Economic Insight

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Economic Insight Ltd

UPDATED ECONOMIC IMPACT ASSESSMENT OF MAGNOX SITES

A report for the Nuclear Decommissioning Authority

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1. Executive summary

The Nuclear Decommissioning Authority (NDA) asked us to update our 2018 assessment of the economic impact of the 12 Magnox sites on their local economies. In line with our previous findings, there are considerable differences in terms of each site's current impact on its local area.

In the following sections, we summarise our key findings in relation to the contribution of Magnox sites to their local economies in terms of employment, GVA, and tax receipts; as well as their broader socio-economic contributions.[1]

Based on data provided by the NDA and Magnox, and our in-house model of the UK economy, we estimated the current economic impact of Magnox sites on their local economies in terms of employment, GVA, and tax receipts. We included direct, indirect (supply chain), and induced (wage) effects. For the socio-economic impact assessment, we examined Magnox and NDA funding for socio-economic projects, as well as the impact of voluntary work undertaken by Magnox employees, and Magnox's response to the COVID-19 pandemic (by way of PPE donations and the creation of a COVID-19 fund).

1.1 Current employment, GVA, and tax impacts

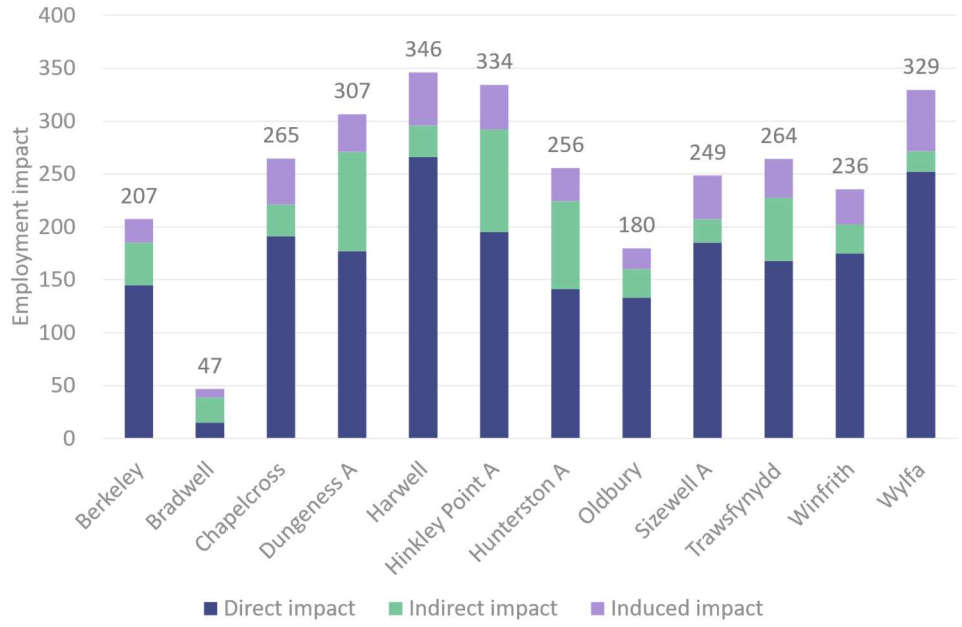
In line with our previous assessment, we find that Magnox sites currently make quantifiable, but varying, contributions to their local economies in terms of employment, GVA, and tax receipts.

Figure 1 shows our estimate of the employment supported by each site in its local area (defined here as the local authority district in which the site is located, and those adjacent to it).[2]

[1] *We note that there could be additional impacts stemming from spending from the Magnox Support Office (MSO) that affects sites' local areas. These additional impacts have not been quantified here, and therefore any estimates presented in this report can be seen as a lower bound.*

[2] *There is no single 'best' geographic definition of a site's local area. We have focussed on sites' local authority districts and those adjacent to them. This reflects: the spread of where employees live; where suppliers are based; and the availability of data.*

Figure 1: Employment effects within each site's local authority district and those adjacent, 2021



Source: Economic Insight analysis of data supplied by Magnox

A similar pattern is observed in terms of the relative magnitudes of the local impacts of sites when measured in terms of GVA and tax receipts. For example, the highest local GVA impact comes from Harwell (£21m), and the lowest from Bradwell (£2m).

We find that the main channel through which local impacts arise is through direct employment at the sites. This is because:

- The sites provide jobs for people living in the local areas; and employees subsequently support further jobs and economic activity through spending their wages – which are above national averages – in local areas. Most employees live in the local authority district that their site is located in, or those adjacent to it. As such, employment effects are relatively concentrated in the local economies.
- On the other hand, Magnox sites purchase a relatively small amount of their inputs from local suppliers (although it can equate to hundreds of thousands of pounds). The sites' supply chains typically consist of UK companies located elsewhere in the country, with a small proportion of inputs coming from abroad. As such, the impact of sites on their local economies that arise through supply chains (the indirect impact in Figure 1) is smaller in comparison to the impact arising through direct employment (which in turn leads to induced impacts, as shown in Figure 1). Some sites have more notable indirect employment effects on their local area because there are significant numbers of on-site contractors.

The operational phase that a site is in affects the scale of economic activities at the site, and therefore its contribution to the local economy. Furthermore, it could reasonably be expected that the sites would have had a greater economic impact whilst they were operational.

To put the above figures into context, we have calculated the sites' contribution to economic activity in their local areas. Total jobs supported by a site in its local authority district range from 0.02% (Bradwell) to 0.37% (Wylfa) of all jobs in the site's local authority district. Sites account for a slightly higher proportion of GVA in their local authority districts because they undertake relatively high value work.

Wylfa makes the largest GVA contribution relative to its local authority district, at 0.66%.

1.2 Strength and dependence of sites

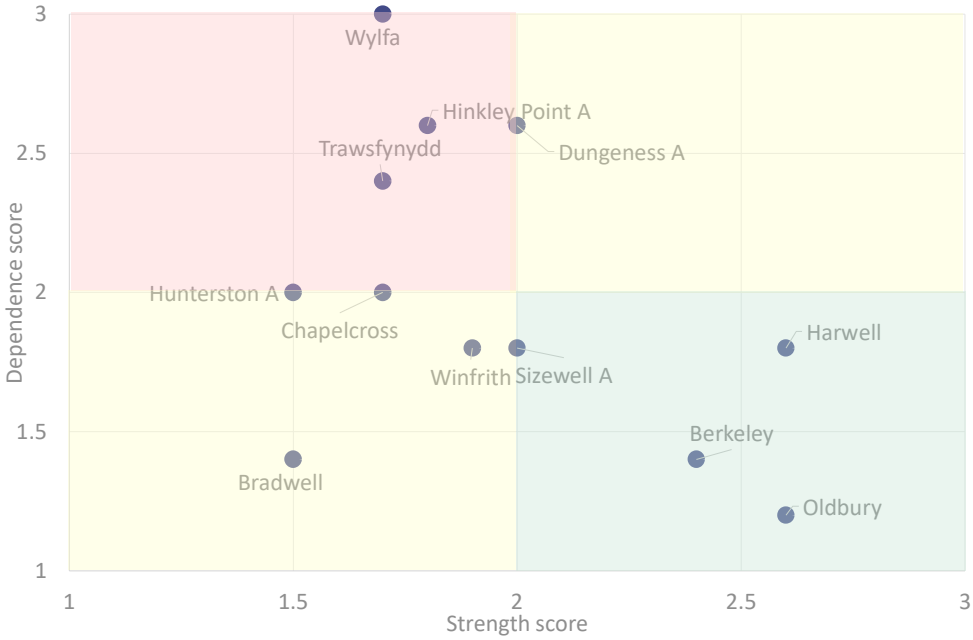
Further to quantifying the current economic impacts, we have assessed the current *strength* of sites' local economies, and their *dependence* on the activities at the sites. This provides an evaluation of the current importance of the sites to their local economies – and an indication of the relative impact that would arise if sites ceased their operations now.

As detailed subsequently in our report, we have assessed the sites' local areas on a variety of metrics that reflect the strength of the area and its dependence on the site. For example, in terms of *strength*, we quantify aspects such as the local areas' employment rate and productivity per capita. For *dependence*, we assess aspects such as the proportion of economic activity that is accounted for by the site.

Local areas that are currently stronger and less dependent on their Magnox site may warrant less support from the NDA and Magnox, compared to those areas that are less strong and more dependent on their Magnox site.

The results of our evaluation of the strength and dependence of the local areas of sites are illustrated in Figure 2. The **top left quadrant** of the figure includes the sites whose local economy is relatively more dependent on its Magnox site, and relatively less strong. Whereas local economies of the sites in the **bottom right quadrant** appear relatively stronger and relatively less dependent on their Magnox site. For example, Wylfa's local economy (Isle of Anglesey) is the most dependent on the site, compared to all the other Magnox sites' local economies, whereas the local economies of Bradwell, Berkeley and Oldbury (Maldon, Stroud, and South Gloucestershire, respectively) are the least dependent on the sites. This analysis does not take into account future developments such as nuclear new builds.

Figure 2: Summary of strength and dependence score for Magnox sites



Source: Economic Insight analysis

1.3 Social and community impacts of sites

Finally, over and above all the impacts identified in the preceding sections, Magnox sites also provide significant social benefits.

Between 2012 and 2021, both Magnox and the NDA committed over £14 million to socio-economic projects in the local areas of the sites.

Moreover, between January 2019 and January 2022, Magnox employees recorded a total of 5,931 hours of voluntary work, of which 90% was in relation to COVID-19 voluntary work.

Magnox sites and their contractors donated 131,653 units of PPE to support the NHS community, such as for example disposable gloves, masks, and coveralls. Magnox also set up a £300,000 COVID-19 support fund across its sites, distributed via local authorities, of which £282,606 has been allocated to date.

1.4 Structure of the report

The remainder of this report is structured as follows.

- **Chapter 2** sets out some background to this research and our methodological approach.
- **Chapter 3** shows the results of the current employment contributions.
- **Chapter 4** presents the current GVA contributions of Magnox sites.
- **Chapter 5** sets out Magnox sites' current tax contributions.
- **Chapter 6** provides a strength and dependence evaluation of local economies on Magnox sites.
- **Chapter 7** sets out Magnox sites' social and community impacts.
- **Chapter 8** concludes our report.
- **Chapter 9** provides an appendix to this report.

2. Background and methodological approach

Here, we set out the background to this report and the methodological approach we have taken. In turn, we discuss the NDA and its socio-economic objectives, the Magnox sites; the aims and objectives of this report; and our methodological approach.

2.1 The NDA and its socio-economic objective

The NDA is an executive non-departmental public body created by the Energy Act 2004 to lead the clean-up and decommissioning work at 17 nuclear sites on behalf of the UK Government. Thus, it was established with the mission to clean up the UK's earliest nuclear sites safely, securely and cost effectively.

The NDA also has a strategic role, whereby it establishes the overall approach, allocates budgets, sets targets and monitors progress. It does not have an overall hands-on role in cleaning up the sites, and instead delivers its mission primarily through six Site Licence Companies (SLCs) – each of which manages one or more of the 17 sites in the NDA's estate. Moreover, the NDA reports to the Department for Business, Energy and Industrial Strategy (BEIS); and for some aspects of its work in Scotland, it is responsible to Scottish ministers. Most recently, it is also providing evidence to the Public Accounts Committee (PAC).

In addition to ensuring the effective decommissioning of sites, the Energy Act 2004 gives the NDA a range of supplementary functions. These include supply chain development, research and development, skills, stakeholder engagement, and of most relevance to this project, supporting local authorities and others to maintain sustainable communities up to and after site closure.

The NDA has recognised its statutory socio-economic function through successive strategies. Indeed, in its 5-year strategy, effective from March 2021, the NDA sets itself a specific objective to:

> *"support the maintenance of sustainable local economies for communities living near NDA sites and, where possible, contribute to regional economic growth."*[3]

Historically, much of the NDA's socio-economic activity has been in the form of funding support. This was delivered either by the NDA or via SLCs, to which increasing amounts of funding and decision-making responsibility has been delegated.

Thus, in order to be able to plan better for the impact of decommissioning and subsequent site closures, the NDA requires a strong understanding of the economic contribution of nuclear to the communities around its sites. Most recently, this

[3] *'Strategy, effective from March 2021'. Nuclear Decommissioning Authority, 2021; page 120.*

understanding for the Magnox sites has been informed by our previous economic impact assessment of Magnox sites in 2018.[4] Therefore, now, given the NDA's socio-economic and Public Accounts Committee (PAC) reporting objectives, we provide an update on our analysis.

2.2 Magnox sites

On 3 September 2019, the NDA took ownership of Magnox Ltd. (Magnox), which was previously owned by Cavendish Fluor Partnership.[5] Magnox is the Site Licence Company (SLC) for 12 sites in the NDA's estate and the operator of one hydroelectric plant in the UK. It is responsible for managing the sites throughout their lifecycle; and overseeing all aspects of decommissioning. It now operates as a subsidiary of the NDA.

The ten Magnox nuclear sites are: (i) Bradwell in Essex; (ii) Chapelcross and (iii) Hunterston A in Scotland; (iv) Dungeness A in Kent; (v) Hinkley Point A in Somerset; (vi) Berkeley and (vii) Oldbury in Gloucestershire; (viii) Sizewell A in Suffolk; and (ix) Trawsfynydd and (x) Wylfa in North Wales.

The other two sites are the research facilities: at (i) Harwell in Oxfordshire; and (ii) Winfrith in Dorset.

Figure 3 illustrates how the Magnox sites are distributed across the UK. As can be seen, they are usually located in remote coastal areas of the country.

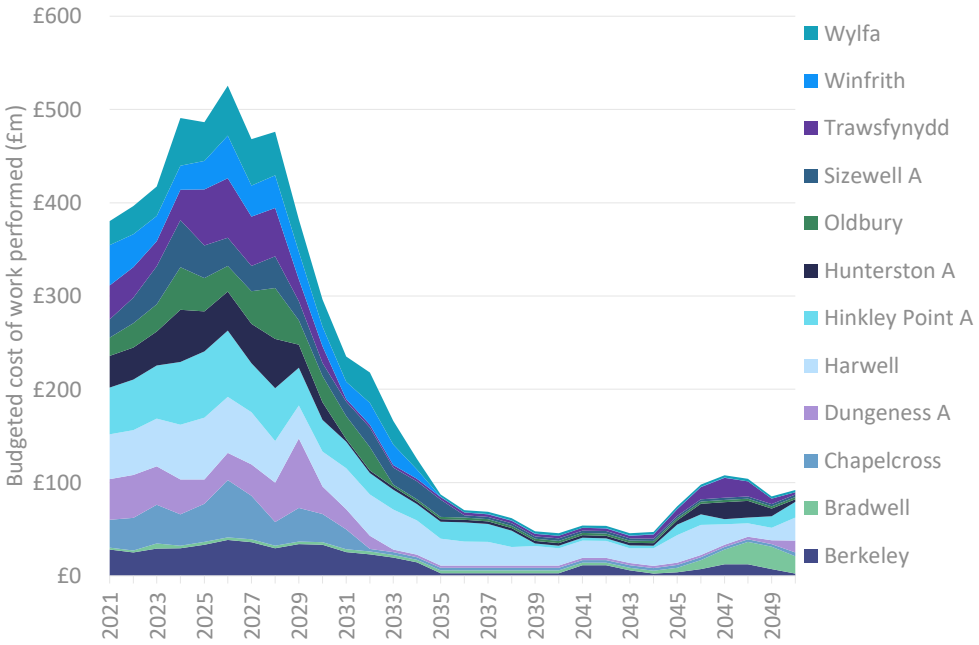
[4] *'Economic impact assessment of Magnox sites'. Economic Insight (July 2018).*
[5] *See: https://www.neimagazine.com/news/newsuk-nda-takes-over-magnox-7400384.*

Figure 3: Location of Magnox nuclear and research sites, 2021

Source: Economic Insight analysis

Furthermore, there is significant variation across the sites in terms of their size, complexity, and stage of decommissioning. Under the current decommissioning plan, most sites (if not all) will enter the *care and maintenance* phase, in which only limited activities take place on the sites, within the next 10 years. We note that currently, the new Business Plan is being finalised, which could change future projections significantly. This is because it is possible that the decommissioning profile may change from *care and maintenance*, to a *rolling* decommissioning profile. Figure 4, shows the level of activity across all 12 Magnox sites based on the current *care and maintenance* decommissioning plan (which as noted above, might change in due course).

Figure 4: Projected site activity – current care and maintenance decommissioning profile (subject to significant change on adoption of the revised business plan)



Source: Economic Insight analysis of data supplied by Magnox

2.3 Aims and objectives of this work

To support the NDA in meeting its socio-economic objective and reporting to the Public Accounts Committee (PAC), it asked Economic Insight to conduct an economic impact assessment of the Magnox sites on their local economies. In particular, the NDA wanted to gain a better understanding of both:

- the current economic contribution of the Magnox sites to their local communities; and
- how well placed each community is to deal with the planned downturn and site closure.

In addition to understanding the purely 'economic' impacts, given its socio-economic role, the NDA also wanted to gain a better understanding of the 'social' impacts of activities related to the sites. Furthermore, given the COVID-19 pandemic and the impacts this has had on the UK and local economies since our last impact assessment, here, we also assess how Magnox and the NDA have provided socio-economic funding in relation to this specific issue.

2.4 Methodology

Our work for the updated assessment of the economic impact of the 12 Magnox sites, follows our previous methodology. That is, our evaluation relies on detailed site-level analysis, using data from a variety of sources including the NDA, Magnox Ltd., the Office of National Statistics (ONS) and the Department for Levelling Up, Housing and Communities (formerly the Ministry for Housing, Communities and Local Government).

We have undertaken economic impact modelling to understand the **current** contribution of sites to their local economies; and then subsequently considered the *strength* and *dependence* of local areas.

In line with economic impact assessment, we estimate three types of economic impact:

- **Direct effects** are the immediate impacts that arise from the operations of the Magnox sites and include aspects such as the number of staff employed by Magnox and the immediate 'value' created by the activities undertaken at the sites.
- **Indirect effects** arise through supply chains that support the Magnox sites. Suppliers buy inputs from their suppliers, and their suppliers buy inputs from others, and so on, creating further economic impacts that can '*ripple through*' the local economies.
- **Induced effects** arise through employees at the Magnox sites and the companies in the supply chains spending their wages in the economy, creating further impacts – which again '*ripple through*' the wider economy.

These types of economic impact are quantified using three metrics:

- jobs / employment;
- gross value added (GVA), a measure of the local contribution to GDP; and
- tax receipts.

We use a combination of data supplied to us by Magnox and our in-house model of the UK economy to quantify the impacts. Further details of this modelling approach are set out in the appendix.

Whilst we have taken steps to ensure our analysis is as robust as possible, it should be noted that estimating impacts relies on assumptions and the precision of estimates can vary. This is why typically, we have greater confidence in estimates of direct impacts, as these tend to rely more closely on raw information and data from Magnox.

Relatedly, as our work centres on the local impact of the Magnox sites, we focus on quantifying impacts that arise within the local authority district that each site is located in, and those adjacent to it – rather than nationally or internationally.

In addition to these quantitative estimates of the economic impact of Magnox sites, we more qualitatively assess the *strength* and *dependence* of sites and their local economies. This allows us to consider a wider range of factors, including *social* impacts.

Our evaluation of *strength* and *dependence* is designed to assist the NDA's decision making. For example, an area of low strength and high dependence on the Magnox site is likely to benefit more from additional support compared to an area of high strength and low dependence.

Strength and dependence are defined as follows.

- **Strength**. By *strength* we mean how well the area is currently performing socio-economically. All else equal, a stronger area is likely to be better able to deal with shocks – including changes in demand such as from reduced activity at the Magnox site.

- **Dependence**. By *dependence* we mean how much the local area depends on the Magnox site. That is, to what extent would the ceasing of operations at the Magnox site affect the local socio-economic area.

We specified several measures for both *strength* and *dependence*; and for each measure, a number of metrics – as detailed in Figure 5. As can be seen, measures cover the local: (i) labour market; (ii) general economy; and (iii) society.

Figure 5: Measures and metrics used to assess strength and dependence

STRENGTH	DEPENDENCE
Labour market	**Labour market**
• **Employment**. Employment rate. • **Skills**. Percentage with a qualification of level NQV4 or above. • **Flexibility**. Migration flow. • **Demographics**. Proportion of the population that is working age. • **Wages**. Median gross weekly pay.	• **Relative size of site-related employment:** - Proportion of local direct jobs related to the site relative to all local jobs. - Proportion of local direct, indirect, and induced jobs relative to all local jobs.
General economy	**General economy**
• **Productivity**. GVA growth rate and GVA per head. • **Investment**. Gross fixed capital formation.	• **Relative size of site-related output.** Indirect and induced GVA as a proportion of total local GVA. • **Concentration of local economy.** Concentration metrics.
Society	**Society**
• **Quality of life**. Adjusted index of multiple deprivation. • **Happiness**. Average reported happiness level.	• Contribution to the **local society** of activities related to site.

Source: Economic Insight

Each metric has been assigned a score on a high-medium-low scale. These scores are relative to the 12 sites. For example, the sites with the highest GVA per head will receive a 'high' score, and those with the lowest will receive a 'low' score. The scores are then aggregated to create overall measures for strength and dependence.

Finally, to understand the:

- **socio-economic impacts from Magnox activities**, we have reviewed information provided by the Socio-Economic team in relation to all the programmes and activities funded by Magnox and the NDA; and
- **COVID-19 impacts on Magnox sites**, we have reviewed the information provided by Magnox in relation to support it has provided to the local economies across the 12 sites during the pandemic.

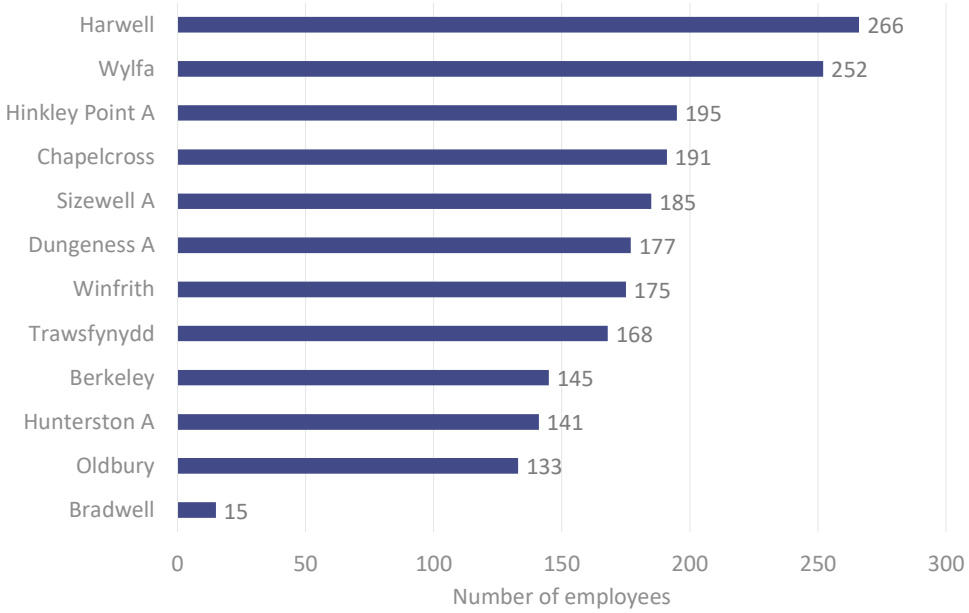
3. Current employment contributions

In this chapter, we first present information in relation to direct employment effects, as well as more detailed statistics in relation to the number of employees at each site, their age; income; where they live; employee turnover; and COVID-19 impacts on employees. We then present our knock-on employment effects of the sites and compare the key aggregate number to our previous assessment.

3.1 Direct employment effects

As of November 2021, Magnox directly employed about 2,043 staff across the 12 sites. In this section we focus on staff directly employed by Magnox – in later sections we also consider site contractors.

Figure 6: Number of direct employees at Magnox Sites (November 2021)[6]



Source: Economic Insight analysis of data supplied by Magnox

[6] *We note that in line with our previous assessment, the impact of Oldbury Technical Centre is not included in the above figures and subsequent analysis. Oldbury Technical Centre, which currently employs 241 people has now been transferred to the new Hub near Bristol and the inclusion would likely lead to additional impacts. Please also note these figures include staff contracted to Magnox Support Office but working at the respective sites.*

Figure 6 shows that the number of Magnox employees varies significantly by site. For example:

- Oldbury has 133 direct employees, whilst both Wylfa and Harwell have more than 250.
- Bradwell has significantly fewer employees than the other sites, with only 15 staff, as it is in its quiescent phase.[7]

To provide some context to the above figures, Table 1 shows that each site contributes a relatively small proportion of the total jobs in the local authority district in which it is located.

Table 1: Direct employees at Magnox sites relative to employment in the local authority district (November 2021)

Site	Local authority district in which the site is located	Site direct employment as a proportion of jobs in local authority district
Berkeley	Stroud	0.16%
Bradwell	Maldon	0.02%
Chapelcross	Dumfries and Galloway	0.21%
Dungeness A	Folkestone and Hythe	0.24%
Harwell	Vale of White Horse	0.26%
Hinkley Point A	Somerset West and Taunton	0.19%
Hunterston A	North Ayrshire	0.22%
Oldbury	South Gloucestershire	0.12%
Sizewell A	East Suffolk	0.24%
Trawsfynydd	Gwynedd	0.17%
Winfrith	Dorset	0.20%
Wylfa	Isle of Anglesey	0.37%

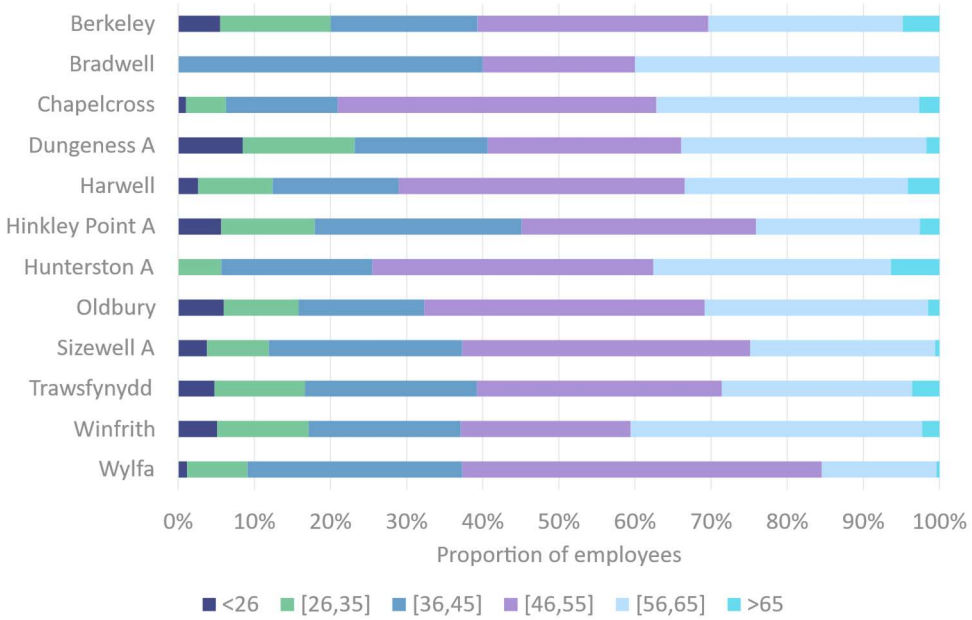
Source: Economic Insight analysis of ONS data and data supplied by Magnox
Notes: The total number of jobs in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".

[7] *'Strategy, effective from March 2021'. Nuclear Decommissioning Authority, 2021; page 142.*

3.1.1 Employee age

The average UK employee tends to be younger than staff at the sites, with 79% of Magnox employees 40 or older (with 40.4 the median age in the UK in mid-2020).[8] This can have opposing effects for the future economic impact of sites (where older employees are closer to retirement but may find it harder to find new employment). Figure 7 shows the age profile of direct employees at each Magnox site.

Figure 7: Age profile of direct employees at Magnox sites (November 2021)



Source: Economic Insight analysis of data supplied by Magnox

3.1.2 Employee income

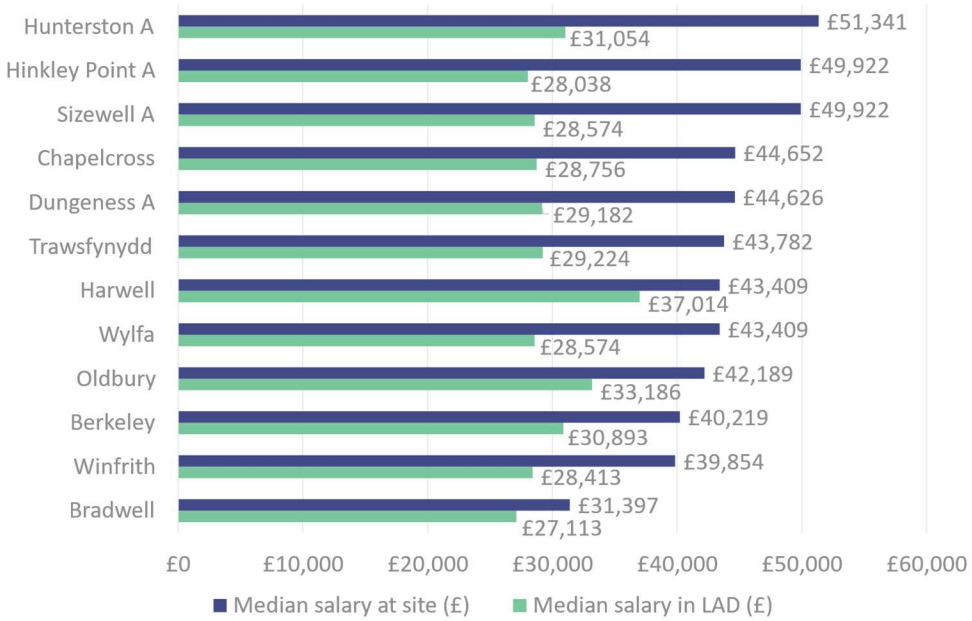
We also find that the median salary of staff at the sites is above the median in that local authority district for each Magnox site. The difference varies by site, with it being:

- greatest for Hunterston A; Sizewell A; and Hinkley Point A; and
- smallest for Bradwell; and Harwell.

The range of median salaries across Magnox sites is not large, as can be seen from the blue bars in Figure 8. This is particularly the case when excluding Bradwell (which has a significantly smaller number of employees than any other site), as was shown in Figure 6 previously.

[8] *See: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2020*

Figure 8: Median annual salary of direct employees at Magnox sites and median annual salary in that local authority district (November 2021)



Source: Economic Insight analysis of ONS data and data supplied by Magnox

3.1.3 Where employees live

Most direct Magnox employees tend to live in the surrounding local authority districts of the site that they work at. This is important as where staff live affects where the induced impacts arise.

Table 2 shows the proportion of employees at a site that live in the local authority district in which it is located; and also, those who live in this local authority district or surrounding local authority districts. It is important to note that these figures are based in part on the size and borders of local authority districts. The least concentrated sites appear to be Berkeley and Oldbury, based on the proportion of staff that live in the site's local authority district or those adjacent.

Table 2: Proportion of direct employees at each site living in the site's local authority district or adjacent local authority districts (November 2021)

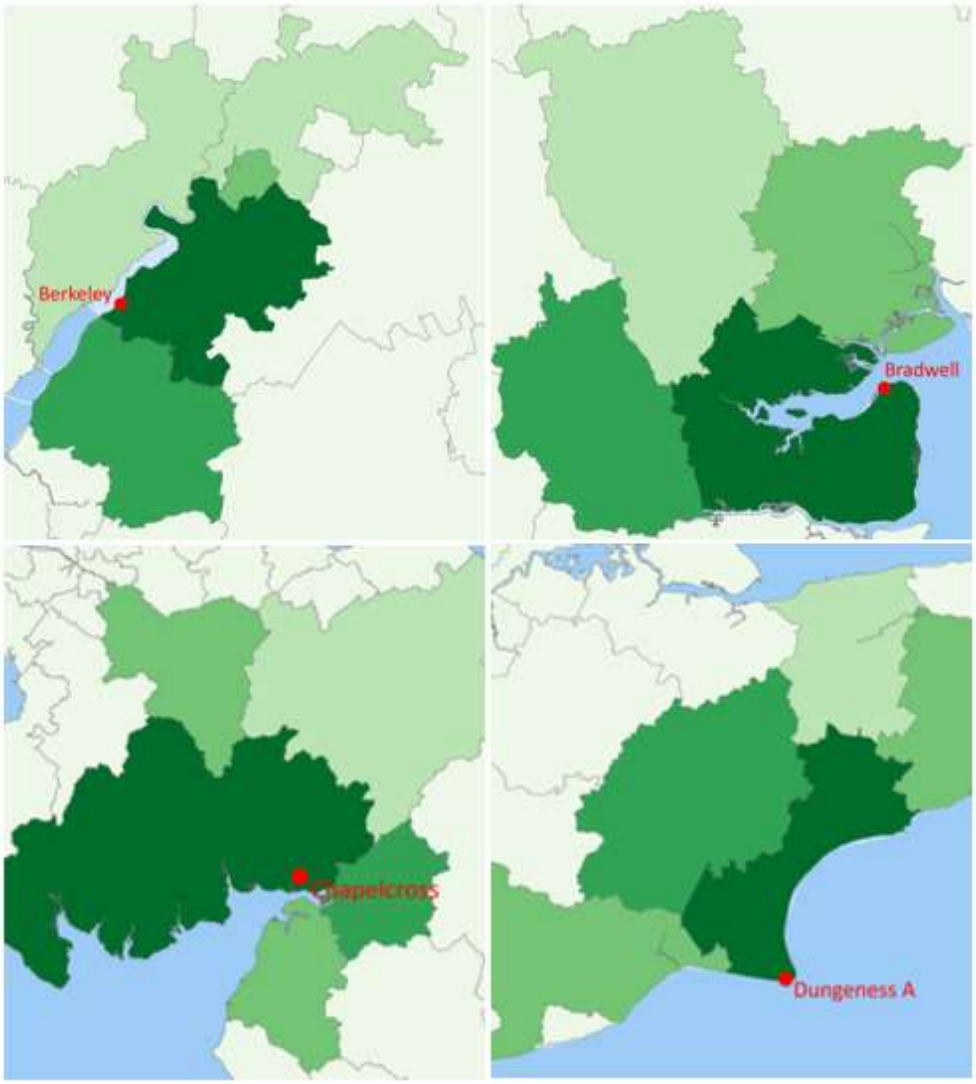
Site	Proportion of site employees that live in the local authority district that the site is located in	Proportion of site employees that live in either the local authority district that the site is located in or an adjacent one
Berkeley	47%	72%
Bradwell	69%	87%
Chapelcross	85%	94%
Dungeness A	55%	91%
Harwell	39%	80%
Hinkley Point A	21%	90%
Hunterston A	71%	89%
Oldbury	24%	67%
Sizewell A	74%	91%
Trawsfynydd	69%	95%
Winfrith	80%	92%
Wylfa	88%	97%

Source: Economic Insight analysis of ONS data and data supplied by Magnox

Since our previous report, some local authority districts have changed, due to smaller adjacent local authority districts having been grouped into one and/or the boundaries of the local authority district having been modified. This is particularly the case for Winfrith. Therefore, the percentages set out above are significantly different to those in our previous report for this site specifically.

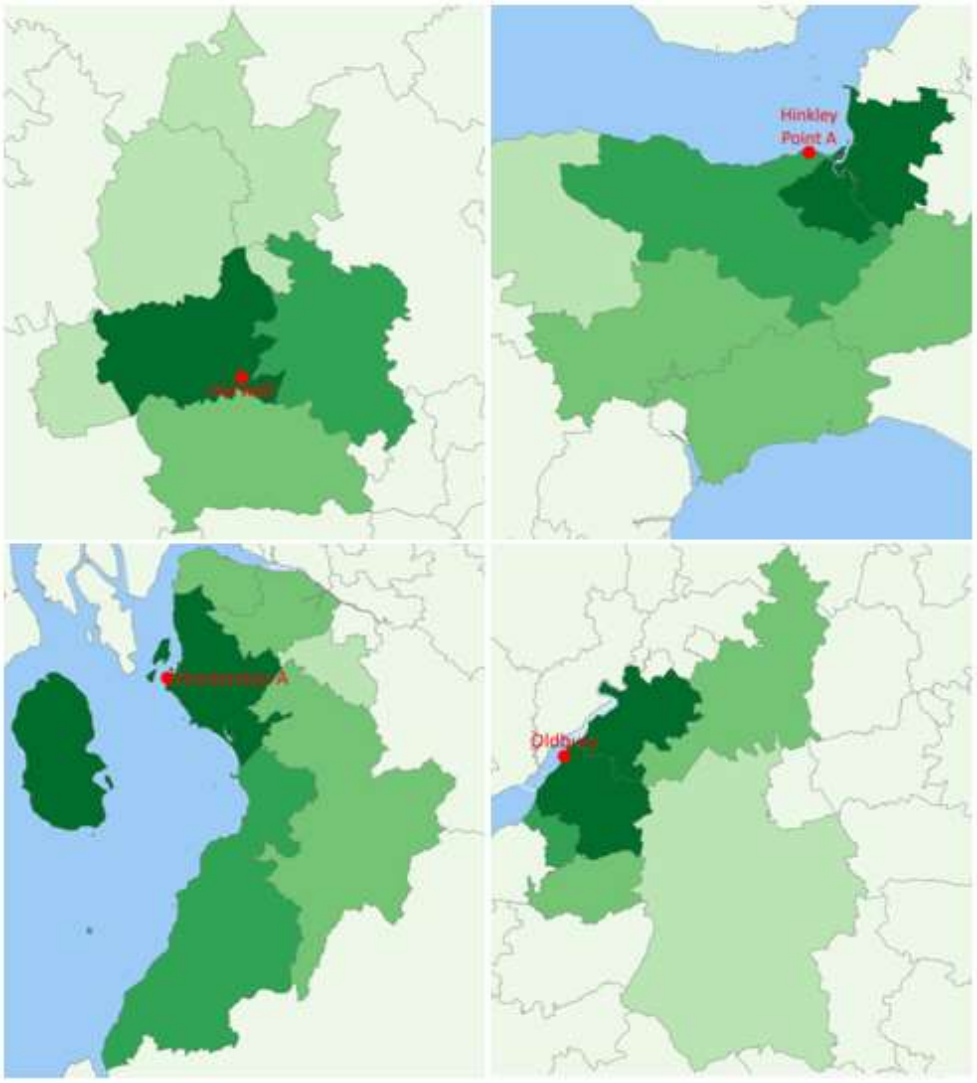
The following figures illustrate the concentration of a site's employees in the site's local and adjacent local authority districts. A darker shade reflects a higher concentration of the site's employees in the local authority district. As can be seen from the figures, for some sites, such as the case of Hinkley Point A, which is located at close proximity with an adjacent local authority district, the concentration of employees is higher in the adjacent local authority district (Sedgemoor) than the local authority district in which the site is located (Somerset West and Taunton). We note that, for some sites, there may be employees that live outside of the site's local authority district and those adjacent. However, our analysis is focussed on specifically the local authority district that the site is located in, and those directly adjacent. Therefore, the effects in the figures below are shown only for these local authority districts.

Figure 9: Staff location for Berkeley, Bradwell, Chapelcross, and Dungeness A (November 2021)



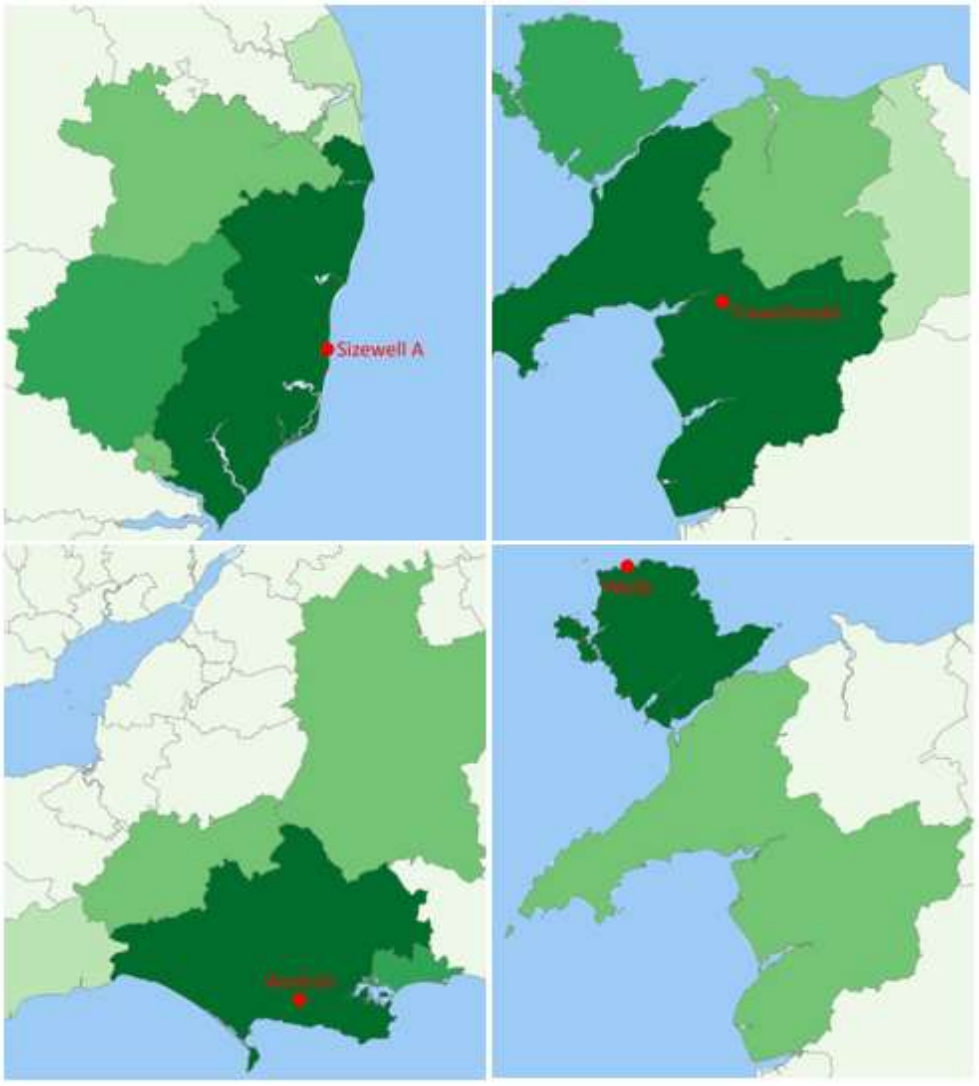
Source: Economic Insight analysis of data supplied by Magnox
Note: The darker shading reflects a higher concentration of employees in the local authority district. Note, the shadings are relative to the number of site employees, and are not comparable across maps e.g. the darkest green represents a different number of employees across the different maps.

Figure 10: Staff location for Harwell, Hinkley Point A, Hunterston A, and Oldbury sites (November 2021)



Source: Economic Insight analysis of data supplied by Magnox
Note: The darker shading reflects a higher concentration of employees in the local authority district. Note, the shadings are relative to the number of site employees, and are not comparable across maps e.g. the darkest green represents a different number of employees across the different maps.

Figure 11: Staff location for Sizewell A, Trawsfynydd, Winfrith and Wylfa sites (November 2021)



Source: Economic Insight analysis of data supplied by Magnox
Note: The darker shading reflects a higher concentration of employees in the local authority district. Note, the shadings are relative to the number of site employees, and are not comparable across maps e.g. the darkest green represents a different number of employees across the different maps.

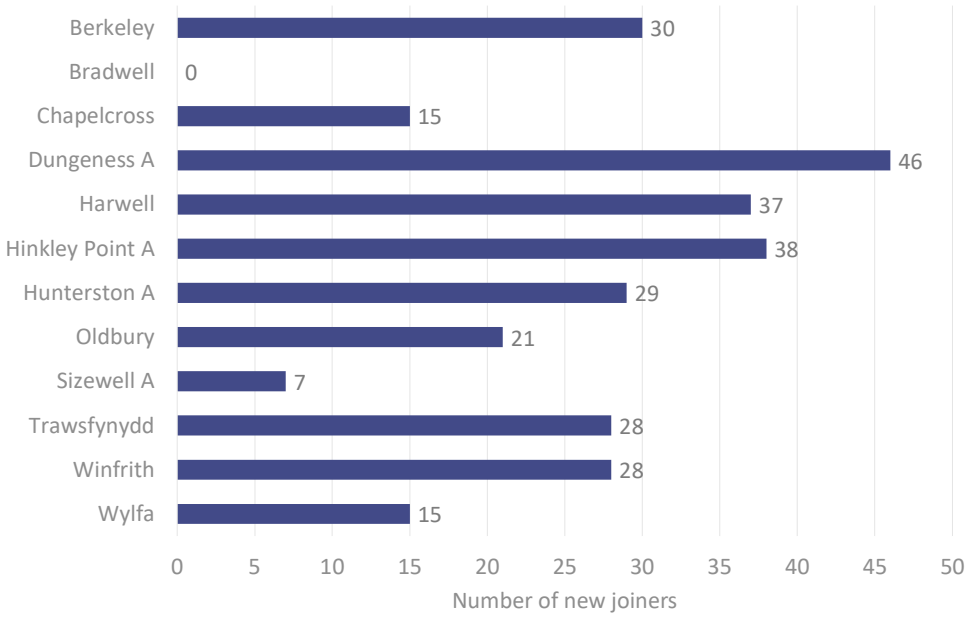
3.1.4 Employee turnover

Further to looking at the current characteristics of Magnox employees, here, we consider whether those that join Magnox do so from the local area, as defined previously; the reasons for Magnox employees leaving their employment; as well as the extent of movement between Magnox sites. These are important, as again, they will dictate whether any of the current impacts are displaced from other areas of the UK, or whether they were already local.

Employees joining

Figure 12 illustrates the number of new staff joining each Magnox site, in 2021. A total of 294 employees joined Magnox sites, with Dungeness A having the highest number of new joiners. We note that in 2021 there were no new joiners at Bradwell, which is consistent with that site being in the quiescent phase.

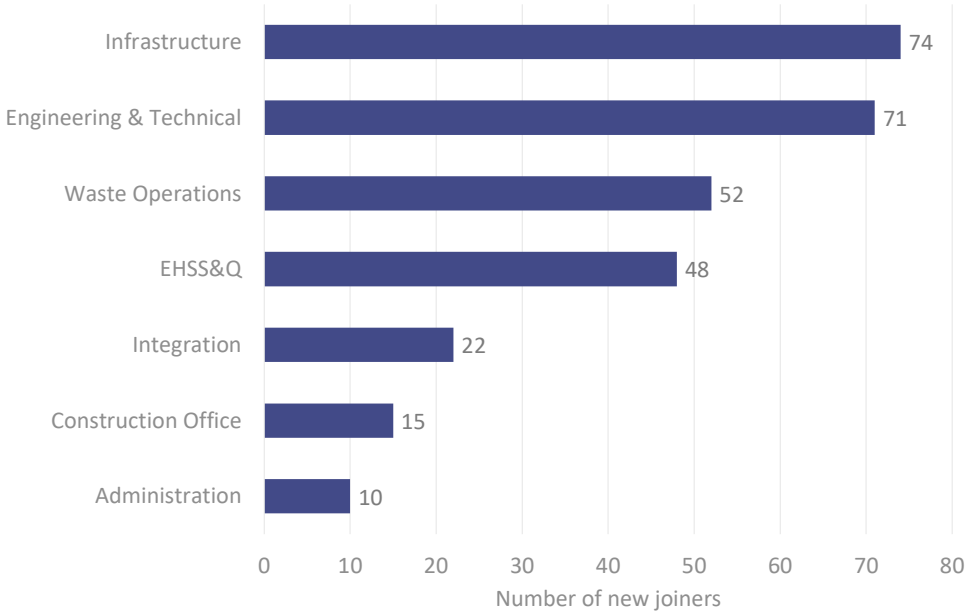
Figure 12: Number of new joiners by site, 2021



Source: Economic Insight analysis of data supplied by Magnox

Figure 13 shows the positions that were filled by these new joiners. As can be seen, most positions were in relation to infrastructure; engineering & technical; and waste operations. This chimes with the Magnox median salaries being higher than the UK median, as well as the median in the local authority district of sites, as the positions being filled tend to be in high-skill type jobs.

Figure 13: Positions filled by new joiners across all 12 Magnox sites, 2021



Source: Economic Insight analysis of data supplied by Magnox

When looking at where these new joiners joined from (i.e., where they live), we can see that most live in the local authority district of the Magnox site, or those adjacent to it. This is illustrated in Table 3. Over half of new joiners live in the local area of the Magnox site they join, except for those joining Berkeley or Chapelcross, which live further away.

Table 3: Proportion of new joiners at each site living in the site's local authority district or adjacent local authority districts, 2021

Site	Proportion of site new joiners that live in the local authority district that the site is located in	Proportion of site new joiners that live in either the local authority district that the site is located in or an adjacent one
Berkeley	0%	40%
Bradwell	N/A	N/A
Chapelcross	33%	33%
Dungeness A	43%	87%
Harwell	16%	50%
Hinkley Point A	0%	75%
Hunterston A	43%	86%
Oldbury	43%	86%
Sizewell A	100%	100%
Trawsfynydd	40%	80%
Winfrith	67%	92%
Wylfa	100%	100%

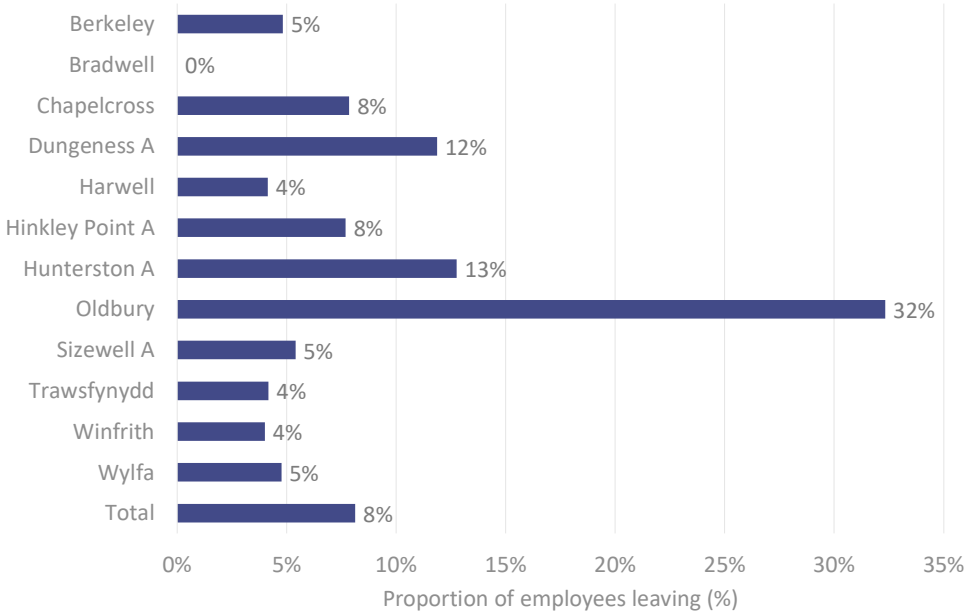
Source: Economic Insight analysis of ONS data and data supplied by Magnox

Employees leaving

In 2021, there was 8% overall staff turnover at Magnox sites. This varied considerably across sites, as illustrated by Figure 14.[9]

[9] *As noted previously, the Bradwell site is in the quiescent phase and thus no additional staff left the site.*

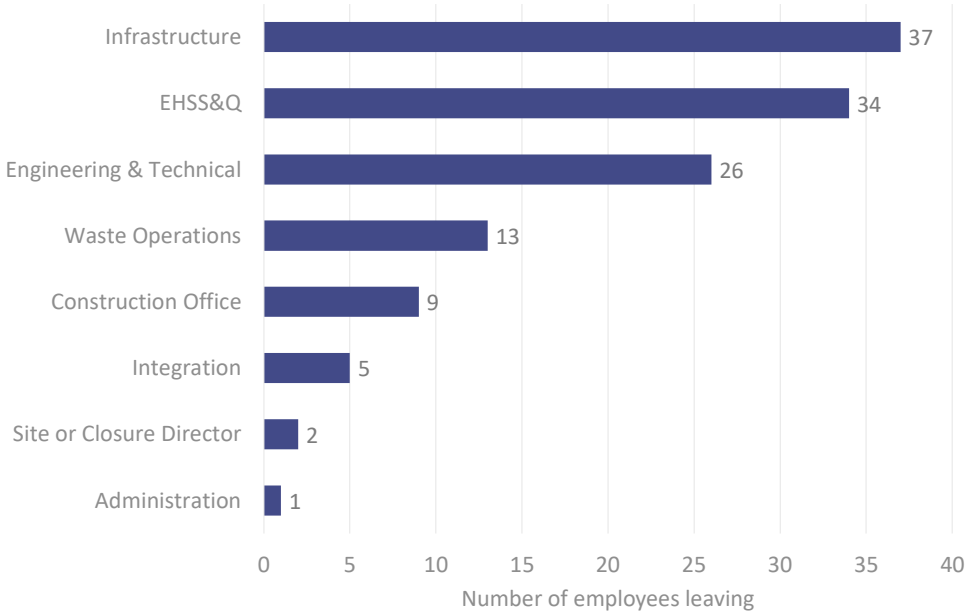
Figure 14: Proportion of workforce leaving site during 2021



Source: Economic Insight analysis of data supplied by Magnox

As can be seen, a higher proportion of employees at Oldbury left, compared to all the other Magnox sites. The main positions that left included roles in infrastructure, EHSS&Q, and engineering & technical, as illustrated in Figure 15. This, in turn, chimes with the positions being filled, shown in Figure 13, as they were mostly infrastructure and engineering roles.

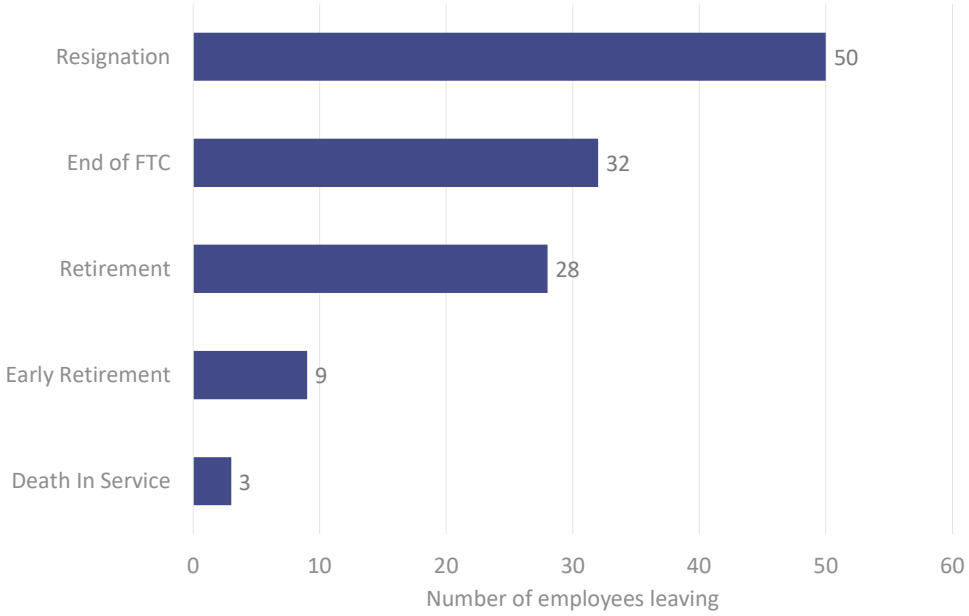
Figure 15: Number of employees leaving during 2021, positions



Source: Economic Insight analysis of data supplied by Magnox

The reasons for leaving the current positions are illustrated in Figure 16. As can be seen, most employees who left either of the Magnox sites resigned, or their fixed term contract (FTC) came to an end. Some reached retirement age or retired early.

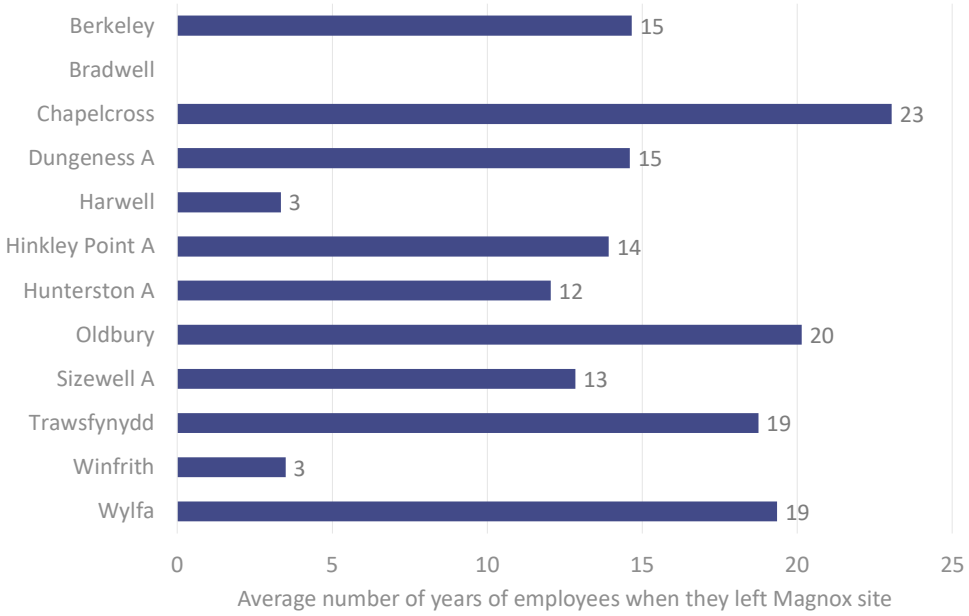
Figure 16: Reasons for leaving, 2021



Source: Economic Insight analysis of data supplied by Magnox
Notes: FTC=Fixed Term Contract.

As retirement was one of the key reasons for leaving, Figure 17 further illustrates employees' average tenure, when leaving. On average, across all Magnox sites, employees tend to work at a site for 14 years. In line with its quiescent phase, no employees left Bradwell during 2021, and thus Figure 17 does not provide an average tenure for that site. This illustrates that roles at Magnox sites provide for job security over longer time periods, compared to other roles across the UK economy.

Figure 17: Average tenure (in years) of Magnox employees by site at date of leaving, 2021



Source: Economic Insight analysis of data supplied by Magnox

Employees moving between Magnox sites

Table 4 shows the number of Magnox employees moving from one Magnox site to another. As can be seen, most employees moved to Dungeness A and Sizewell A, closely followed by Harwell and Hinkley Point A.

Table 4: Employees moving to one Magnox site from another Magnox site, 2021

To → From ↓	To Wylfa	To Winfrith	To Trawsfynydd	To Sizewell A	To Oldbury	To Hunterston A	To Hinkley Point A	To Harwell	To Dungeness A	To Chapelcross	To Bradwell	To Berkeley	Total from a site
Wylfa		0	2	0	1	1	0	1	1	0	0	0	**6**
Winfrith	0		0	0	0	0	0	2	0	0	0	0	**2**
Trawsfy-nydd	3	0		0	0	0	0	0	0	0	0	0	**3**
Sizewell A	2	0	0		0	0	0	2	8	1	1	1	**15**
Oldbury	0	1	0	0		0	0	0	2	0	0	6	**9**
Hunterston A	1	0	0	1	0		0	0	0	2	0	0	**4**
Hinkley Point A	0	0	0	4	0	0		1	0	1	0	0	**6**
Harwell	0	2	0	0	0	0	0		0	1	0	0	**3**
Dungeness A	0	0	0	2	0	0	4	2		0	0	0	**8**
Chapelcross	0	1	0	1	1	2	1	0	0		0	0	**6**
Bradwell	0	2	0	5	0	1	1	1	0	0		0	**10**
Berkeley	0	0	0	0	1	0	3	0	3	1	0		**8**
Total to a site	**6**	**6**	**2**	**13**	**3**	**4**	**9**	**9**	**14**	**6**	**1**	**7**	

Source: Economic Insight analysis of data supplied by Magnox

Most employees moving to Sizewell A came from Bradwell, which is the closest adjacent Magnox site. On the other hand, most employees moving to Dungeness A, came from Sizewell A. There were also some moves between Berkeley and Oldbury, which are very close to one another.

This further illustrates that Magnox employees move between sites but tend to remain in the local area.

3.1.5 COVID-19 impacts

COVID-19 impacted the whole UK economy. However, when narrowly considering employment numbers and salaries, it did not have any significant impacts on Magnox employees. There was no reduction in employment numbers due to COVID-19 and Magnox continued to pay its employees and contractors throughout the first lockdown from late March 2020 to June 2020. Moreover, Magnox did not operate the Government's furlough scheme. Rather, all employees and contractors were paid in full and, where possible and practicable, they changed to remote working during this period.

3.2 Indirect and induced employment effects

On top of the direct employment effects, the sites also have impacts on the economy through:

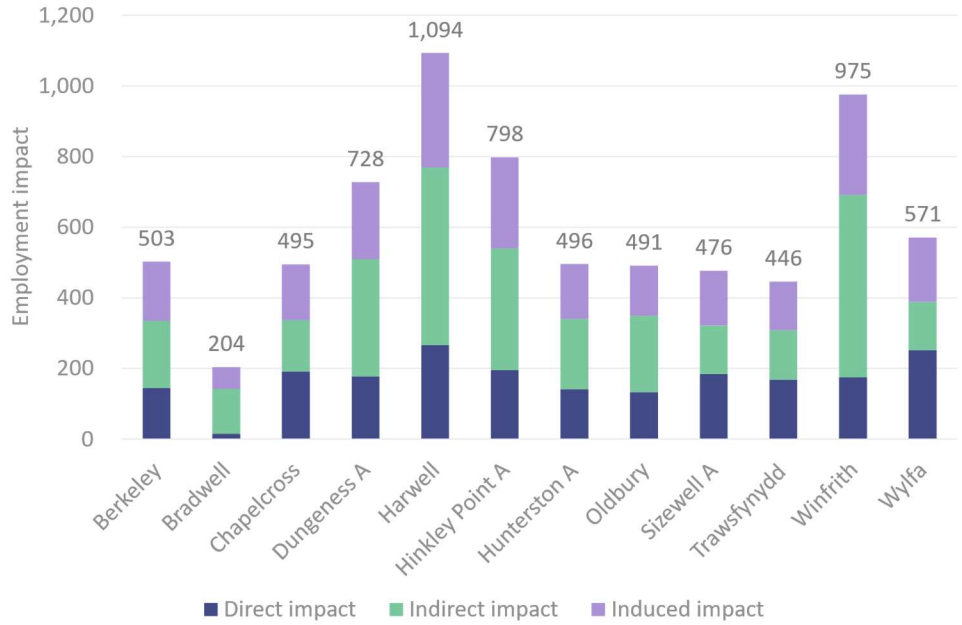
- indirect employment effects, which arise through supply chains; and
- induced employment effects, which arise through employees of the Magnox sites and their suppliers spending their wages.

The total employment contribution of Magnox sites to the UK is 7,277, with this made up of the following:

- direct: **2,043** (28% of the total);
- indirect: **2,989** (41% of the total); and
- induced: **2,245** (31% of the total).

At a UK level, these indirect and induced impacts are significant compared to the number of staff directly employed by sites. As can be seen in Figure 18, these multiplier effects mentioned above are larger than the direct employment effects.

Figure 18: Total employment impact of Magnox sites at the national level, 2021



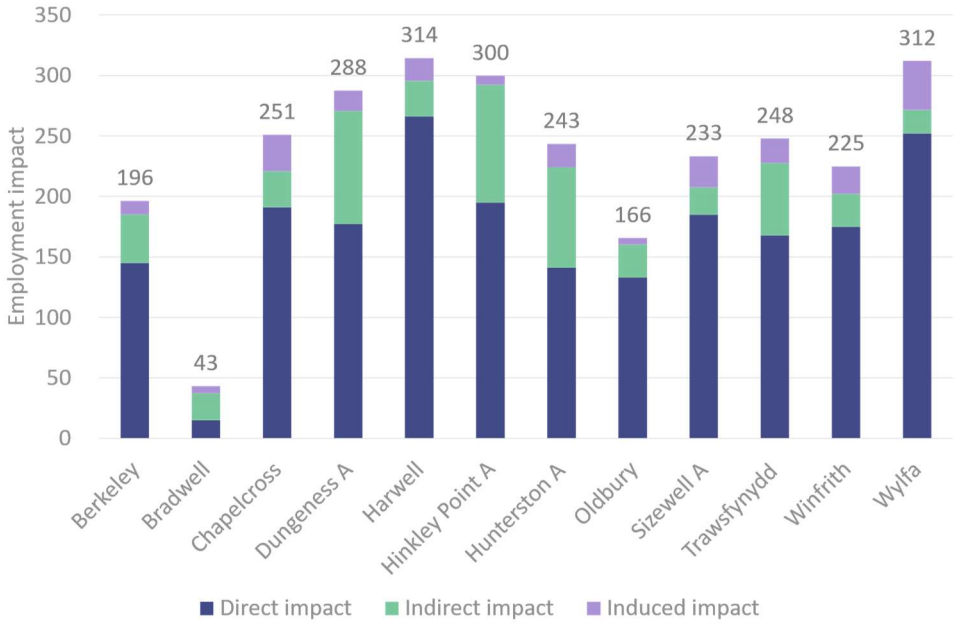
Source: Economic Insight analysis of data supplied by Magnox

The relative magnitude of the knock-on effects varies considerably across sites. As can be seen in Figure 23, Harwell and Winfrith have the greatest supply chains of all the sites, and as a result the largest knock-on employment effects. Additionally, despite having by far the smallest number of direct employees, Bradwell has a (relatively) sizeable supply chain (shown in Figure 23), meaning that it therefore has significant knock-on employment effects, relative to its direct effects.

The indirect and induced effects shown above arise throughout the whole economy, whereas our focus is on the local impact of sites. The two figures below show that only a proportion of the knock-on effects arise in sites' local economies – defined first as the local authority district in which a site is located, and secondly including adjacent local authority districts as well. As can be seen:

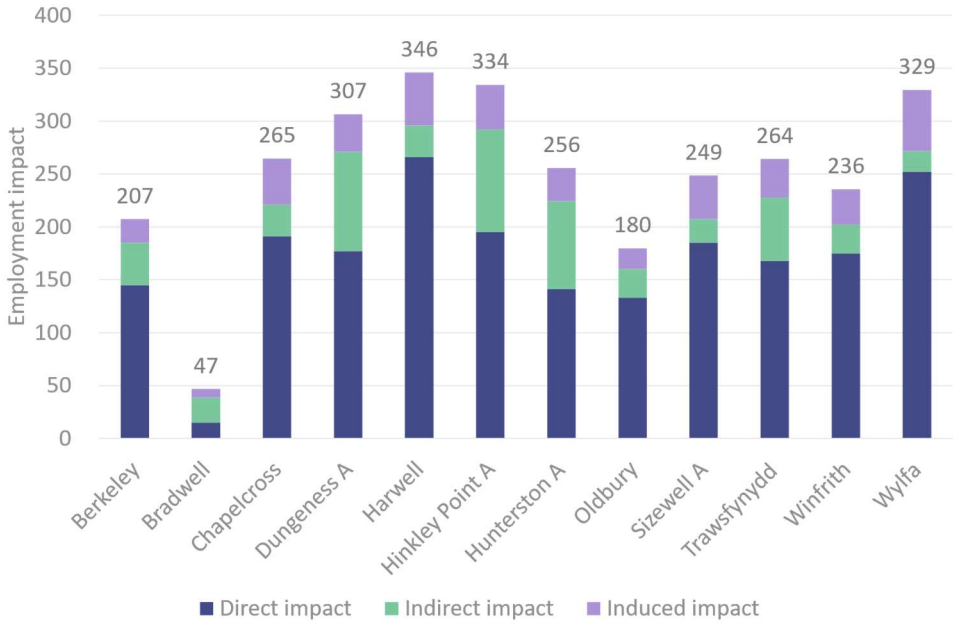
- **The indirect employment effect is significant for some sites**. This is particularly true for the sites that have a large proportion of on-site contractors, such as Dungeness A, Hinkley Point A, and Hunterston A. The contribution of suppliers (other than those that provide on-site contractors) to local employment impacts is relatively small because the majority of suppliers are not local to the sites (see further details in section 4.1.1).
- **Local employment is also supported by induced impacts**. This is primarily because staff of the sites live in the local areas and spend part of their wages there – thus supporting local jobs. The relative size of the induced impacts largely turns on the proportion of site staff that live in the local area but will also be affected by wages rates and the presence of suppliers (whose employees are likely to spend wages locally). We understand that whilst on-site contractors by definition work in the area, they may not live there permanently (e.g., do not stay in the area during weekends).

Figure 19: Employment effects within each site's local authority district, 2021



Source: Economic Insight analysis of data supplied by Magnox

Figure 20: Employment effects within each site's local authority district and those adjacent, 2021



Source: Economic Insight analysis of data supplied by Magnox

Every job at a Magnox site supports other jobs in the local economies. Table 5 specifies employment multipliers, which show the equivalent number of local jobs supported by each Magnox job. For example, the figures in the right-hand column suggest that for every 10 jobs at a Magnox site, between another 3 to 8 (or 21 with Bradwell) jobs are supported in the site's local authority district and those adjacent to it.[10]

[10] *We note that Bradwell is an outlier, given its current relatively low number of employees, which is consistent with its quiescent phase.*

Table 5: Local employment multipliers, 2021

Site	Employment multiplier within the site's local authority district	Employment multiplier within the site's local authority district plus those adjacent
Berkeley	1.4	1.4
Bradwell	2.9	3.1
Chapelcross	1.3	1.4
Dungeness A	1.6	1.7
Harwell	1.2	1.3
Hinkley Point A	1.5	1.7
Hunterston A	1.7	1.8
Oldbury	1.2	1.4
Sizewell A	1.3	1.3
Trawsfynydd	1.5	1.6
Winfrith	1.3	1.3
Wylfa	1.2	1.3

Source: Economic Insight analysis

Table 6 puts the local employment figures into context of total employment with the local authority districts. As can be seen, the total number of jobs supported by the sites in their local areas are a small proportion of all jobs in the local areas. Wylfa supports the largest proportion of jobs in sites' local authority districts, as direct employment at the site accounts for the largest proportion of jobs in a site's local authority district, and a large proportion of Wylfa's employees live on Anglesey.

Table 6: Local employment supported by sites as a proportion of the total number of jobs in an area[11], 2021

Site	Jobs supported by the site in its local authority district as a proportion of total jobs in the area	Jobs supported by the site in its local authority district and those adjacent as a proportion of total jobs in the area
Berkeley	0.22%	0.03%
Bradwell	0.06%	0.01%
Chapelcross	0.28%	0.04%
Dungeness A	0.39%	0.08%
Harwell	0.30%	0.04%
Hinkley Point A	0.30%	0.06%
Hunterston A	0.39%	0.06%
Oldbury	0.14%	0.03%
Sizewell A	0.30%	0.05%
Trawsfynydd	0.26%	0.05%
Winfrith	0.26%	0.04%
Wylfa	0.45%	0.20%

Source: Economic Insight analysis of ONS data and data supplied by Magnox
Notes: The total number of jobs in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".

[11] *Total number of jobs is measured by job density, which is defined as 'the number of jobs in an area divided by the resident population aged 16-64 in that area'.*

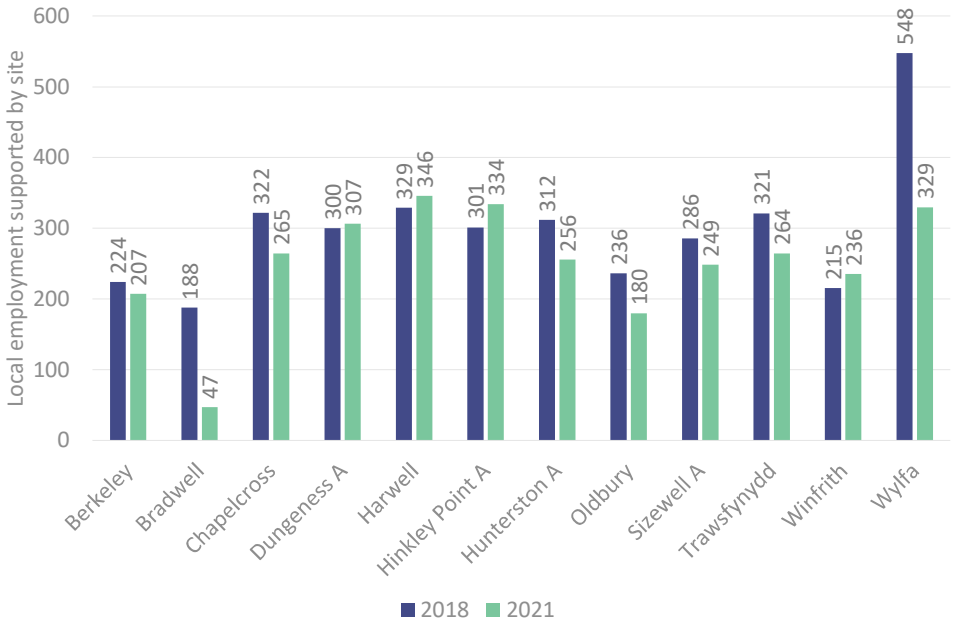
3.3 Changes compared to the 2018 assessment

The overall number of Magnox employees across all sites reduced by about 7%. This, therefore, will lead to lower current employment impacts.

Figure 21 shows a summary of the estimated employment impacts of the sites on their local economies (defined as the local authority district in which the site is located and those adjacent to it) compared to our previous assessment. As can be seen, some sites are making considerably lower local employment contributions, compared to our previous assessment.

- Wylfa is now supporting 329 jobs across the local economy, compared to 548 in 2018. Similarly, Bradwell is now supporting 47 jobs across the local economy as opposed to 188 in 2018. These changes are mostly due to Bradwell having achieved the quiescent phase in 2019, and Wylfa having successfully completed defueling in 2019, too.[12]
- Hinkley Point A on the other hand now supports 334 jobs across the local area, whereas it previously supported 301 in 2018. Both Dungeness A and Harwell support more jobs now compared to our previous assessment.

Figure 21: Local employment supported by site - comparison between 2018 and 2021



Source: Economic Insight analysis of data supplied by Magnox

[12] *'Strategy, effective from March 2021'. Nuclear Decommissioning Authority, 2021; pages 52 and 142.*

4. Current GVA contributions

The economic impact of sites can also be calculated in terms of GVA, which is a measure of contribution to GDP. In this chapter, we detail: (i) the direct GVA effects of sites; (ii) sites' supply chains, which determine knock-on impacts; and (iii) our quantification of the indirect and induced impacts.

4.1 Direct GVA effect

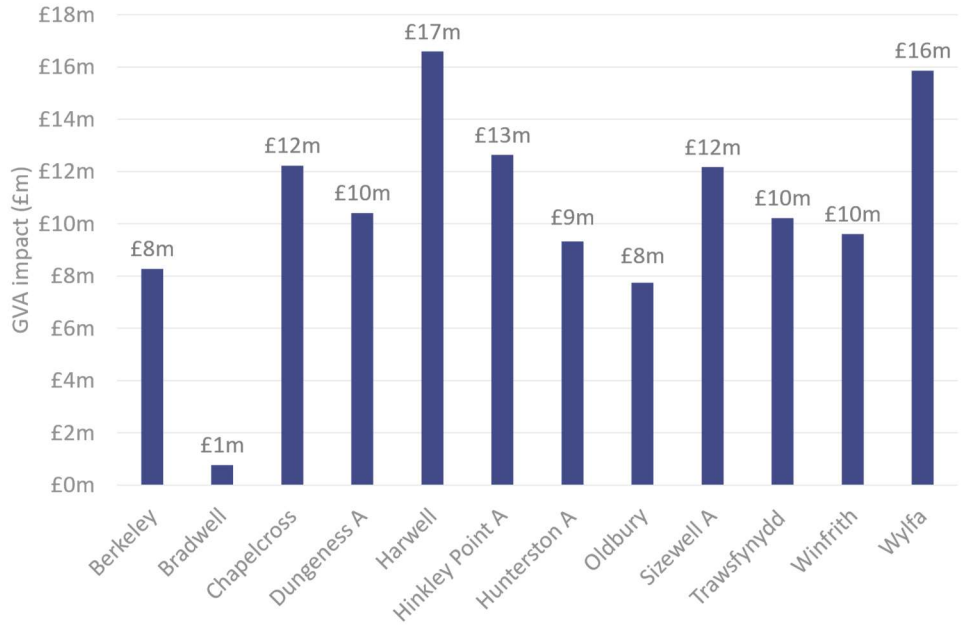
Direct GVA is the economic value created by the activities that are undertaken at a specific site. It is equal to the sum of employment costs and operating surplus (where operating surplus is defined as income, less all operating costs other than those related to capital i.e., excluding depreciation charges). This captures the value that operations at a site are adding on top of the inputs that are bought from suppliers. More specifically, the site-level components of direct GVA have been calculated as follows:

- Employment costs are estimated as the sum of site-level wages and salaries, 'scaled up' to the same proportion that wages and salaries are to total employment costs at the Magnox Ltd level. This means that, for example, social security and pension costs are included within our estimate of employment costs.
- Operating surpluses are assumed to be proportional to employment costs, and equal to the ratio at the Magnox Ltd level. We understand that profit is not accounted for at the individual site level, and therefore this is a reasonable approximation to make.

The definition of direct GVA impact should be kept in mind when considering the local impact of sites. For example, a larger operating surplus (all else equal) will not benefit the local economy. Rather, benefits to the local economy are felt through direct employment (one component of direct GVA), and the knock-on effects through local suppliers (as estimated separately).

Figure 22 showing the direct GVA effect for each of the 12 Magnox sites. These direct impacts are assigned fully to where each site is located.

Figure 22: Direct GVA effect of Magnox sites, 2021



Source: Economic Insight analysis of data supplied by Magnox

The direct GVA effect is highly correlated with the number of employees, hence the effect of Bradwell is far smaller than the effect of other sites (see Figure 6 for the number of employees across sites).

Table 7 shows the proportion of the direct GVA effect from each site, of the total GVA in the site's local authority district. All the direct GVA contribution of the sites is concentrated in the sites' local authority districts.

As can be seen, the proportions are all less than 1% but vary by site, with Wylfa having the greatest proportionate effect on its local authority district. As was indicated in the previous chapter, Bradwell has a significantly smaller number of direct employees than each of the other sites, such that its direct GVA as a proportion of the total GVA in the local authority district is much smaller than the other sites.

Other than Bradwell, direct GVA at Berkeley and Oldbury make up the smallest proportion of total GVA in the corresponding local authority districts.

Table 7: Direct GVA at Magnox sites relative to GVA in the local authority district, 2021

Site	Local authority district in which the site is located	Site direct GVA as a proportion of GVA in local authority district
Berkeley	Stroud	0.20%
Bradwell	Maldon	0.02%
Chapelcross	Dumfries and Galloway	0.28%
Dungeness A	Folkestone and Hythe	0.29%
Harwell	Vale of White Horse	0.30%
Hinkley Point A	Somerset West and Taunton	0.33%
Hunterston A	North Ayrshire	0.31%
Oldbury	South Gloucestershire	0.10%
Sizewell A	East Suffolk	0.31%
Trawsfynydd	Gwynedd	0.29%
Winfrith	Dorset	0.26%
Wylfa	Isle of Anglesey	0.55%

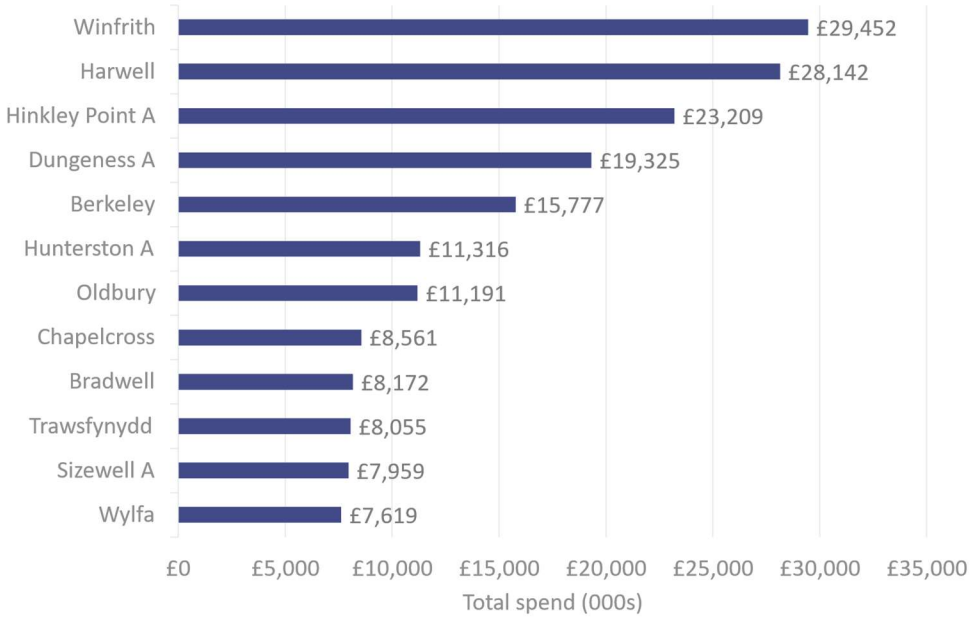
Source: Economic Insight analysis of ONS data and data supplied by Magnox
Notes: The GVA in each LAD has been standardised by a scaling factor, equal to "Average population across LADs / Population in LAD".

4.1.1 Supply chains

The knock-on GVA impacts of activities at sites are in part determined by supply chains, particularly where suppliers are based. As can be seen in Figure 23, the 12 Magnox sites purchase a significant amount of goods and services from suppliers within the UK. Based on our analysis of supplier data, we calculate that only 1% of spend across all sites was with international suppliers. Therefore, it can be expected that the UK will accrue most of the knock-on effects arising through supply chains.

Figure 23 also illustrates that there is a large variation amongst sites in their total spend in the UK. Winfrith (the largest spender in the UK) had a spend in 2019/20 that was almost four times that of Wylfa (the smallest spender in the UK). This reflects the level of activity at the Magnox site and the funding it receives.

Figure 23: Total spend on UK suppliers by Magnox sites 2019/20



Source: Economic Insight analysis of data supplied by Magnox

Figure 24 shows the spending on UK suppliers in each local authority district across the 12 Magnox sites. The figure shows that the spend by Magnox sites is spread across local authority districts over the entirety of the UK. In particular, there are many local authority districts with a high level of spending that are not in the vicinity of any Magnox sites. This means that sites (both on an individual and a collective basis) can have a significant economic impact on local areas in which they (and other sites) are not situated, or adjacent to.

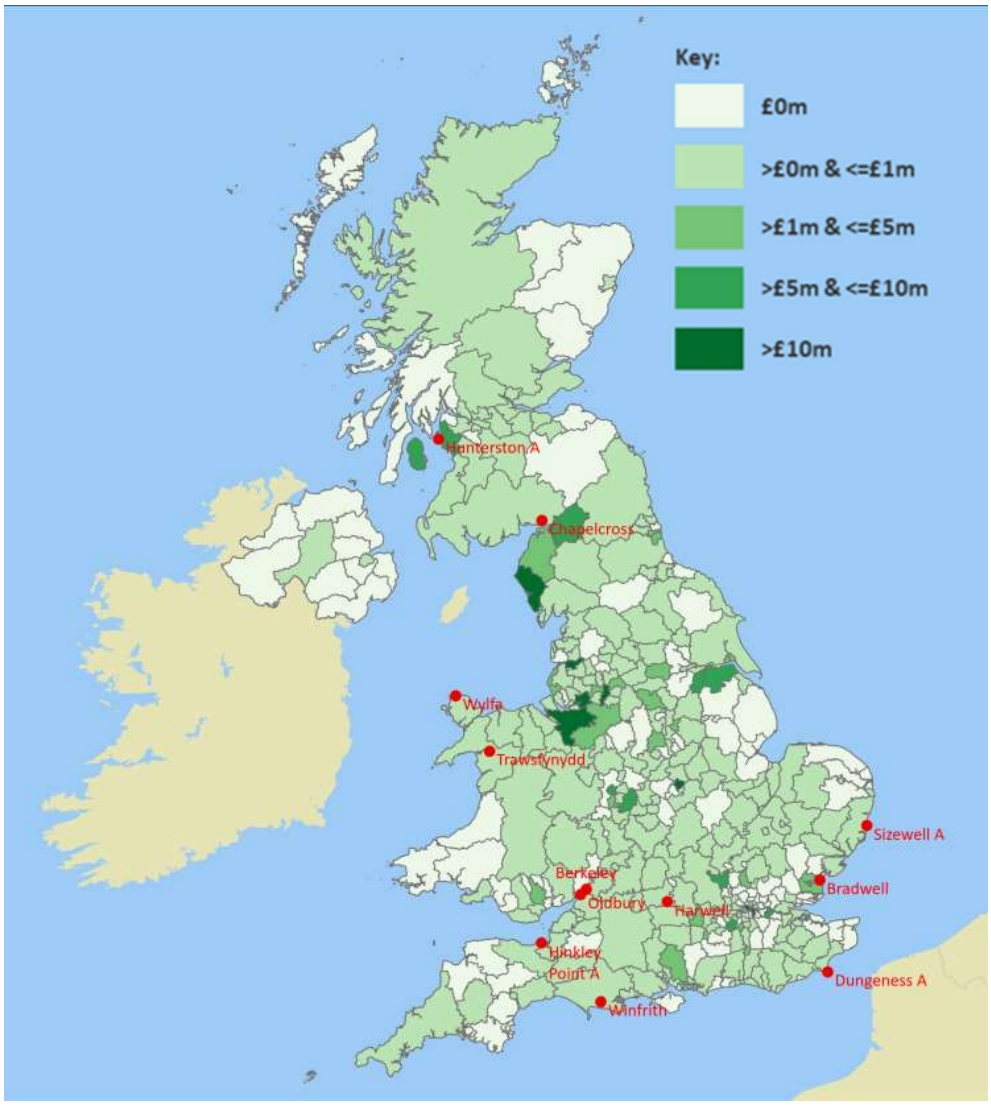
For instance, the five local authority districts with the highest spend by the 12 Magnox sites collectively neither contain any sites nor are adjacent to any local authority districts that do. These five local authority districts are:

(i) South Ribble (£20.5m);
(ii) Southwark (£18.4m);
(iii) Cheshire West and Chester (£17.8m);
(iv) Copeland (£13.6m); and
(v) Warrington (£11.9m).

The total spend on UK suppliers by the 12 Magnox sites was £179m.[13]

[13] *We note that this excludes the approximately 1% of spend for which the data did not contain a postcode, as we were unable to allocate this to a given local authority district.*

Figure 24: Total spending on UK suppliers by Magnox sites by local authority district in 2019/20



Source: Economic Insight analysis of data supplied by Magnox

Although a relatively small proportion of a site's spend is within the local area, it can still equate to hundreds of thousands of pounds. Table 8 shows how much each site spent in its local authority district and adjacent ones, along with the proportion of each site's total spend. As can be seen, Bradwell spent by far the most (in absolute terms) within its local authority district and those surrounding it.[14] This is followed by Wylfa, whereas Berkeley and Hinkley Point A spent the least.

[14] *This is due to a very significant spend of £1,889,000 on "I D Corcoran Building Contractors Ltd".*

Table 8: Each site's spend with suppliers in their local authority districts and those adjacent 2019/20

Site	Spend in the local authority district that the site is located in	Spend in either the local authority district that the site is located in or an adjacent one
Berkeley	£5,000 (0.03%)	£49,000 (0.31%)
Bradwell	£1,893,000 (23.16%)	£1,893,000 (23.16%)
Chapelcross	£95,000 (1.11%)	£324,000 (3.78%)
Dungeness A	£194,000 (1.00%)	£210,000 (1.09%)
Harwell	£167,000 (0.59%)	£384,000 (1.36%)
Hinkley Point A	£10,000 (0.04%)	£85,000 (0.37%)
Hunterston A	£142,000 (1.25%)	£307,000 (2.71%)
Oldbury	£29,000 (0.26%)	£125,000 (1.12%)
Sizewell A	£53,000 (0.67%)	£53,000 (0.67%)
Trawsfynydd	£57,000 (0.71%)	£273,000 (3.39%)
Winfrith	£123,000 (0.42%)	£212,000 (0.72%)
Wylfa	£97,000 (1.27%)	£331,000 (4.34%)

Source: Economic Insight analysis of data supplied by Magnox
Notes: Figures in parentheses are the relevant proportion of a site's spend with UK suppliers.

The sites' spending is relatively concentrated by sector and supplier.

Figure 25 shows the 10 SIC sectors where most spending occurred. For each site, we show the percentage of its spending across the 10 SIC sectors. For most sites, the highest proportion of spending (usually between 30% to 40%) was on suppliers in the architectural and engineering services or construction services. This is relevant for

calculating knock-on impacts that arise through supply chains, because different industries generate different levels of GVA and employment.

Figure 25: Site spend by SIC group 2019/20

SIC/site	Berkeley	Bradwell	Chapelcross	Dungeness A	Harwell	Hinkley Point A	Hunterston A	Oldbury	Sizewell A	Trawsfynydd	Winfrith	Wylfa
Architectural and engineering services; technical testing and analysis services	4%	29%	11%	12%	27%	8%	43%	9%	5%	17%	60%	14%
Computer, electronic and optical products	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction	7%	12%	25%	38%	7%	36%	6%	6%	40%	25%	10%	25%
Employment services	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%
Machinery and equipment n.e.c.	5%	0%	10%	2%	1%	10%	3%	1%	1%	8%	1%	4%
Office administrative, office support and other business support services	13%	12%	20%	17%	34%	11%	14%	17%	21%	21%	8%	29%
Other professional, scientific and technical services	12%	18%	23%	21%	9%	12%	14%	15%	22%	19%	14%	15%
Public administration and defence services; compulsory social security services	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rail transport services	0%	0%	0%	1%	2%	0%	0%	42%	0%	0%	0%	2%
Waste collection, treatment and disposal services; materials recovery services	56%	25%	7%	5%	19%	20%	6%	9%	5%	5%	5%	5%

Source: Economic Insight analysis of data supplied by Magnox
Notes: Darker shades represent higher proportions.

In addition to the consistency between sites in terms of what they purchase, there is also a high degree of consistency in terms of suppliers. Put another way, the 12 sites often buy from the same suppliers. As can be seen in Figure 26, suppliers such as Interserve (Facilities Management) Ltd, James Fisher Nuclear Ltd and Hertel Ltd are among the main suppliers for many of the sites.

Figure 26: Site spend by supplier 2019/20

	Berkeley	Bradwell	Chapelcross	Dungeness A	Harwell	Hinkley Point A	Hunterston A	Oldbury	Sizewell A	Trawsfynydd	Winfrith	Wylfa
Interserve (Facilities Management) Ltd	8%	9%	7%	9%	10%	7%	12%	13%	18%	17%	5%	27%
James Fisher Nuclear Ltd T/A JF Faber, JFNS, JFRH, JFIMS	2%	1%	3%	1%	0%	1%	2%	1%	1%	2%	54%	3%
Hertel (UK) Ltd t/a Altrad Services	0%	0%	23%	3%	0%	28%	5%	0%	0%	10%	0%	24%
LLW Repository Ltd	1%	24%	6%	1%	18%	3%	2%	7%	5%	4%	4%	3%
Nuvia Ltd	0%	0%	0%	11%	7%	0%	11%	2%	0%	11%	14%	4%
Cavendish Nuclear Limited	55%	0%	0%	0%	1%	5%	0%	2%	0%	0%	1%	1%
Erith Contractors Ltd	0%	7%	0%	29%	0%	3%	0%	0%	0%	13%	0%	0%
Profile Security Services Ltd	4%	3%	11%	4%	4%	3%	1%	1%	2%	3%	2%	1%
Civil Nuclear Police Authority - known as Civil Nuclear Constabulary	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%
Radwise Ltd	0%	15%	9%	4%	0%	8%	0%	0%	10%	0%	0%	0%

Source: Economic Insight analysis of data supplied by Magnox
Notes: Darker shades represent higher proportions.

We note that the supplier Radwise Ltd is located in North Ayrshire, the same local authority district where Hunterston A site is located, which is one of the sites that has a relatively higher proportion of spending within its local economy, as per Table 8.

For some suppliers, the sales to Magnox sites comprise a considerable proportion of total revenues, such as the case of Nuvia Ltd where sales to Magnox sites comprise around 21% of their total revenues.

4.2 Indirect and induced GVA effects

As with the employment effects in Figure 16, we now show the total knock-on GVA impacts of the Magnox sites, beyond just the direct GVA impact shown in Figure 12.

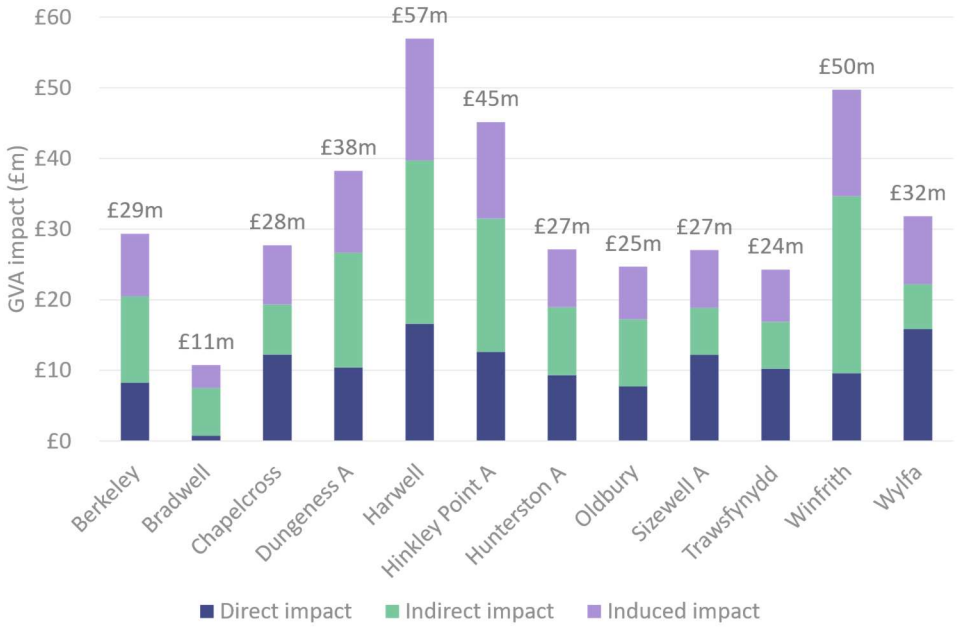
The total GVA contribution of Magnox sites to the UK is £393m, which is made up of the following:

- direct: **£126m** (32% of the total);
- indirect: **£148m (**38% of the total); and
- induced: **£119m** (30% of the total).

As is shown in Figure 27, the Magnox sites have significant knock-on effects on the UK economy, when measured in terms of GVA. Given their large supply chains, the sites have significant indirect impacts. Therefore, as was shown in Figure 23, Harwell and Winfrith have the largest supply chains, and therefore the largest indirect GVA impacts.

In addition, induced impacts are also significant, with these arising through employees of Magnox sites and suppliers.

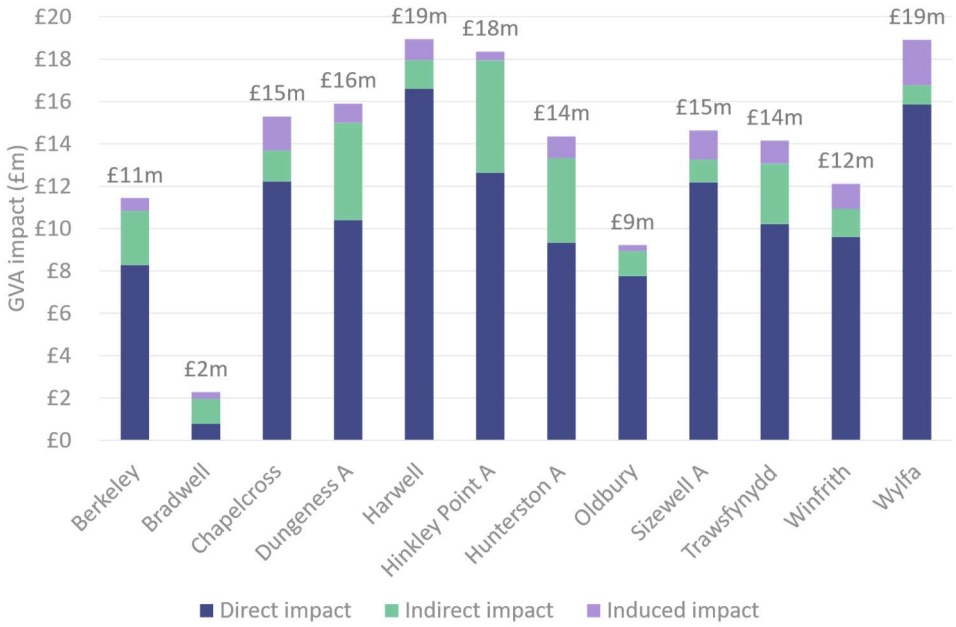
Figure 27: Total GVA impact of Magnox sites at the national level, 2021



Source: Economic Insight analysis of data supplied by Magnox

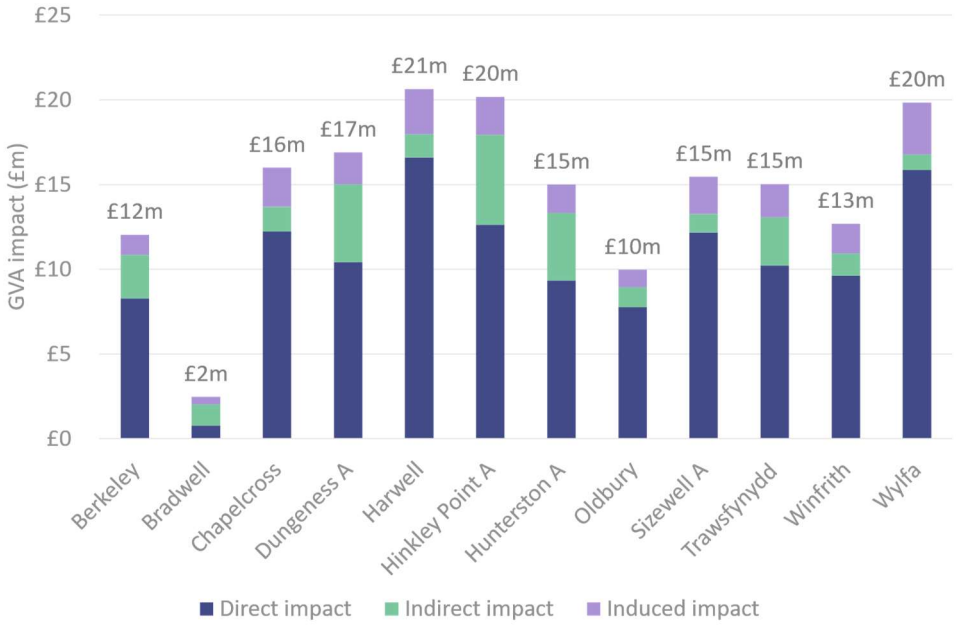
Similar to the employment effect, only a proportion of the national GVA effects arise in the sites' local areas. The following figures show the GVA impact of sites on their local authority districts and those adjacent to it.

Figure 28: GVA effects within each site's local authority district, 2021



Source: Economic Insight analysis of data supplied by Magnox

Figure 29: GVA effects within each site's local authroity district and those adjacent, 2021



Source: Economic Insight analysis of data supplied by Magnox

Table 9 puts the total GVA impacts of the sites in the context of total GVA within local areas. As can be seen, whilst the proportions are all less than 1%, they are varied in their magnitude. For example, Wylfa contributes 0.66% of its local authority district's GVA respectively, whilst Bradwell contributes 0.07%. Notably, the sites, in total, contribute a greater proportion of GVA than employment – this is because the jobs are relatively high value and above average productivity.

Table 9: Total GVA impact of site as a proportion of local GVA, 2021

	Total GVA impact of site as a proportion of GVA of its local authority district	Total GVA impact of site as a proportion of GVA of its local authority district plus those adjacent
Berkeley	0.27%	0.04%
Bradwell	0.07%	0.01%
Chapelcross	0.35%	0.06%
Dungeness A	0.45%	0.09%
Harwell	0.35%	0.04%
Hinkley Point A	0.48%	0.09%
Hunterston A	0.48%	0.08%
Oldbury	0.12%	0.03%
Sizewell A	0.38%	0.07%
Trawsfynydd	0.40%	0.08%
Winfrith	0.32%	0.05%
Wylfa	0.66%	0.31%

Source: Economic Insight analysis of ONS data and data supplied by Magnox
Notes: The GVA in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".

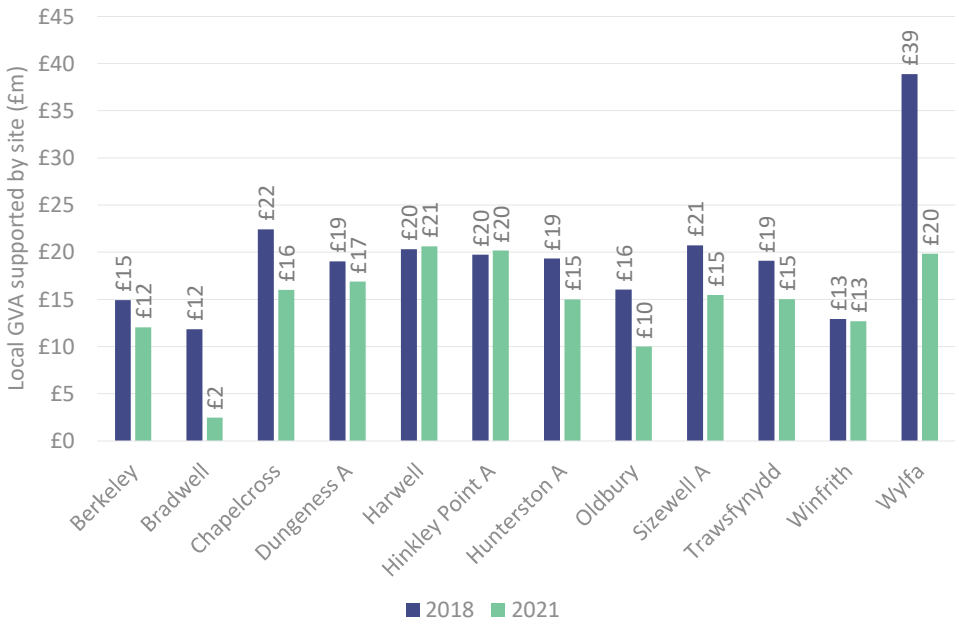
4.3 Changes compared to the 2018 assessment

Similarly to the employment contributions set out earlier, GVA contributions will also reduce, based on reduced employees, as well as reduced spending on suppliers.

Figure 30 shows a summary of the estimated GVA impacts of the sites on their local economies (defined as the local authority district in which the site is located and those adjacent to it) compared to our previous assessment. As can be seen, some sites are making considerably lower local GVA contributions, compared to our previous assessment.

- These are mostly in line with the changes in the employment contributions. For example, both Wylfa and Bradwell are now contributing less GVA to their local economy than in our 2018 assessment.

Figure 30: Local GVA supported by site (£m) - comparison between 2018 and 2021



Source: Economic Insight analysis of data supplied by Magnox

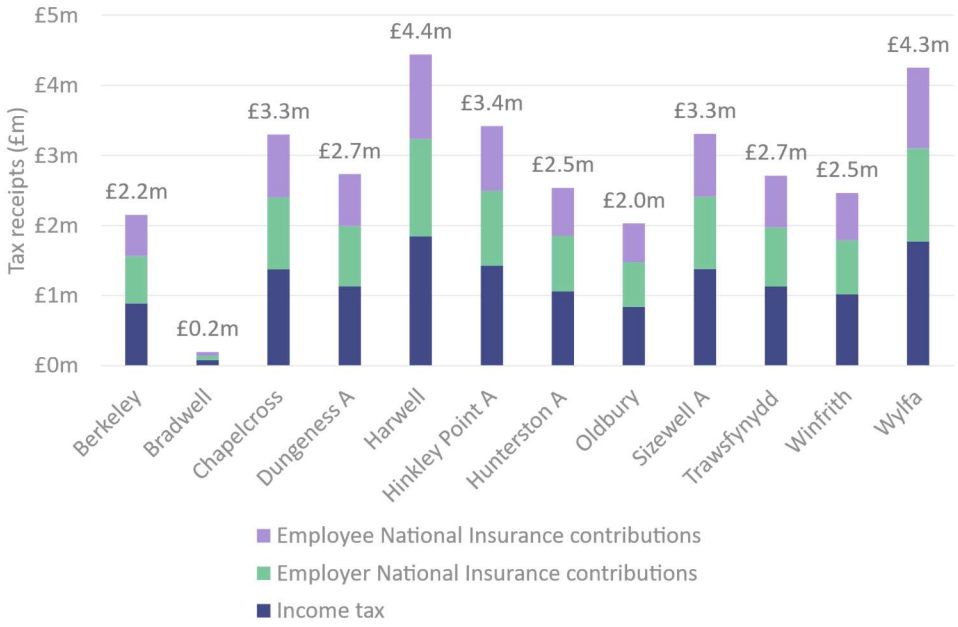
5. Current tax contributions

In this chapter, we set out the impact of Magnox sites on both national and local taxes. This is because the current impact of sites can also be measured in terms of contributions to tax receipts.

5.1 National taxes

Income tax and national insurance contributions will be raised from direct employment at the Magnox sites. Figure 31 shows the estimated revenues HMRC receives from these employment taxes. The number of employees, and to a lesser extent average wages, drive the relative magnitudes of the receipts from different sites.

Figure 31: Employment tax receipts, 2021



Source: Economic Insight analysis of data supplied by Magnox

Harwell and Wylfa have the most employees and the average wages across sites are similar, as was shown in Figure 6 and Figure 8 respectively. Therefore, Harwell and Wylfa also have the greatest employment tax receipts, as shown above.

In addition to employment taxes, central government will also receive:

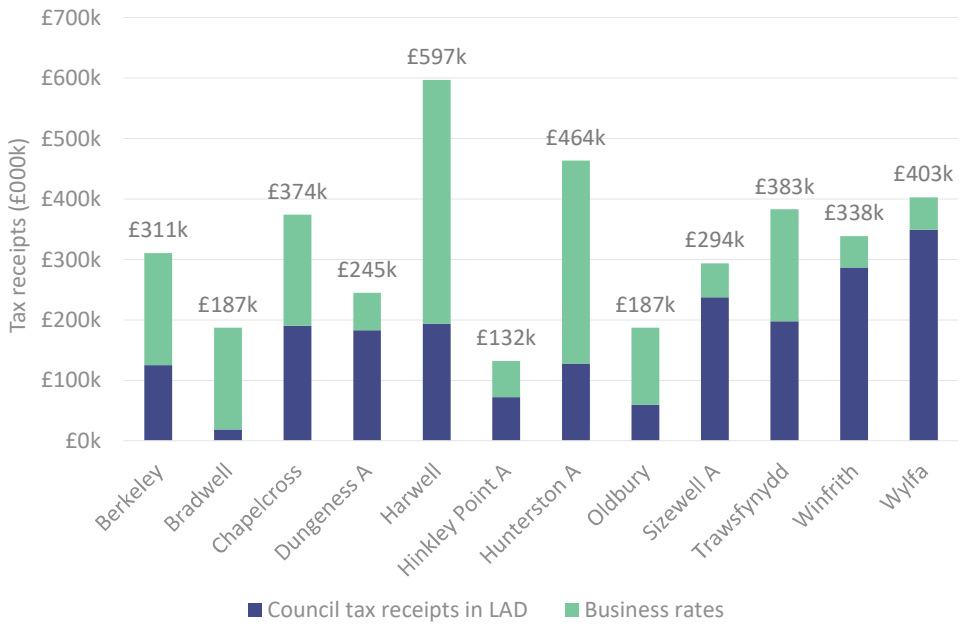
- VAT from employees of Magnox sites and their suppliers when spending their wages; and
- Corporation Tax from Magnox Ltd and its suppliers in relation to any profit that is made.

5.2 Local taxes

Council Tax and business rates (non-domestic business rates) will be due as a result of activities at the Magnox sites. Whilst national taxes support all local economies (e.g., through welfare spending and healthcare), these local taxes are used by local authorities to fund services in their area. Therefore, these local taxes may have a more 'direct' local impact than national taxes.

Figure 32 shows the estimated amount of Council Tax that is raised from individuals directly employed by the Magnox sites in the LAD that the site is located in, and estimates of the business rates paid by the Magnox sites. As can be seen, the sites make significant contributions to their local economies through local taxes.

Figure 32: Council tax receipts from employees in the site's LAD and estimated business rates paid by sites, 2021

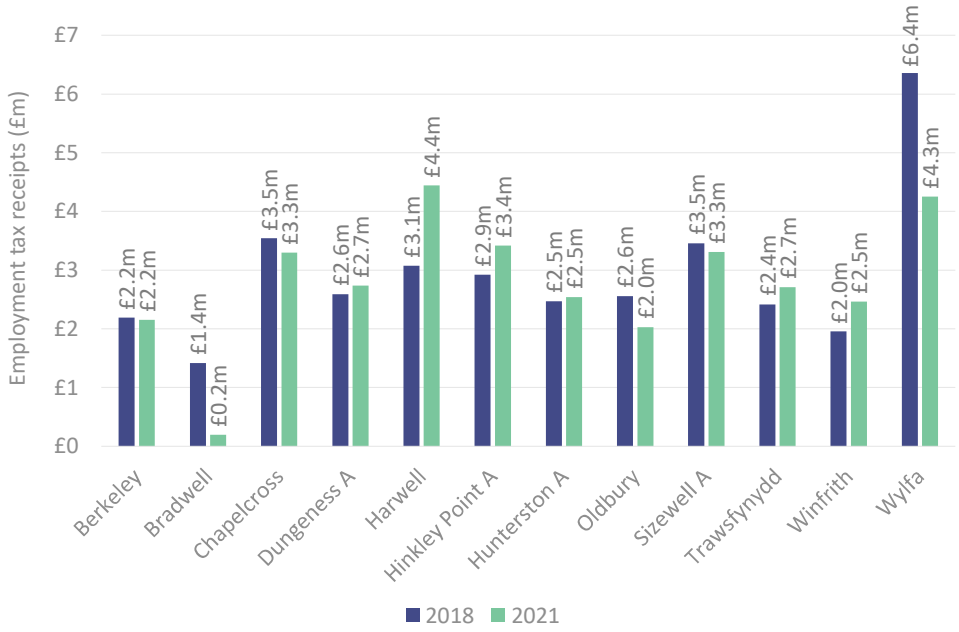


Source: Economic Insight analysis of UK government and Scottish Assessors data, and data supplied by Magnox

5.3 Changes compared to the 2018 assessment

Again, in line with the previous employment, and GVA contribution comparisons, Magnox sites' employment tax and local tax contributions have reduced, compared to our previous assessment. This is illustrated in Figure 33 for employment tax receipts by site.

Figure 33: Employment tax receipts by site (£m) - comparison between 2018 and 2021



Source: Economic Insight analysis of data supplied by Magnox

6. Evaluation of strength and dependence of local economies

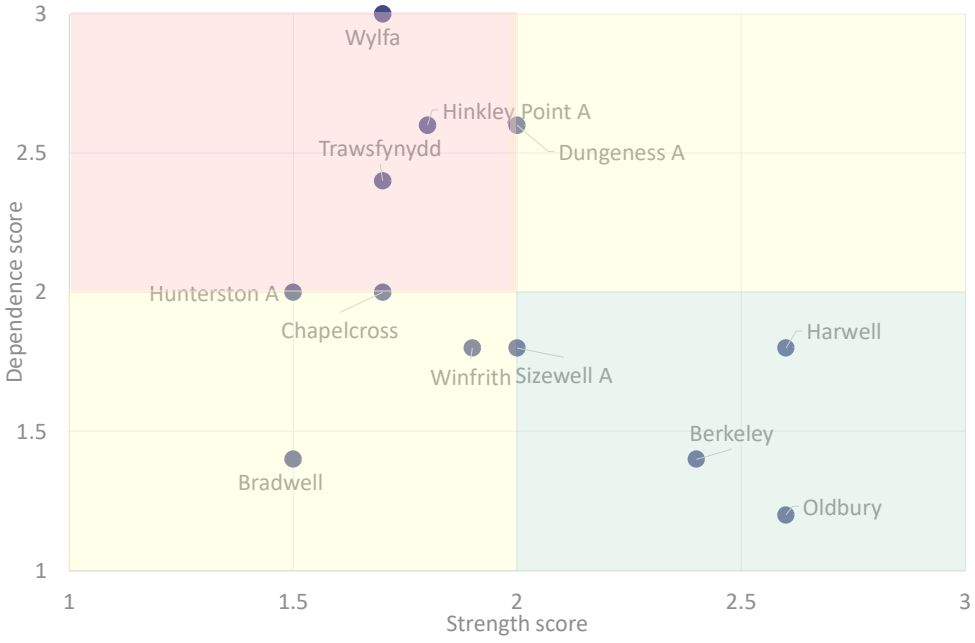
This chapter assesses the current socio-economic strength of the local economies in which the sites are located, as well as their dependence on the sites' operations.

Here, we assess the labour market, general economy, and society of the local authority district in which each site is located. For these three domains, we look at several metrics that reflect the current level of socio-economic activity in a local area and assign the sites a score based on their relative distribution with respect to other local authorities in the UK for *strength* metrics and with respect to each other for *dependence* metrics. Once equally weighted and aggregated, each site has a score between 1 (low) and 3 (high) for *strength* and *dependence*.

Figure 34 shows how the local economies of each of the sites performs in total on the strength and dependence domains. The **top left quadrant** of the figure includes the sites whose local economy is: relatively more dependent on their Magnox site; and relatively less strong. Sites that fall into this quadrant may require greater support from the NDA to mitigate the effects of downturn. The local economies of the sites in the **bottom right quadrant** appear relatively stronger and relatively less dependent on their Magnox site and may therefore require less support. The local economies of the sites that fall into the **other two quadrants** (or that fall exactly between quadrants) could be seen as *medium* priorities.

THE **TOP LEFT QUADRANT** OF THE FIGURE INCLUDES THE SITES WHOSE LOCAL ECONOMY IS: RELATIVELY MORE DEPENDENT ON THEIR MAGNOX SITE; AND RELATIVELY LESS STRONG.

Figure 34: Summary of strength and dependence score for Magnox sites



Source: Economic Insight analysis

Notably, the local economies of the following sites fall into the 'high dependence, low strength' quadrant:

- **Wylfa**. The Isle of Anglesey was scored as having relatively low strength due to: a low migration flow; a low proportion of the population that is of working age; and low GVA per head. It was scored as having relative high dependency mainly due to the proportion of local employment and GVA it contributes.
- **Hinkley Point A.** Somerset West and Taunton scored low strength and high dependence due to the proportion of the population that is of working age and low GVA growth rate; and relatively smaller contributions to socio-economic activities in the local area.
- **Trawsfynydd.** Gwynedd was scored as having low strength and high dependence due to low average earnings and a relatively high concentration in the local economy.

Whereas the local economies of the following sites fall into the 'low dependence, high strength' quadrant:

- **Harwell**. Dorset was scored high strength due to its large proportion of working age population and high GVA growth, and low dependence due to the relatively small proportion of local employment and GVA it contributes.
- **Oldbury**. South Gloucestershire scored highly on proportion of working age population, as well as strong GVA growth and GVA per head. Its relatively low dependence stems from the relatively small proportion of local employment and GVA it contributes, as well as low concentration in the local economy.
- **Berkeley**. Stroud falls into this category as it scored highly on the overall employment rate in the local authority district, as well as the small proportion of local employment and GVA it contributes.

It should be noted that this analysis is based only on an evaluation of the current strength and dependence of local economies.[15] Furthermore, the criteria that we have selected and the equal weighting we have applied are based on judgement, and alternative well-reasoned choices could give different results. Nevertheless, the above figure gives an indication of the relative strength and dependence of the local economies of the sites.

In the following sections, we present the metrics for strength and dependence, and how each of the sites perform against them.

6.1 Strength of the local economies

Table 10 shows the score that is assigned to each of the sites for the measures of strength. The steps for assigning strength scores are as follows:

- Firstly, we look up the value for the metric (for example, employment rate) for the site based on the local authority district in which it is located.
- Secondly, we calculate the lower and upper quartile values for the metric across the local authority districts in England, Wales, and Scotland.

[15] *We note that some local authority districts appear more/less dependent on Magnox sites compared to our 2018 assessment, due to changes in the local authority districts, affecting in particular the following sites: Hinkley Point A, Sizewell A, Trawsfynydd, and Winfrith.*

- Thirdly, we assign the site a value 1 if its value is below the lower quartile, a value 3 if its value is greater than the upper quartile, and a value 2 if its value is between the lower and upper quartile values.

Note that a higher score reflects a stronger economic performance in the local authority district where the site is located.

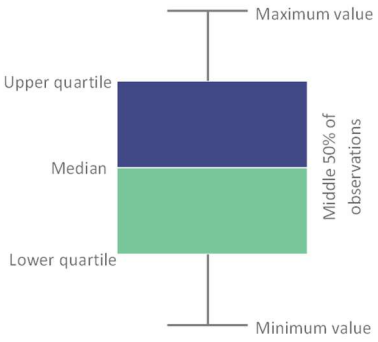
Table 10: Summary of scores across strength metrics for Magnox sites

Site / metric	Berkeley	Bradwell	Chapelcross	Dungeness A	Harwell	Hinkley Point A	Hunterston A	Oldbury	Sizewell A	Trawsfynydd	Winfrith	Wylfa
Employment rate	3	2	1	3	3	2	1	3	2	2	2	2
Proportion with NVQ4 or above	2	1	2	2	3	2	2	2	2	2	2	2
Migration flow	2	2	1	2	3	2	1	2	2	2	2	1
Proportion of working age	2	1	1	1	2	1	2	2	1	2	1	1
Median gross weekly pay	2	2	1	1	3	2	2	3	2	1	2	2
GVA growth rate	2	2	2	2	1	1	2	3	2	2	1	3
GVA per head	2	1	2	2	3	2	1	3	2	2	2	1
Gross fixed capital formation	3	1	2	2	3	2	2	3	2	1	2	1
Adjusted IMD	3	2	2	2	3	2	1	3	2	1	2	1
Average reported happiness	3	1	3	3	2	2	1	2	3	2	3	3

Source: Economic Insight analysis
*Notes: **Green** reflects a stronger economic performance in the local authority district where the site is located, whereas **red** reflects a weaker economic performance in the local authority district where the site is located.*

In the following sub-section, we look at the distribution[16] of the local authority districts in England, Scotland, and Wales across each of the metrics, and point out where each of the sites' local authority district is located relative to the distribution.

[16] *Note that we use the latest available data for each of the metrics.*



Specifically, for each of the metrics, we present a box and whisker plot[17] and highlight the sites that are in local authority districts that have values above or below the upper and lower quartile values of the metric – see opposite illustration.

6.1.1 Labour market

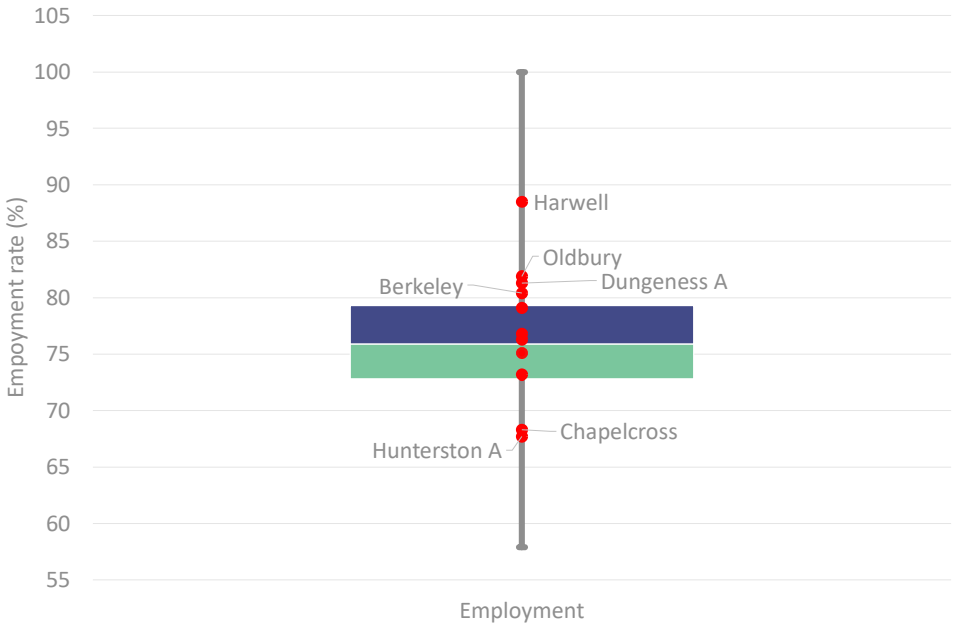
6.1.1.1 Employment

For the employment domain we look at the employment rate, which is the number of people employed as a percentage of the economically active population (employed plus unemployed individuals).

Generally, the higher the level of employment within a local area the stronger it is.

As Figure 35 shows, the local authority districts in which Harwell, Oldbury, Dungeness A and Berkeley sites are located have an employment rate that is above the upper quartile value of employment rate for local authority districts in England, Scotland, and Wales. While Hunterston A, located in North Ayrshire, and Chapelcross, located in Dumfries and Galloway, have an employment rate that is below the lower quartile value of employment rate for the other local authority districts.

Figure 35: Distribution of employment rates in UK local authority districts



Source: Economic Insight analysis of ONS data

6.1.1.2 Skills

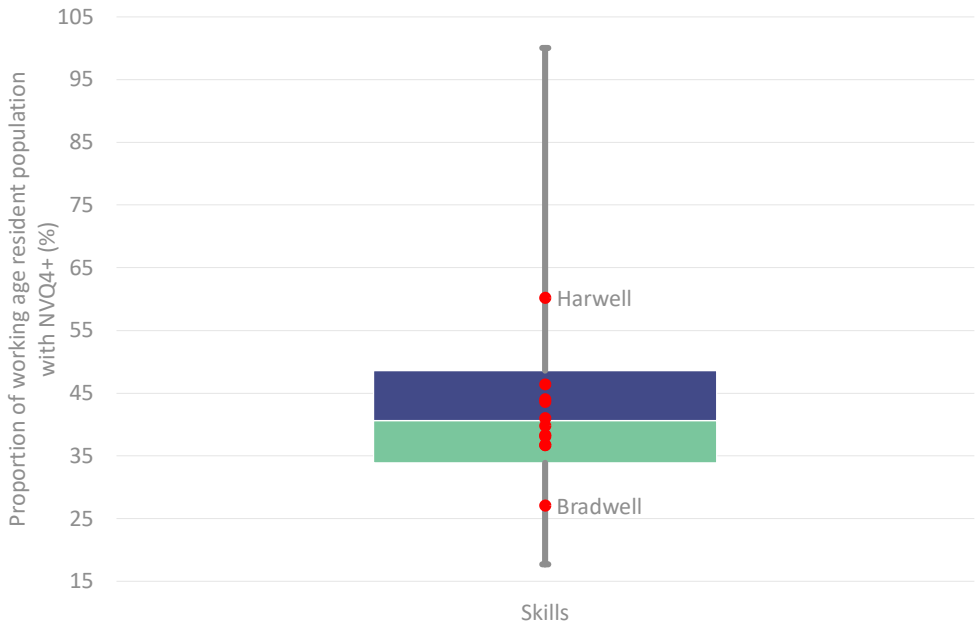
For the skills domain, we look at the percentage of working-age population within a local authority district with a qualification of level NVQ4 or above.

[17] *A box and whisker plot shows statistic summary of the data: maximum, minimum, median, upper quartile, and lower quartile. The box identifies the upper and lower quartile values, the line that divides the box shows the median value. The 'whiskers' go from each of the quartiles to the minimum or maximum values.*

Generally, a more highly qualified population is more productive and better able to find employment opportunities.

As Figure 36 shows, the Vale of White Horse (Harwell) local authority district has a large proportion of highly qualified working-age population, whereas Maldon (Bradwell) lies in the lower quartile of the distribution for the local authority districts in England, Wales, and Scotland.

Figure 36: Distribution of proportion of working-age residents with qualification level NVQ4+ in UK local authority districts



Source: Economic Insight analysis of ONS data

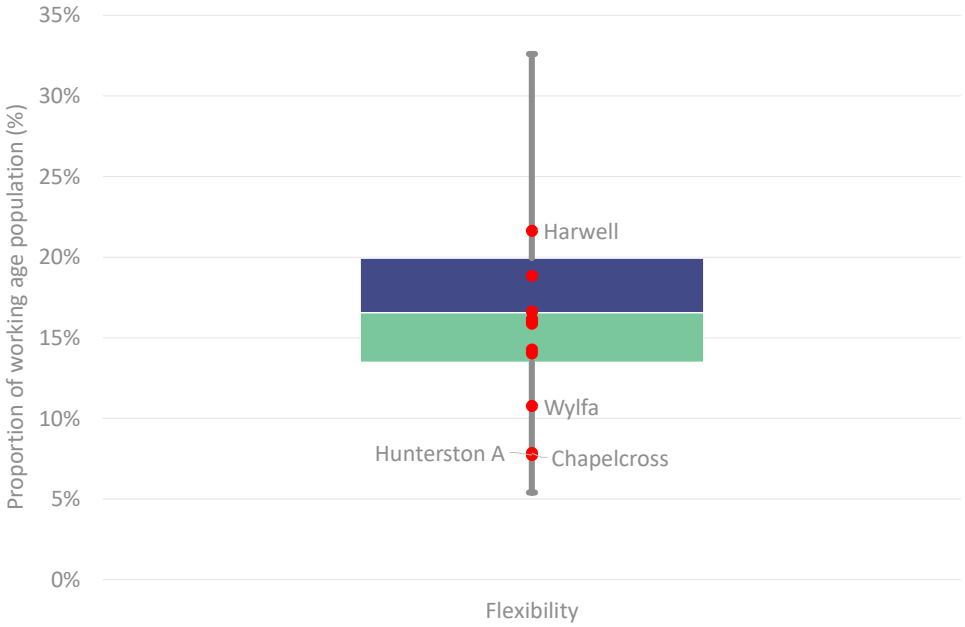
6.1.1.3 Flexibility

For the flexibility domain, we look at the migration flow (inward plus outward) both internal and international migration as a proportion of the working-age population.

Generally, a more flexible and adaptable labour market is better able to deal with changes in the labour market conditions and is therefore stronger.

Figure 37 shows that, in general, sites located in local authority districts in Wales and Scotland have lower proportions of migration flow in comparison with sites located in England.

Figure 37: Distribution of proportion of migration flow to working-age population in UK local authority districts



Source: Economic Insight analysis of ONS data

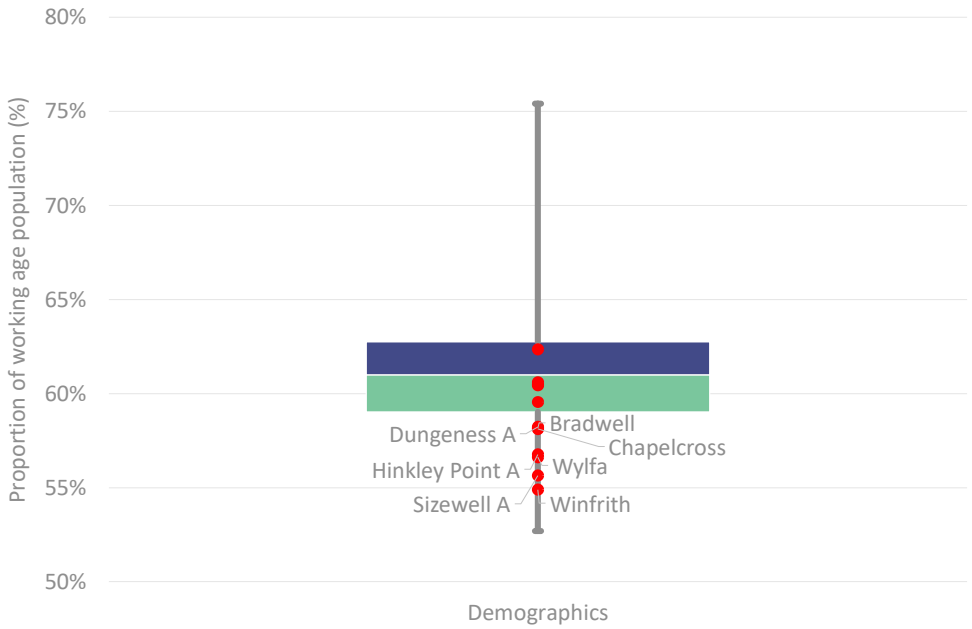
6.1.1.4 Demographics

For the demographics domain, we look at the proportion of the local authority district's population that is of working-age.

Generally, a higher proportion of working-age individuals in the population translates into a higher level of economic activity.

Figure 38 shows that more than half of Magnox sites are in local authority districts that have a proportion of working-age population that is below the lower quartile value for local authority districts in England, Scotland, and Wales.

Figure 38: Distribution of proportion of working-age population of UK local authority districts



Source: Economic Insight analysis of ONS data

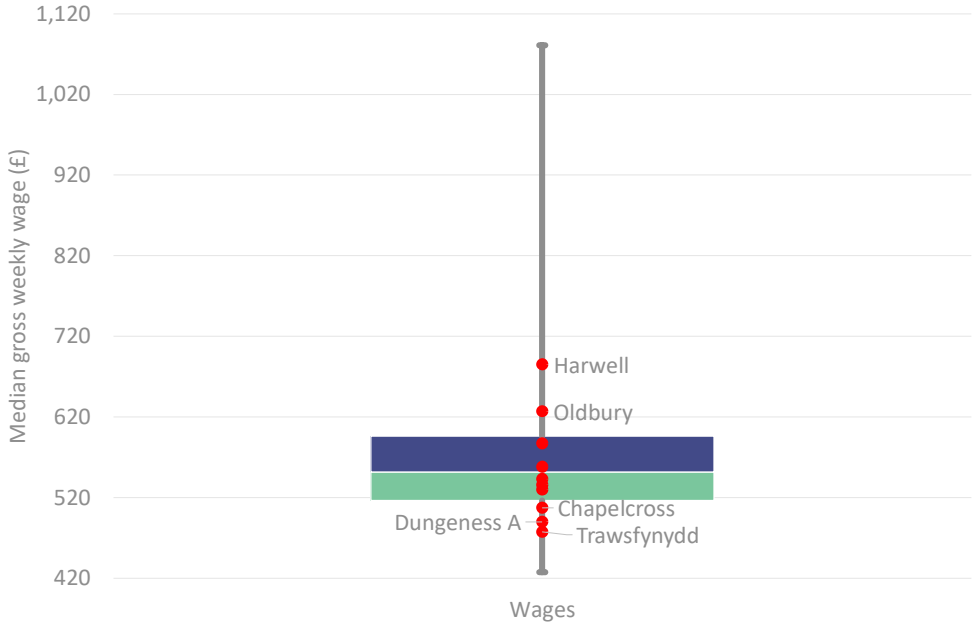
6.1.1.5 Wages

For the wages domain, we look at the median gross weekly pay for full-time employee jobs in the local authority districts.

Generally, a higher local wage level is consistent with a stronger economy.

We note from Figure 39 that the Vale of White Horse local authority district, where the Harwell site is located, has the highest level of median gross weekly pay (in comparison with other sites), which is consistent with the local authority district having the highest percentage of working-age population with NVQ4+ as per Figure 36.

Figure 39: Distribution of weekly gross median pay across UK local authority districts



Source: Economic Insight analysis of ONS data

6.1.2 General economy

6.1.2.1 Productivity

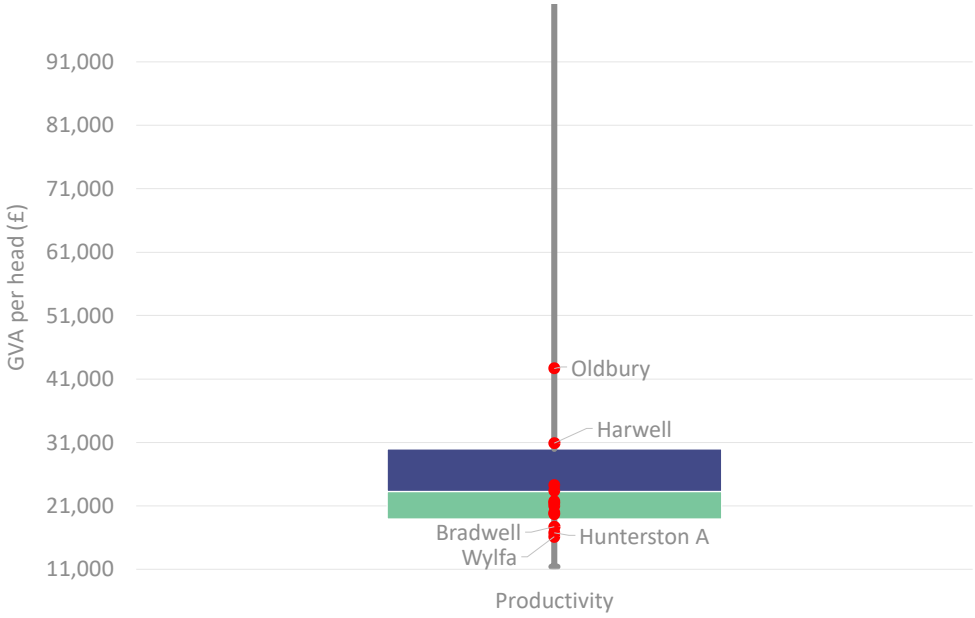
To assess productivity levels in a local economy, we look at GVA per head and GVA per head growth rate in a local authority district.[18]

Generally, a stronger economy is consistent with higher growth and higher levels of productivity.

We note from Figure 40 that Vale of White Horse (Harwell) and South Gloucestershire (Oldbury) have the highest GVA per head values in comparison with local authority districts of other sites, consistent with the two local authority districts also having the highest median gross weekly pay as per Figure 39, consistent with economic theory that suggest more productive economies also have higher wage levels.

[18] *For GVA growth rate, we took the average growth rate across the years 1998-2019, to capture the 'trend' in economic growth in the local authority.*

Figure 40: Distribution of GVA per head across UK local authority districts[19]



Source: Economic Insight analysis of ONS data

Figure 41: Distribution of GVA growth rate across UK local authority districts

Source: Economic Insight analysis of ONS data

6.1.2.2 Investment

For investment levels, we look at gross fixed capital formation per head in NUTS2[20] areas in the UK and assign local authority districts values based on the NUTS2 area in which they are located.

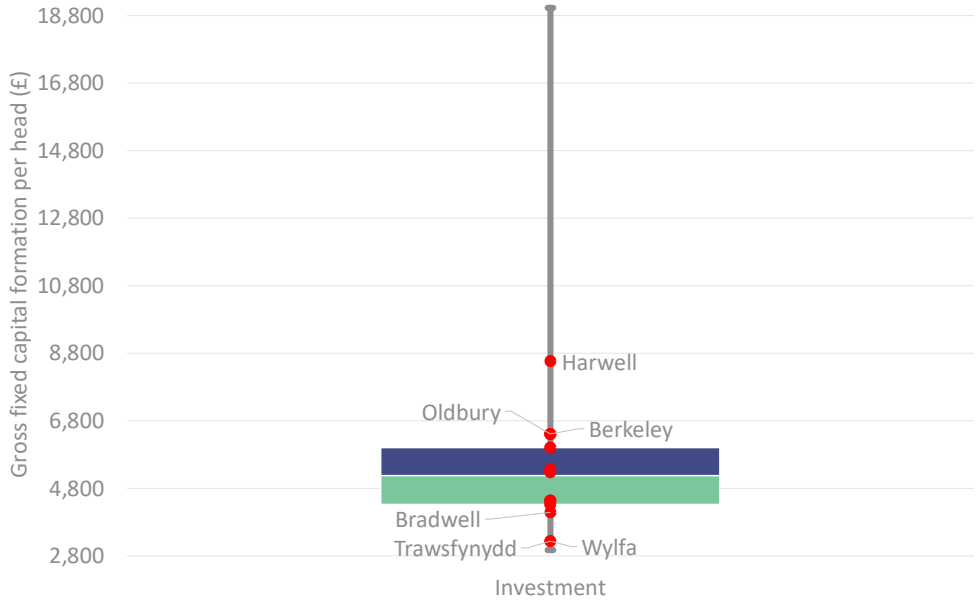
[19] *Note that GVA per head in City of London, Westminster, and Camden are outliers and have been excluded in looking at the distribution of values.*

[20] *Data for investment levels is not available at the local authority level, and NUTS2 is the most granular geographic level for which investment data is available.*

Generally, the greater the level of investment in an area, the stronger is the economy.

Consistent with high GVA per head and wage levels, Figure 42 shows that the local authority districts for Harwell and Oldbury also have a high level of gross fixed capital formation per head in comparison with other sites.

Figure 42: Distribution of investment levels across UK local authority districts



Source: Economic Insight analysis of ONS data

6.1.3 Society

6.1.3.1 Quality of life

The metric that we look at here is an adjusted Index of Multiple Deprivation (IMD), which measures the relative deprivation of local areas in the UK. The IMD assesses deprivation across the following domains: employment, education, health, income, crime, barriers to housings and services, and environment. As slightly different approaches are used to calculate IMD metrics in the different countries of the UK, we have calculated an adjusted measure which standardises the metrics, based on accepted practice. We implicitly associate a lower level of deprivation with a higher quality of life.

A higher quality of life is a sign of a stronger socio-economic area.

As per Figure 43, North Ayrshire (Hunterston A), Isle of Anglesey (Wylfa) and Gwynedd (Trawsfynydd) are the only sites located in a local authority district that has a quality of life measure below the lower quartile value, consistent with North Ayrshire also having an employment rate below the lower quartile value as per Figure 35, and Isle of Anglesey and Gwynedd being in the lower quartile, too.

Figure 43: Distribution of quality of life measure across UK local authority districts

Source: Economic Insight analysis of devolved government statistics

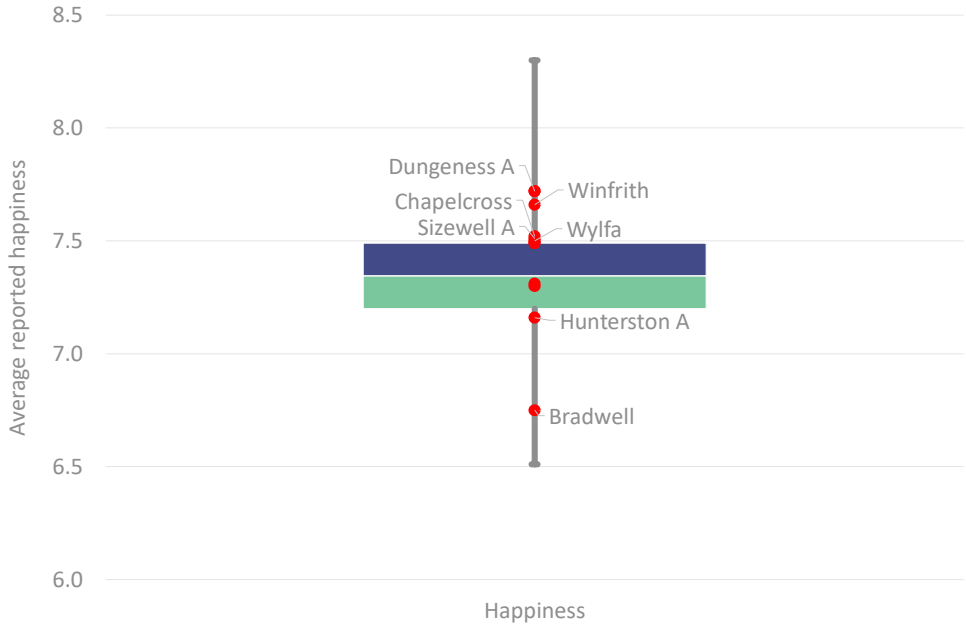
6.1.3.2 Happiness

The metric for happiness is the average reported happiness level such that a value of 10 is equivalent to feeling '*completely happy*' yesterday, and a value of 0 equivalent to being '*not happy at all*' yesterday.

The higher reported happiness level, the stronger an area can be considered socio-economically.

Figure 44 shows that most Magnox sites are located in local authority districts that report high levels of happiness. Only Bradwell and Harwell are in local authority districts that have average reported happiness levels below the lower quartile.

Figure 44: Distribution of happiness levels across UK local authority districts



Source: Economic Insight analysis of ONS data

6.2 Dependence of the local economy on the site operations

In this section we look at the extent to which local economies are dependent on the site's socio-economic operations and activities. That is, we look at the economic and social contribution of the site to the local area to assess how the downturn of operations at the Magnox sites may impact the local economy if it were to take place 'now'. As with strength, we look at each of the site's contribution to the local economy in three different domains: the labour market; the general economy; and society. The steps for assigning dependence scores are as follows:

- Firstly, we calculate the value for the metric.
- Secondly, we calculate the lower and upper quartile values across the values for the 12 Magnox sites for each of the metrics.
- Thirdly, we assign the site a value 1 if its value is below the lower quartile, a value 3 if its value is greater than the upper quartile, and a value 2 if its value is between the lower and upper quartile values.

Note that in the case of dependence, a higher score reflects a higher dependence of the local authority district on the site operations.

Table 11 shows the dependence score across each of the metrics for the 12 Magnox sites.

Table 11: Summary of scores across dependence metrics for Magnox sites

Site / metric	Berkeley	Bradwell	Chapelcross	Dungeness A	Harwell	Hinkley Point A	Hunterston A	Oldbury	Sizewell A	Trawsfynydd	Winfrith	Wylfa
Proportion of local direct jobs related to the site relative to the number of all local jobs	1	1	2	3	3	2	2	1	2	2	2	3
Proportion of local direct, indirect and induced jobs relative to all local jobs	1	1	2	3	2	3	2	1	2	2	2	3
Direct, indirect and induced GVA as a proportion of total local GVA	1	1	2	3	2	3	2	1	2	2	2	3
Sum of the squares of the proportion of GVA from each industry	3	2	2	2	1	2	2	1	1	3	2	3
Contribution to social activities in local area	1	2	2	2	1	3	2	2	2	3	1	3

Source: Economic Insight analysis
*Notes: **Green** reflects a lower economic dependence of the local authority district where the site is located on the site, whereas **red** reflects a higher economic dependence of the local authority district where the site is located on the site.*

In the following, we present the metrics for each of the three domains and discuss how Magnox sites perform against them.

6.2.1 Labour market

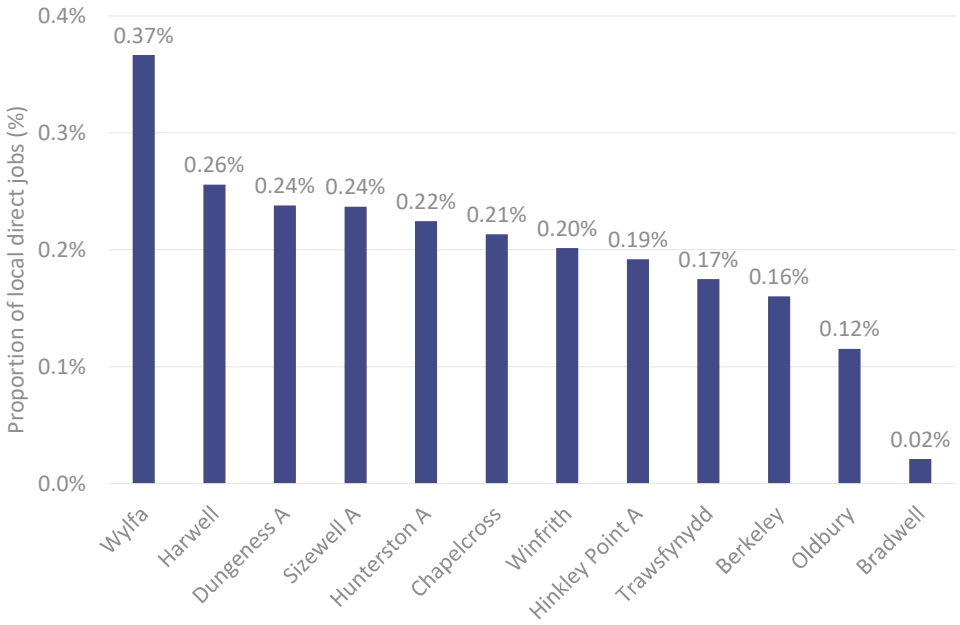
6.2.1.1 Employment

To assess the dependence of the local labour market on the site, we look at the relative size of site-related employment in the local area.

The greater the proportion of local jobs related to the site the more dependent the local area is likely to be on the site.

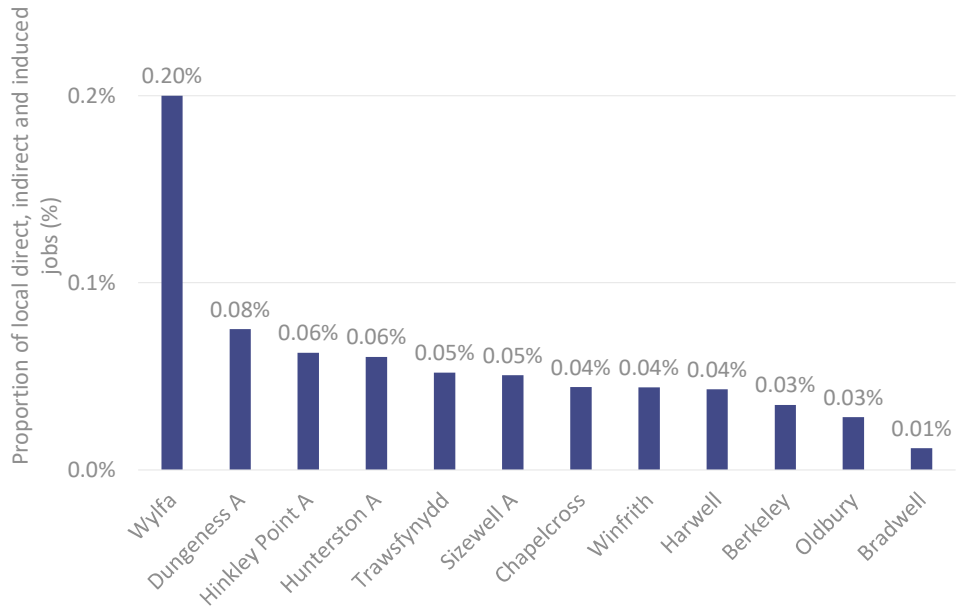
Figure 45 and Figure 46 show that, in general, a site's direct as well as indirect and induced contribution to employment in the local labour market is relatively small. Still, there is some variation across sites, with Wylfa creating the largest proportion of employment in a local authority district in comparison with other sites, and Bradwell creating the smallest relative proportion.

Figure 45: Proportion of local direct jobs related to the site relative to the number of all local jobs[21]



Source: Economic Insight analysis

Figure 46: Proportion of local direct, indirect, and induced jobs relative to the number of all local jobs[22]



Source: Economic Insight analysis

[21] *The total number of jobs in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".*

[22] *The total number of jobs in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".*

6.2.2 General economy

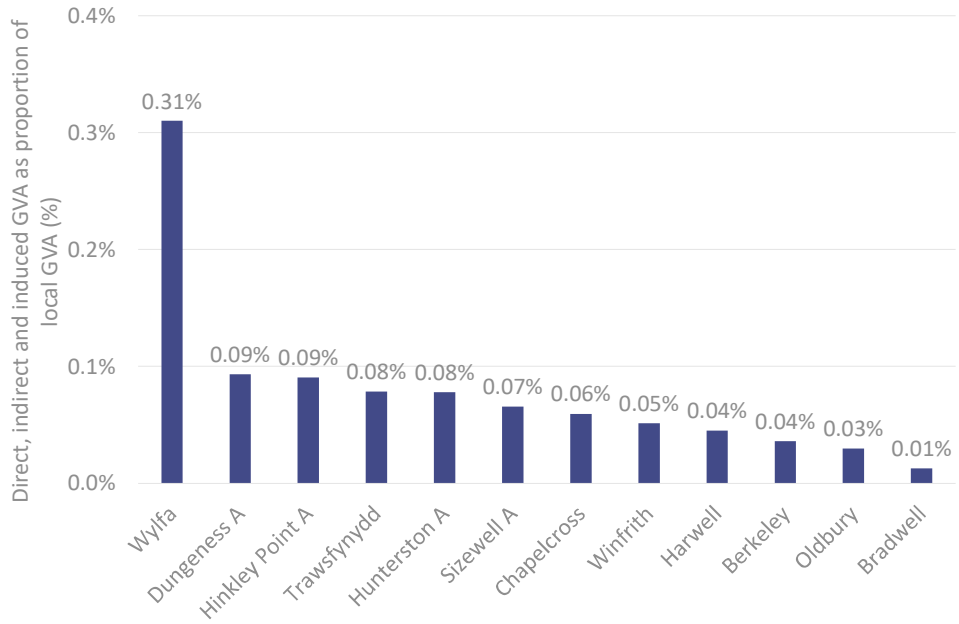
6.2.2.1 Output

For a measurement of the size of output in a local economy, we look at the total GVA impact of sites (direct, indirect and induced) as a proportion of total GVA in the local authority district.

The greater the proportion of local output related to the site the more dependent the local area is likely to be on the site.

Consistent with the findings from the previous section showing the contribution of sites to the local labour market, Figure 47 shows that Wylfa has the highest proportional contribution to GVA, and Bradwell the smallest.

Figure 47: Direct, indirect, and induced GVA as a proportion of total local GVA[23]



Source: Economic Insight analysis

6.2.2.2 Concentration of local economy

Additionally, we look at the concentration of economic activities in the local authority district where the site is located. The metric is the Herfindahl-Hirschman Index (HHI) – a measure of market concentration. The HHI value ranges from 0 to 10,000 where the higher the value of the index, the more concentrated is the market.

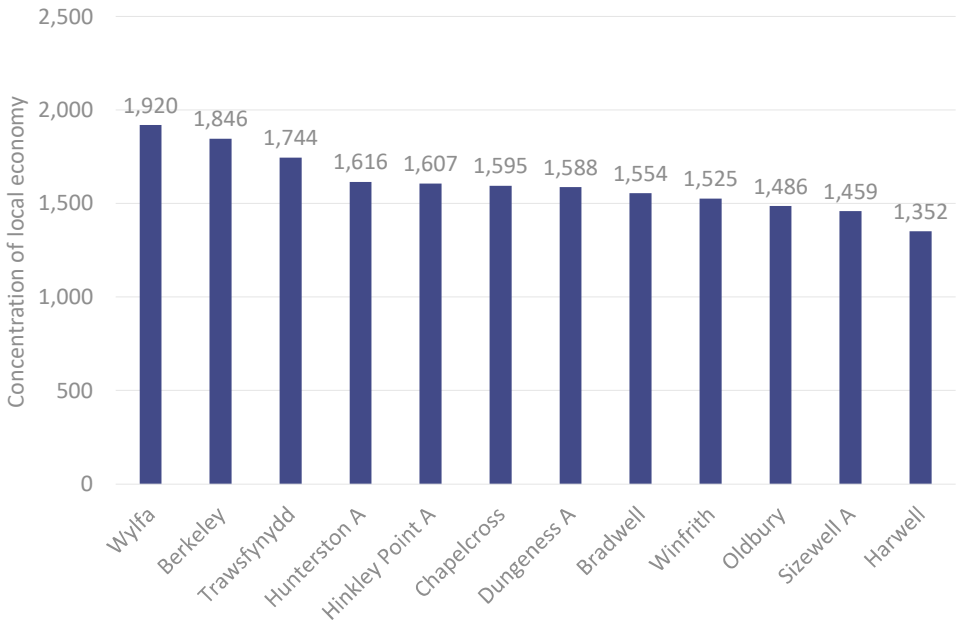
The more heavily concentrated an area's economy, the less likely it is to be able to adapt to changes.

Figure 48 shows that the local authority district where Wylfa (Isle of Anglesey), Berkely (Stroud), and Trawsfynydd (Gwynedd) are located are the most heavily

[23] *The GVA in each local authority district has been standardised by a scaling factor, equal to "Average population across local authority districts / Population in local authority district".*

concentrated local authority districts in comparison with local authorities where the rest of the sites are located. Harwell (Vale of White Horse) is located in a local authority district that is relatively more diversified. It should be noted that the sites' local authority districts can all be considered '*moderately concentrated*' markets. That is, an HHI value of less than 1,500 is a competitive market; a value greater than or equal to 2,500 is highly concentrated market; and a value between 1,500 and 2,500 is a moderately concentrated market.

Figure 48: Sum of squares of the proportion of GVA from each industry in the local economy



Source: Economic Insight analysis

6.2.3 Society

6.2.3.1 Socio-economic contribution of the sites to the local economies

Besides the sites' direct economic contribution to the local area, they also contribute to the wider society through various activities and donations. Examples of these contributions include:

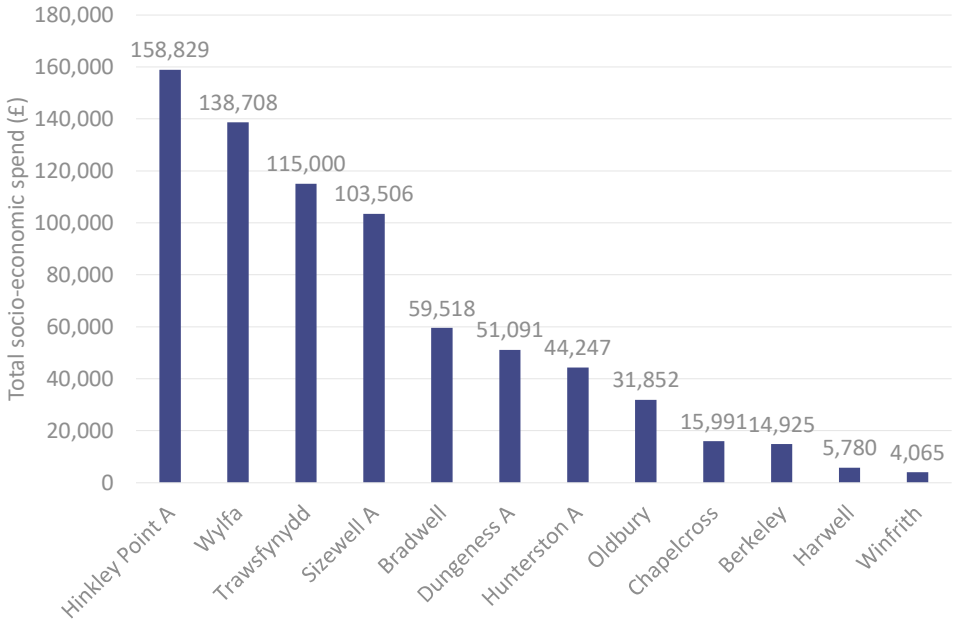
- funding projects in arts, community and enterprise regeneration development;
- apprenticeship opportunities; and
- helping in diversifying the local economy.

These types of activities are also important for a comprehensive overview of the role that a site plays in a local economy.

The more social activities provided and facilitated by the site, the greater the local society is likely to depend on it.

In the following, we look at the size of the sites' social contribution to the local areas, as per the socio-economic spend by each of the sites. Figure 49 shows that Hinkley Point A's contribution to social activities is largest and Winfrith's is smallest.[24]

Figure 49: Relative size of social activities



Source: Economic Insight analysis

We note that the above is an imperfect measure of the site's contribution to society where a £1 spend does not necessarily have the same impact across sites. Additionally, there are other alternative ways that the site can contribute to the social cohesion and participation that are not necessarily captured by the total spending figures in the chart above. Examples include the activities that the employees of the sites organise between each other (such as football matches or other group activities) that boost the general sense of belonging in the society.

[24] *Note this is based on Magnox Ltd only spending as per the 2018-19 spending report, available here: https://www.gov.uk/government/publications/socio-economic-report-2018-to-2019/socio-economic-report-2018-to-2019#magnox-ltd .*

7. Social and community impacts of sites

Finally, over and above all the impacts identified in the previous chapters, here we assess the wider social benefits from Magnox sites. Between 2012 and 2021, both Magnox and the NDA committed over £14 million to socio-economic projects in the local areas of the sites. Moreover, between January 2019 and January 2022, Magnox employees recorded a total of 5,931 hours of voluntary work, of which 90% was in relation to COVID-19 voluntary work. Finally, Magnox sites and their contractors donated 131,653 units of PPE to support the NHS community, such as for example disposable gloves, masks, and coveralls. Magnox also set up a £300,000 COVID-19 support fund across its sites, which was distributed via local authorities, of which £282,606 has been allocated to date.

7.1 Magnox Socio-Economic Scheme

'... to support the creation of dynamic, sustainable local economies for communities living near our sites.'

Magnox's socio-economic aims and objectives align with those of the NDA. Specifically, the NDA's objective is "*to support the creation of dynamic, sustainable local economies for communities living near our sites*".[25]

As part of this, the Magnox Socio-Economic Scheme (the Scheme) provides funding for activities that benefit the social or economic life of communities. This supports the NDA's responsibilities under the Energy Act (2004) to mitigate the socio-economic impact of its work programme where it operates. The Scheme has three funding aims.

- **Aim 1**: Being a good neighbour.
- **Aim 2:** Helping to build sustainable communities.
- **Aim 3**: Supporting transformational projects that mitigate the impact of decommissioning Magnox sites.

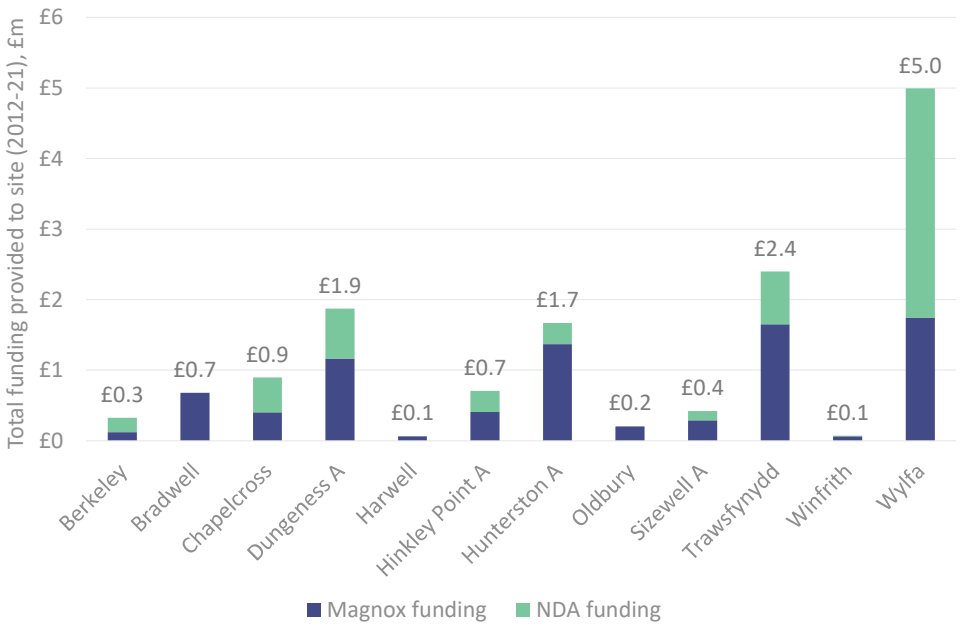
The Scheme prioritises funding for projects which address aims 2 and 3, as these provide for the biggest and most sustainable socio-economic benefits. It manages a funding portfolio of £1 million each financial year. From 2012 to 2021, both Magnox and the NDA provided direct funding in support of projects totalling over **£14 million**, as follows:

- Magnox: £8.2 million; and
- NDA: £6.1 million.

This is illustrated in Figure 50, which shows the split between Magnox and NDA funding by site, between 2012 and 2021.

[25] *'NDA Socio-Economic Policy'. NDA (2008); page 4.*

Figure 50: Total funding provided to site by Magnox and NDA, £m, 2012-21[26]



Source: Economic Insight analysis of data supplied by Magnox

As can be seen, communities closer to some sites – such as Wylfa and Trawsfynydd – receive a larger amount of funding than others. This is because different sites have been prioritised for socio-economic interventions based on the following factors:[27]

- workforce profile;
- lifecycle transition dates from decommissioning to care and maintenance, as currently stipulated;
- results of the Scheme and direct NDA funding invested to date;
- external factors, such as inward investment employment opportunities, new nuclear build and sister nuclear site lifecycles; and
- prevailing socio-economic conditions in the surrounding area.

The prioritisation of sites is regularly reviewed in order to take account of changing factors. Table 12 sets out the current prioritisation of sites.

[26] *It should be noted that the Harwell and Winfrith sites joined the Scheme later than the other sites, in 2015.*
[27] *'Magnox Socio-economic Plan 2016-21(Interim)'. Magnox (August 2020); pages 5-6.*

Table 12: High to low priority sites for Magnox/NDA socio-economic funding

High priority areas/sites	Mid priority areas/sites	Low priority areas/sites
Bradwell	Chapelcross	Berkeley
Dungeness A	Hinkley Point A	Harwell
Hunterston A	Winfrith	Oldbury
Trawsfynydd		Sizewell A
Wylfa		

Source: 'Magnox Socio-economic Plan 2016-21(Interim)', Magnox (2021); page 6.

This prioritisation largely reflects the differences in funding by the sites. However, just because a site is lower priority, does not necessarily indicate it is not able to receive commensurate socio-economic funding for its local area. For example, Chapelcross, which is a mid-priority site, still received more funding between 2012-21 than Bradwell, which is a high-priority site. Finally, these differences in funding could also be explained by the extent to which different local governments source and manage funds for their local authorities.

Below, we provide a more detailed yearly analysis of the socio-economic funding provided by Magnox and the NDA to the respective sites, as well as setting out in more detail examples of five large socio-economic funding projects and their impacts on the local communities. This is so that we can assess the effects of the support provided, which can be more easily observed when considering larger projects.

7.1.1 Yearly socio-economic funding analysis

Table 13 sets out the spread of Magnox socio-economic funding by site, between 2012-21. As set out above, usually, total funding across all sites is around £1 million, except for 2013/14, where it was almost £2 million, due to the inclusion of £500,000 for the Marsh Million project, at Dungeness A.

Table 13: Magnox socio-economic funding, by site, £m, 2012-21

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total 2012-21
Berkeley	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.1**
Bradwell	£0.1	£0.2	£0.0	£0.0	£0.0	£0.1	£0.1	£0.0	£0.1	**£0.7**
Chapelcross	£0.1	£0.0	£0.1	£0.0	£0.0	£0.1	£0.0	£0.1	£0.0	**£0.4**
Dungeness A	£0.0	£0.7	£0.0	£0.0	£0.2	£0.0	£0.0	£0.0	£0.1	**£1.2**
Harwell	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.1**
Hinkley Point A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.3	£0.0	£0.0	**£0.4**
Hunterston A	£0.0	£0.4	£0.3	£0.0	£0.0	£0.0	£0.0	£0.5	£0.0	**£1.4**
Oldbury	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.1	£0.0	£0.0	**£0.2**
Sizewell A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.2	£0.0	£0.0	**£0.3**
Trawsfynydd	£0.5	£0.2	£0.1	£0.1	£0.1	£0.2	£0.2	£0.3	£0.0	**£1.6**
Winfrith	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.1**
Wylfa	£0.0	£0.2	£0.1	£0.5	£0.2	£0.5	£0.0	£0.1	£0.1	**£1.7**
Total	**£0.9**	**£1.8**	**£0.6**	**£0.7**	**£0.5**	**£0.9**	**£1.1**	**£1.0**	**£0.6**	**£8.2**

Source: Economic Insight analysis of data supplied by Magnox

The way funding gets allocated across sites is also varied. For example, in 2013/14 Dungeness A received a total of £0.7 million of funding, whereas in other financial years, such as 2017/18, Wylfa received the largest proportion of funding – at £0.5 million.

- In 2013/14, Dungeness A's Marsh Million Fund project with Kent County Council received £500,000 over approx. 7 years, as well as other projects receiving significant funding from the Scheme. Funding was allocated equally between two sub-programmes: (i) Marsh Million Economic Projects Scheme offered grants ranging between £10,000 - £100,000 for projects seeking to help start-ups, small businesses and social enterprises in the Romney Marsh area to grow and diversify; and (ii) Marsh Business Boost, which offered 0% interest loans of up to £50,000 to help start-ups, small businesses and social enterprises in the Romney Marsh area who were seeking to develop new or expand exiting products or services, where these would lead to sustainable employment.
- In 2018/19, the Oldbury site provided £90,000 funding (over three years) for a community apprenticeship programme – Environmental Vision (trading as Envision). This scheme brings together local businesses, schools, charities and volunteers and provides young people with community skills training through a purposefully facilitated training programme, which develops confidence and key

employability skills through having business mentors (e.g. Magnox staff mentoring young people).[28]

Further to Magnox's socio-economic funding, the NDA itself also provides direct funding to the sites. Table 14 illustrates this by site, between 2012-21.

Table 14: NDA socio-economic funding, by site, £m, 2012-21

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total 2012-21
Berkeley	£0.0	£0.0	£0.0	£0.2	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.2**
Bradwell										
Chapelcross	£0.0	£0.0	£0.0	£0.0	£0.0	£0.5	£0.0	£0.0	£0.0	**£0.5**
Dungeness A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.7	£0.0	**£0.7**
Harwell										
Hinkley Point A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.3	**£0.3**
Hunterston A	£0.3	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.1	**£0.3**
Oldbury										
Sizewell A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.1	£0.0	**£0.1**
Trawsfynydd	£0.0	£0.0	£0.0	£0.3	£0.0	£0.5	£0.0	£0.0	£0.0	**£0.8**
Winfrith	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.0**
Wylfa	£0.0	£0.0	£0.0	£0.0	£2.0	£0.0	£0.0	£1.0	£0.2	**£3.2**
Total	**£0.3**	**£0.0**	**£0.0**	**£0.5**	**£2.0**	**£1.0**	**£0.0**	**£1.8**	**£0.6**	**£6.1**

Source: Economic Insight analysis of data supplied by Magnox

As can be seen, NDA funding is less spread across the different sites, with Wylfa receiving most of the NDA's socio-economic funding. This includes the following projects receiving awards at the Wylfa site.

- In 2016/17, the NDA contributed £2m to the building of the Grŵp Llandrillo Menai Engineering Centre, alongside the Welsh Government (£6.8m) and Horizon Nuclear Power (£1m). This was one of the largest capital builds to date and features the highest quality, most state-of-the-art engineering training equipment in Wales.[29]
- In 2019/20, the NDA provided £400,000 to Menter Môn Morlais Tidal Energy Development (over two years) and in 2020/21 a further £200,000 was provided to this project by the NDA. The Menter Môn Morlais project manages a 35km^2 area of seabed off the coast of Holy Island, Anglesey and has the potential to bring tidal stream energy to the area. It has the potential to create around 100 jobs in the first ten years, and to tackle climate change by generating clean

[28] *See: https://www.envision.org.uk/about/about-us*
[29] *See: https://www.wales247.co.uk/new-13-6m-engineering-centre-launched-in-wales*

electricity from renewable energy. Moreover, it improves local skills with apprenticeships and training opportunities and creates new supply chain opportunities for local business during construction and operation.[30]

- In 2019/20, North Anglesey Regeneration Plan project with Isle of Anglesey County Council over 3 years was awarded £495,000. See Box 1 for more details on this project.

Box 1: North Anglesey Regeneration Plan overview

The Isle of Anglesey County Council developed an external funding application to secure additional support from the NDAs socio-economic fund. Recognising the impact of both the Hitachi and Rehau announcements,[31] the NDA announced funding support of £495,000 to help progress the County Council's North Anglesey Economic Regeneration Plan and support the creation of new economic opportunities on the island.

The purpose of this funding will be to further develop and advance to the next stage some of the concepts and ideas within the Plan. The NDA funding does not include officer employment costs. Officers will ensure that the funding secured from the NDA is not delivered in isolation and adds value and supplements other activities to create a critical mass of investment in and for the North Anglesey area.

This work will be aligned with other activities in the area which will complement and add value to the Plan. These include the Arfor scheme, proposals for environmental projects through Enraw / SMS funding, and work being delivered on the ground by such groups as Caru Amlwch, Menter Amlwch and Cemaes CIC.

Opportunities to secure funding from other sources are being/ will also be explored, including in particular the possibility of funding from the Welsh Government for key projects in the area. It must also be noted that the Plan itself should form only one small part of an overall homogenous strategy to regenerate and redevelop the North Anglesey area in collaboration with partners and stakeholders.

Source: https://democracy.anglesey.gov.uk/documents/s14668/North%20Anglesey%20Economic% 20Regeneration%20Plan.pdf?LLL=0

Further to Wylfa, other Magnox sites have also received NDA funding, such as Dungeness A. This is illustrated in more detail in Box 2 overleaf.

[30] *See: https://www.morlaisenergy.com/*

[31] *Hitachi's suspension of Wylfa Newydd and Rehau's Amlwch factory closure have been severe blows to the immediate economic prospects and communities of North Anglesey which add to the expected major impacts of the Wylfa power station decommissioning phase.*

Box 2: Romney Marsh Business Hub scheme overview

In 2019/20, New Romney, a town close to the Dungeness A site, was allocated £705,000 of NDA funding towards the building and management of the £2m Romney Marsh Business Hub. The Hub, in Mountfield Road, will bring a range of business and job opportunities to the Romney Marsh area and, having recently opened its doors, already has some tenants occupying the modern, spacious offices available with other businesses also looking to sign-up.

Folkestone & Hythe District Council and not-for-profit regeneration company East Kent Spatial Development (EKSDC) equally contributed to the development – each funding £735,000. The NDA's socio-economic programme met £500,000 of the building cost and provided a further £205,238 for an adviser to be based at the Hub for the next four years to support local businesses based at the Hub and surrounding area.

The Hub has 14 rooms, which have been designed to provide flexible workspace for small businesses. This joint venture offers employment opportunities to the Romney Marsh area by providing high-quality office space to local businesses.

There is also a support scheme for businesses taking up space in the Hub with grants of up to £10,000 (or more in exceptional circumstances) available for the fit-out for specific business needs, new furniture, office accessories and ICT equipment.

Following on from the initial underpinning study and public engagement work that went into this project, Folkestone and Hythe District Council was able to secure an additional £3.5m Getting Building Fund award from central government.

Opposite the Romney Marsh Business Hub, work is now underway on the construction of a new service road and utilities to open the remaining five hectares of council-owned land on the estate. This is expected to bring new business units or attract new local businesses to develop their own units and bring a large number of jobs to the area over the next 10 years. The project has been supported by the Southeast Local Enterprise Partnership, Kent County Council and the Kent and Medway Economic Partnership.

Source: Information provided by Magnox; https://folkestone.works/why-here/ambition-growth/mountfield-road-industrial-estate/

Table 15 illustrates the combined Magnox and NDA socio-economic funding by site, between 2012 and 2021. As can be seen, Wylfa tends to receive overall a larger proportion of the funding available – where this is mostly driven by NDA funding, as set out above.

Table 15: Magnox and NDA socio-economic funding, by site, £m, 2012-21

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Total 2012-21
Berkeley	£0.0	£0.0	£0.0	£0.2	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.3**
Bradwell	£0.1	£0.2	£0.0	£0.0	£0.0	£0.1	£0.1	£0.0	£0.1	**£0.7**
Chapelcross	£0.1	£0.0	£0.1	£0.0	£0.0	£0.6	£0.0	£0.1	£0.0	**£0.9**
Dungeness A	£0.0	£0.7	£0.0	£0.0	£0.2	£0.0	£0.0	£0.7	£0.1	**£1.9**
Harwell	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.1**
Hinkley Point A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.3	£0.0	£0.3	**£0.7**
Hunterston A	£0.3	£0.4	£0.3	£0.0	£0.0	£0.0	£0.0	£0.5	£0.1	**£1.7**
Oldbury	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.1	£0.0	£0.0	**£0.2**
Sizewell A	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.2	£0.1	£0.1	**£0.4**
Trawsfynydd	£0.5	£0.2	£0.1	£0.4	£0.1	£0.7	£0.2	£0.3	£0.0	**£2.4**
Winfrith	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	**£0.1**
Wylfa	£0.0	£0.2	£0.1	£0.5	£2.2	£0.5	£0.0	£1.1	£0.3	**£5.0**
Total	**£1.1**	**£1.8**	**£0.6**	**£1.2**	**£2.5**	**£1.9**	**£1.1**	**£2.9**	**£1.2**	**£14.3**

Source: Economic Insight analysis of data supplied by Magnox

The next section provides some more qualitative analysis of five key projects that received Magnox funding across various sites.

7.1.2 In-depth analysis of five large projects

Below, we set out key outcomes from five large projects across the Wylfa, Trawsfynydd, Hunterston A, Dungeness A, and Bradwell sites. This has been done to demonstrate the impacts that funding these projects has provided. For example, from creating roles at different organisations, to providing training to various people, and making local areas more appealing for tourism. These are important impacts that are not captured within the direct economic impacts set out in the preceding chapters, and provide a more qualitative view as to how these projects and initiatives provide additional impacts – over and above the ones quantified previously. Therefore, any estimates set out previously are likely an underestimate of the Magnox sites' impacts, as, for example, these projects and initiatives provide further, additional impacts.

- At the Wylfa site, **Môn Communities Forward (Môn CF)** was awarded £300,000 over three years to continue with the successful delivery of the Academy during the transition to the new premises in Holyhead town centre and the refurbishment of the offices. The Magnox funding safeguarded two roles annually, Delivery Manager and Training Team coordinator. In 2019/20, the second year of the project, 566 individuals were supported through the

employment team services and 807 training opportunities were undertaken through the scheme. Six participants passed their practical driving test, which is part of the previously Magnox funded Journey to Work Programme.

- At the Trawsfynydd site, Magnox committed £180,000 towards the £1.5m five-year continuation of the Pathways to Employment Programme (initially funded by the NDA with £169k in 2012) through the **Outdoor Partnership**. The Outdoor Partnership continues to remove barriers for underrepresented groups in the outdoor sector, where Magnox is working with local people with mental health problems and individuals with disabilities. Magnox funding is for annual revenue costs for an Inclusion Officer, Pathways to Employment Officer and full time Volunteer Officer. The Outdoor Partnership Project successfully completed all agreed targets in its second year, with over 1,600 outdoor activity taster sessions for individuals with disabilities, 35 employment opportunities, 260 training opportunities and 1,665 hours dedicated to supporting unemployed people into work.
- At the Hunterston A site, Magnox has committed £499,999 to Ayrshire College for the new **Future Skills Hub** on the Kilwinning Campus. The Hub will deliver a curriculum in Engineering, Construction and SMART Technologies for employers, primary schools, secondary schools and college students. The new facility will provide first-class training for people in Ayrshire.
- At the Dungeness A site, the **Romney Marsh Partnership (RMP) Group** continues to work towards the delivery of the Romney Marsh Socio-economic Plan, which focuses on:
    - highlighting some of the area's significant economic and social challenges;
    - bringing people together and making the most of the projects already being delivered on Romney Marsh;
    - involving local people and giving them more of a stake in their local community and local economy; and
    - providing a framework and a strategy to bring new funding into the area through new projects and new approaches.

  Members of the partnership include Kent County Council, Folkestone & Hythe District Council, Ashford Borough Council and Rother District Councils, East Sussex County Council, Dungeness Site Stakeholder Group, the NDA and Magnox amongst others.
- At the Bradwell site, the main project Magnox is funding, for three years, is a Coordinator for the **Sense of Place initiative**. This initiative has evolved through the business community in conjunction with Maldon District Council, with plans to capitalise on the local environment to make the area a tourist destination and a place for businesses to invest and grow. The Sense of Place team aims to:
    - create a series of core events;
    - get more business buy-in;
    - improve the visitor experience;
    - involve businesses in helping to grow the local high street and economy;
    - work with the local schools to develop learning opportunities for students;
    - explore the needs of local businesses and the availability of bespoke apprenticeships in the locality across a variety of areas; and

- develop the training offer around those in the care industry as a career choice.

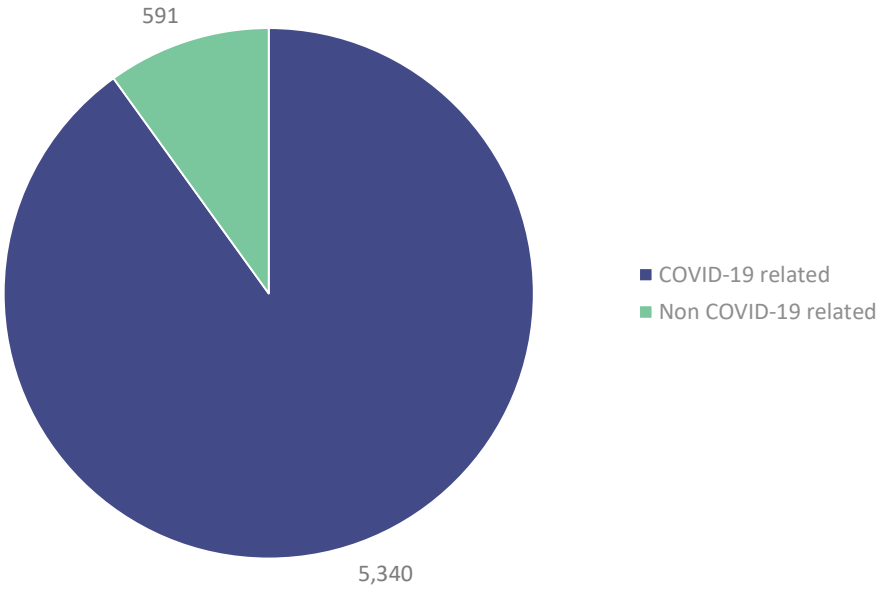
Finally, we note that between 2018 and 2021 the Good Neighbour funding (applications up to £1,000) for all Magnox sites came to £145,343.[32] This supports various junior sports clubs, schools, pre-schools, scouts, theatre groups and other voluntary organisations in close proximity to each of the Magnox sites.

Further to providing funding for projects across the sites' local areas, Magnox staff also undertake voluntary work in the local communities. The following section provides some more detail on this.

7.2 Magnox voluntary work

Magnox staff undertake voluntary work in the local area. Across all Magnox sites, employees recorded a total of 5,931 hours of voluntary work between January 2019 and January 2022. This included both COVID-19 and non COVID-19 related voluntary work. Figure 51 illustrates the split between COVID-19 related and non COVID-19 related voluntary hours worked.

Figure 51: Voluntary hours worked, all sites, Jan 2019 - Jan 2022



Source: Economic Insight analysis of data supplied by Magnox
Note: There is likely to be more non COVID-19 voluntary work taking place, which is not recorded, as it is personal to individuals. The recorded non COVID-19 voluntary work is usually linked to staff who have requested a discretionary contribution of paid support from Magnox for voluntary work they may perform within the community, e.g. lifeboat, fire brigade, Armed Forces Reservists, etc. This does not include staff who volunteer out of hours, e.g. STEM Ambassadors, Scout or Guide Leaders.

As can be seen, most voluntary hours were worked on COVID-19 related matters, whereas a smaller proportion of voluntary hours accrued to non COVID-19 related voluntarism.

The above total number of hours worked implies **an additional impact of ca. £16.7k arising from voluntary work undertaken by Magnox employees**. This is based on

[32] *As this included the pandemic, the total funding provided was lower than in previous years.*

the average wage across all Magnox sites of £46,727 and a total of 5,931 hours (or, 741 days) of voluntary work.[33]

So, not only did Magnox employees volunteer their time during the COVID-19 pandemic, Magnox sites and their contractors also provided various PPE donations and created a COVID-19 fund. This is set out in depth in the following section.

7.3 Magnox COVID-19 community impacts

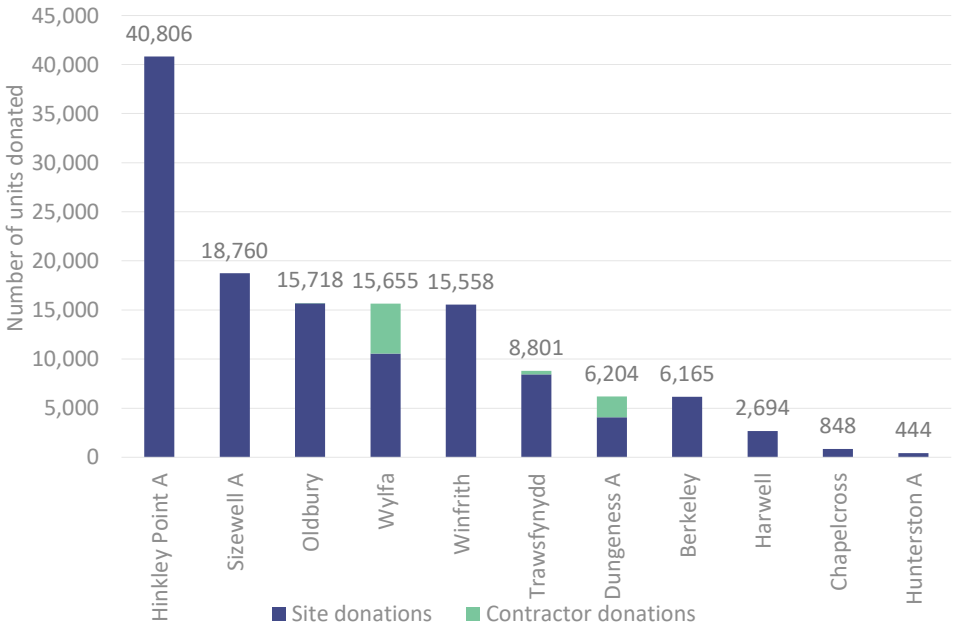
Magnox sites and some of their contractors have provided important donations at the height of the COVID-19 outbreak, as well as providing support through allocated COVID-19 funding throughout the pandemic. Below, we first set out the donations of PPE equipment that Magnox sites (and some of its contractors) did between March and May 2020, as well as the COVID-19 funding following that.

7.3.1 PPE donations

Between March and May 2020, the twelve Magnox sites and contractors at the Chapelcross, Dungeness A, Oldbury, Trawsfynydd, and Wylfa, sites donated a total of 131,653 units of PPE to support the NHS community.

Figure 52 sets out how these donations were spread across the sites, with Hinkley Point A donating over 40,000 of PPE and Hunterston A just over 400.

Figure 52: Donations by site, March - May 2020



Source: Economic Insight analysis of data supplied by Magnox

As can be seen, the volume of donations varied considerably across sites, but was significant across all of them, especially given the PPE shortages at the time. For example, the Guardian stated that healthcare workers were "*lacking essential items like full gowns and eye protection; and other equipment was out of date. There has been recurrent and systemic failure of the PPE supply chain, leaving staff in some instances*

[33] *Where the hourly wage of £22.5 is derived based on 52 40-hour working weeks.*

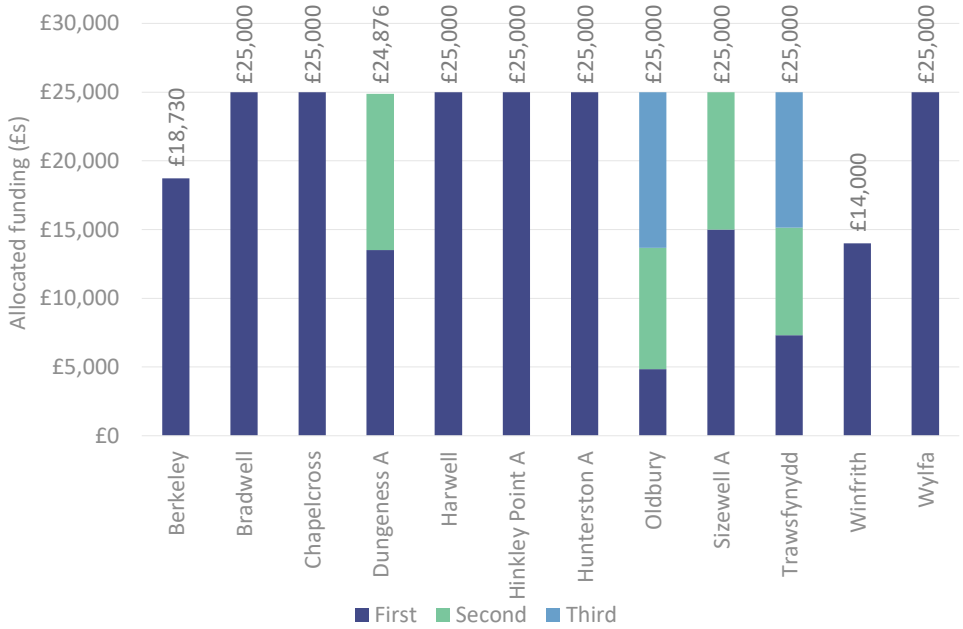
with makeshift or no PPE."[34] Thus, the PPE donations by Magnox and its contractors likely had a significant and immediate impact on the healthcare workers they supported.

The PPE items donated across the Magnox sites and its contractors included disposable: coveralls; eye protection; food; gloves; masks; mop caps; other items; over boots; oxygen; and sanitiser.

7.3.2 COVID-19 funding allocation

Further to the donations set out above, Magnox allocated £300,000 for COVID-19 funding, which it allocated equally across its sites. To date, £282,606 of COVID-19 funding has been approved, as illustrated in Figure 53.

Figure 53: Approved COVID-19 funding



Source: Economic Insight analysis of data supplied by Magnox

Most of this funding has been requested to purchase food to stock the foodbanks, pay for delivery costs and provide PPE for the volunteers. Some funding was allocated to 3D printers to produce visors for key workers, for example Trawsfynydd provided Gwynedd County Council with £4,000 for this, as did Wylfa (£10,000 for Isle of Anglesey County Council). Kitchen equipment was also funded to help food preparation for vulnerable local residents when the communities mobilised, as was equipment to help manage social distancing and manage queues with restricted numbers at local community shops.

[34] *See: https://www.theguardian.com/society/2020/may/10/coronavirus-doctors-call-for-inquiry-into-ppe-shortages-for-nhs-staff*

8. Conclusions

This chapter provides a conclusion to our analyses set out in the preceding chapters.

We find that the 12 Magnox sites currently make quantifiable, but varying, contributions to their local economies, in line with our previous assessment.

We presented several ways of quantifying the economic impacts, including both in absolute and relative terms. We find that the main channel through which local impacts arise is through direct employment at the sites. This is because:

- The sites provide jobs for people living in the local areas; and employees subsequently support further jobs and economic activity through spending their wages – which are above national averages – in local areas. Most employees live in the local authority district that their site is located in, or those adjacent to it. As such, employment effects are relatively concentrated in the local economies.
- On the other hand, Magnox sites purchase a relatively small amount of their inputs from local suppliers (although it can equate to hundreds of thousands of pounds). The sites' supply chains typically consist of UK companies located elsewhere in the country, with a small proportion of inputs coming from abroad. As such, the impact of sites on their local economies that arise through supply chains (the indirect impact in Figure 1) is smaller in comparison to the impact arising through direct employment (which in turn leads to induced impacts, as shown in Figure 1). Some sites have more notable indirect employment effects on their local area because there are significant numbers of on-site contractors.

Furthermore, we assessed the current strength of local economies and their dependence on Magnox sites. The results of our evaluation of the strength and dependence of the local areas of sites suggest that the local authority districts where Wylfa, Hinkley Point A, and Trawsfynydd are located are relatively more dependent on their Magnox sites and less strong compared to other local authorities. On the other hand, Oldbury, Berkeley and Harwell appear to be stronger and less dependent on their Magnox sites.

Finally, we find that Magnox and the NDA make significant contributions to the local authorities in which the Magnox sites are located, through the Socio-Economic Scheme – which includes working in partnership with local authorities and other organisations. The impact of the funding provided to various programmes and projects has not been captured in this report, as there will likely be additional impacts. For example, in relation to the Envision programme, these could be in terms of young people with additional skills, as well as other impacts across the local authorities, where Magnox estimate that for every £1 invested by the Magnox Socio-Economic Scheme, an additional £17 has been secured from other sources.[35]

[35] *See: 2018/19 Magnox Socio-economic Infographic (May 2019).*

9. Appendix

This appendix provides more detail on: (i) the sites' local authority districts and those adjacent to it; and (ii) input-output modelling.

9.1 Sites' local authority district and those adjacent to it

Table 16 specifies the local authority district that each Magnox site is located in, along with the adjacent local authority district.

Table 16: Sites' local authority districts

Magnox site	Site's local authority district	Adjacent local authority districts
Berkeley	Stroud	South Gloucestershire Cotswold Gloucester Forest of Dean Tewkesbury
Bradwell	Maldon	Rochford Colchester Chelmsford Braintree
Chapelcross	Dumfries and Galloway	Carlisle Scottish Borders South Ayrshire East Ayrshire South Lanarkshire Allerdale
Dungeness A	Folkestone and Hythe	Canterbury Dover Ashford Rother

Magnox site	Site's local authority district	Adjacent local authority districts
Harwell	Vale of White Horse	Oxford South Oxfordshire West Oxfordshire West Berkshire Swindon Cherwell
Hinkley Point A	Somerset West and Taunton	Sedgemoor Mid Devon North Devon South Somerset East Devon
Hunterston A	North Ayrshire	Inverclyde Renfrewshire East Renfrewshire East Ayrshire South Ayrshire
Oldbury	South Gloucestershire	Wiltshire Bath and North East Somerset Bristol, City of Stroud Cotswold
Sizewell A	East Suffolk	Mid Suffolk Babergh Ipswich South Norfolk Great Yarmouth
Trawsfynydd	Gwynedd	Ceredigion Isle of Anglesey Conwy Denbighshire Powys
Winfrith	Dorset	Bournemouth, Christchurch and Poole Wiltshire New Forest South Somerset East Devon

Magnox site	Site's local authority district	Adjacent local authority districts
Wylfa	Isle of Anglesey	Gwynedd

Source: Economic Insight review

9.2 Input-output modelling

Input-output modelling is a standard technique to estimate the effects of economic activities on whole economies, geographic regions, and industries. It incorporates the interdependencies present in modern economies. For example, an increase in final demand for one type of product will cause an increase in demand for the inputs into production, and the wages earned by employees in related sectors will increase demand for other goods and services, thus further increasing demand for final outputs.

More specifically, economic impacts can be broken down into three channels:

- **Direct effects** arise as an immediate impact from the activities being studied. These include the value created by producing the final good or service, and the employment required to do so.
- **Indirect effects** arise through the supply chain. An increase in demand for a final output will also increase demand for its inputs, and the inputs to those inputs, and so forth.
- **Induced effects** arise as a result of increased wages to the employees of the organisation(s) producing the final output, and those in the supply chain.

Whilst standard accounting information can be used to calculate direct effects, input-output modelling quantifies the indirect and induced effects.

Typically, economic impact is measured in terms of:

- gross value added (GVA);
- employment; and
- tax receipts.

Our in-house input-output model has been developed to estimate the economic impacts of organisations / industries defined by the user, on geographic regions of choice. The basis of our model is the set of input-output analytical tables produced by the ONS for the UK as a whole. These tables show the flows of products and services in the economy and are themselves based on the same underlying data that is used to produce estimates of Gross Domestic Product (GDP).

To reflect the regional differences in the economy, and to estimate localised economic impacts, our model adjusts the UK level data to reflect the regions we are focusing on. In particular, we use the location quotient approach that is consistent with that used by the ONS and advocated by academics specialising in input-output modelling. These location adjustment calculations are also based on data from the ONS.

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