In addition, this does not reveal the specific training courses workers may need to take to move from one role to the other.

Nevertheless, our analysis shows that all the most closely related occupations share at least 30 per cent of their work tasks with nuclear roles. In the case of nuclear medicine technologists, this is far higher with the most closely related occupations sharing at least 50 per cent of work tasks. In addition, certain occupations have a particularly large number of jobs in each region, including many medical professionals, chemical and biological technicians, building inspectors and aerospace technicians, suggesting that workers may find new roles more easily in these sectors.

7 NB occupation names may not match exact job titles

TABLE A.1

The most closely related occupations share at least 30 per cent of their work tasks with key nuclear roles and certain occupations are large employers in regions where nuclear power stations are due to retire

Comparison of five key nuclear roles with the five most closely related net-zero compatible occupations, determined by the proportion of work tasks shared. The number of jobs in Scotland, the North West and the North East in each of these occupations is added to the analysis

Occupation in nuclear power sector	Occupation with similar skills	Proportion of work tasks shared	Number of jobs in Scotland (2023)	Number of jobs in North West (2023)
Nuclear Medicine Technologists	Cardiovascular Technologists and Technicians	59.1%	250	901
	Respiratory Therapists	55.0%	1,110	1,966
	Diagnostic Medical Sonographers	54.5%	2,331	2,678
	Ophthalmic Medical Technologists	52.6%	98	319
	Radiologic Technologists and Technicians	52.2%	1,874	2,153
Nuclear engineers	Agricultural Engineers	44.4%	138	307
	Photonics Engineers	42.1%	446	237
	Robotics Engineers	36.8%	142	317
	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	36.4%	122	273
	Environmental Engineering Technologists and Technicians	36.0%	480	1,071
Nuclear monitoring technicians	Food Science Technicians	42.9%	273	180
	Precision Agriculture Technicians	42.9%	102	482
	Agricultural Technicians	36.8%	102	180
	Chemical Technicians	35.7%	1,599	2,579
	Biological Technicians	35.7%	1,462	1,639
Nuclear power reactor operators	Power Distributors and Dispatchers	58.3%	99	108
	Power Plant Operators	43.8%	80	88
	Airfield Operations Specialists	38.5%	623	1,582
	Transportation Inspectors	38.5%	382	459
	Ship Engineers	35.7%	309	113
Nuclear technicians	Textile Knitting and Weaving Machine Setters, Operators, and Tenders	41.2%	235	496
	Textile Cutting Machine Setters, Operators, and Tenders	38.9%	73	155
	Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	33.3%	592	346
	Construction and Building Inspectors	31.3%	3,637	2,787
	Aerospace Engineering and Operations Technologists and Technicians	31.3%	2,478	2,680

Source:

A.2 CHECKLIST FOR DEVELOPING A WORKFORCE PLAN

- What technology pathways will your sector be pursuing in future?
- Overall, do you expect the number of jobs in the sector to grow, decrease or stay the same? Does the chosen technology employ more, fewer or a similar number of people?
- What are the skills that will be needed for this future technology pathway?
- What proportion of the current workforce has skills that are transferable to the new technology pathway?
- What proportion of the current workforce can retrain or upskill based on their current level of skills and expertise?
- What proportion of the current workforce are likely to be made redundant?
- What proportion of the current workforce are likely to retire soon/in the next five years?
- What proportion of jobs in the future technology pathway could be sourced from similar industries in the economy?
- What proportion of jobs in the future technology pathway will need to be sourced from new labour market entrants?
- How do the salaries paid in the future technology pathway compare to the current wages of each occupation?
- Where will new sites for the future technology pathway be and how far might the existing workforce need to travel?
- What in-house support is being provided to retrain, upskill or relocate the existing workforce?
- What in-house support is being provided to train new labour market entrants?
- How long will the new jobs in the future technology pathway last?
- How much notice are you giving to your workforce about the changes to the business that you expect to take place in the years ahead?

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